

AANVRAAG OMGEVINGSVERGUNNING

PLAATSEN ZONNEPANELEN

Datum. 21.09.2023

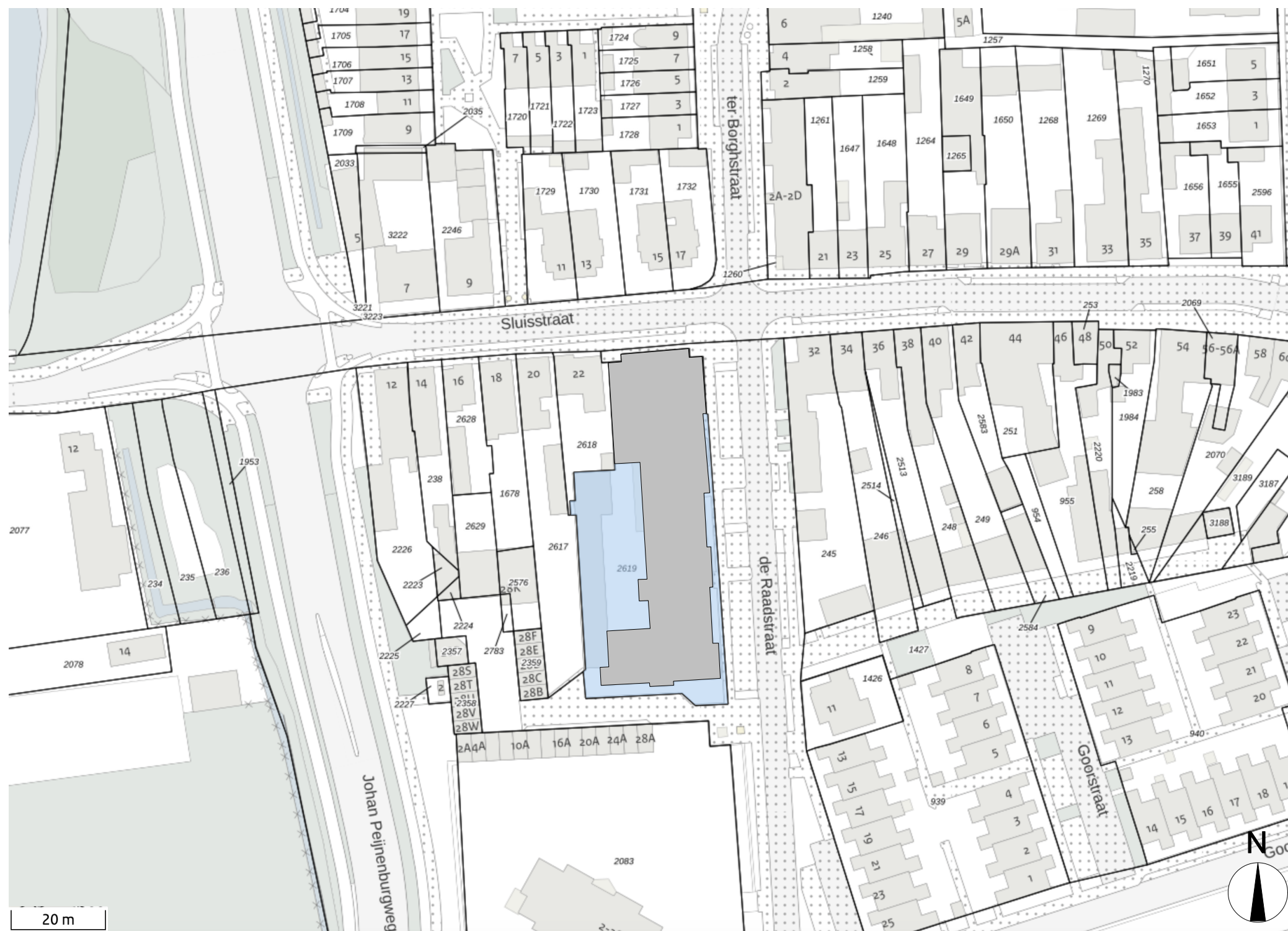


Inhoud

Situatie
Gevels bestaand
Doorsnedes bestaand
Dakconstructie bestaand
3D renders bestaand
Gevels nieuw
Constructie technische ruimtes
Doorsnedes nieuw
bestaande zonnepanelen
Legplan zonnepanelen
Detail
Brandveiligheid
3D renders nieuw

LOCATIE:
de Raadstraat 44
5666 EG Geldrop

OPDRACHTGEVER:
VVE



Legenda

- perceel, de Raadstraat 30-80 te Geldrop
- bebouwing

Situatie
schaal 1:1000

Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-2
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

eksom
bouwexpertise
Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



Voorgevel bestand



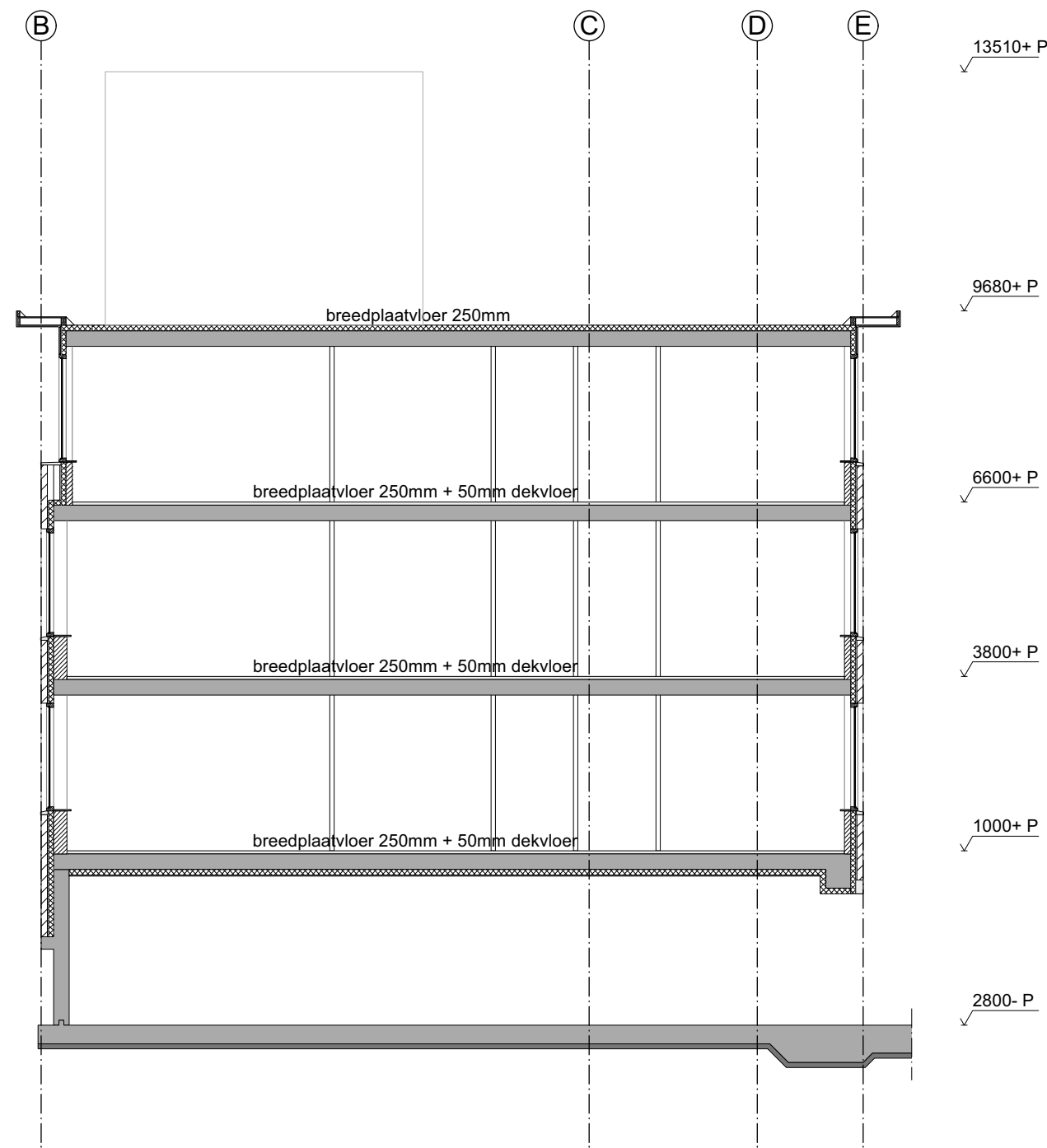
Achtergevel bestand



Linker zijgevel bestaand



Rechter zijgevel bestaand



Legenda

- bestaande metselwerk
- bestaande kalkzandsteen
- bestaande isolatie
- bestaande beton

Doorsnede A-A bestand
schaal 1:100

Project: 2023-42
Opdrachtgever: VVE

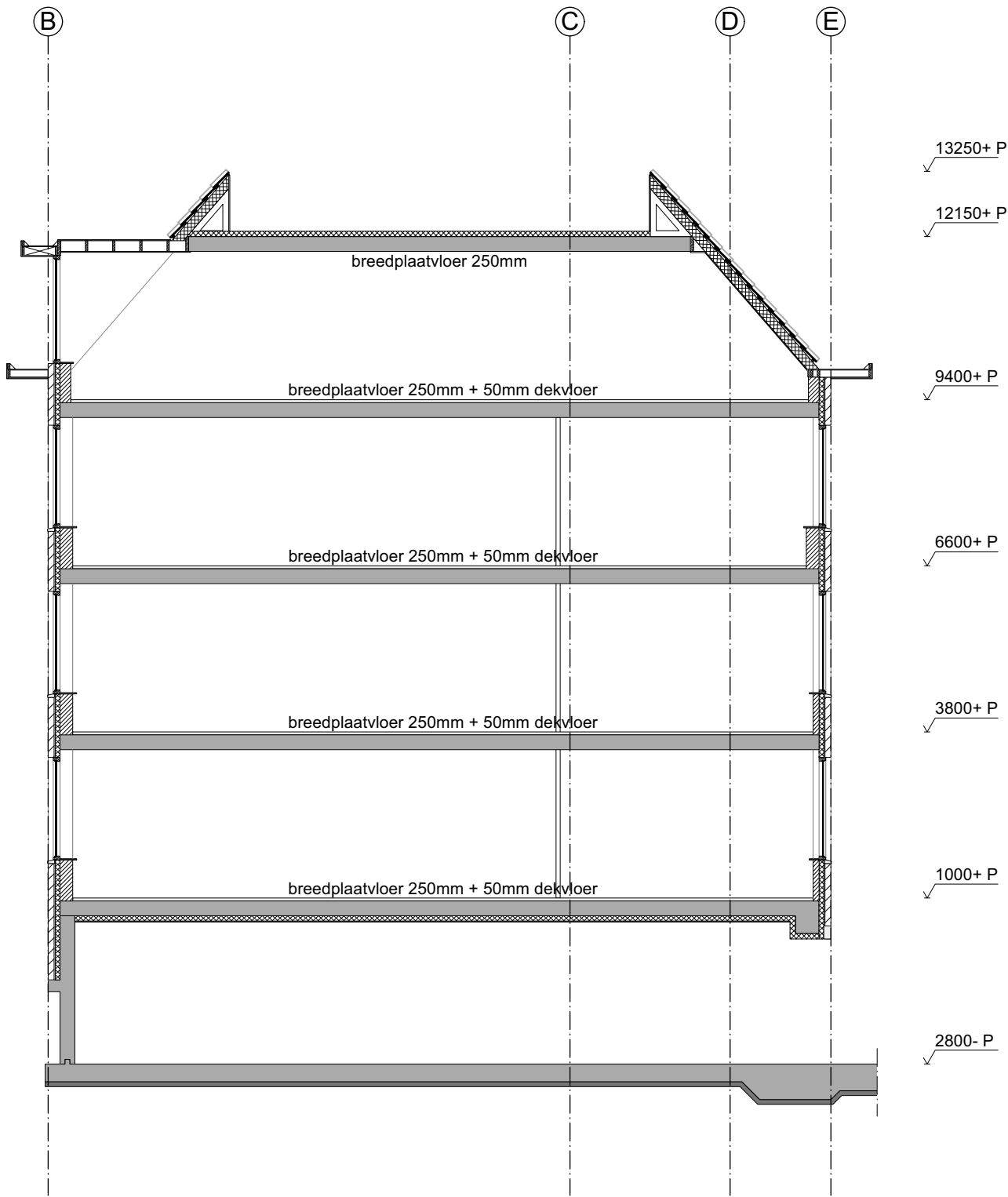
Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-5
Formaat: A3



Ulgersmaweg 47
9731 BK Groningen

info@eksom.nl
050 - 577 75 66



Legenda

- bestaande metselwerk
- bestaande kalkzandsteen
- bestaande isolatie
- bestaande beton

Doorsnede B-B bestand
schaal 1:100

Project: 2023-42
Opdrachtgever: VVE

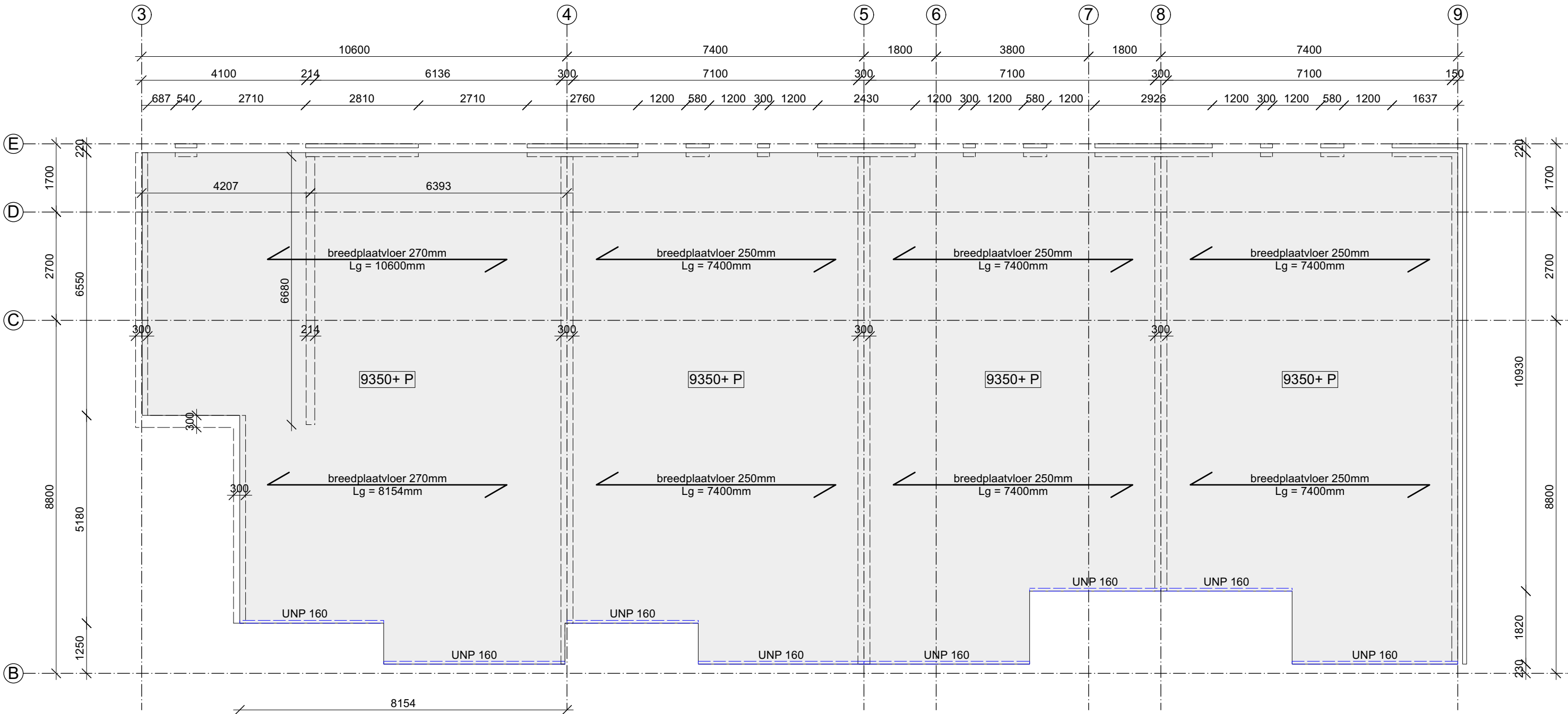
Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

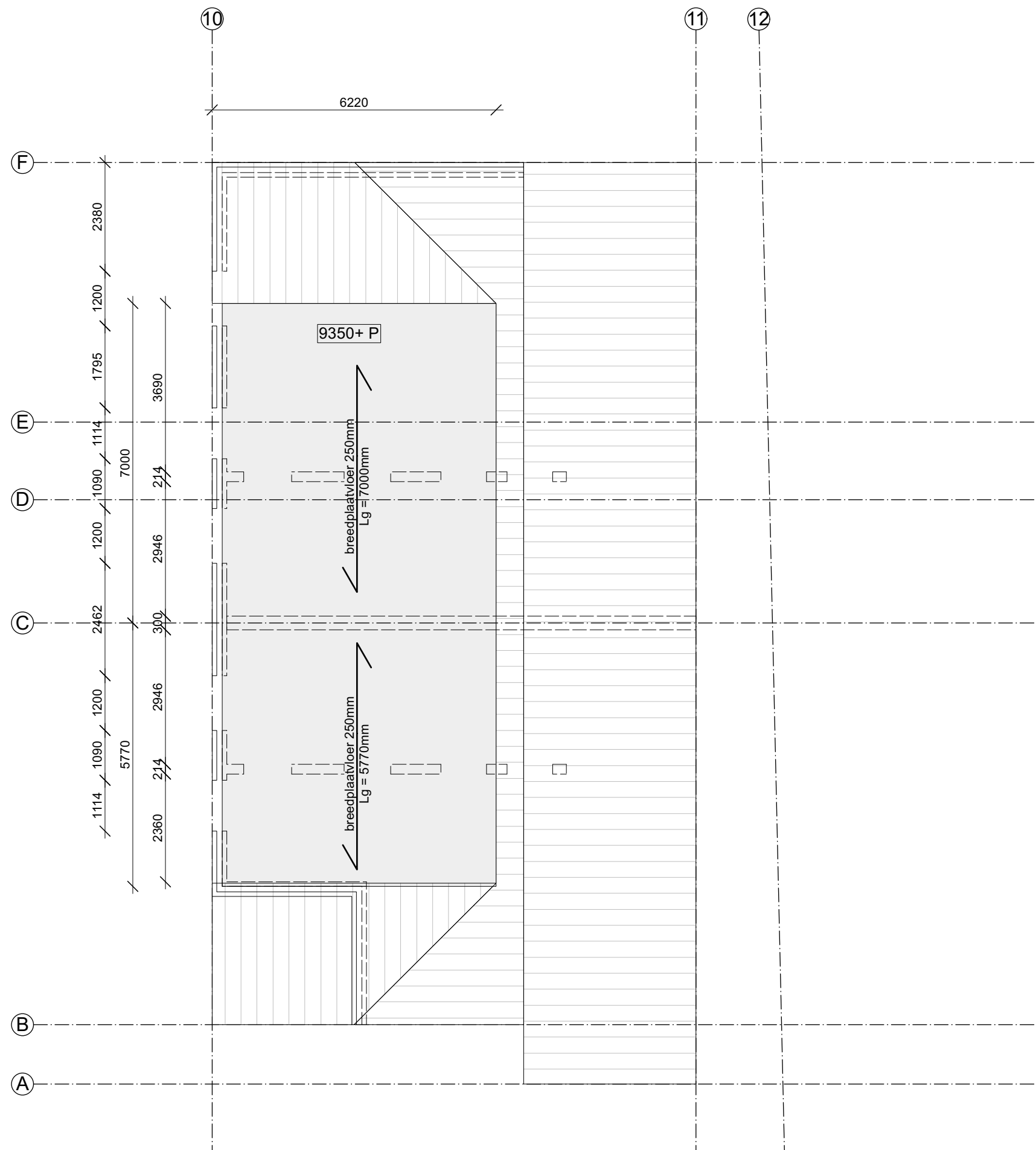
Bladnummer: BV-6
Formaat: A3


Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66

Legenda

- bestaande metselwerk
- bestaande draagwanden
- breedplaatvloer
- staal





Legenda

- bestaande metselwerk
- bestaande draagwanden
- breedplaatvloer
- staal



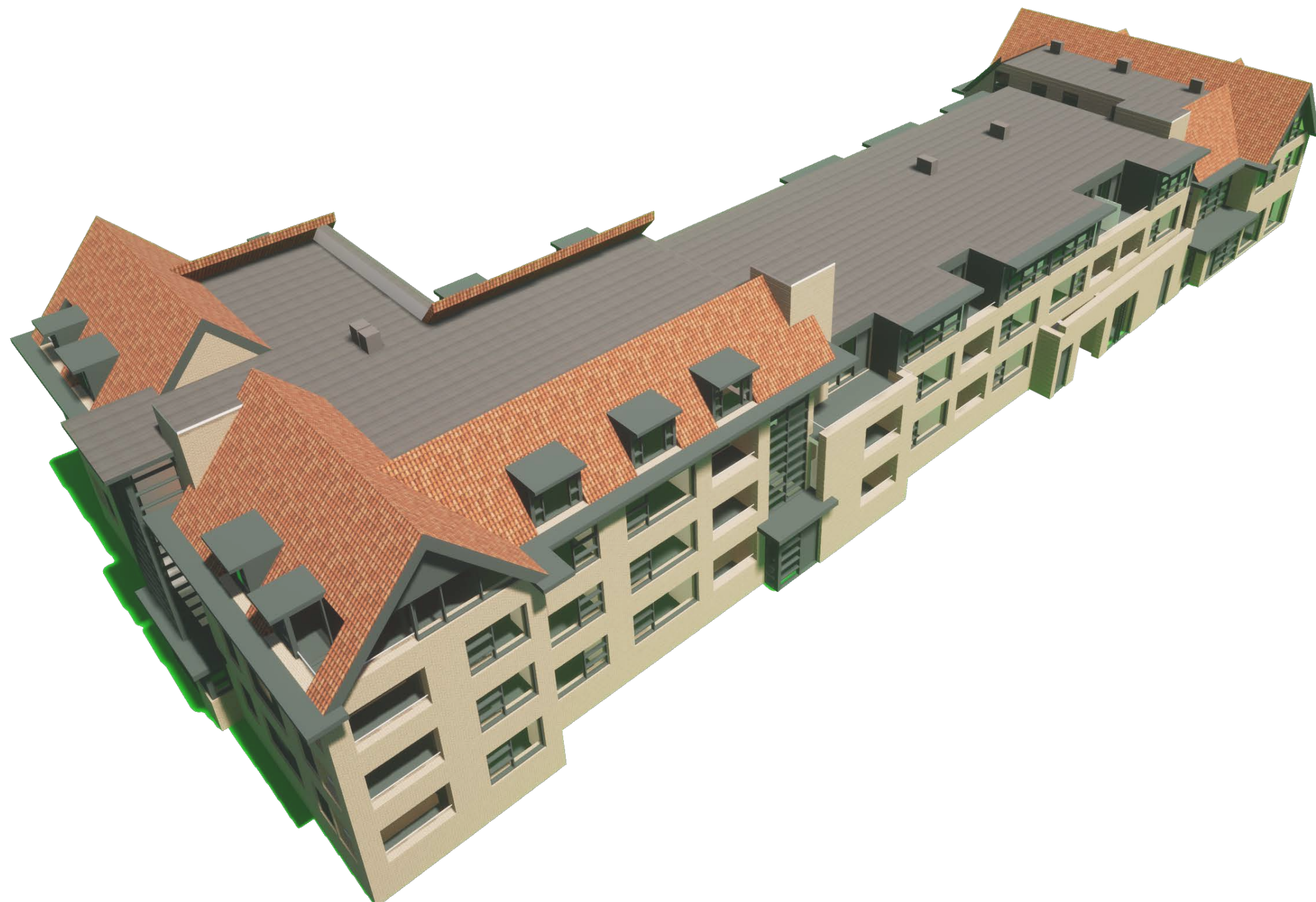
3D renders bestand
schaal n.v.t.

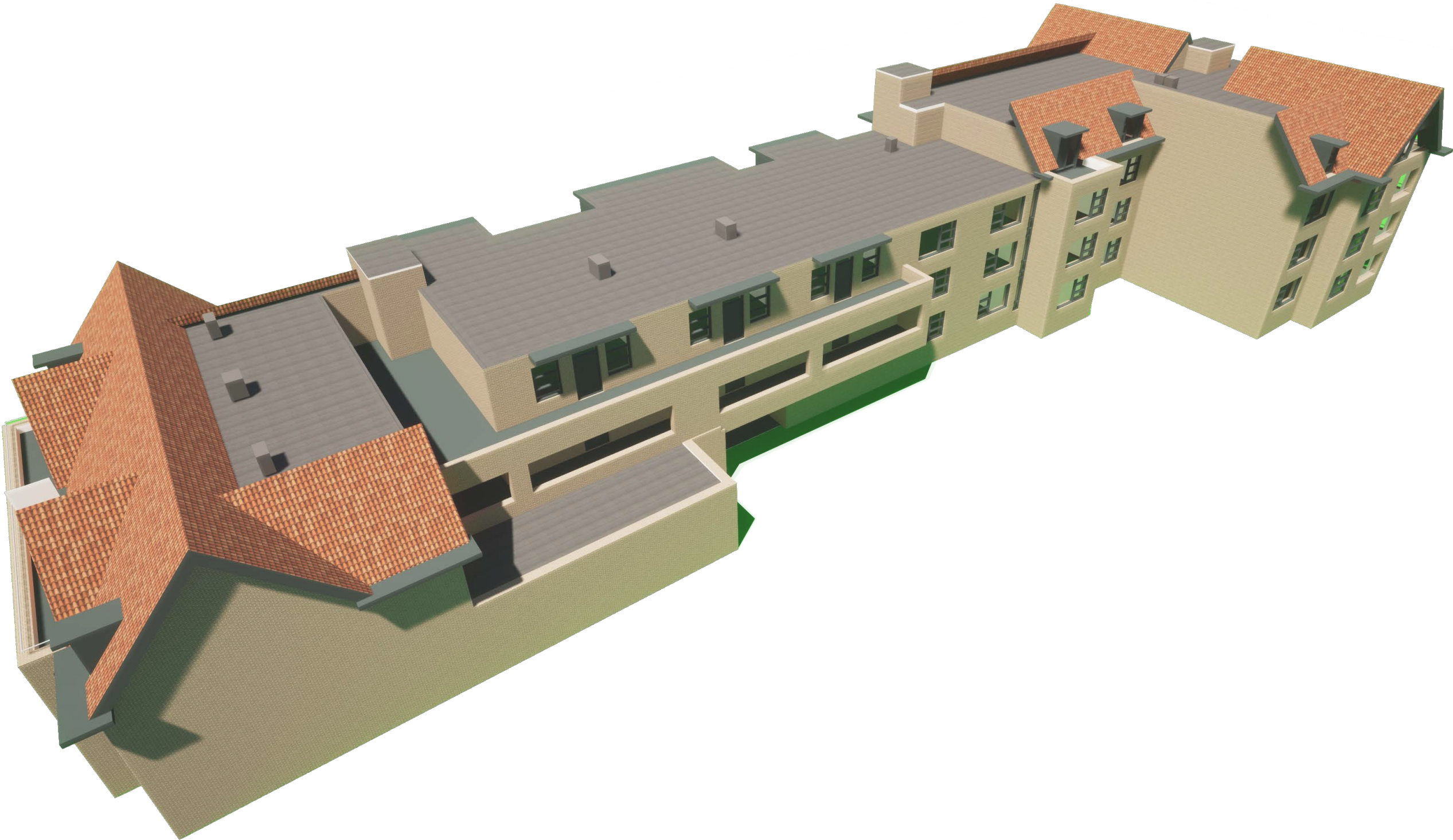
Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-10
Formaat: A3


Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66





3D renders bestand
schaal n.v.t.



Voorgevel nieuw



Achtergevel nieuw

Specificates nieuwe technische ruimte

AFMETINGEN

Lengte : 6500mm
Breedte : 2800mm
Hoogte : 2800mm

BRANDVEILIGHEID

Brandwerendheid : 60 minuten



Linker zijgevel nieuw



Rechter zijgevel ongewijzigd

Linker- en rechterzijgevel nieuw
schaal 1:200

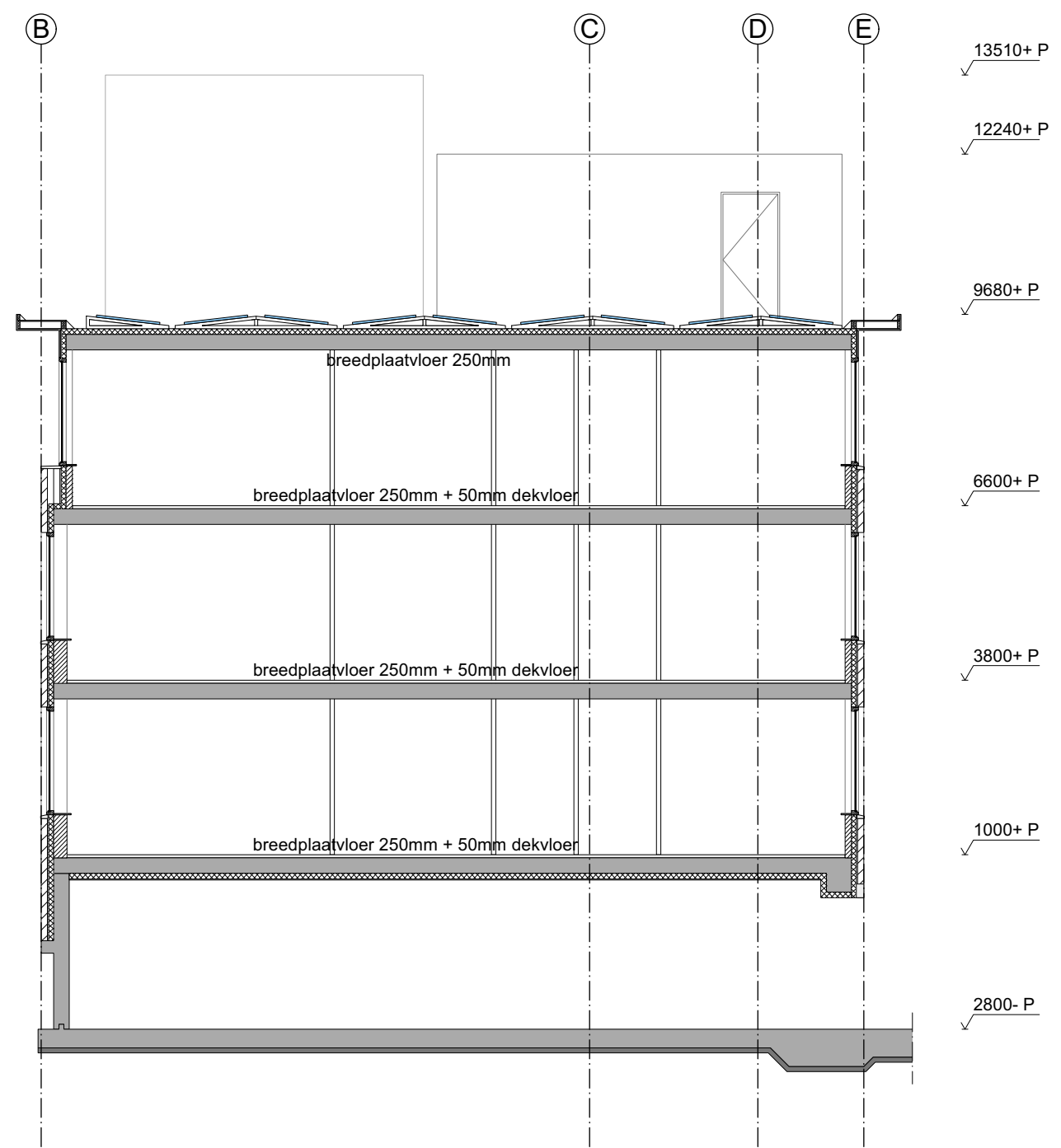
Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-14
Formaat: A3

 **eksom**
bouwexpertise

Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



Legenda

- bestaande metselwerk
- bestaande kalkzandsteen
- bestaande isolatie
- bestaande beton
- zonnepanelen

Doorsnede A-A nieuw
schaal 1:100

Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

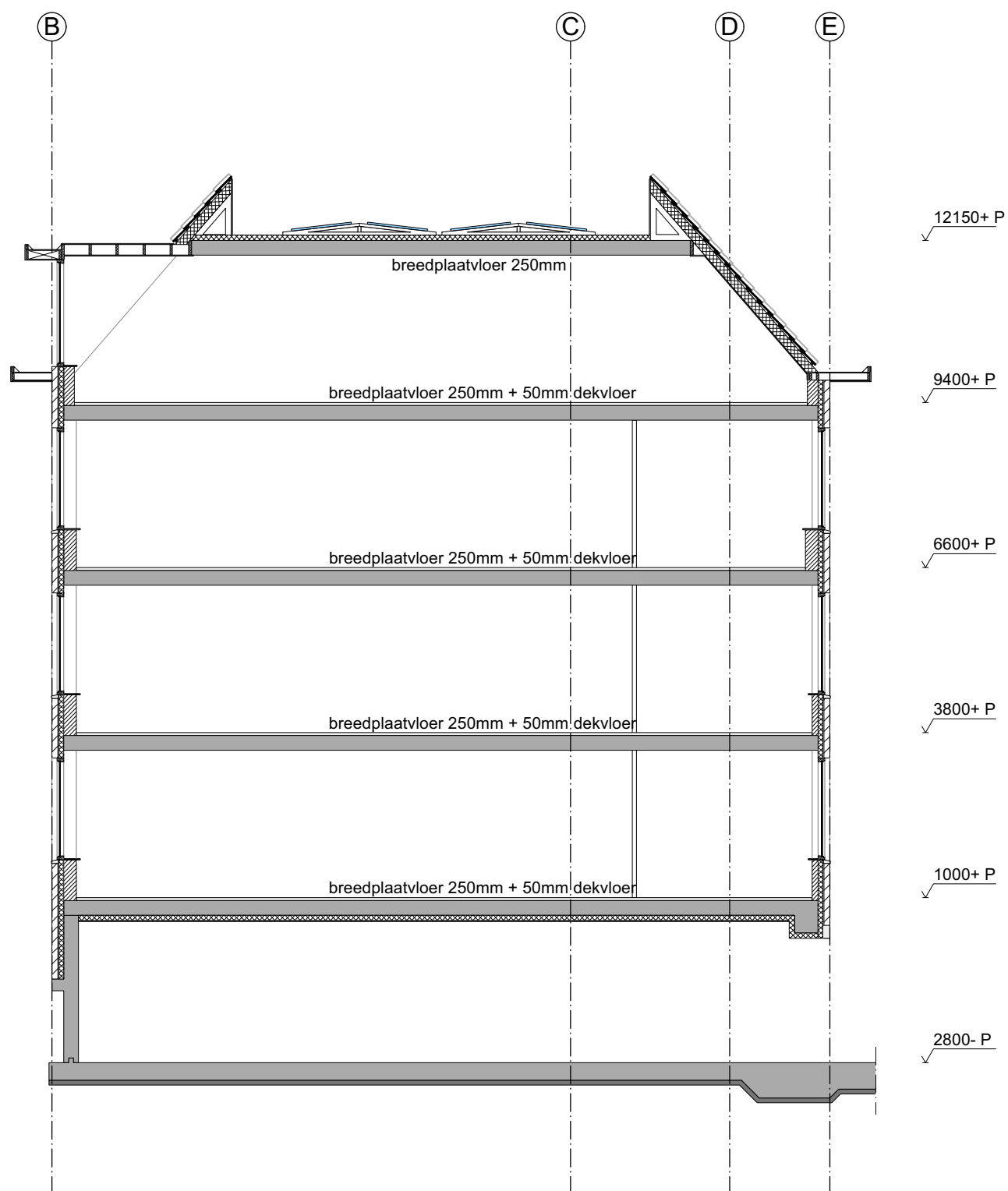
Bladnummer: BV-15
Formaat: A3



eksom
bouwexpertise

Ulgersmaweg 47
9731 BK Groningen

info@eksom.nl
050 - 577 75 66



Legenda

- bestaande metselwerk
- bestaande kalkzandsteen
- bestaande isolatie
- bestaande beton
- zonnepanelen

Doorsnede B-B nieuw
schaal 1:100

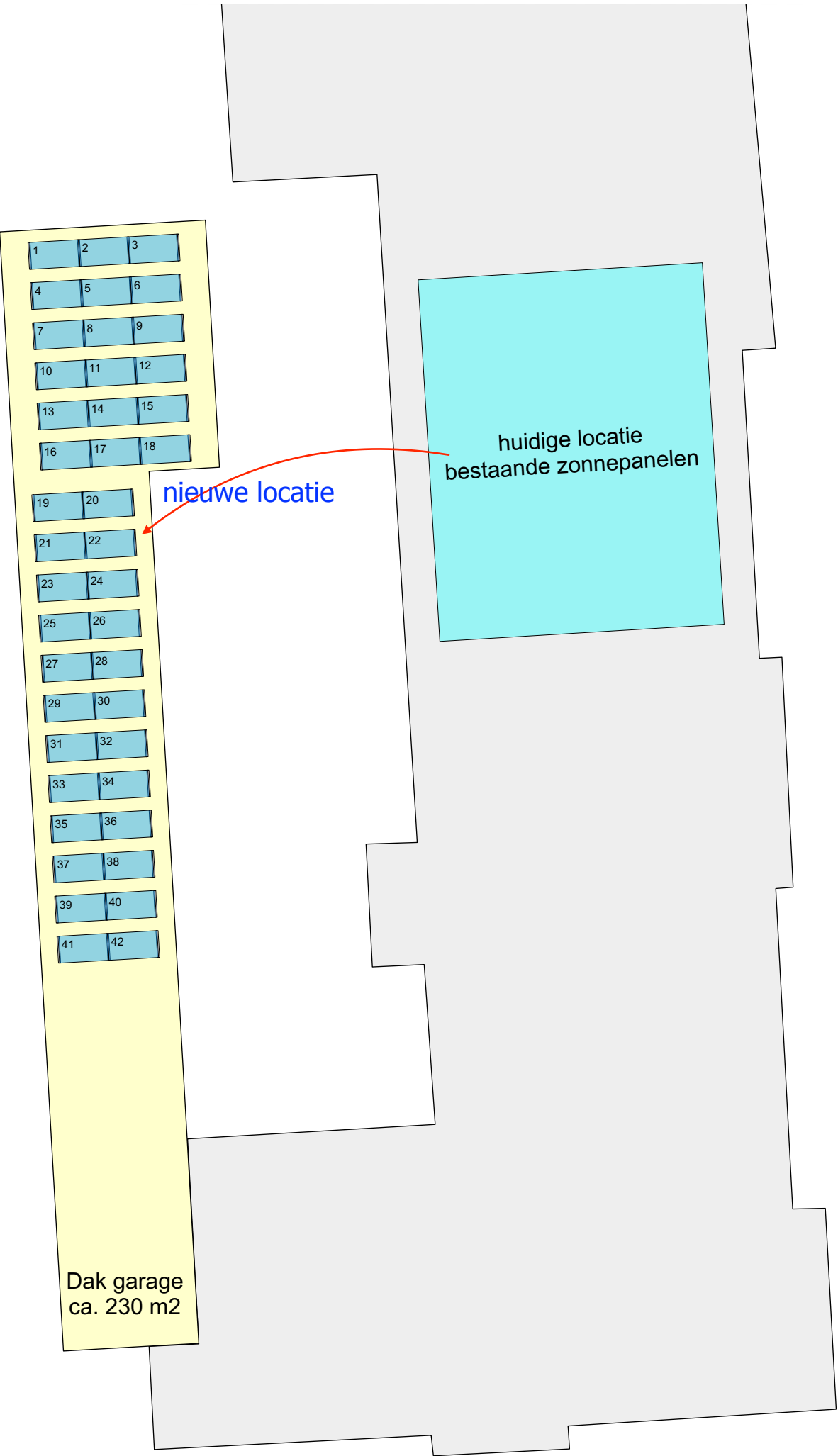
Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-16
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

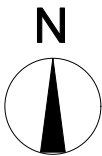
 **eksom**
bouwexpertise
Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66

Bestaande zonnepanelen
schaal 1:200



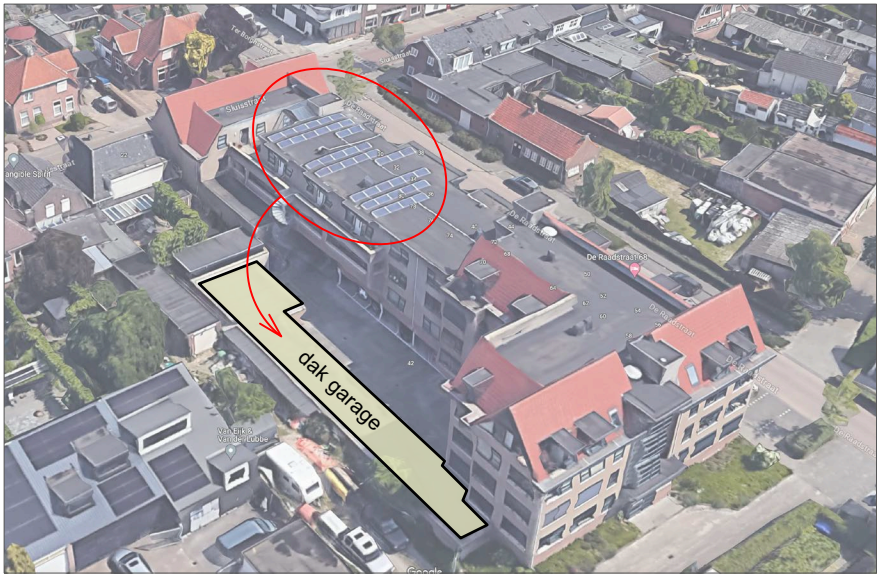
Legenda

- flat
- garage
- bestaande zonnepanelen (42 stuks)



Bestaande zonnepanelen

De bestaande 42 zonnepanelen zoals te zien is in de vogelvlucht foto van Google Maps worden verplaatst naar het dak van de garage om zo ruimte te maken voor de nieuw te plaatsen zonnepanelen. (zie foto hieronder)



Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-17
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:



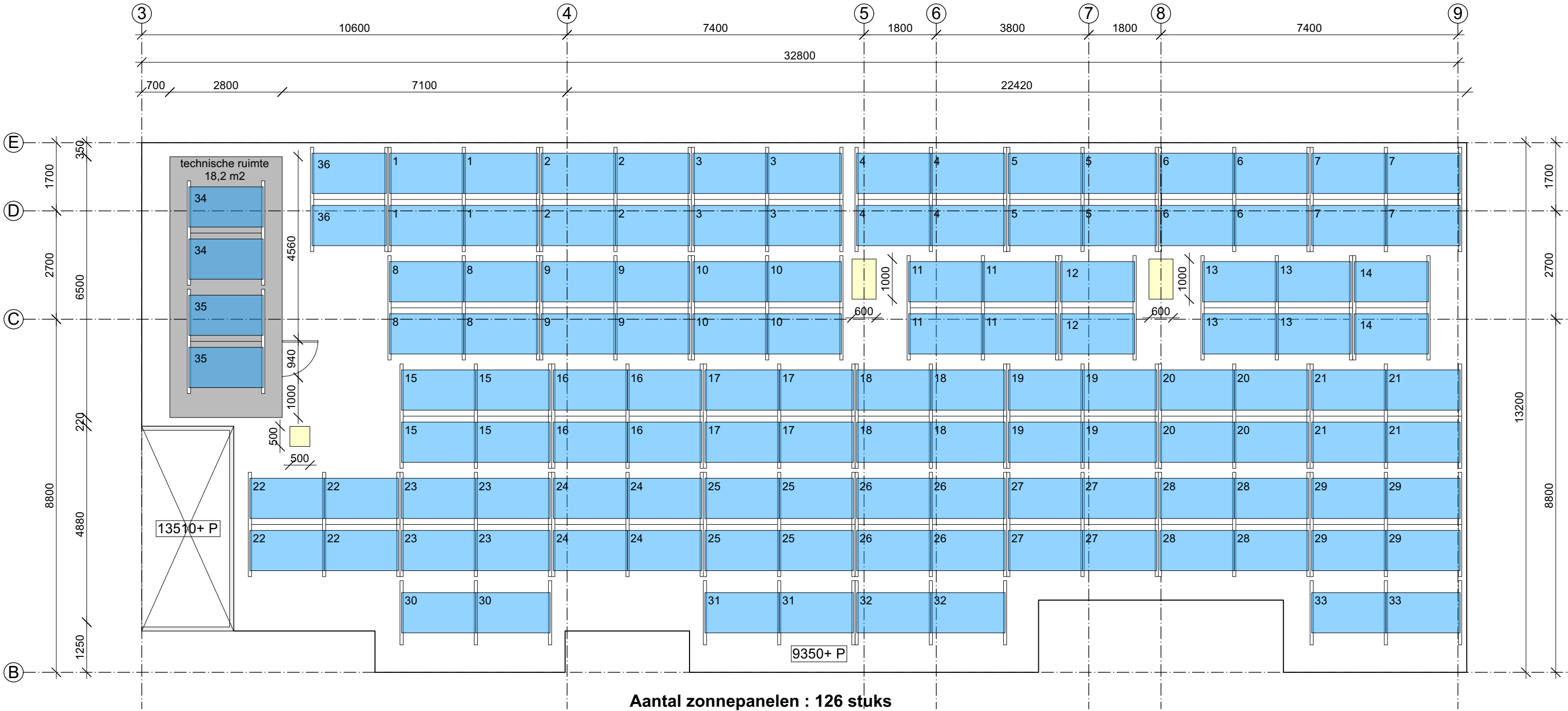
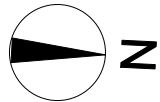
Ulgersmaweg 47
9731 BK Groningen
info@eksom.nl
050 - 577 75 66

Legenda

- raster laagbouw 9350+ P
- zonnepanelen, frame en bevestiging aan dak volgens aannemer/leverancier
- installatie- en technische ruimte
- schoorsteen/dakdoorvoer

Aantal zonnepanelen

Laagbouw : 126 + 22 = 148 stuks
Hoogbouw : 52 stuks
TOTAAL : 200 stuks



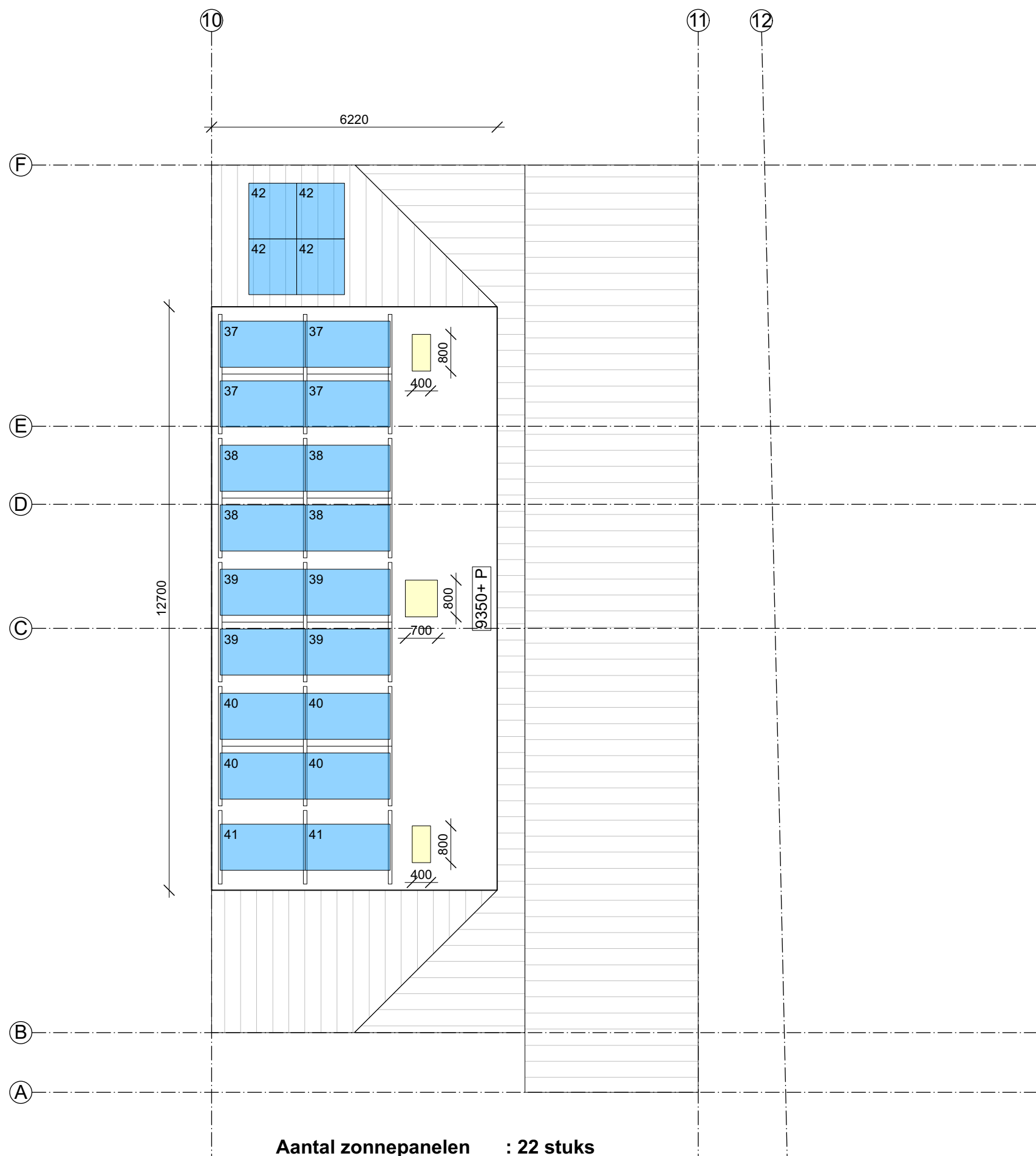
Legplan zonnepanelen laagbouw
schaal 1:100

Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-18
Formaat: A3

Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



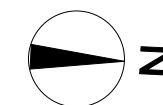
Aantal zonnepanelen : 22 stuks

Legenda

- raster laagbouw 9350+ P
- zonnepanelen, frame en bevestiging aan dak volgens aannemer/leverancier
- schoorsteen/dakdoorvoer

Aantal zonnepanelen

Laagbouw : 126 + 22 = 148 stuks
Hoogbouw : 52 stuks
TOTAAL : 200 stuks



Legplan zonnepanelen laagbouw 2
schaal 1:100

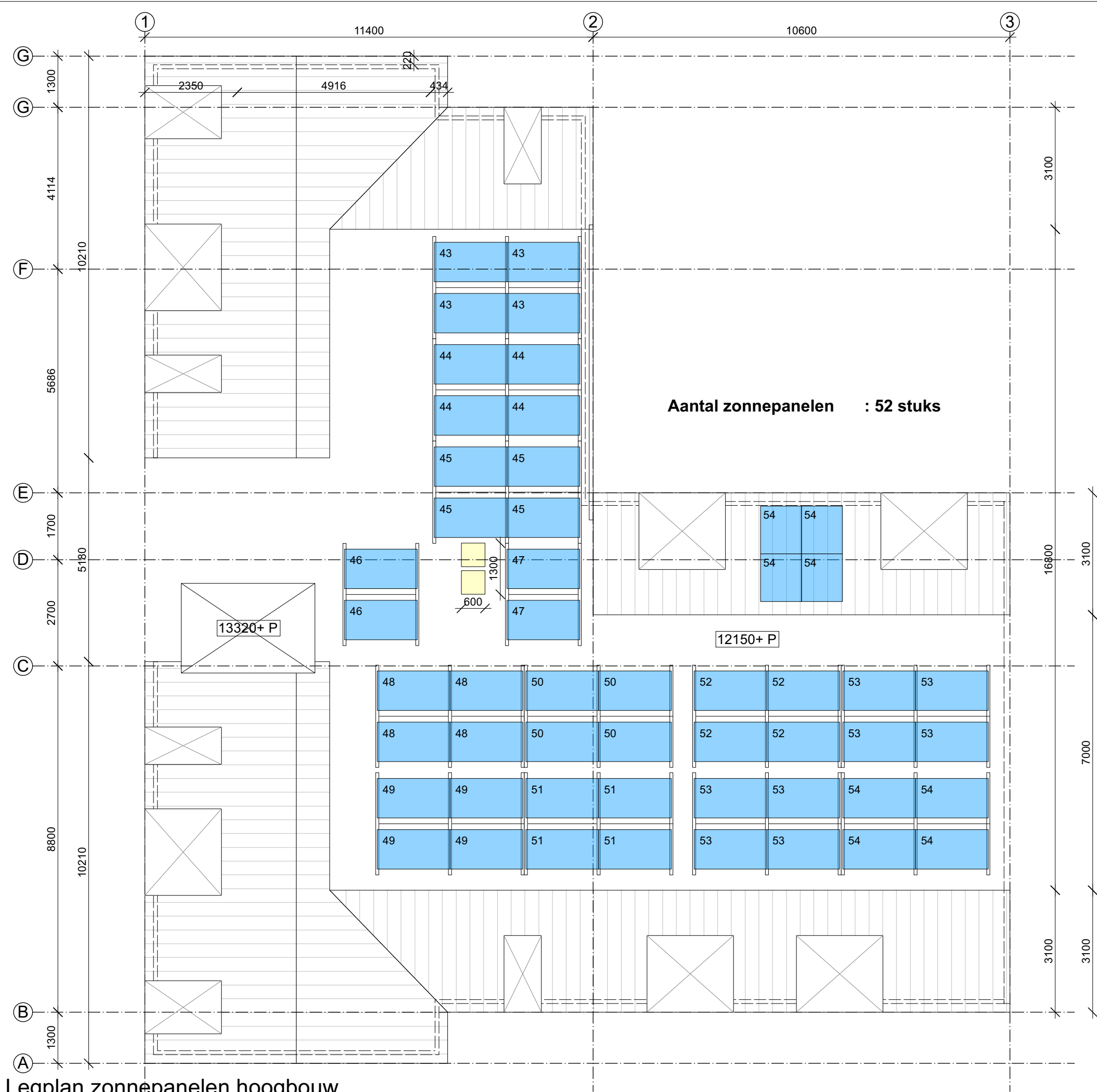
Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-19
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:



Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



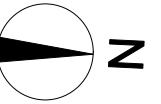
Legplan zonnepanelen hoogbouw
schaal 1:100

Legenda

- raster laagbouw 9350+ P
- zonnepanelen, frame en bevestiging aan dak volgens aannemer/leverancier
- schoorsteen/dakdoorvoer

Aantal zonnepanelen

Laagbouw : 126 + 22 = 148 stuks
Hoogbouw : 52 stuks
TOTAAL : 200 stuks



Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-20
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:



Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66

De wanden van de units worden als volgt opgebouwd:

De toegepaste sandwichpanelen voor de wanden, vloer en dak:
Brucha Beta MW-FX 80mm

De sandwichpanelen die minimaal met een 60 minuten brandwerendheid worden gemonteerd worden geplaatst op een staalframe geplaatst. Het staal is gestraald en gespoten in de menie en later na het lassen met menie en verf geschilderd om een goede bescherming tegen weersinvloeden te verkrijgen.

De naden tussen de sandwichpanelen worden niet groter dan 25mm, deze naden worden gevuld met brandwerende PUR. Nullfire FF197, [zie Rapport Nullfire FF197.PDF](#)

De toegang tot de unit wordt gerealiseerd doormiddel van een loopdeur van ISDRA. IDRA 1B60 dagmaat 940 x 2140 mm. Deze deur heeft een brandwerendheid van minimaal 60 minuten. [Zie certificaat IDRA 1B 60 deur.pdf](#)

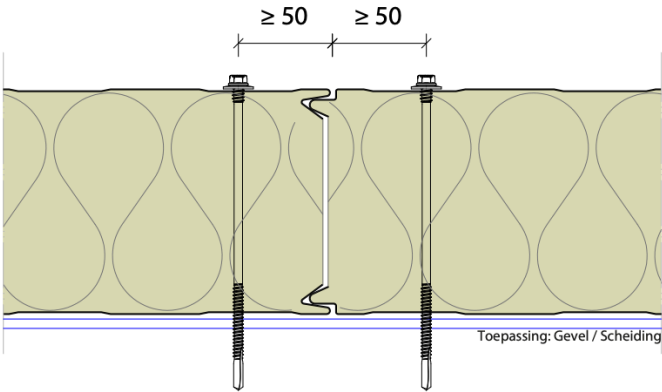
Voor het doorvoeren in de wand voor de lucht behandeling zijn zelfsluitende brand kleppen gebruikt welke bij oververhitting dicht gaan.

Het doorvoeren van de kabels zijn afgewerkt met nullfire FS steenwol plaat met acrylaatkit en coating. Zie tabel hieronder voor specificaties.



Brucha Beta MW-FX 80mm

Bevestiging (zichtbare bevestiging)



1.3.2 Risico's van EOS

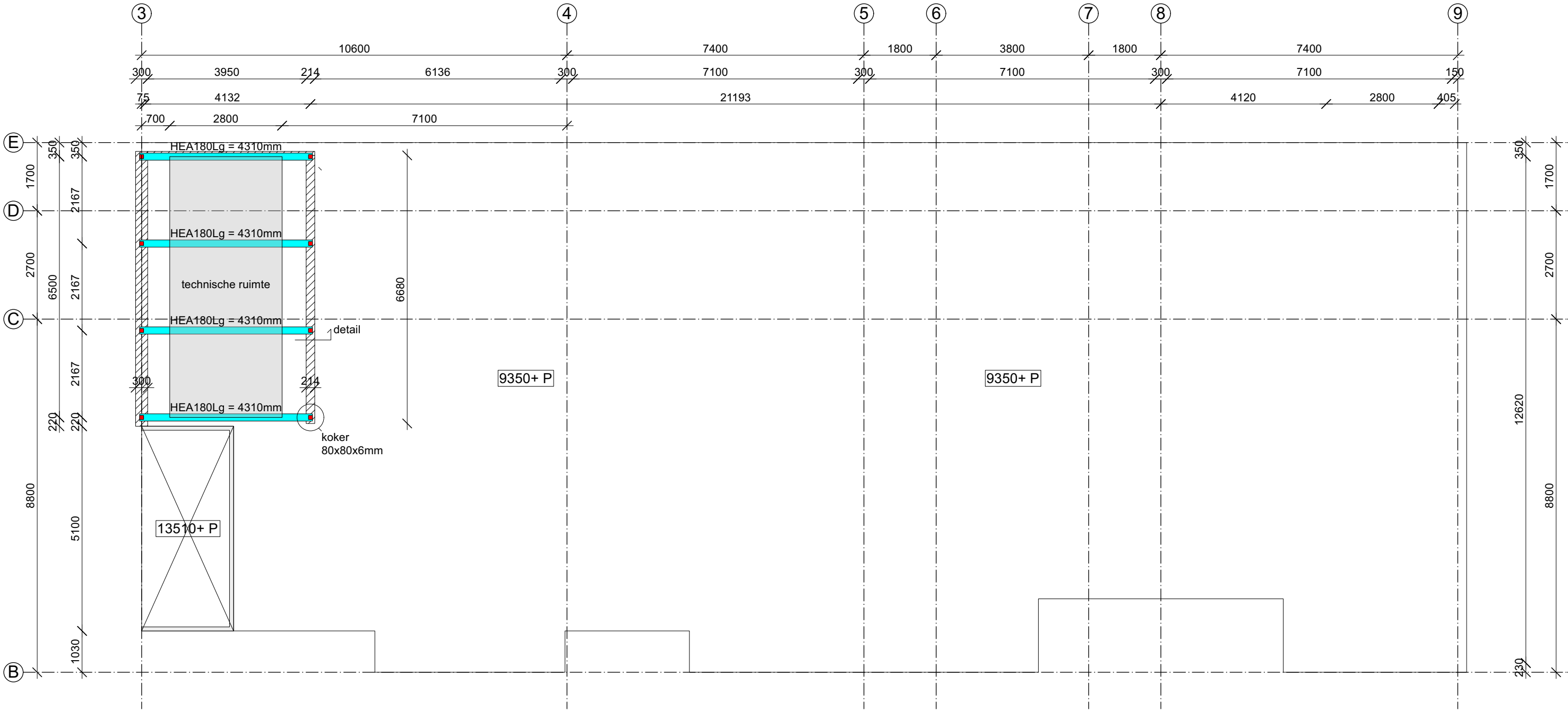
In de Handreiking Elektriciteit Opslag Systemen (EOS > 25 kWh Li-ION) zijn twee (brand)scenario's beschreven voor incidenten met een EOS. In het eerste scenario is er sprake van een lithium-ion accu die te veel opwarmt en in een 'thermal runaway' raakt, met als gevolg een zichzelf in stand houdende brand. In geval van monitoring van het EOS als geheel en in het bijzonder het accugedeelte, kan er bijtijds worden ingegrepen door de betrokken accu te verwijderen. Mocht dit niet tot het gewenste resultaat leiden dan kan brand worden voorkomen door gebruik te maken van een doeltreffend (automatisch) blussysteem.

Het tweede scenario dat in de bovengenoemde handreiking wordt beschreven, is het 'worst case' scenario. Wanneer één van de accu's tot ontbranding komt (thermal runaway) is het lastig om een dergelijke brand te blussen. Als gevolg van de duur van de brand of van de constructie en montage van de accu's kunnen andere accu's ook betrokken raken of tot een thermal runaway overgaan. Een dergelijke brand kan gedurende lange tijd (meerdere uren tot dagen) woeden en herontsteken. Bij dergelijke branden komen naast hitte ook giftige stoffen vrij (onder andere waterstoffluoride, lithiumoxide en zoutzuur). Het effectgebied is afhankelijk van de meteorologische omstandigheden, de grootte van de brand en de bereikbaarheid van het EOS voor hulpdiensten. Het kan tot enkele kilometers ver reiken (zie bijvoorbeeld de brand te Drogenbosch in België van november 2017).

Bron: *RAPPORT*Instituut Fysieke Veiligheid; *Energieopslag en/of -opwekking op daken van collectiewoongebouwen*

Legenda

- raster laagbouw 9350+ P
- installatie- en technische ruimte
- bestaande draagwanden, kalkzandsteen
- stalen balk HEA180
- stalen voet, stalen koker 80x80x6mm



Maatregelen tegen trillingen

Om trillingen vanuit de technische ruimte op te vangen, worden rubberen dempers geïnstalleerd tussen de technische ruimte en het stalen frame. Deze rubberen dempers zijn ontworpen om resonanties te verminderen.

Project: 2023-42
Opdrachtgever: VVE

Bladnummer: BV-22
Formaat: A3

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

eksom
bouwexpertise
Ulgersmaweg 47
9731 BK Groningen
info@eksom.nl
050 - 577 75 66



3D renders nieuw
schaal n.v.t.

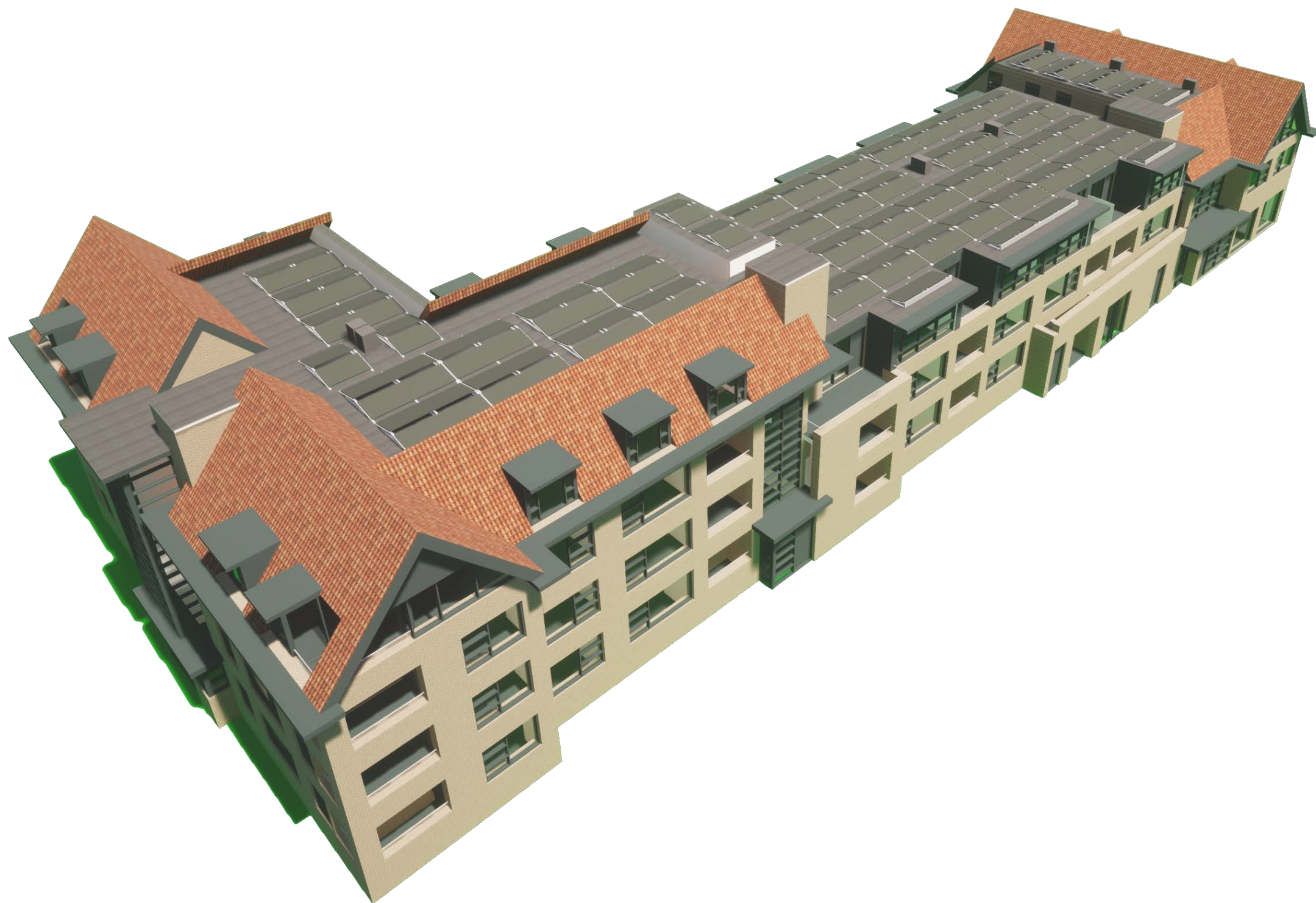
Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-24
Formaat: A3

 **eksom**
bouwexpertise

Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



3D renders nieuw
schaal n.v.t.

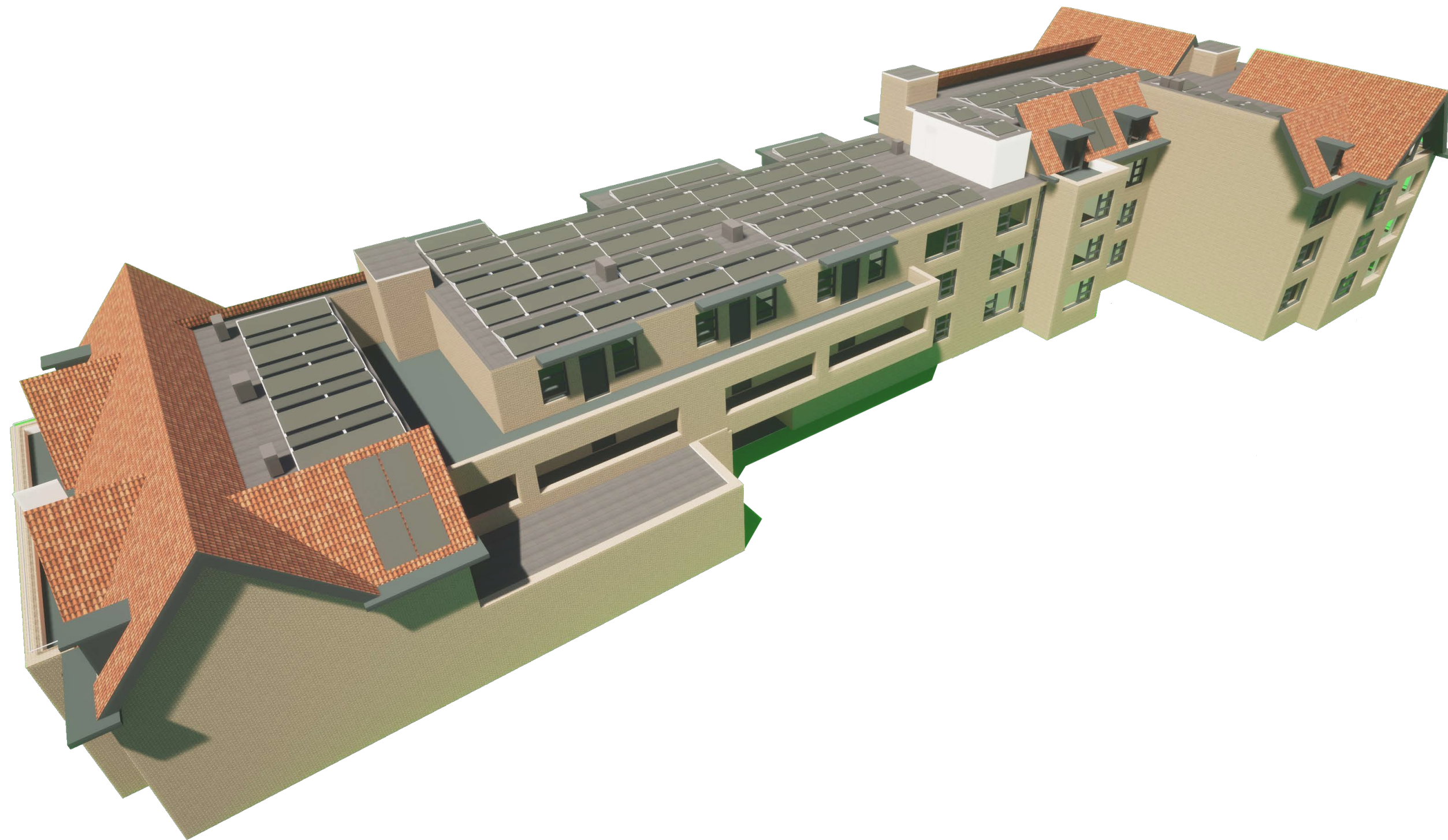
Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-25
Formaat: A3

 **eksom**
bouwexpertise

Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66



3D renders nieuw
schaal n.v.t.

Project: 2023-42
Opdrachtgever: VVE

Fase: vergunning
Datum: 21-09-2023
Laatst gewijzigd:

Bladnummer: BV-26
Formaat: A3

 **eksom**
bouwexpertise

Ulgersmaweg 47 info@eksom.nl
9731 BK Groningen 050 - 577 75 66

Verklaring opbouw brandcompartiment.

De brand werende units welke gebouwd worden in opdracht van voor de VVE worden als volgt opgebouwd,

Op 2 liggers van C 60/200/60 profiel wordt een stalen frame gebouwd waar tussen sandwichpanelen worden gemonteerd met een brandwerendheid van 60 minuten, dit staal is gestraald en gespoten in de menie en later na het lassen met menie en verf geschilderd om een goede bescherming tegen weersinvloeden te verkrijgen.

Brucha Beta MW-FX 80 mm. Panelen dus voor de wanden, vloer en dak.

Certificaat bijgevoegd.

Hierin wordt een loopdeur van ISDRA gemonteerd. IDRA 1B60 dagmaat 940 x 2140 mm.

Certificaat bijgevoegd.

Naden in 80 mm wand minder dan 25 mm breed gehouden en gevuld met brandwerende Pur

Nullifire FF197

Certificaat bijgevoegd.

Voor de doorvoeren in de wand voor de lucht behandeling zijn zelfsluitende brand kleppen gebruikt welke bij oververhitting dicht gaan.

Certificaat bijgevoegd.

De doorvoeren van de kabels zijn afgewerkt met nullifire FS steenwol plaat met acrylaatkit en coating.

Certificaat bijgevoegd.

Classificatie van de brandwerendheid volgens EN 13501-2:2007+A1:2009 van lineaire voegen afgedicht met tremco illbruck Nullifire FF197 brandwerend PU schuim

Rapport nummer	2014-Efectis-R0204d(NL)
Opdrachtgever	tremco illbruck Productie BV Vlietskade 1032 4241 WC ARKEL Nederland
Afgegeven door	Efectis Nederland
Notified body nr.	1234
Auteurs	Ing. W. Scheffer S. Lutz
Project nummer	2014204
Rapport datum	September 2014
Versie	1
Aantal pagina's	9

Alle rechten voorbehouden.

Niets uit deze uitgave mag worden vermenigvuldigd en/of openbaar gemaakt zonder voorafgaande toestemming van Efectis.
Het ter inzage geven van het Efectis-rapport aan direct belanghebbenden is toegestaan.

Indien dit rapport in opdracht werd uitgevoerd, wordt voor de rechten en verplichtingen van opdrachtgever en opdrachtnemer verwezen naar de
Algemene Voorwaarden voor onderzoeksopdrachten aan Efectis Nederland, dan wel de betreffende ter zake tussen de partijen gesloten overeenkomst.

tremco illbruck Productie BV
T.a.v. dhr. F. Hendrikse
Vlietskade 1032
4241 WC ARKEL

Onze referentie 2015-Efectis-R000033/SRW/TNL
Projectnummer 2015152

Bleiswijk, 6 februari 2015

Beoordeling van de brandwerendheid van voegen afgedicht met tremco illbruck Nullifire FF197 brandwerend PU schuim

Geachte heer Hendrikse,

U heeft Efectis Nederland BV verzocht om een beoordeling uit te voeren van de te verwachten brandwerendheid van verschillende afmetingen voegen, afgedicht door middel van verschillende afmetingen brandwerende kit. Het betreft Tremco Illbruck Nullifire FF197 brandwerend PU schuim.

De beoordeling zal mede worden gebaseerd op de onderstaande criteria en rapportages.

1. BEOORDELINGSBASIS

Als basis voor de beschrijving is de volgende informatie gebruikt:

- Efectis classificatie rapport 2014-Efectis-R0204d(NL)[Rev.1]
- Kennis en ervaring van Efectis Nederland BV

2. TOELICHTING EN BEOORDELINGSVRAAG

2.1 TOELICHTING

Voegafdichtingen getest in een vloer zijn volgens de norm EN 1366-4 ook toepasbaar in aansluitingen tussen een wand en een vloer. De norm heeft echter een beperking; de voegen mogen enkel in een wand/vloer aansluiting worden aangebracht met een dikte gelijk aan de geteste vloerdikte. Dit is in het geval van de geteste vloer 150 mm.

2.2 BEOORDELINGSVRAAG

Welke brandwerendheid hebben voegen aangebracht in een wand-vloer aansluiting wanneer de wand een dikte heeft van 70 of 100 mm?

Alle rechten voorbehouden.

Dit document heeft de status van een Efectis Nederland rapport.

Wets- en/of andere uitgifte mag worden verspreid of openbaar gemaakt zonder voorafgaande toestemming van Efectis Nederland. Het ter inzage geven van het Efectis rapport aan direct belanghebbenden is toegestaan.

Indien dit rapport in opdracht werd opgesteld, wordt voor de rechten en verplichtingen van opdrachtgever en opdrachtnemer verwezen naar de Algemene Voorwaarden voor onderzoeksopdrachten van Efectis Nederland, die op de website www.efectis.nl zijn gepubliceerd.

**CLASSIFICATIE VAN DE BRANDWERENDHEID
IN OVEREENSTEMMING MET EN 13501-2:2007+A1:2009**

Classificatierapport nr.	2016-Efectis-R000058
Sponsor	Tremco Illbruck Productie BV Vlietskade 1032 4241 WC ARKEL
Productnaam	Nullifire F197 voegafdichting
Opgesteld door	Efectis Nederland BV
Notified body nr.	1234
Auteur(s)	Ing. P.G.R. Scholten Ing. R.D. Scheepe
Projectnummer	ENL-15-001439
Datum van uitgifte	februari 2016
Aantal pagina's	8

Alle rechten voorbehouden.

Niets uit deze uitgave mag worden vermenigvuldigd en/of openbaar gemaakt zonder voorafgaande toestemming van Efectis Nederland. Het ter inzage geven van het Efectis-rapport aan direct belanghebbenden is toegestaan.

Indien dit rapport in opdracht werd uitgevoerd, wordt voor de rechten en verplichtingen van opdrachtgever en opdrachtnemer verwezen naar de Algemene Voorwaarden voor onderzoekopdrachten van Efectis Nederland, dan wel de betreffende tarieven tussen de partijen gesloten overeenkomst.

© 2016 Efectis Nederland BV

1. Unieke identificatiecode van het producttype:	SC+
2. Beoogd(e) gebruik(en):	Ronde brandklep voor gebruik ter hoogte van een scheidingsconstructie voor het behouden van brandcompartimentering in HVAC-systemen.
3. Fabrikant:	Rf-Technologies NV, Lange Ambachtstraat 40, B-9860 Oosterzele
4. Systeem voor de beoordeling en verificatie van de prestatiebestendigheid:	Systeem 1
5. Geharmoniseerde norm / Europees beoordelingsdocument; aangemelde instantie(s) / Europese technische beoordeling, technische beoordelingsinstantie, aangemelde instantie(s); certificaat van prestatiebestendigheid:	EN 15650:2010, BCCA met identificatienummer 0749; BCCA-0749-CPR-BC1-606-0464-15650.09-2517
6. Aangegeven prestatie(s) volgens	(Brandweerstand volgens EN 1366-2 en classificatie volgens EN 13501-3)

Essentiële kenmerken					Prestaties
Gamma	Wandtype	Wand	Afdichting	Installatie	Classificatie
SC(V)+60 Ø 100-200 mm	Massieve wand	Cellenbeton ≥ 100mm	Mortel	1	El 60 (v _e i ↔ o) S - (300Pa)
	Massieve vloer	Cellenbeton ≥ 150mm	Mortel	1	El 60 (h _o i ↔ o) S - (300Pa)
	Flexibele wand	Metal stud gipsplatenwand Type A (EN 520) ≥ 100mm	Steenwol ≥ 40 kg/m ³ + afdekplaten	1	El 60 (v _e i ↔ o) S - (300Pa)
			Gips	1	El 60 (v _e i ↔ o) S - (300Pa)
SC(V)+90 Ø 100-200 mm	Massieve wand	Cellenbeton ≥ 100mm	Mortel	1	El 90 (v _e i ↔ o) S - (300Pa)
			Gecoate steenwol + coating ≥ 150 kg/m ³ + coating op kanaal	1	El 90 (v _e i ↔ o) S - (300Pa)
	Massieve vloer	Cellenbeton ≥ 150mm	Mortel	1	El 90 (h _o i ↔ o) S - (300Pa)
			Steenwol ≥ 40 kg/m ³ + gips + afdekplaten	1	El 90 (v _e i ↔ o) S - (300Pa)
SC+120 Ø 100-200 mm	Massieve vloer	Gewapend beton ≥ 150mm	Gecoate steenwol + coating ≥ 150 kg/m ³ + coating op kanaal	1	El 90 (v _e i ↔ o) S - (300Pa)
			Mortel	1	El 120 (v _e i ↔ o) S - (300Pa)
SC(V)0 Ø 100-200 mm	Massieve wand	Gewapend beton ≥ 110mm	Mortel	1	E 120 (v _e o → i) S - (300Pa)
			Mortel	1	E 120 (h _o o → i) S - (300Pa)

1 Installatiemethode: ingebouwd in kanaal, 0-360°



Nominale activeringscondities/gevoeligheid:	Geslaagd
Reactievertraging (reactietijd): sluitingstijd	Geslaagd
Operationele betrouwbaarheid: cyclische bewegingen	50 cycli
Duurzaamheid van de reactievertraging:	Geslaagd
Duurzaamheid van operationele betrouwbaarheid:	Geslaagd
Bescherming tegen corrosie volgens EN 60068-2-52	NPD (geen prestatie bepaald)
Luchtdichtheid (lekage over tunnel) volgens EN 1751:	NPD (geen prestatie bepaald)

De prestaties van het hierboven omschreven product zijn conform de aangegeven prestaties. Deze prestatieverklaring wordt in overeenstemming met Verordening (EU) nr. 305/2011 onder de exclusieve verantwoordelijkheid van de hierboven vermelde fabrikant verstrekt.

Ondertekend voor en namens de fabrikant door:
Frank Verlinden, Product Manager

Frank Verlinden

Oosterzele, 12/2017



Productinformatie

Materiaal

De Nullifire FB750 Brandwerende Steenwolplaat is een lichtgewicht steenwolplaat met een uniek identificeerbare watergedragen coating met een brandwerendheid van maximaal 240 minuten (afhankelijk van constructie en toepassing).

Toepassingsgebied

De Nullifire FB750 Brandwerende Steenwolplaat wordt toegepast om de openingen in de wanden en vloeren van brandcompartimenten te herstellen, de potentiële verspreiding van vuur te stoppen en een thermische-, brand-, rook- en akoestische afdichting te bieden.

Bij gebruik in combinatie met FS702 Brandwerende Acrylaat en FS709 Brandwerende Grafietkit, is FB750 Brandwerende Steenwolplaat geschikt voor afdichting rond de volgende doorvoeren:

- metalen- en kunststofbuizen
- kabelgoten
- kabelladders (geperforeerd of niet geperforeerd)
- gepantserde kabels
- datakabels
- HV-kabels
- kabelbundels

Beschikbare maten

600 x 600 x 50 mm, verpakt per 2 stuks

1200 x 600 x 50 mm, uitsluitend verkrijgbaar per pallet van 48 stuks

Tolerantie: $\pm 2.5\%$

140 kg/m³

Opslag

Opslaan onder droge condities tussen -10°C en +70°C. De verpakking opslaan op een houten of kunststof plateau en niet direct op een steenachtige vloer.

Houdbaarheid

Onbeperkt houdbaar, mits opgeslagen zoals geadviseerd.

Verwerkingsinstructies

Voorbereiding

- Reinig de aangrenzende constructieoppervlaktes en verwijder alle vervuilde, losse en/of ondeugdelijke delen.
- Zorg ervoor dat alle doorvoeren die door de opening in de constructie gaan, geschikt zijn voor het afdichten met de FB750 Brandwerende Steenwolplaat en zijn geïnstalleerd naar tevredenheid van alle relevante partijen.
- Identificeer alle doorvoeren en zorg ervoor dat u over de juiste producten beschikt:

Voor geïsoleerde metalen leidingen is FP302 Grafietband en/of FS709 Brandwerende Grafietkit te gebruiken en voor kunststofbuizen FP170 Brandmanchet, FS709 Brandwerende Grafietkit en FP302 Grafietband.

Verwerking

- Meet de grootte van de sparing en de relevante posities van alle doorvoeren op, die door de sparing gaan. Breng deze afmetingen over op het oppervlak van de FB750 Brandwerende Steenwolplaat. Voor opbouwmontage is de vereiste overlap 75 mm.
- Probeer zo min mogelijk losse stukken FB750 Brandwerende Steenwolplaat te gebruiken en zaag met een handzaag of een isolatiemes de FB750 om de installatie mogelijk te maken.
- Gebruik het voorgeschreven Nullifire product voor alle doorvoeren in overeenstemming met de FB750 Brandwerende Steenwolplaat.
- De afgezaagde passtukken FB750 Brandwerende Steenwolplaat moeten worden verlijmd met FS702 Brandwerende Acrylaatpasta en/of FS712 Brandwerende Acrylaatcoating en mogen niet droog worden gemonteerd.
- Dicht alle aansluitingen af met FS702 Brandwerende Acrylaatkit om een volledige brand-, rook- en akoestische afdichting te realiseren.

FB750

Brandwerende Steenwolplaat



Producteigenschappen en technische specificaties

- Getest volgens EN1366-3 en conform de EN13501-2; ETA 21/0412
- BS 476 Pt 20/22 getest
- BS EN 1366-3 getest
- Unieke identificatiecode
- Akoestische isolatie
- Bestand tegen rook
- Luchtdruk getest t/m 2000 Pa
- Lichtgewicht
- Gemakkelijk te snijden



FB750

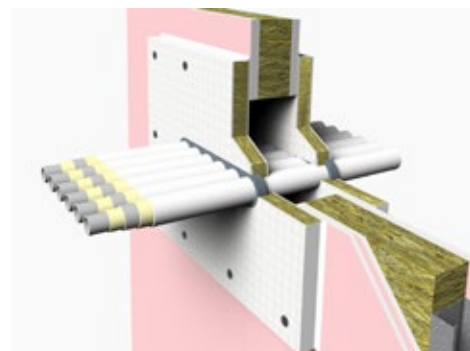
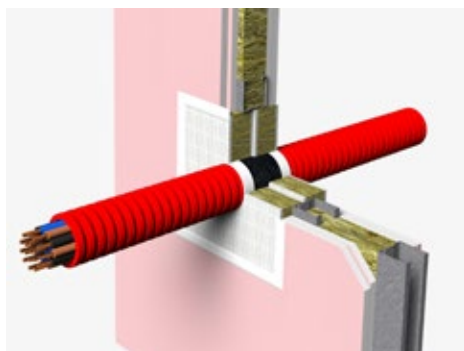
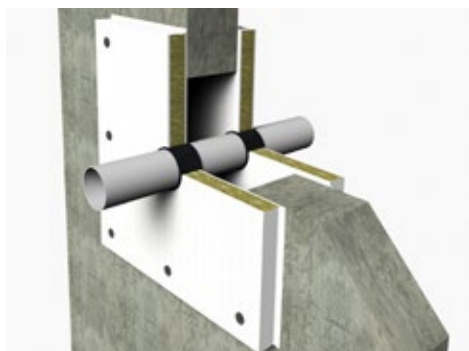
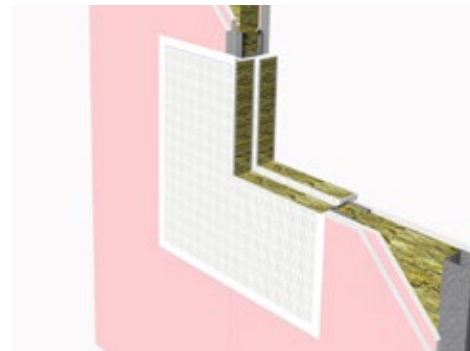
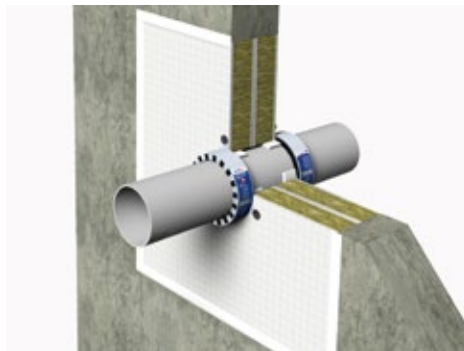
Brandwerende Steenwolplaat

Nullifire
Smart Protection

- Zorg ervoor dat alle doorvoeren correct zijn behandeld om te voldoen aan de vereiste EI (vlamdicht en thermische isolatie) van het compartiment.
- Als een dubbele FB750-afdichting moet worden gebruikt, is het raadzaam de aansluiting waar mogelijk te laten verspringen.

Veiligheidsaanbevelingen

Zie het veiligheidsinformatieblad.



Technische gegevens

Eigenschappen	Test Methode	Specificatie
Omschrijving		Geperst steenwol, aan beide zijden voorzien van coating 1.3
Akoestische isolatie (dubbele plaat)		57 dB
Verwerkingstemperatuur		+5°C tot +60°C
Brandklasse	EN 13501-1	Klasse E
Luchtdicht	BS EN ISO 1023:2	A+
Brandwerendheid	BS EN ISO 1366-3/4	tot 2,000 Pa
Opslag		Opslaan tussen -10°C en +70°C onder droge condities. Niet direct op betonnen vloeren opslaan.
Houdbaarheid		Onbeperkt mits opgeslagen zoals aangegeven



Construction
Products Group
Europe

Tremco CPG Netherlands B.V.
Vlietskade 1032, 4241 WC Arkel
T: +31 (0)183568019

info-nl@cpg-europe.com
www.cpg-europe.com

Tremco CPG Belgium N.V. (p.a. Arkel)
Vlietskade 1032, 4241 WC Arkel,
Nederland

+32 (0)36646384
info-be@cpg-europe.com
www.cpg-europe.com

2022/03

European Technical Assessment

ETA-21/0412 of 15th of august 2021

English translation prepared by CSTB - Original version in French language

General Part

Nom commercial
Trade name

Nullifire FB750 Intubatt

Famille de produit
Product family

Produits de compartimentage et de calfeutrement au feu :
- Calfeutrements de pénétration
Fire Stopping and Sealing Product :
- Penetration Seals

Titulaire
Manufacturer

Tremco CPG UK Ltd.
Coupland Rd, Hindley Green, Wigan WN2 4HT

Usine de fabrication
Manufacturing plant

Tremco CPG UK Ltd. Coupland Rd, Hindley Green, Wigan WN2 4HT

Cette évaluation contient:
This Assessment contains

134 pages incluant 127 pages d'annexes qui font partie intégrante de cette évaluation
134 pages including 127 pages of annexes which form an integral part of this assessment

Base de l'ETE
Basis of ETA

DEE 350454-00-1104
EAD 350454-00-1104

Cette évaluation remplace:
This Assessment replaces

ETE 20/1319 délivrée le 01/01/2021
ETA 20/1319 issued on 01/01/2021

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such. Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

General Part	1
Specific Part.....	5
1 Technical description of the product.....	5
2 Specification of the intended use	5
3 Performance of the product.....	6
3.1 Safety in case of fire (BWR 2)	6
3.2 Hygiene, health and the environment (BWR 3)	6
3.3 Safety and accessibility in use (BWR 4)	6
3.4 Protection against noise (BWR 5)	7
3.5 Energy economy and heat retention (BWR 6).....	7
3.6 General aspects relating to fitness for use	7
4 Assessment and verification of constancy of performance (AVCP).....	7
5 Technical details necessary for the implementation of the AVCP system	7
Annex A: Resistance to fire	8
WALLS.....	8
A1. CABLES & CABLE CARRIERS - DOUBLE BATT PATTRESS	8
A2. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION	16
A3. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION (ASYMMETRIC).....	20
A4. CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION.....	22
A5. CABLES & CABLE CARRIERS - DOUBLE BATT PATTRESS BATT BOX	25
A6. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION BATT BOX	28
A7. CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION BATT BOX.....	31
A8. COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS – FS709/FP302	33
A9. COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS – FP170/FP220	36
A10. COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION - FS709/FP302	39
A11. COMBUSTIBLE PIPES DOUBLE BATT COMPRESSION - FP170/FP220	41
A12. COMBUSTIBLE PIPES - SINGLE BATT PATTRESS	43
A13. COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION	44
A14. COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION (ASYMMETRIC).....	46
A15. COMBUSTIBLE PIPES IN SHAFTS - DOUBLE BATT PATTRESS & COMPRESSION	47
A16. COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT PATTRESS	49
A17. COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT COMPRESSION	51
A18. COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION	53
A19. NON COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS.....	55
A20. NON COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS (ASYMMETRIC)	58

A21.	NON COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION.....	60
A22.	NON COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION (ASYMMETRIC)	62
A23.	NON COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION	64
A24.	NON COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION (ASYMMETRIC).....	66
A25.	NON COMBUSTIBLE PIPES IN SHAFTS - DOUBLE BATT PATRESS & COMPRESSION	68
A26.	NON COMBUSTIBLE PIPES INSULATED CI - DOUBLE BATT PATRESS.....	70
A27.	NON COMBUSTIBLE PIPES INSULATED CI - DOUBLE BATT COMPRESSION.....	72
A28.	NON COMBUSTIBLE PIPES INSULATED CI - SINGLE BATT COMPRESSION	74
A29.	NON COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT PATRESS	76
A30.	NON COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT COMPRESSION	79
A31.	NON COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION	82
A32.	NON COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION (ASYMMETRIC)	84
A33.	NON COMBUSTIBLE PIPES INSULATED LS - DOUBLE BATT PATRESS.....	86
A34.	NON COMBUSTIBLE PIPES INSULATED LS - DOUBLE BATT COMPRESSION	88
A35.	NON COMBUSTIBLE PIPES INSULATED LS - SINGLE BATT COMPRESSION (ASYMMETRIC)	90
A36.	DAMPERS - DOUBLE BATT COMPRESSION.....	92
A37.	BLANK SEALS - DOUBLE BATT PATRESS.....	94
A38.	BLANK SEALS - DOUBLE BATT COMPRESSION.....	96
A39.	BLANK SEALS - SINGLE BATT PATRESS.....	98
A40.	BLANK SEALS - SINGLE BATT COMPRESSION.....	99
FLOORS.....		101
A41.	CABLES & CABLE CARRIERS - DOUBLE BATT PATRESS	101
A42.	CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION	103
A43.	CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION.....	105
A44.	CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION BATT BOX	107
A45.	COMBUSTIBLE PIPES - DOUBLE BATT PATRESS.....	109
A46.	COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION.....	111
A47.	COMBUSTIBLE PIPES – MULTIPLE BATT PATRESS	114
A48.	NON COMBUSTIBLE PIPES - DOUBLE BATT PATRESS.....	116
A49.	NON COMBUSTIBLE PIPES – DOUBLE BATT COMPRESS	118
A50.	NON COMBUSTIBLE PIPES INSULATED CS – DOUBLE BATT PATRESS.....	120
A51.	NON COMBUSTIBLE PIPE INSULATED CS – DOUBLE BATT COMPRESS	122
A52.	NON COMBUSTIBLE PIPE INSULATED CS – SINGLE BATT PATRESS.....	124

A53.	DAMPERS – DOUBLE BATT COMPRESS	126
A54.	BLANK SEALS - DOUBLE BATT COMPRESSION	128
A55.	BLANK SEALS - SINGLE BATT COMPRESSION.....	130
Annex B:	Air Permeability	132
Annex C:	Airborne sound insulation	133

CS: Continuous Sustained insulation

CI: Continuous Interrupted insulation

LS: Local Sustained insulation

Specific Part

1 Technical description of the product

Nullifire FB750 Intubatt is a coated mineral wool board used to reinstate the fire resistance performance of wall and floor constructions where they have been provided with apertures for the penetration of single or multiple services. Nullifire FB750 Intubatt is a 50mm thick board made of 140 kg/m³ (-5/+15 %) mineral fibre insulation board coated on both sides in factory with ablative acrylic coating, with a minimum Dry Film Thickness of 0.26mm.

The Nullifire FB750 Intubatt is supplied coated on both faces, the board or boards are then cut to allow the penetration of the required services, before being inserted into the aperture in the wall or floor.

2 Specification of the intended use

The intended use of Nullifire FB750 Intubatt is to reinstate the fire resistance performance of flexible wall, rigid wall and floor constructions where they are penetrated by various cables and pipes.

The specific elements of construction that the system Nullifire FB750 Intubatt may be used to provide a penetration seal in, are as follows:

- a. Flexible walls: The wall must have a minimum thickness of 90mm or as defined within the tables in Annex A, and comprise steel studs lined on both faces with minimum 2 layers of 12.5 mm thick boards. Apertures in flexible walls shall be constructed as per the requirements shown in tables contained within this document.
- b. Rigid walls: The wall must have a minimum thickness of 90 mm of concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³ or as defined within the tables shown in annex A.
- c. Rigid floors: The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 650 kg/m³.

The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. The standard EN 1366-3 allows different flexible wall configurations of plasterboard linings, but does not allow overall thickness to be reduced.

The System Nullifire FB750 Intubatt may be used to provide a penetration seal with cables, cable trays, metallic pipes, combustible pipes and other services (for details see Annex A). Blank seals are also possible.

The total amount of cross sections of services (including insulation) shall not exceed 60% of the penetration area.

The installation instructions for service support requirements are as per the requirements of the standard. The current standard EN 1366-3 2009 offers guidance as follows to how services may be supported for the purposes of the test. REF 6.3.3.1 Testing carried out without support. Standard Services support construction as in practise Full Scale representation as in practise. A load may be applied to simulate practical conditions. The "C" option applies a load to the most onerous service (Cable Trays) The services within this document suit the most onerous requirement, option C of the above. Tested services were rigidly supported via steel angles, hangers or channels not further than 430mm from the surface of the sealing system on both faces. Service support should be in accordance with service manufacturer's recommendations / specifications and non combustible.

The manufacturer must be contacted for minimum / maximum service separation distances, opening distances, and for full application instructions.

The provisions made in this European technical assessment are based on an assumed working life of the Nullifire FB750 Intubatt of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class according to EN 13501-1 : E
Resistance to fire	Class according to EN 13501-2 See Annex A

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Release of dangerous substances	The applicant has submitted a written declaration that Nullifire FB750 Intubatt does not contain substances which have to be classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the EGDS - taking into account the installation conditions of the construction product and the release scenarios resulting from there. There may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.
Air permeability	According to EN 1026 See Annex B
Water permeability	No performance assessed

3.3 Safety and accessibility in use (BWR 4)

No performance assessed or claimed.

For floors, precautions/protections are to be taken to prevent a person stepping onto this horizontal FB750 Intubatt seal.

3.4 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation	According to EN 10140-2 See Annex C

3.5 Energy economy and heat retention (BWR 6)

No performance assessed

3.6 General aspects relating to fitness for use

Essential characteristic	Performance
Durability and serviceability	Type Z ₁ : intended for use in internal conditions with humidity equal to or higher than 85% RH excluding temperatures below 0°C, without exposure to rain or UV.

4 Assessment and verification of constancy of performance (AVCP)

According to the Decision 1999/454/EC of the European Commission¹, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Fire Stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	any	1

5 Technical details necessary for the implementation of the AVCP system

Technical details necessary for the implementation of the Assessment and verification of constancy of performance (AVCP) system are laid down in the control plan deposited at Centre Scientifique et Technique du Bâtiment.

The control plan including confidential informations, it is not included in the published part of this ETA.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of fire stopping and sealing products for issuing the certificate of conformity CE based on the control plan.

The Notified Body shall visit the factory at least twice a year for surveillance of the manufacturer.

The original French version is signed by

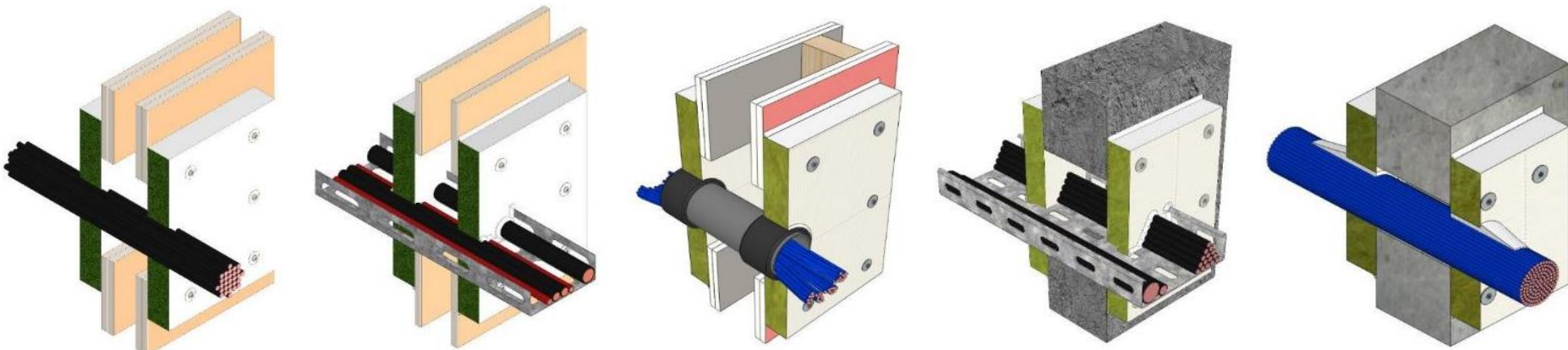
Anca Cronopol Head of Division

¹ Official Journal of the European Communities L 178/52 of 14.7.1999

Annex A: Resistance to fire

WALLS

A1. CABLES & CABLE CARRIERS - DOUBLE BATT PATRESS

Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1100mm by 1100mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction. Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges) The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 450mm width	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 450mm width	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 225mm width	120	120	✓	✓	✓			✓		-
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 150mm width	120	120	✓	✓	✓	✓				-
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 450mm width	120	120	✓	✓						25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Steel trunking ≤ 50mmx50mmx1mm	120	120	✓	✓	✓	✓	✓	✓	✓	FP333 Trunking Infill 29x47x333mm one side only (either side) or central
Bundle of ≤ 37 twin & earth cables, each ≤ 17mm diameter	240	240	✓	✓						200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 10 communication cables, each ≤ 7mm diameter within a ≤ 100mmx100mmx1.2mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	-
≤ 4 twin and earth cables, each ≤ 17mm diameter within a ≤ 100mmx100mmx1.2mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	-
≤ 15 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 50mmx50mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP333 Trunking Infill 47x29x333mm one side only (either side) or central, 50mm minimum extension into seal
16 to 45 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 50mmx50mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP333 Trunking Infill 47x29x333mm one side only (either side) or central, 50mm minimum extension into seal
≤ 24 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 100mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	3 layers of FP333 Trunking Infill 97x29x333mm one side only (either side) or central, 50mm minimum extension into seal
25 to 90 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 100mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP333 Trunking Infill 97x29x333mm one side only (either side) or central, 50mm minimum extension into seal
91 to 158 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 100mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP333 Trunking Infill 97x29x333mm one side only (either side) or central, 50mm minimum extension into seal
≤ 24 Cat 5 Ethernet cables, each ≤ 6mm diameter, ≤ 150mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	3 layers of FP333 Trunking Infill 147x29x333mm one side only (either side) or central, 50mm minimum extension into seal

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
25 to 90 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 150mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP333 Trunking Infill 147x29x333mm one side only (either side) or central, 50mm minimum extension into seal
91 to 158 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 150mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP333 Trunking Infill 147x29x333mm one side only (either side) or central, 50mm minimum extension into seal
≤ 24 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 150mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	3 layers of FP333 Trunking Infill 147x29x333mm one side only (either side) or central, 50mm minimum extension into seal
≤ 2 G2 cables, each ≤ 20mm diameter, within a ≤ 41mmx41mmx2.5mm steel trunking with PVC lid	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP333 Trunking Infill 47x29x333mm one side only (either side) or central, 50mm minimum extension into seal
1 Fibre optic cable, ≤ 12mm diameter	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
1 Ethernet Cat 5 cable ≤ 6mm diameter	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 20 Ethernet Cat 5 cables, each ≤ 6mm diameter	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 Communication cables, each ≤ 7mm diameter	120	120	✓	✓	✓	✓	✓	✓	✓	-
Bundle of ≤ 4 Twin & earth cables, each ≤ 17mm	120	120	✓	✓	✓	✓	✓	✓	✓	-
1 TV coaxial cable, ≤ 10mm diameter	120	120	✓	✓	✓	✓	✓	✓	✓	Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 20 Cat 5 Ethernet cables, each ≤ 6mm diameter within a Ribbed Nylon Copex combustible conduit ≤ 55mm x (0.5 or 1.2mm)	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
1 Ethernet Cat 5 cable, ≤ 6mm diameter, within a PEX multilayer conduit ≤ 28mm x 2.6mm	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
25 to 90 Cat 5 Ethernet cables, each ≤ 6mm diameter, within a ≤ 150mmx100mmx1mm steel trunking	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP333 Trunking Infill 147x29x333mm one side only (either side) or central, 50mm minimum extension into seal

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
1 Ethernet Cat 5 cable ≤ 6mm diameter, 1 TV coaxial cable ≤ 10mm diameter, 1 fibre optic cable ≤ 12mm diameter within a PEX multilayer conduit ≤ 28mm x 2.6mm	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
1 Fibre optic cable, ≤ 12mm diameter within a PEX multilayer conduit ≤ 28mm x 2.6mm	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
1 TV coaxial cable ≤ 10mm diameter within a PEX multilayer conduit ≤ 28mm x 2.6mm	120	120	✓	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 A1 cables, each ≤ 12mm	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 A2 cables, each ≤ 12mm	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 A3 cables, each ≤ 12mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 2 type B cables, each ≤ 19mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C1 cable ≤ 41mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C3 cable ≤ 37mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D1 cable ≤ 55mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D3 cable ≤ 52.5mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
≤ 2 type E cables, each ≤ 25mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 100mm diameter type F cables, each ≤ 13mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D3 cable ≤ 52.5mm diameter	120	120	✓	✓	✓			✓		-
1 type G1 cable ≤ 15mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type G2 cable ≤ 20mm diameter	120	120	✓	✓	✓			✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 12 twin & earth cables - each ≤ 17mm diameter	120	120	✓	✓	✓	✓	✓			Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 3 fire alarm (gold) cables, each ≤ 8mm diameter	120	120	✓	✓	✓	✓	✓			Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
1 TV coaxial cable ≤ 10mm diameter	120	120	✓	✓	✓	✓	✓			Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 8 TV Coaxial cables, each ≤ 10mm diameter, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 3 Fire alarm cables, each ≤ 10mm diameter, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 12 Fibre optic cables, each ≤ 8mm diameter, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓						1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 20 Audiovisual cables, each ≤ 10mm diameter within an ≤ 80mm x 3.2mm PVC Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 65 different cables within an ≤ 80mm x 3.2mm PVC Conduit : ≤ 20 Audiovisual cables, each ≤ 10mm diameter ≤ 17 Ethernet Cat 5 cables, each ≤ 6mm diameter ≤ 17 Telecoms cables, each ≤ 5mm diameter ≤ 7 Fibre optic cables, each ≤ 12mm diameter ≤ 4 twin & earth cables, each ≤ 17mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
Bundle of ≤ 17 Ethernet Cat5 cables, each ≤ 6mm diameter within an ≤ 80mm x 3.2mm PVC Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 7 Fibre optic cables, each ≤ 12mm diameter within an ≤ 80mm x 3.2mm PVC Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 17 telecom cables cables, each ≤ 5mm diameter within an ≤ 80mm x 3.2mm PVC Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 4 twin and earth cables, each ≤ 17mm diameter within an ≤ 80mm x 3.2mm PVC Conduit	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 7 Fibre optic cables, each ≤ 12mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 12 Fibre optic cables, each ≤ 8mm diameter	120	120	✓	✓						1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 17 Ethernet Cat 5 cables, each ≤ 6mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 20 Audiovisual cables, each ≤ 10mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 17 Telecom cables, each ≤ 5mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 100mm Diameter A1 cable, each ≤ 12mm diameter	120	120	✓	✓						≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓						≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓						≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
Bundle of ≤ 4 Twin & earth cables, each 17mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 3 Fire alarm cables, each ≤ 10mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
Bundle of ≤ 3 Fire alarm cables, each ≤ 10mm diameter	120	120	✓	✓						≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
Bundle of ≤ 3 TV Coaxial cables, each ≤ 12mm	120	120	✓	✓						25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Bundle of ≤ 9 TV Coaxial cables, each ≤ 12mm diameter	120	120	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓	✓	✓	✓			Cone (100mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 40mm diameter type F cables, each ≤ 13mm diameter	90	90	✓	✓	✓					-
Bundle of ≤ 100mm diameter A1 cables, each ≤ 12mm diameter	60	60	✓	✓						-
≤ 4 type B cables, each ≤ 19mm diameter	60	60	✓	✓						-
1 type C2 cable ≤ 50mm diameter	60	60	✓	✓						-
1 type D2 cable ≤ 65mm diameter	60	60	✓	✓						-
1 type G1 cable ≤ 15mm diameter	60	60	✓	✓						-
Bundle of ≤ 7 twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓						1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 6 twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓						25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Bundle of ≤ 40mm diameter twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓						-
Bundle of ≤ 35mm diameter fire alarm cables, each ≤ 12mm diameter	60	60	✓	✓						-
Bundle of ≤ 6 Fire alarm cables, each ≤ 12mm diameter	60	60	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)					Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 110	≥ 100	≥ 130	≥ 100	
Bundle of ≤ 30mm diameter TV coaxial cables, each ≤ 10mm diameter	60	60	✓	✓						-
Bundle of ≤ 8 TV coaxial cable, each ≤ 10mm diameter	60	60	✓	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 7 twin and earth cables, each ≤ 17mm diameter, in a ≤ 55mm x 3.2mm ABS Conduit	60	60	✓	✓						1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 6 twin and earth cables, each ≤ 17mm diameter, in a ≤ 55mm x 3.2mm ABS Conduit	60	60	✓	✓						25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
1 type D2 Cable ≤ 65mm diameter	120	60	✓							-
≤ 2 type A2 cables, each ≤ 12mm diameter	120	60	✓							-
1 type A2 cable ≤ 12mm diameter	120	60	✓							-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A2. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION

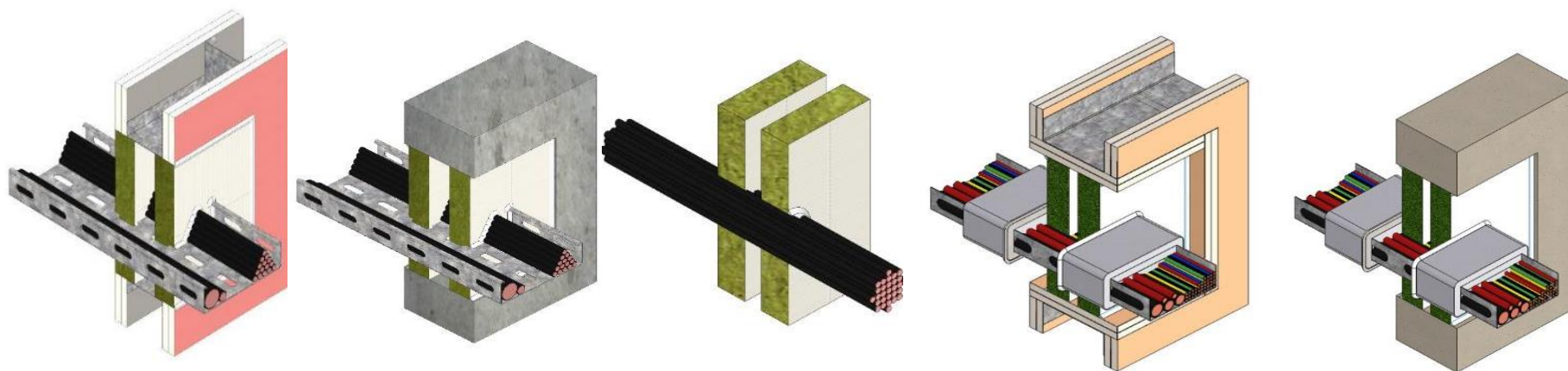
Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: 1100mm by 1100mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS.
(Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.



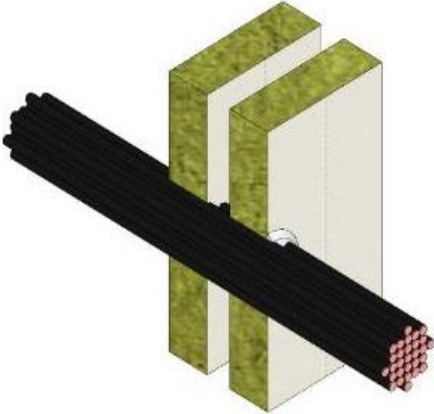
Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 100	≥ 130	≥ 100	
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 450mm width	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 450mm width	120	120	✓	✓					≤ 85mm high FS709 HP Intumescent Sealant above cable tray, 50mm depth
Bundle of ≤ 37 twin & earth cables, each ≤ 17mm diameter	240	240	✓	✓					200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 20 Ethernet Cat 5 cables, each ≤ 6mm	120	120	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap (central to the seal), sealed with FS702 Intumastic
Bundle of ≤ 20 Cat 5 Ethernet cables, each ≤ 6mm diameter in ≤ 55mm x (0.5 ot 1.2mm) Ribbed Nylon Copex combustible conduit	120	120	✓	✓	✓	✓	✓	✓	1 layer of FP302 Intustrap (central to the seal), sealed with FS702 Intumastic
Bundle of ≤ 100mm diameter type F cables, each ≤ 13mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 A1 cables, each ≤ 12mm	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 A3 cables, each ≤ 12mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 2 type B cables, each ≤ 19mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C1 cable ≤ 41mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D1 cable ≤ 55mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D3 cable ≤ 52.5mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 2 type E cables, each ≤ 25mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type G1 cable ≤ 15mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type G2 cable ≤ 20mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 100	≥ 130	≥ 100	
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓	✓		✓		200mm extension of 1 layer of FI025 Intuflex, taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 12 twin & earth cables - each ≤ 17mm diameter	120	120	✓	✓					Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 100mm Diameter A1 cable, each ≤ 12mm diameter	120	120	✓	✓					≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
Bundle of ≤ 3 Fire alarm cables, each ≤ 10mm diameter	120	120	✓	✓					2 layers of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
Bundle of ≤ 3 fire alarm (gold) cables, each ≤ 8mm diameter	120	120	✓	✓					Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 9 TV Coaxial cables, each ≤ 12mm, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓					2 layers of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
Bundle of ≤ 3 Fire alarm cables, each ≤ 10mm, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓					2 layers of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
Bundle of ≤ 12 Fibre optic cables, each ≤ 8mm, in a ≤ 55mm x 3.2mm ABS Conduit	120	120	✓	✓					1 layer of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓					≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓					≤ 85mm high FS709 HP Intumescent Sealant, 50mm depth
1 TV coaxial cable ≤ 10mm diameter	120	120	✓	✓					Cone (60mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓					Cone (100mm circumference, 60mm along the cable) of FS702 Intumastic to outside of FB750 Intubatt seal
Bundle of ≤ 40mm diameter type F cables, each ≤ 13mm diameter	90	90	✓	✓	✓				-
Bundle of ≤ 7 twin and earth cables, each ≤ 17mm, in a ≤ 55mm x 3.2mm ABS Conduit	60	60	✓	✓					1 layer of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
Bundle of ≤ 6 twin and earth cables, each ≤ 17mm, in a ≤ 55mm x 3.2mm ABS Conduit	60	60	✓	✓					25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Bundle of ≤ 7 twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓					1 layer of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)		Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 150	≥ 130	≥ 100	≥ 130	≥ 100	
Bundle of ≤ 6 twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓					25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Bundle of ≤ 40mm diameter twin & earth cables, each ≤ 17mm diameter	60	60	✓	✓					-
Bundle of ≤ 100mm Diameter A1 cables, each ≤ 12mm diameter	60	60	✓	✓					-
Bundle of ≤ 30mm diameter Fire alarm cables, each ≤ 12mm	60	60	✓	✓					-
Bundle of ≤ 6 Fire alarm cables, each ≤ 12mm	60	60	✓	✓					2 layers of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
Bundle of ≤ 30mm diameter TV coaxial cables, each ≤ 10mm diameter	60	60	✓	✓					-
Bundle of ≤ 8 TV coaxial cable, each ≤ 10mm diameter	60	60	✓	✓					2 layers of FP302 Intustrap (central to the seal) sealed with FS702 Intumastic
1 type C2 cable ≤ 50mm diameter	60	60	✓	✓					-
1 type D2 cable ≤ 65mm diameter	60	60	✓	✓					-
1 type C3 cable ≤ 37mm diameter	90	30	✓	✓	✓				-
1 type D2 Cable ≤ 65mm diameter	120	60	✓						-
≤ 2 type A2 cables, each ≤ 12mm diameter	120	60	✓						-
≤ 2 type E Cables - each ≤ 25mm diameter	120	30	✓						-
Bundle of ≤ 6 type A2 cables, each ≤ 12mm diameter	120	30	✓						-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A3. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION (ASYMMETRIC)

Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Rigid Walls as identified below, protected by double compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Rigid Walls of minimum thickness as identified below and with performance classified to EN13501-2 .
Maximum Opening size: 1100mm by 450mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded together in the aperture with the outer face flush with the face of the supporting construction on the opposite side to the fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 2 layers (or more) surface mounted. Results could also be used in both directions with the addition of FB750 Intubatt to fully fill the opening.


Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 150	
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 500mm width	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 300mm width	180	180	✓	-
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 340mm width	240	60	✓	-
Bundle of ≤ 10 A1 cables, each ≤ 12mm	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 5 A2 cables, each ≤ 12mm	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 100mm diameter type F cables, each ≤ 13mm diameter	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 5 A3 cables, each ≤ 12mm	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
≤ 3 type G1 cables, each ≤ 15mm diameter	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
≤ 2 type G2 cables, each ≤ 20mm diameter	240	180	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 A1 cables, each ≤ 12mm	180	180	✓	
Bundle of ≤ 5 A2 cables, each ≤ 12mm	240	60	✓	-
Bundle of ≤ 5 A3 cables, each ≤ 12mm	240	60	✓	-
≤ 3 type G1 cables, each ≤ 15mm diameter	240	60	✓	-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A4. CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION

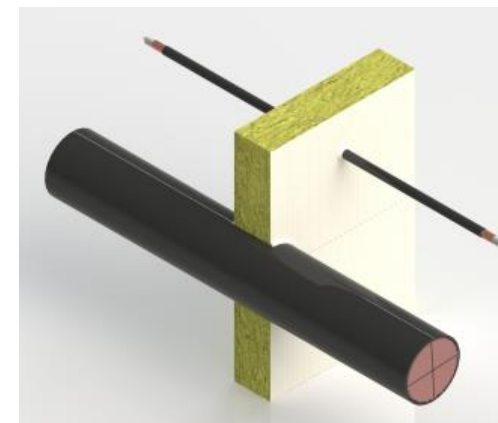
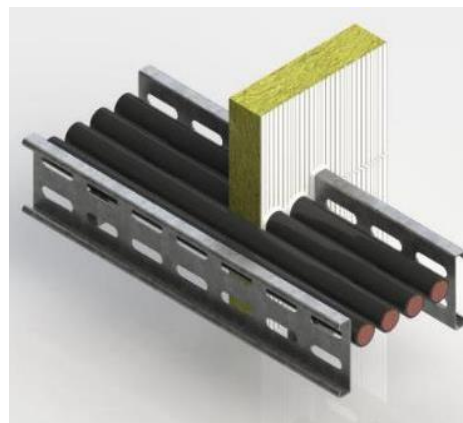
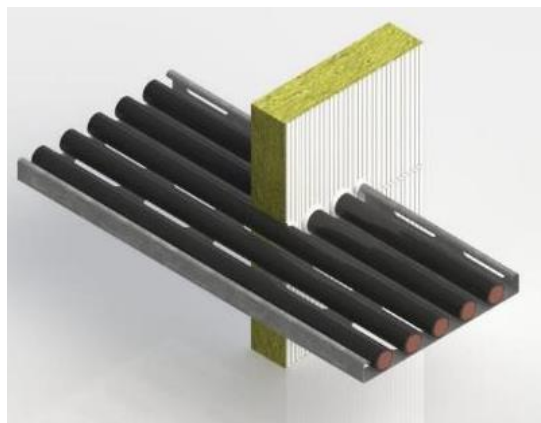
Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: 1100mm by 1100mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.



Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 130	≥ 130	
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 500mm width & minimum 1mm thickness	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 600mm width & minimum 3mm thickness	120	60	✓			-
Bundle of ≤ 100mm diameter type F data cables - each cable ≤ 13mm diameter	120	120	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 type A1 cables, each cable ≤ 12mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 type A2 cables, each cable ≤ 12mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
Bundle of ≤ 10 type A3 cables, each cable ≤ 12mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 2 type B cables, each cable ≤ 19mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C1 cable ≤ 41mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C2 cable ≤ 50mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type C3 cable ≤ 37mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D1 cable ≤ 55mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D2 cable ≤ 52.5mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type D3 cable ≤ 52.5mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
≤ 2 type E cables, each cable ≤ 25mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type G1 cable ≤ 15mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex,taped with aluminium foil (min 30 micron), abutting FB750 Intubatt

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	Additional requirements (both sides)
	E (mins)	EI (mins)	≥ 215	≥ 130	≥ 130	
1 type A2 cable ≤ 12mm diameter	120	60	✓			-
1 type D2 cable ≤ 65mm diameter	120	60	✓			-
≤ 2 type A2 cables, each cable ≤ 12mm diameter	120	60	✓			-
1 type E cable ≤ 25mm diameter	120	30	✓			-
Bundle of ≤ 6 type A2 cables, each cable ≤ 12mm diameter	120	30	✓			-
≤ 2 type E cables, each cable ≤ 25mm diameter	120	30	✓			-
Bundle of ≤ 7 type F data cables, each cable ≤ 13mm diameter	90	30	✓			-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A5. CABLES & CABLE CARRIERS - DOUBLE BATT PATRESS BATT BOX

Cables, Metal Cable Trays, Trunking, Baskets and Ladders insulated within a batt box passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic.

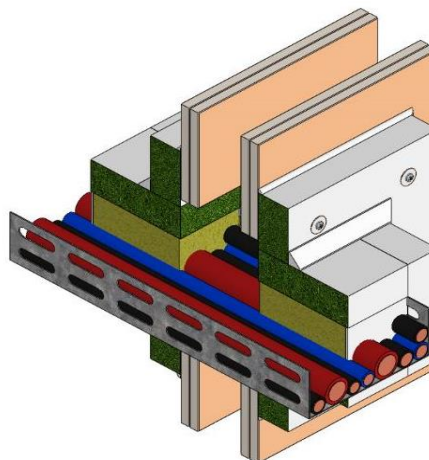
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: 1600mm by 1000mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Cut FB750 Intubatt to form batt box detail around cable tray(s) as per detail drawing below. Position the batt box around the penetration flush with the wall face on both faces of the compartment, extending 150mm away from the compartment wall. Cut FB750 Intubatt to the required size and shape, ensuring it will be a tight fit to all edges of the aperture. Cut the FB750 Intubatt to tightly fit around the batt box detail, using a single layer board to each side, pattress requirements explained below. The remaining aperture within the batt box should be completely filled with FI064 Soft Joint Filler, and coated to each side with 3mm WFT FS702 Intumastic. Cut the FB750 Intubatt across the shortest dimension aligning both to the midpoint of the batt box, to enable the FB750 Intubatt to be fitted in to the aperture. Apply FS702 Intumastic to all edges of the FB750 Intubatt, ensuring that an even cover is achieved over the entire exposed thickness of the FB750 Intubatt, this should include the outer edges of the FB750 Intubatt and the cut across to allow installation in the aperture.

Boards surface mounted on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges). Batt Box is only required to be installed round cables, trays (perforated or non-perforated), ladders, baskets and trunking. If included within a mixed penetration seal, the rest of the seal should be completed as per the normal surface mounted batt requirement.

The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.

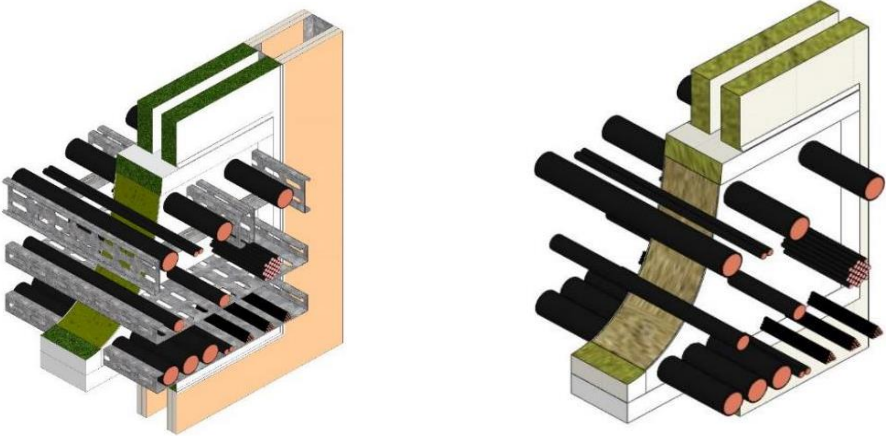


Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 500mm width	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A1 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A2 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A3 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓	✓	✓
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓	✓	✓
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	120	✓		✓	
≤ 2 type B cables, each cable ≤ 19mm diameter	120	120	✓		✓	
1 type C1 cable ≤ 41mm diameter	120	120	✓		✓	
1 type C2 cable ≤ 50mm diameter	120	120	✓		✓	
1 type C3 cable ≤ 37mm diameter	120	120	✓		✓	
1 type D1 cable ≤ 55mm diameter	120	120	✓		✓	
1 type D2 cable ≤ 65mm diameter	120	120	✓		✓	
1 type D3 cable ≤ 52.5mm diameter	120	120	✓		✓	
≤ 2 type E Cables ≤ 25mm diameter	120	120	✓		✓	

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
1 type G1 cable ≤ 15mm diameter	120	120	✓		✓	
1 type G2 cable ≤ 20mm diameter	120	120	✓		✓	
Bundle of ≤ 9 type A1 Cables, each ≤ 12mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
Bundle of ≤ 9 type A2 Cables, each ≤ 12mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
≤ 2 type E Cables ≤ 25mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	90	✓	✓	✓	✓
1 type G1 cable ≤ 15mm diameter	120	90	✓	✓	✓	✓
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓	✓	✓
1 type C1 cable ≤ 41mm diameter	120	90	✓	✓	✓	✓
1 type C3 cable ≤ 37mm diameter	120	90	✓	✓	✓	✓
1 type D1 cable ≤ 55mm diameter	120	90	✓	✓	✓	✓
1 type D3 cable ≤ 52.5mm diameter	120	60	✓	✓	✓	✓
≤ 2 type B cables, each cable ≤ 19mm diameter	120	60	✓	✓	✓	✓
2 type E cables ≤ 25mm diameter	120	60	✓	✓	✓	✓
1 type G2 cable ≤ 20mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	90	✓		✓	

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A6. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION BATT BOX

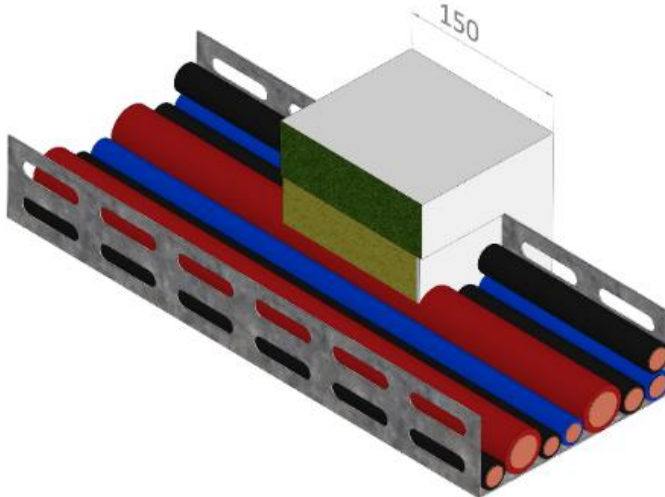
Cables, Metal Cable Trays, Trunking, Baskets and Ladders insulated within a batt box passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1800mm by 1200mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Cut FB750 Intubatt to form batt box detail around cable tray(s) as per detail drawing below. Position the batt box around the penetration and position the centre of the batt box inline with the centre of the proposed FB750 Intubatt seal. Cut FB750 Intubatt to the required size and shape, ensuring it will be a tight fit to all edges of the aperture. Cut the FB750 Intubatt to tightly fit around the batt box detail, using a double Layer board, compressed and bonded into the aperture at mid depth of the wall. FS702 Intumastic or FS712 Intucoat is to be used to bond and form a seal between the batt box and the abutment of the wall and board to board joints. The remaining aperture within the batt box should be completely filled with FI064 Soft Joint Filler, and coated to each side with 3mm WFT FS702 Intumastic. Cut the FB750 Intubatt across the shortest dimension aligning both to the midpoint of the batt box, to enable the FB750 Intubatt to be fitted in to the aperture. Apply FS702 Intumastic to all edges of the FB750 Intubatt, ensuring than an even cover is achieved over the entire exposed thickness of the FB750 Intubatt, this should include the outer edges of the FB750 Intubatt and the cut across to allow installation in the aperture. Insert the FB750 Intubatt in the opening. Apply a bead of FS702 Intumastic to approximately 6mm by 6mm wide to the perimeter and 20mm by 20mm around the batt box detail, where the FB750 Intubatt meets the aperture and penetration. Ensure that all gaps between the FB750 Intubatt and the surrounding edges are fully filled. Repair any damages to the coating which may have occurred during installation using FS702 Intumastic or FS712 Intucoat. Repeat FS702 / FS712 seal to the opposite side of wall. Batt Box is only required to be installed round cables, trays (perforated or non-perforated), ladders, baskets and trunking. If included within a mixed penetration seal, the rest of the seal should be completed as per the normal double batt requirement.
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 500mm width	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A1 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A2 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
Bundle of ≤ 10 type A3 cables, each cable ≤ 12mm diameter	120	120	✓	✓	✓	✓
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓	✓	✓
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓	✓	✓
≤ 2 type B cables, each cable ≤ 19mm diameter	120	120	✓		✓	
Bundle of ≤ 9 type A1 Cables, each ≤ 12mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
Bundle of ≤ 9 type A2 Cables, each ≤ 12mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
≤ 2 type E Cables ≤ 25mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	120	✓		✓	
1 type C1 cable ≤ 41mm diameter	120	120	✓		✓	
1 type C3 cable ≤ 37mm diameter	120	120	✓		✓	
1 type D1 cable ≤ 55mm diameter	120	120	✓		✓	
1 type D3 cable ≤ 52.5mm diameter	120	120	✓		✓	
≤ 2 type E cables ≤ 25mm diameter	120	120	✓		✓	
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	120	✓		✓	

Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
1 type G1 cable ≤ 15mm diameter	120	120	✓		✓	
1 type G2 cable ≤ 20mm diameter	120	120	✓		✓	
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	90	✓	✓	✓	✓
1 type G1 cable ≤ 15mm diameter	120	90	✓	✓	✓	✓
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓	✓	✓
1 type C1 cable ≤ 41mm diameter	120	90	✓	✓	✓	✓
1 type C3 cable ≤ 37mm diameter	120	90	✓	✓	✓	✓
1 type D1 cable ≤ 55mm diameter	120	90	✓	✓	✓	✓
1 type G2 cable ≤ 20mm diameter, within a ≤ 340mm x 140mm steel trunking 300mm in length, filled with FI064 Backer (64kg/m ³ RF), and coated using 3mm WFT FS702 Intumastic to both faces	120	90	✓		✓	
1 type D3 cable ≤ 52.5mm diameter	120	60	✓	✓	✓	✓
≤ 2 type E cables ≤ 25mm diameter	120	60	✓	✓	✓	✓
≤ 2 type B cables, each cable ≤ 19mm diameter	120	60	✓	✓	✓	✓

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

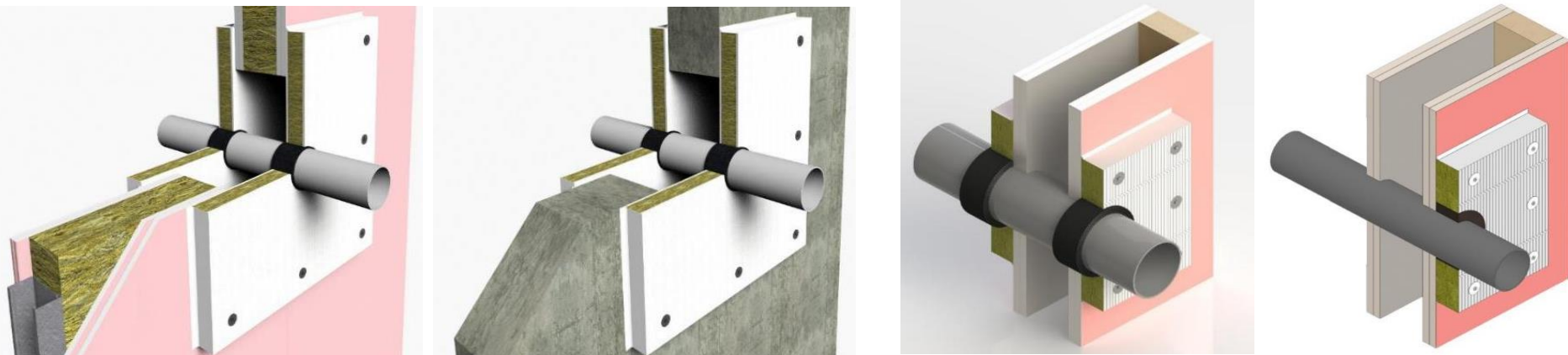
A7. CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION BATT BOX

Cables, Metal Cable Trays, Trunking, Baskets and Ladders insulated within a batt box passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1800mm by 1200mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Cut FB750 Intubatt to form batt box detail around cable tray(s) as per detail drawing below. Position the batt box around the penetration and position the centre of the batt box inline with the centre of the proposed FB750 Intubatt seal. Cut FB750 Intubatt to the required size and shape, ensuring it will be a tight fit to all edges of the aperture. Cut the FB750 Intubatt to tightly fit around the batt box detail, using a single Layer board, compressed and bonded into the aperture at mid depth of the wall. FS702 Intumastic or FS712 Intucoat is to be used to bond and form a seal between the batt box and the abutment of the wall and board to board joints. The remaining aperture within the batt box should be completely filled with FI064 Soft Joint Filler, and coated to each side with 3mm WFT FS702 Intumastic. Cut the FB750 Intubatt across the shortest dimension aligning to the midpoint of the batt box, to enable the FB750 Intubatt to be fitted in to the aperture. Apply FS702 Intumastic to all edges of the FB750 Intubatt, ensuring than an even cover is achieved over the entire exposed thickness of the FB750 Intubatt, this should include the outer edges of the FB750 Intubatt and the cut across to allow installation in the aperture. Insert the FB750 Intubatt in the opening. Apply a bead of FS702 Intumastic to approximately 6mm by 6mm wide to the perimeter and 20mm by 20mm around the batt box detail, where the FB750 Intubatt meets the aperture and penetration. Ensure that all gaps between the FB750 Intubatt and the surrounding edges are fully filled. Repair any damages to the coating which may have occurred during installation using FS702 Intumastic or FS712 Intucoat. Repeat FS702 / FS712 seal to the opposite side of wall.
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)
	E (mins)	EI (mins)	≥ 100	≥ 100
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 500mm width	120	120	✓	✓
Bundle of ≤ 10 type A1 cables, each cable ≤ 12mm diameter	120	120	✓	✓
Bundle of ≤ 10 type A2 cables, each cable ≤ 12mm diameter	120	120	✓	✓
Bundle of ≤ 10 type A3 cables, each cable ≤ 12mm diameter	120	120	✓	✓
1 type D2 cable ≤ 65mm diameter	120	120	✓	✓
1 type C2 cable ≤ 50mm diameter	120	120	✓	✓
1 type C1 cable ≤ 41mm diameter	120	90	✓	✓
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	90	✓	✓
1 type G1 cable ≤ 15mm diameter	120	90	✓	✓
1 type G2 cable ≤ 20mm diameter	120	90	✓	✓
1 type C3 cable ≤ 37mm diameter	120	90	✓	✓
1 type D1 cable ≤ 55mm diameter	120	90	✓	✓
1 type D3 cable ≤ 52.5mm diameter	120	60	✓	✓
≤ 2 type E cables ≤ 25mm diameter	120	60	✓	✓
≤ 2 type B cables, each cable ≤ 19mm diameter	120	60	✓	✓

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A8. COMBUSTIBLE PIPES - DOUBLE BATT PATGRESS – FS709/FP302

Combustible Pipes Insulated with No insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 900mm by 550mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction. Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)			Additional requirements (both sides)
		(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 145	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	≥ 90	
HDPE pipe		≤ 110	10,0	✓	✓	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 160	3.2	✓	✓	120	120	✓	✓	✓		✓	✓		4 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	6.6	✓	✓	120	120	✓	✓			✓			3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	3.2	✓	✓	120	120	✓	✓						3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3.2	✓	✓	120	120	✓							2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 55	2	✓	✓	120	120	✓	✓	✓					1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	4.2	✓	✓	90	90	✓	✓	✓		✓	✓		3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	3.2	✓	✓	90	90	✓	✓	✓		✓	✓		3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 36	1.8	✓	✓	90	90	✓	✓	✓		✓	✓		1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	(#)	≤ 110	3.2	✓	✓	60	60	✓							3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PEX multilayer pipe		≤ 69	8,0	✓	✓	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic
PEX multilayer pipe		≤ 111	10,0	✓	✓	120	120	✓	✓	✓	✓	✓	✓	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic
PEX multilayer pipe	(*)	≤ 64	12	✓	✓	120	120	✓	✓	✓		✓	✓		20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PEX multilayer pipe	(*)	≤ 111	12	✓	✓	120	120	✓	✓	✓		✓	✓		20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PEX multilayer pipe		≤ 28	2.6	✓	✓	120	120	✓	✓	✓		✓	✓		1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PEX multilayer pipe		≤ 40	4.2	✓	✓	120	120	✓	✓	✓		✓	✓		25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)

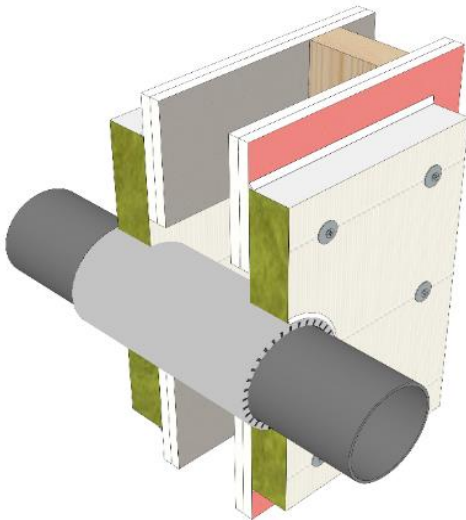
Service	Pipe diameter (mm)	Pipe wall thickness (mm)	Pipe end configuration		Integrity E (mins)	Integrity & Insulation EI (mins)	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)			Additional requirements (both sides)
			C/C	U/C			≥ 145	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	≥ 90	
PEX multilayer pipe		≤ 26	3	✓	✓	120	120	✓	✓	✓		✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
PEX multilayer pipe		≤ 21	2.8	✓	✓	120	120	✓	✓	✓		✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
PEX multilayer pipe		≤ 18	2.8	✓	✓	120	120	✓	✓	✓		✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
PEX multilayer pipe		≤ 28	2.6	✓	✓	120	120	✓	✓	✓		✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
≤ 2 banks of 6 PEX multilayer pipes		≤ 28	2.6	✓	✓	120	120	✓	✓	✓		✓	✓	1 layer of FP302 Intustrap around the entire perimeter (not individual pipes), sealed within FB750 Intubatt with FS702 Intumastic
1 stack of 10 PEX multilayer pipes		≤ 28	2.6	✓	✓	120	120	✓	✓	✓		✓	✓	1 layer of FP302 Intustrap around the entire perimeter (not individual pipes), sealed within FB750 Intubatt with FS702 Intumastic
1 bank of 6 PEX multilayer pipes		≤ 28	2.6	✓	✓	60	60	✓	✓	✓		✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
Ribbed Nylon Copex pipe		≤ 55	0.5 - 1.2	✓	✓	120	120	✓	✓	✓		✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PPR multilayer pipe		≤ 75	10	✓	✓	120	120	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
CPVC Lubrizol Pipe		≤ 90 (\$)	7.2	✓	✓	120	120	✓	✓	✓		✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
CPVC Lubrizol Pipe	(#)	≤ 34 (\$)	3	✓	✓	60	60	✓						1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
CPVC Lubrizol Pipe	(#)	≤ 34 (\$)	3	✓	✓	60	60	✓						25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
PE pipe (+ HDPE, ABS, San+ PVC, PVC-U & PVC-C)		≤ 110	3.4	✓	✓	90	90	✓	✓	✓		✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 110	3.4	✓	✓	90	90	✓	✓	✓		✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

(*) Includes horizontal pipes from 90° to 45° to supporting construction

(#) Overlap can be reduced from 75mm to 50mm

(\$) External measurements manually taken from US units specified pipes

A9. COMBUSTIBLE PIPES - DOUBLE BATT PATGRESS – FP170/FP220

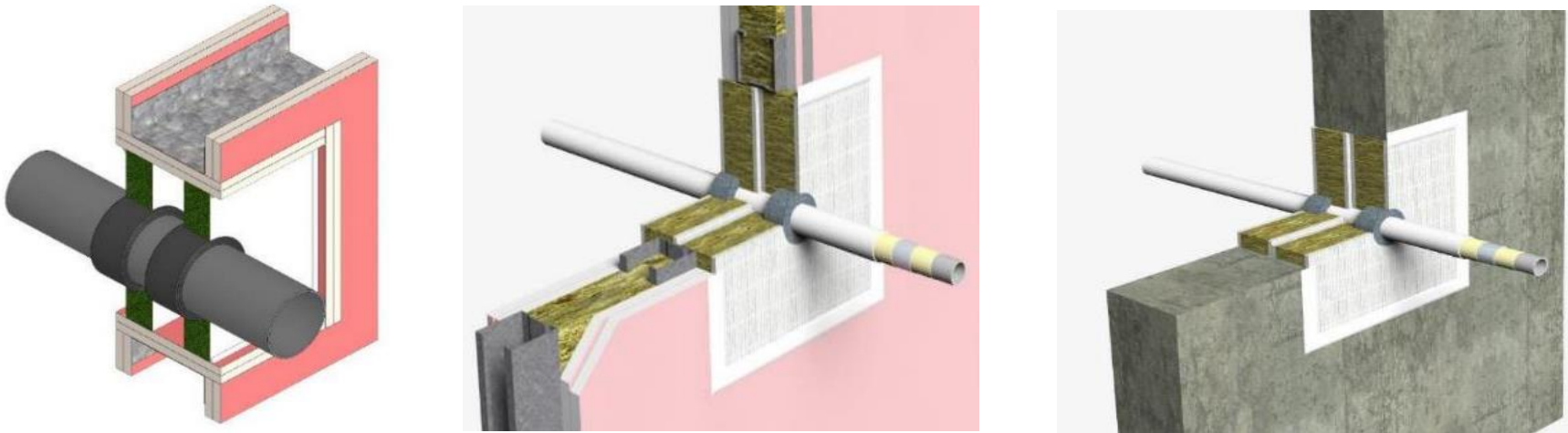
Combustible Pipes Insulated with No insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 800mm by 550mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction. Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service		Pipe diameter	Pipe wall thickness	Pipe end configuration				Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
		(mm)	(mm)	C/C	U/C	C/U	U/U	E (mins)	EI (mins)	≥ 100	≥ 100	
PP-MD pipe (+ HDPE, PVC-U & PVC-C)	(*)	≤ 50	2	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø55 x 220mm (central to the seal) within the FB750 Intubatt, sealed with 3mm deep FS709 HP Intumastic Sealant
PP-MD pipe (+ HDPE, PVC-U & PVC-C)		≤ 50	2	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø55mm, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 160	14.6	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø192 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 75	7.6	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø87 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 50	2.2	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø62 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 110	3.4	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 75	7.1	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 110	2.4	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø110mm, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 75	7.2	✓	✓	✓	✓	120	30	✓	✓	FP170 Intucollar Ø82mm, sealed with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)		≤ 160	5.4	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø192 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)		≤ 110	4.2	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)		≤ 110	11	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic

Service		Pipe diameter	Pipe wall thickness	Pipe end configuration				Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
		(mm)	(mm)	C/C	U/C	C/U	U/U	E (mins)	EI (mins)	≥ 100	≥ 100	
PVC-U pipe (+ PVC-C)		≤ 82	3.1	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 80	10.6	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 50	2.4	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø62 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 50	2.6	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø55mm, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)	(*)	≤ 110	2.4	✓	✓	✓	✓	90	60	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3.2	✓	✓	✓	✓	60	60	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3.2	✓	✓	✓	✓	60	60	✓	✓	FP170 Intucollar Ø82mm, sealed with FS702 Intumastic
PVC rectangular pipe		220x90	1.5	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve 220x90x220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC rectangular pipe		204x60	1.5	✓	✓	✓	✓	90	90	✓	✓	FP220 Service Sleeve 204x60x220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PE-RT multilayer pipe	(*)	≤ 40	4	✓	✓			120	15	✓	✓	FP220 Service Sleeve Ø55 x 220mm (central to the seal) within the FB750 Intubatt, sealed with 3mm deep FS709 HP Intumastic Sealant

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A10. COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION - FS709/FP302

Uninsulated Combustible Pipes passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 800mm by 550mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	Additional requirements (both sides)
		(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 145	≥ 100	≥ 100	
CPVC Lubrizol pipe		≤ 90	7.2	✓	✓	120	120	✓	✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
Ribbed Nylon Copex pipe		≤ 55	0.5 to 1.2	✓	✓	120	120	✓	✓	✓	1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 160	3.2	✓	✓	120	120	✓	✓	✓	4 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 55	2	✓	✓	120	120	✓	✓		1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	3.2	✓	✓	120	120	✓			3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 110	4.2	✓	✓	90	90	✓	✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PPR multilayer pipe		≤ 75	10	✓	✓	120	120	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PEX multilayer pipe	(*)	≤ 64	12	✓	✓	120	120	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PEX multilayer pipe	(*)	≤ 111	12	✓	✓	120	120	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PEX multilayer pipe		≤ 28	2.6	✓	✓	90	90	✓	✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
1 bank of 6 PEX multilayer pipes		≤ 28	2.6	✓	✓	60	60	✓	✓	✓	25mm annulus of FS709 HP Intumescent Sealant, 25mm depth (using FB750 as backer)
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)		≤ 110	3.4	✓	✓	90	90	✓	✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 110	3.4	✓	✓	90	90	✓	✓	✓	3 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A11. COMBUSTIBLE PIPES DOUBLE BATT COMPRESSION - FP170/FP220

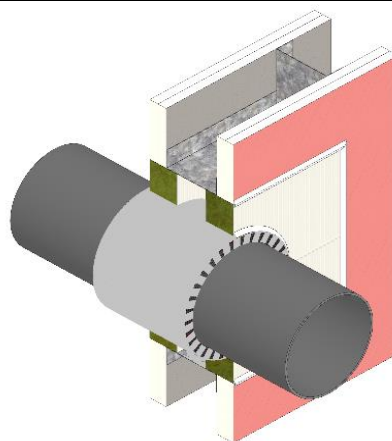
Uninsulated Combustible Pipes passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: 800mm by 550mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

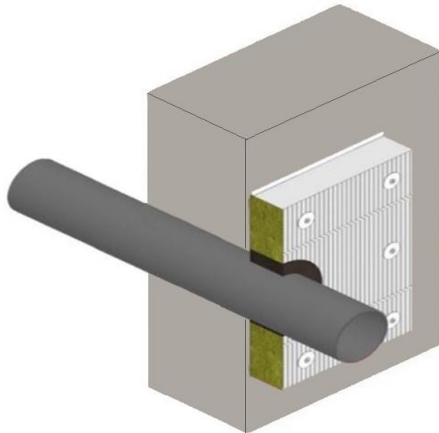
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.



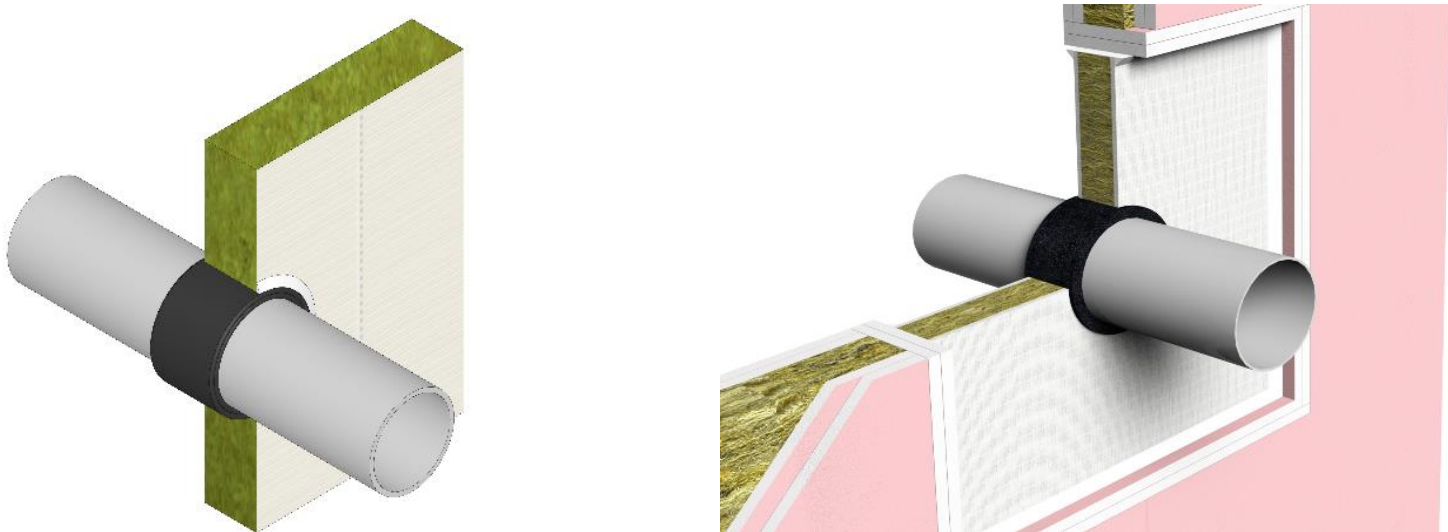
Service		Pipe diameter	Pipe wall thickness	Pipe end configuration				Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
		(mm)	(mm)	C/C	U/C	C/U	U/U	E (mins)	EI (mins)	≥ 100	≥ 100	
PP-MD pipe (+ HDPE, PVC-U & PVC-C)	(*)	≤ 50	2	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø≤ 55 x 220mm (central to the seal) within the FB750 Intubatt, sealed with 3mm deep FS709 HP Intumastic Sealant
PP-MD pipe (+ HDPE, PVC-U & PVC-C)		≤ 50	2	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø≤ 55mm, sealed with FS702 Intumastic
PE pipe (+ HDPE, ABS, San+ PVC, PVC-U & PVC-C)		≤ 160	5	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø192 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PE pipe (+ HDPE, ABS, San+ PVC, PVC-U & PVC-C)		≤ 110	4	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 50	2	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø62 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 50	3	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø≤ 55mm, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)	(*)	≤ 110	2	✓	✓	✓	✓	90	60	✓	✓	FP220 Service Sleeve Ø130 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3.2	✓	✓	✓	✓	60	60	✓	✓	FP220 Service Sleeve Ø94 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PVC-U pipe (+ PVC-C)		≤ 82	3.2	✓	✓	✓	✓	60	60	✓	✓	FP170 Intucollar Ø82mm, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 160	15	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø192 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 75	8	✓	✓	✓	✓	120	120	✓	✓	FP220 Service Sleeve Ø87 x 220mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 110	2	✓	✓	✓	✓	120	120	✓	✓	FP170 Intucollar Ø≤ 110mm, sealed with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)		≤ 75	7	✓	✓	✓	✓	120	30	✓	✓	FP170 Intucollar Ø82mm, sealed with FS702 Intumastic
PVC rectangular pipe		204x60	2	✓	✓	✓	✓	90	90	✓	✓	FP220 Service Sleeve Ø92 x 236mm (central to the seal) within the FB750 Intubatt, sealed with FS702 Intumastic
PE-RT multilayer pipe	(*)	≤ 40	4	✓	✓			120	15	✓	✓	FP220 Service Sleeve Ø≤ 55 x 220mm (central to the seal) within the FB750 Intubatt, sealed with 3mm deep FS709 HP Intumastic Sealant

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A12. COMBUSTIBLE PIPES - SINGLE BATT PATTRESS

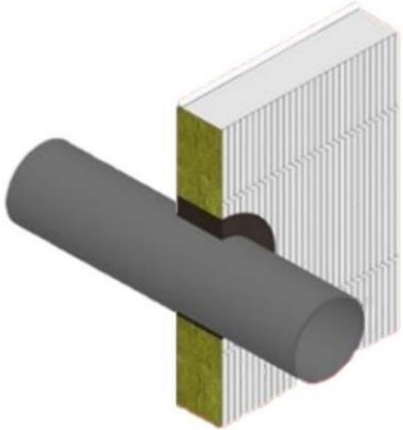
Uninsulated Combustible Pipes passing through Rigid Walls as Identified below, protected by single FB750 Intubatt seal, pattress fitted to one side, sealed with FS702 Intumastic or FS712 Intucoat.								
Wall Details: Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.								
Maximum Opening size: 300mm by 300mm. In Rigid Walls, no cavity may be evident or the cavity should be fully closed prior to application. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.								
Installation Instructions: Single Layer board, surface mounted (pattress fit) with 75mm overlap beyond the aperture on the opposite side of the wall to the fire. FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from the services.								
Results could also be used in both directions with 1 layer (or more) of surface mounted FB750 Intubatt on both sides of the opening.								
								
Service	Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Additional requirements
	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 130	
HDPE pipe	≤ 32	1.5	✓	✓	120	120	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
HDPE pipe	≤ 40	4	✓	✓	120	120	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

A13. COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION

Uninsulated Combustible Pipes passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 500mm by 550mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service	Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 100	≥ 100	
PVC-U pipe (+ PVC-C)	≤ 110	4.2	✓	✓	90	60	✓		3 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	≤ 110	3.5	✓	✓	90	30	✓	✓	3 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic

A14. COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION (ASYMMETRIC)

Uninsulated Combustible Pipes passing through Flexible and Rigid Walls as identified below, protected by single compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.										
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.										
Maximum Opening size: 500mm by 550mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.										
Installation Instructions: Single Layer board, compressed and bonded into the aperture on the opposite side of the wall to fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)										
The results below are also applicable when using multiple layers of FB750 Intubatt, including one layer or more of surface mounted FB750 Intubatt.										
										
Service		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
		(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 100	≥ 100	
PEX multilayer pipe	(*)	≤ 111	12	✓	✓	60	60	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

A15. COMBUSTIBLE PIPES IN SHAFTS - DOUBLE BATT PATRESS & COMPRESSION

Combustible Pipes through Flexible and Rigid Shaft Walls as identified below, protected by double FB750 Intubatt seal, requiring access from one side only to construct. The first batt is installed flush with the surface furthest from the installation side. The second batt is surface mounted on the installation side, sealed with FS702 Intumastic or FS712 Intucoat. Results apply for fire in either direction.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.

Flexible Walls constructed from steel or studs with a minimum of 1x19mm EN 520 type F board on the far side, and 2x15mm EN 520 type F boards on the installation side of the studs.

Maximum Opening size: 2010mm by 1000mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: A 10mm bead of FS702 should be applied to the perimeter of the opening at the furthest point. The first board is then compressed, bonded and located onto the perimeter bead, within the opening. This FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate.

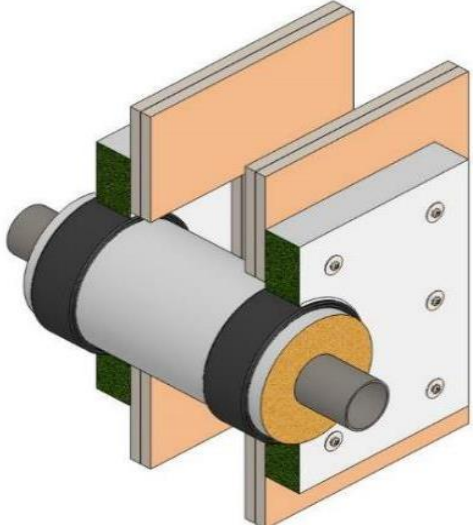
Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. The second board is surface mounted on installation side of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. This FB750 Intubatt should also be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)

The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.



Service	Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Flexible Asymmetric Shaft Wall thickness (mm)	Additional requirements
	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 90	
HDPE pipe	≤ 110	10,0	✓	✓	120	120	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic
PEX multilayer pipe	≤ 69	8,0	✓	✓	120	120	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic
PEX multilayer pipe	≤ 111	10,0	✓	✓	120	120	✓	2 layers of FP302 Intustrap central to the seal of both batts and sealed with FS702 Intumastic

A16. COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT PATTRESS

Combustible Pipes Insulated with Continuous Sustained insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 900mm by 550mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction. Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges) The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service	CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
	Material	Thickness (mm)	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 100	≥ 100	
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 2.4	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 3.7	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.8	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 5.5	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 3	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.9	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Glass Fibre	≥ 50	≤ 20	≥ 1.5	✓	✓	120	30	✓		2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

A17. COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT COMPRESSION

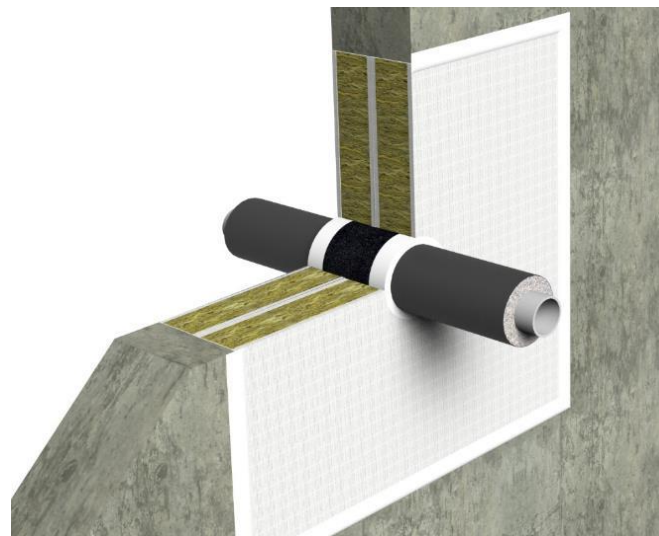
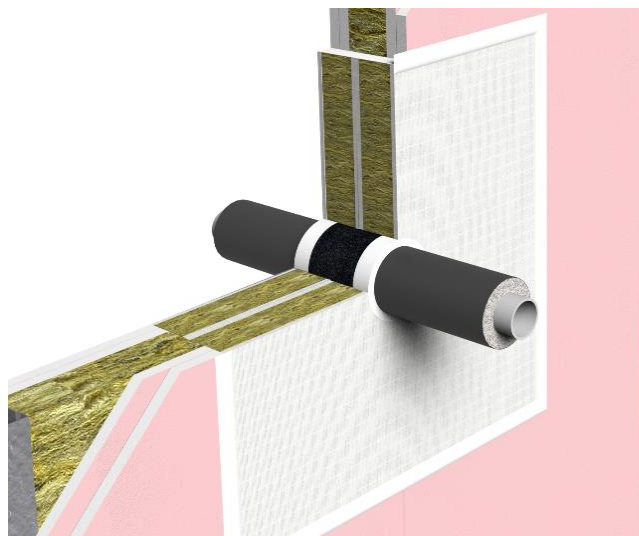
Combustible Pipes Insulated with Continuous Sustained insulation passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: 900mm by 550mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

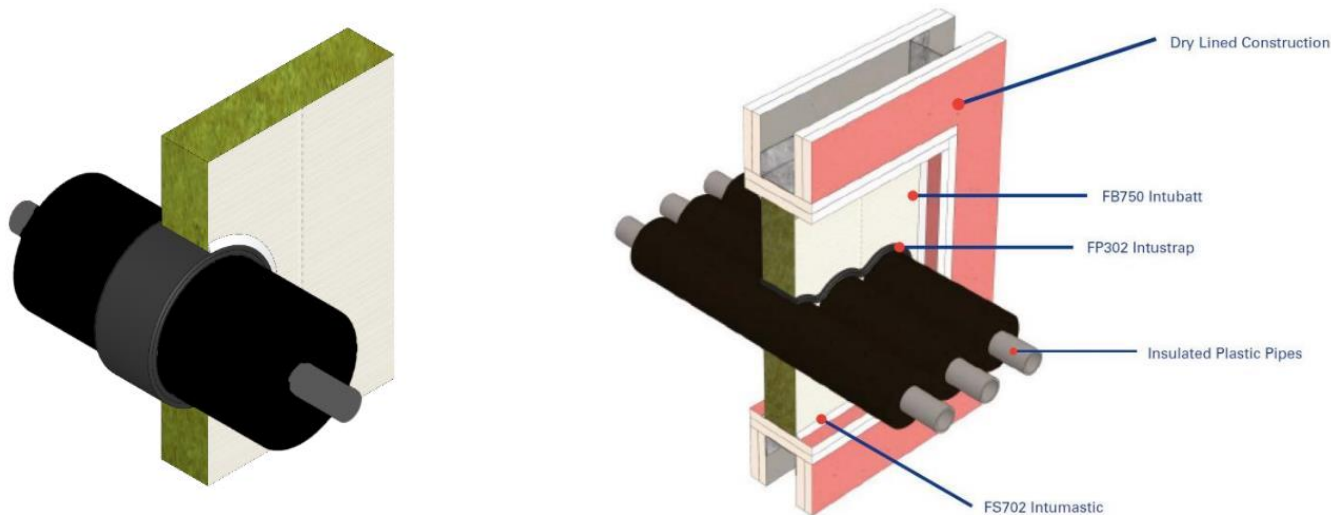
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.



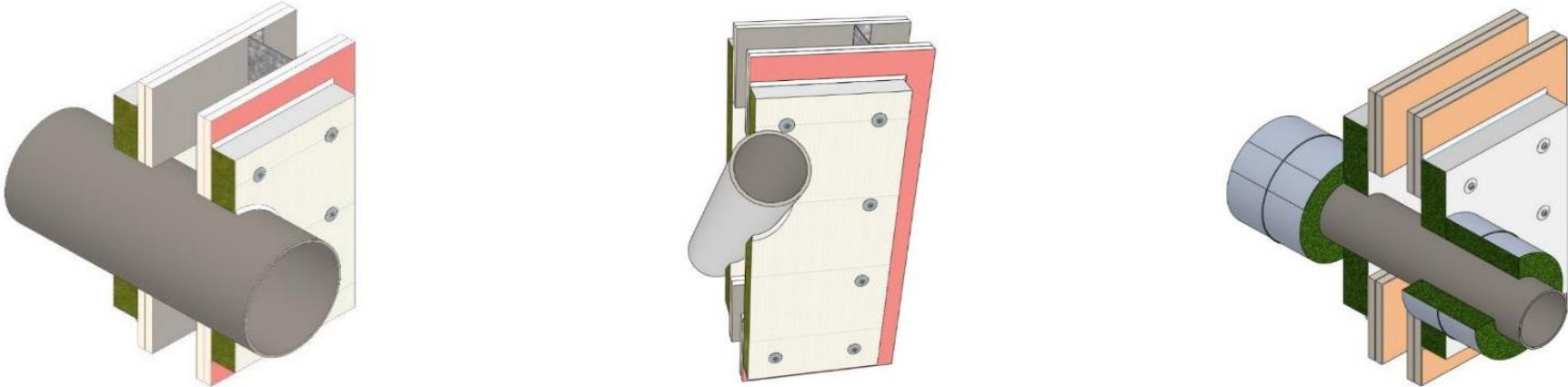
Service	CS Pipe Insulation (Continuous Sustained)		Pipe diameter (mm)	Pipe wall thickness (mm)	Pipe end configuration		Integrity E (mins)	Integrity & Insulation EI (mins)	Rigid Wall thickness (mm) ≥ 100	Flexible Wall thickness (mm) ≥ 100	Additional requirements
	Material	Thickness (mm)			C/C	U/C					
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 3	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.9	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Glass Fibre	≥ 50	≤ 20	≥ 1.5	✓	✓	120	30	✓		2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.8	✓	✓	90	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 5.5	✓	✓	60	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 3.7	✓	✓	60	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 2.4	✓	✓	60	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic

A18. COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION

Combustible Pipes Insulated with Continuous Sustained insulation passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 900mm by 550mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service	CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
	Material	Thickness (mm)	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 100	≥ 100	
PP pipe (+ HDPE, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.8	✓	✓	90	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PE pipe (+ HDPE, ABS, San+ PVC, PVC-U & PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 2.4	✓	✓	90	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Glass Fibre	≥ 50	≤ 20	≥ 1.5	✓	✓	90	30	✓		2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 3	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	Nitrile (Elastomeric)	19	≤ 40	≥ 1.9	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic

A19. NON COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS

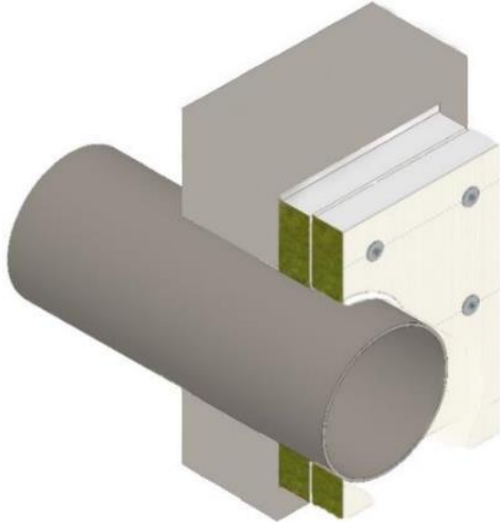
Non Combustible Pipes through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1200mm by 500mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction. Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges) The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service				Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)			Additional requirements (both sides)
Cast Iron	Steel	Copper	-	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	≥ 90	
✓	✓	✓		≤ 42	≥ 1	✓	✓	240	120	✓							200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 14	≥ 1.2	✓	✓	120	120	✓	✓	✓	✓	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 28	≥ 1.2	✓	✓	120	120	✓	✓	✓	✓	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 14	≥ 1	✓	✓	120	120	✓	✓	✓		✓	✓		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 28	≥ 1	✓	✓	120	120	✓	✓	✓		✓	✓		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 42	≥ 1	✓	✓	120	120	✓	✓	✓		✓	✓		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 160	≥ 2	✓	✓	120	120	✓	✓			✓			500mm extension of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 159	≥ 2	✓	✓	120	120	✓	✓			✓			-
✓	✓	✓	(*)	≤ 42	≥ 1.2	✓	✓	120	90	✓	✓	✓	✓	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 15	≥ 0.8	✓	✓	120	90	✓	✓			✓			-
✓	✓	✓		≤ 35	≥ 1.2	✓	✓	120	60	✓	✓	✓		✓	✓		-
✓	✓	✓		≤ 15	≥ 0.7	✓	✓	90	90	✓	✓	✓		✓	✓		-
✓	✓	✓	(*)	≤ 28	≥ 1	✓	✓	60	60	✓	✓	✓		✓	✓		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 160	≥ 1.2	✓	✓	120	30	✓	✓	✓	✓	✓	✓	✓	500mm extension of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 14	≥ 1.2	✓	✓	120	30	✓	✓	✓	✓	✓	✓	✓	-
✓	✓	✓	(*)	≤ 14	≥ 1.2	✓	✓	120	30	✓	✓			✓			-

Service				Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)			Additional requirements (both sides)
Cast Iron	Steel	Copper	-	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	≥ 90	
✓	✓	✓		≤ 22	≥ 1	✓	✓	120	30	✓	✓	✓		✓	✓		200mm coatback of FS712 Intucoat 2mm WFT
✓	✓	✓		≤ 28	≥ 1	✓	✓	60	30	✓	✓	✓		✓	✓		-
✓	✓	✓	(*)	≤ 42	≥ 1	✓	✓	60	30	✓	✓	✓		✓	✓		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 28	≥ 1.2	✓	✓	30	30	✓	✓	✓	✓	✓	✓	✓	-
✓	✓	✓	(*)	≤ 42	≥ 1.2	✓	✓	120	15	✓	✓	✓		✓	✓		-
✓	✓			≤ 76	≥ 2	✓	✓	240	120	✓							200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓			≤ 20	≥ 1.5	✓	✓	120	120	✓	✓						-
✓	✓			≤ 60	≥ 3.3	✓	✓	120	90	✓	✓						-
✓	✓			≤ 220	≥ 8.5	✓	✓	120	60	✓	✓			✓			-
✓	✓			≤ 10	≥ 1.8	✓	✓	90	60	✓	✓	✓		✓	✓		200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 87	≥ 4	✓	✓	60	45	✓	✓						-
✓	✓			≤ 220	≥ 6	✓	✓	120	30	✓	✓	✓		✓	✓		200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 64	≥ 3	✓	✓	120	30	✓	✓	✓		✓	✓		200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 76	≥ 3.4	✓	✓	240	15	✓							-
✓	✓			≤ 90	≥ 3	✓	✓	120	15	✓	✓	✓		✓	✓		200mm coatback of FS712 Intucoat 2mm WFT

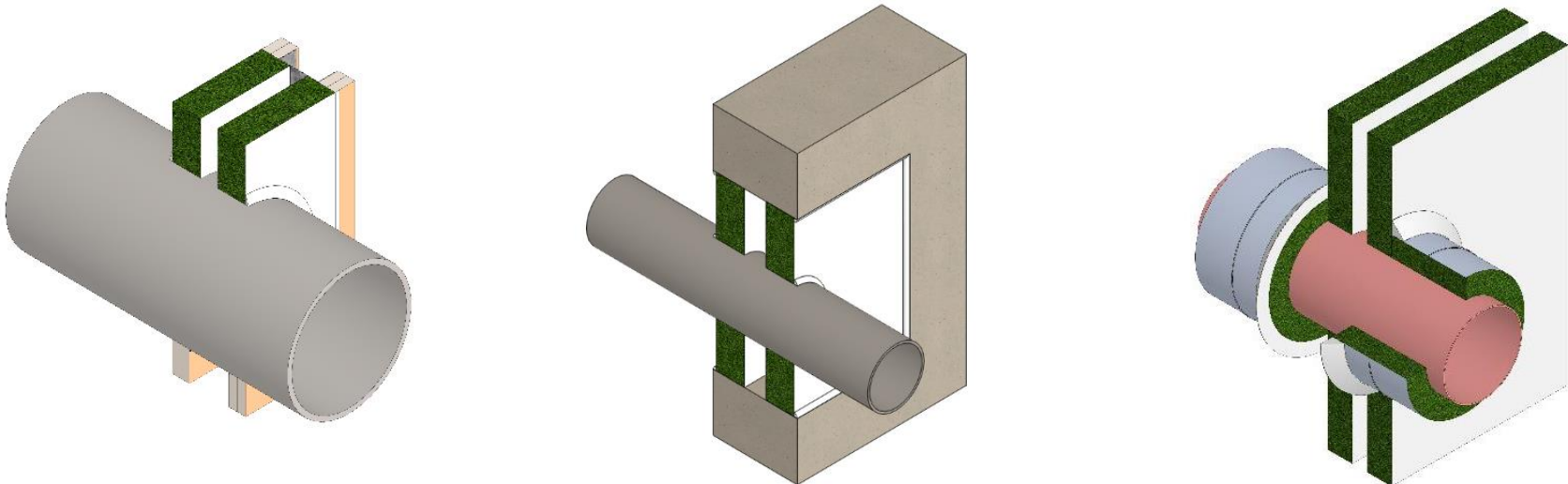
*) Includes horizontal pipes from 90° to 45° to supporting construction

A20. NON COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS (ASYMMETRIC)

Non Combustible Pipes through Rigid Walls as identified below, protected by double pattress (surface mounted) asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Rigid Walls of minimum thickness as identified below and with performance classified to EN13501-2 .
Maximum Opening size: 1100mm by 450mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double layer board surface mounted (pattress fit) together on the opposite side of the wall to the fire, with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. Results could also be used in both directions with double layer surface mounted of FB750 Intubatt on both sides of the opening.


Service			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Additional requirements (both sides)
Cast Iron	Steel	Copper	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓		≤ 40	≥ 2	✓	✓	240	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓		≤ 40	≥ 1.7	✓	✓	240	120	✓	-
✓	✓		≤ 110	≥ 2.2	✓	✓	240	30	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	≤ 40	≥ 1.5	✓	✓	240	60	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	≤ 110	≥ 2.7	✓	✓	240	15	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic

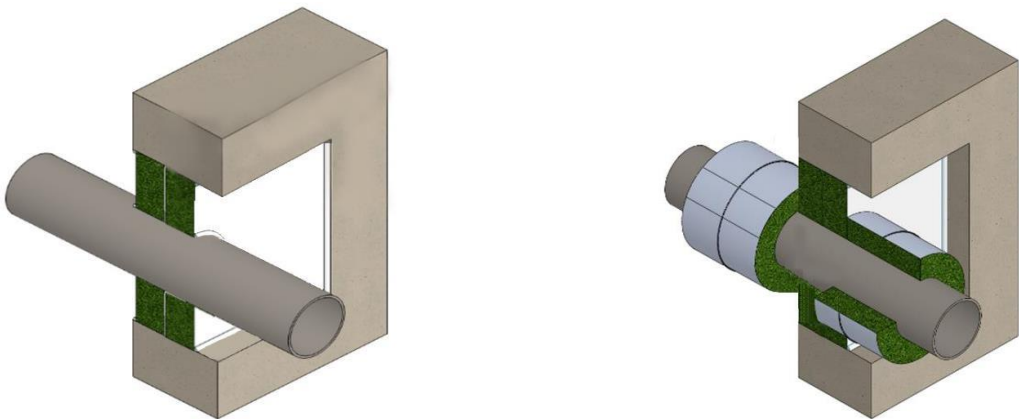
A21. NON COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION

Uninsulated Non Combustible Pipes through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 2000mm by $\leq$ 1100mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service				Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)			Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	-	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓	✓		≤ 42	≥ 1	✓	✓	240	120	✓					200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 42	≥ 1	✓	✓	120	120	✓	✓	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 160	≥ 2	✓	✓	120	120	✓	✓		✓		500mm extension of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 15	≥ 0.8	✓	✓	120	90	✓	✓		✓		-
✓	✓	✓	(*)	≤ 28	≥ 1	✓	✓	60	60	✓	✓	✓	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 14	≥ 1.2	✓	✓	120	30	✓	✓	✓	✓	✓	-
✓	✓	✓	(*)	≤ 42	≥ 1.2	✓	✓	120	15	✓	✓	✓	✓	✓	-
✓	✓	✓		≤ 22	≥ 1	✓	✓	120	15	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 76	≥ 2	✓	✓	240	120	✓					200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓			≤ 220	≥ 8.5	✓	✓	120	60	✓	✓		✓		-
✓	✓			≤ 22	≥ 1	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 220	≥ 6	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 64	≥ 3	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 65	≥ 3.2	✓	✓	90	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓			≤ 76	≥ 3.4	✓	✓	240	15	✓					-
✓	✓			≤ 90	≥ 3	✓	✓	120	15	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT

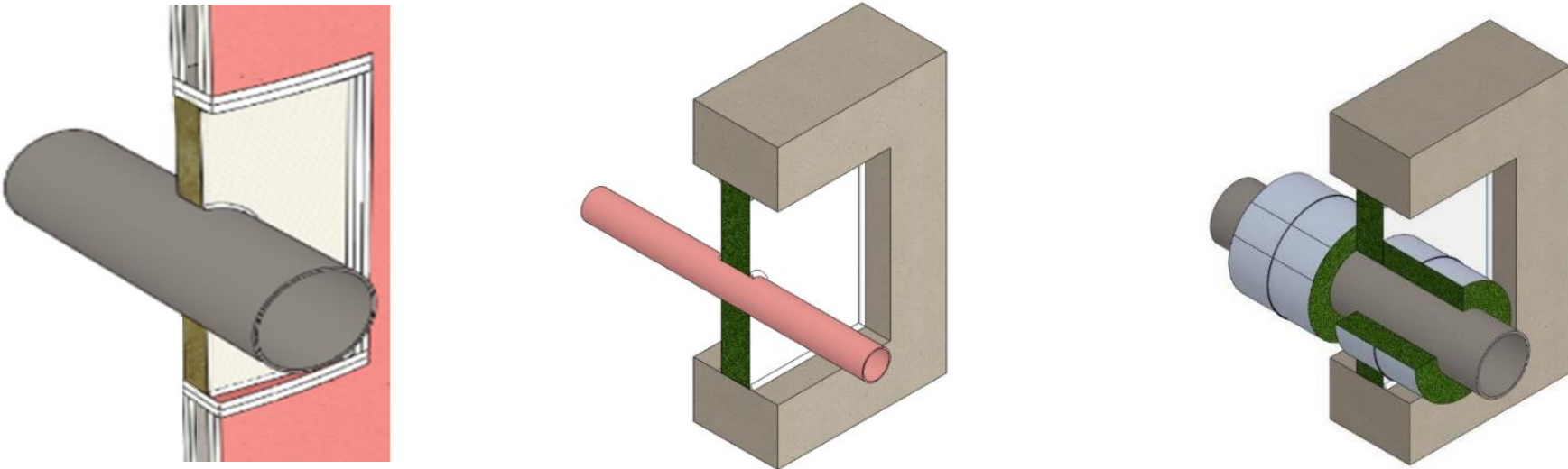
(*) Includes horizontal pipes from 90° to 45° to supporting construction

A22. NON COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION (ASYMMETRIC)

Uninsulated Non Combustible Pipes through Rigid Walls as identified below, protected by double compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: $\leq 1100\text{mm}$ by 450mm . Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded together into the aperture outer face flush with the face of the supporting construction on the opposite side to the fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 2 layers (or more) of surface mounted FB750 Intubatt. Results could also be used in both directions with the addition of FB750 Intubatt to fully fill the opening.


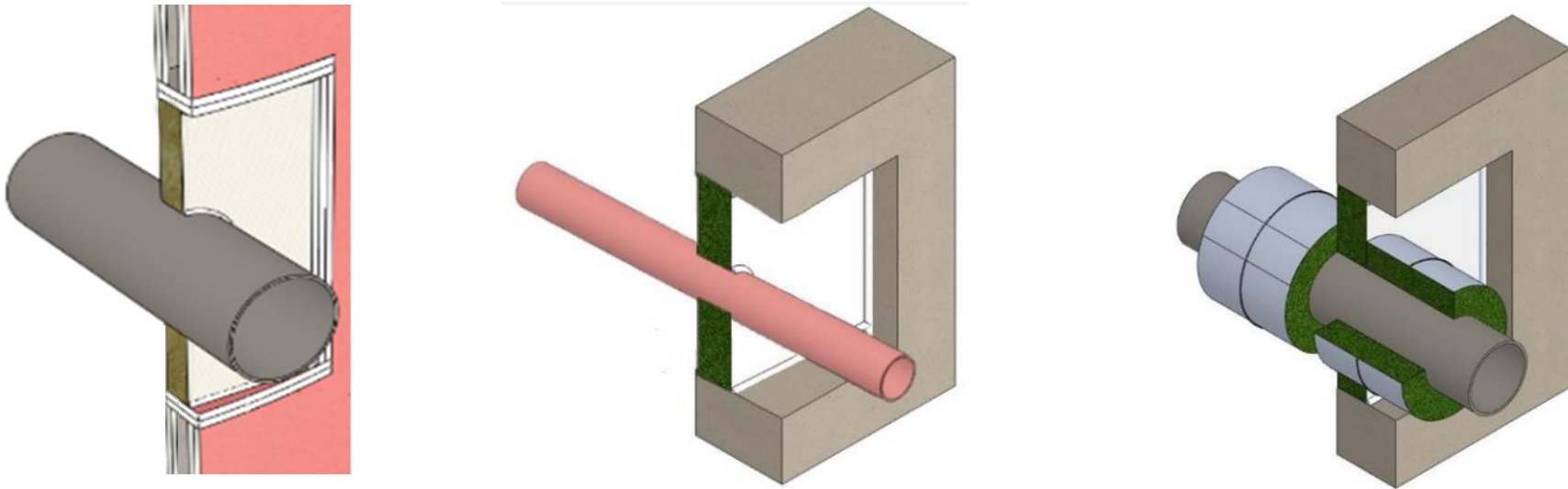
Service			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Additional requirements (both sides)
Cast Iron	Steel	Copper	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓		≤ 40	≥ 2	✓	✓	240	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓		≤ 40	≥ 1.7	✓	✓	240	120	✓	-
✓	✓		≤ 110	≥ 2.2	✓	✓	240	30	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	≤ 40	≥ 1.5	✓	✓	240	60	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic

A23. NON COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION

Uninsulated Non Combustible Pipes through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1800mm by 1200mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)			Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓		≤ 160	≥ 5	✓	✓	120	60	✓					500mm extension (2 rows) of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓		≤ 10	≥ 1.8	✓	✓	90	60	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓		≤ 22	≥ 1	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓		≤ 220	≥ 6	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓		≤ 64	≥ 3	✓	✓	120	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓		≤ 65	≥ 3.2	✓	✓	90	30	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓		≤ 76	≥ 3.4	✓	✓	240	15	✓					-
✓	✓		≤ 90	≥ 3	✓	✓	120	15	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT
✓	✓	✓	≤ 159	≥ 2	✓	✓	60	60	✓	✓		✓		500mm extension (2 rows) of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	≤ 22	≥ 1	✓	✓	120	15	✓	✓	✓	✓	✓	200mm coatback of FS712 Intucoat 2mm WFT

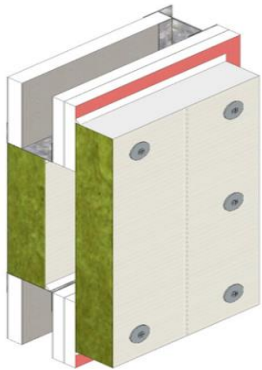
A24. NON COMBUSTIBLE PIPES - SINGLE BATT COMPRESSION (ASYMMETRIC)

Uninsulated Non Combustible Pipes through Flexible and Rigid Walls as identified below, protected by single compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 400mm by 400mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture on the opposite side of the wall to the fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt length. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) of surface mounted FB750 Intubatt.


Service				Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
Cast Iron	Steel	Copper	-	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓	✓	(*)	≤ 28	≥ 1	✓	✓	60	60	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 42	≥ 1	✓	✓	60	30	✓	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 28	≥ 1	✓	✓	60	30	✓	✓	-
✓	✓	✓		≤ 160	≥ 1	✓	✓	60	15	✓	✓	220mm extension of 2 layers of FI025 Intuflex, sealed within FB750 Intubatt with FS702 Intumastic

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A25. NON COMBUSTIBLE PIPES IN SHAFTS - DOUBLE BATT PATRESS & COMPRESSION

Non Combustible Pipes through Flexible and Rigid Shaft Walls as identified below, protected by double FB750 Intubatt seal, requiring access from one side only to construct. The first batt is installed flush with the surface furthest from the installation side. The second batt is surface mounted on the installation side, sealed with FS702 Intumastic or FS712 Intucoat. Results apply for fire in either direction.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or studs with a minimum of 1 x 19mm EN 520 type F board on the far side, and 2x15mm EN 520 type F boards on the installation side of the studs.
Maximum Opening size: 2010mm by 1000mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: A 10mm bead of FS702 should be applied to the perimeter of the opening at the furthest point. The first board is then compressed, bonded and located on the perimeter bead, within the opening. This FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. The second board is surface mounted on installation side of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. This FB750 Intubatt should also be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service				Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Flexible Asymmetric Shaft Wall thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	-	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 90	
✓	✓	✓	(*)	≤ 14	≥ 1.2	✓	✓	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 28	≥ 1.2	✓	✓	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	≤ 42	≥ 1.2	✓	✓	120	90 (120*)	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 160	≥ 1.2	✓	✓	120	30 (60*)	✓	500mm extension of 2 layers of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
✓	✓	✓		≤ 14	≥ 1.2	✓	✓	120	30	✓	-
✓	✓	✓		≤ 28	≥ 1.2	✓	✓	30 (120**)	30	✓	-

(*) Includes horizontal pipes from 90° to 45° to supporting construction

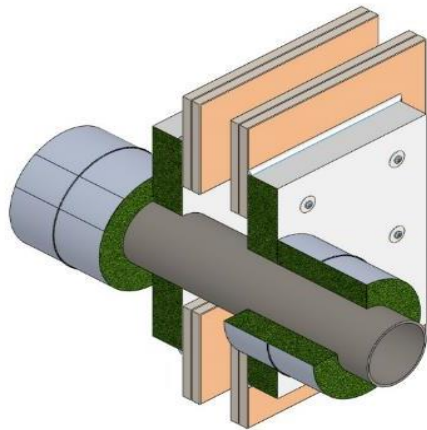
All results apply for fire in either direction.

(60*) Result can be increased to EI60 for fire case into shaft

(120*) Result can be increased to EI120 for fire case into shaft

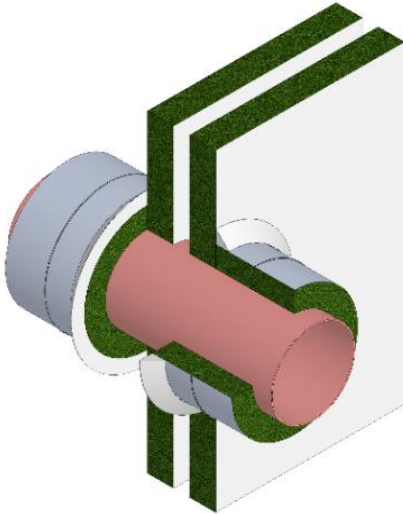
(120**) Result can be increased to E120 for fire case from shaft into room

A26. NON COMBUSTIBLE PIPES INSULATED CI - DOUBLE BATT PATTRESS

Non Combustible Pipes Insulated with Continuous Interrupted Insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1000mm by 1000mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


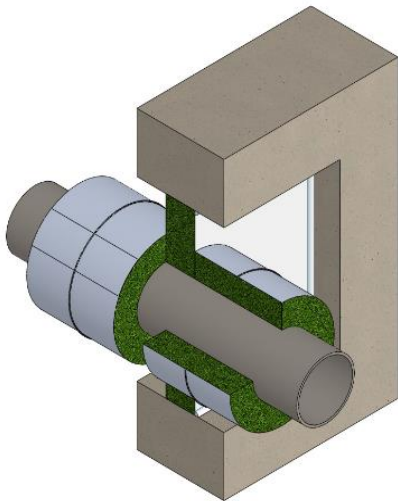
Service			CI Pipe Insulation (Continuous Interrupted)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)		Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓	✓	Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	120	120	✓		✓		-
✓	✓	✓	Rock Fibre	≥ 30	≤ 22	≥ 0.9	✓	✓	120	90	✓		✓		-
✓	✓	✓	Rock Fibre	≥ 30	≤ 15	≥ 0.7	✓	✓	120	90	✓		✓		-
✓	✓	✓	PIR / Phenolic	25	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓	✓	Glass Fibre / Rock Fibre	≥ 40	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓		Rock Fibre	≥ 40	≤ 200	≥ 7.5	✓	✓	120	120	✓		✓		-
✓	✓		Rock Fibre	≥ 30	≤ 60	≥ 7	✓	✓	120	120	✓		✓		-
✓	✓		Nitrile (Elastomeric)	20	≤ 90	≥ 3	✓	✓	120	30	✓	✓	✓	✓	-

A27. NON COMBUSTIBLE PIPES INSULATED CI - DOUBLE BATT COMPRESSION

Non Combustible Pipes Insulated with Continuous Interrupted Insulation passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1200mm by 1200mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


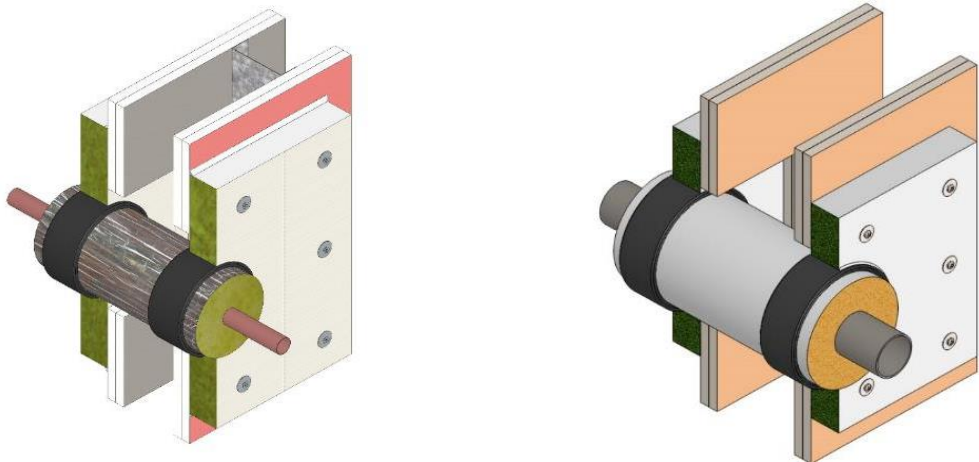
Service			CI Pipe Insulation (Continuous Interrupted)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)		Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓		Rock Fibre	≥ 40	≤ 200	≥ 7.5	✓	✓	120	120	✓		✓		-
✓	✓		Rock Fibre	≥ 30	≤ 60	≥ 7	✓	✓	120	120	✓		✓		-
✓	✓		Nitrile (Elastomeric)	20	≤ 90	≥ 3	✓	✓	120	30	✓	✓	✓	✓	-
✓	✓	✓	Rock Fibre	≥ 30	≤ 22	≥ 0.9	✓	✓	120	90	✓		✓		-
✓	✓	✓	Rock Fibre	≥ 30	≤ 15	≥ 0.7	✓	✓	120	90	✓		✓		-
✓	✓	✓	PIR / Phenolic	25	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓	✓	Glass Fibre / Rock Fibre	≥ 40	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓	✓	Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	60	60	✓		✓		-

A28. NON COMBUSTIBLE PIPES INSULATED CI - SINGLE BATT COMPRESSION

Non Combustible Pipes Insulated with Continuous Interrupted Insulation passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1800mm by 1200mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service			CI Pipe Insulation (Continuous Interrupted)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)		Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓	✓	Rock Fibre	≥ 40	≤ 15	≥ 1	✓	✓	120	90	✓		✓		-
✓	✓	✓	PIR / Phenolic	25	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓	✓	Glass Fibre / Rock Fibre	≥ 40	≤ 22	≥ 1	✓	✓	120	60	✓	✓	✓	✓	-
✓	✓	✓	Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	60	60	✓		✓		-
✓	✓		Nitrile (Elastomeric)	20	≤ 90	≥ 3	✓	✓	120	30	✓	✓	✓	✓	-

A29. NON COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT PATRESS

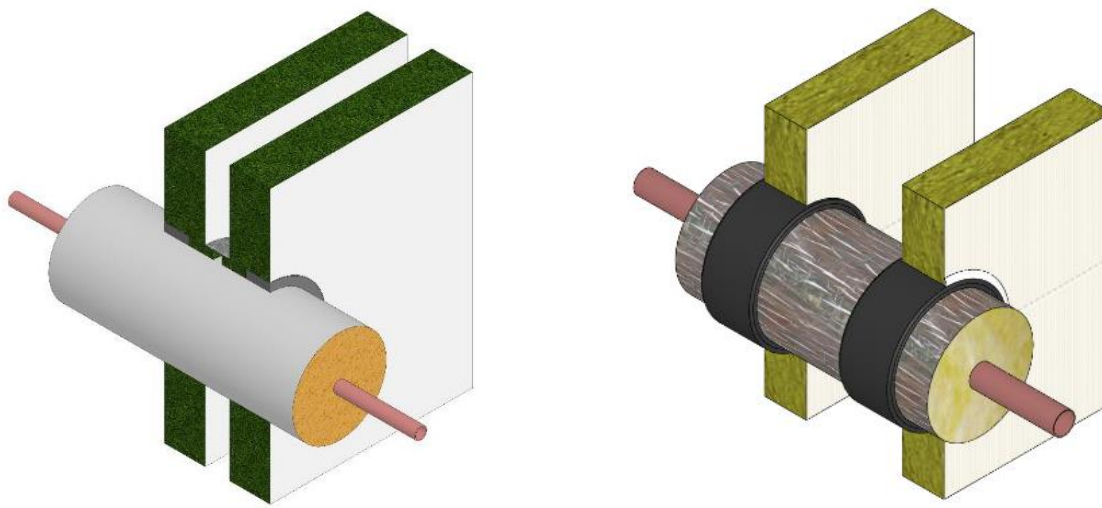
Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 2000mm by 1100mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service				CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 145	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	
✓	✓	✓		PIR / Phenolic	20	≤ 14	≥ 1.2	✓	✓	120	120	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≤ 28	≥ 1.2	✓	✓	120	120	✓	✓	✓		✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≤ 14	≥ 1.2	✓	✓	120	120	✓	✓	✓		✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	30	≤ 22	≥ 1.2	✓	✓	120	120	✓	✓	✓				25mm annulus of FS709 HP Intumescent Sealant, 25mm depth, with a central rock fibre backing
✓	✓	✓		PIR / Phenolic	20	≤ 22	≥ 0.7	✓	✓	120	120	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Glass fibre	≥ 50	≤ 15	≥ 1	✓	✓	120	120	✓	✓			✓		2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Glass fibre	≥ 25	≤ 22	≥ 0.7	✓	✓	120	120	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Nitrile (Elastomeric)	35	≤ 15	≥ 1	✓	✓	120	120	✓	✓			✓		2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Nitrile (Elastomeric)	15	≤ 22	≥ 0.7	✓	✓	120	120	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	50	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	✓		✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≤ 48	≥ 1.2	✓	✓	120	90	✓	✓	✓		✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	50	≤ 42	≥ 1.2	✓	✓	120	30	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≤ 42	≥ 1.2	✓	✓	120	30	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

Service				CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)				Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 145	≥ 130	≥ 100	≥ 90	≥ 130	≥ 100	
✓	✓	✓		Rock Fibre	≥ 40	≤ 15	≥ 0.7	✓	✓	90	90	✓	✓	✓		✓	✓	-
✓	✓	✓		Rock Fibre	≥ 40	≤ 159	≥ 2	✓	✓	90	90	✓	✓	✓		✓	✓	-
✓	✓	✓		Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	90	60	✓	✓	✓		✓	✓	-
✓	✓	✓		Glass fibre	≥ 50	≤ 22	≥ 0.9	✓	✓	90	30	✓	✓	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	30	≤ 22	≥ 0.9	✓	✓	90	30	✓	✓	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	30	≤ 22	≥ 0.9	✓	✓	90	30	✓	✓	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≤ 42	≥ 1.2	✓	✓	60	30	✓	✓	✓		✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓			Glass Fibre	≥ 25	≤ 60	≥ 3.3	✓	✓	120	120	✓	✓					2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Glass Fibre	≥ 50	≤ 60	≥ 6	✓	✓	120	120	✓	✓					1 layer of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Glass Fibre	≥ 50	≤ 220	≥ 6	✓	✓	120	90	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			PIR / Phenolic	30	≤ 22	≥ 1.8	✓	✓	90	90	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Nitrile (Elastomeric)	38	≤ 220	≥ 6	✓	✓	120	60	✓						2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Nitrile (Elastomeric)	25	≤ 22	≥ 1.8	✓	✓	90	30	✓	✓	✓		✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A30. NON COMBUSTIBLE PIPES INSULATED CS - DOUBLE BATT COMPRESSION

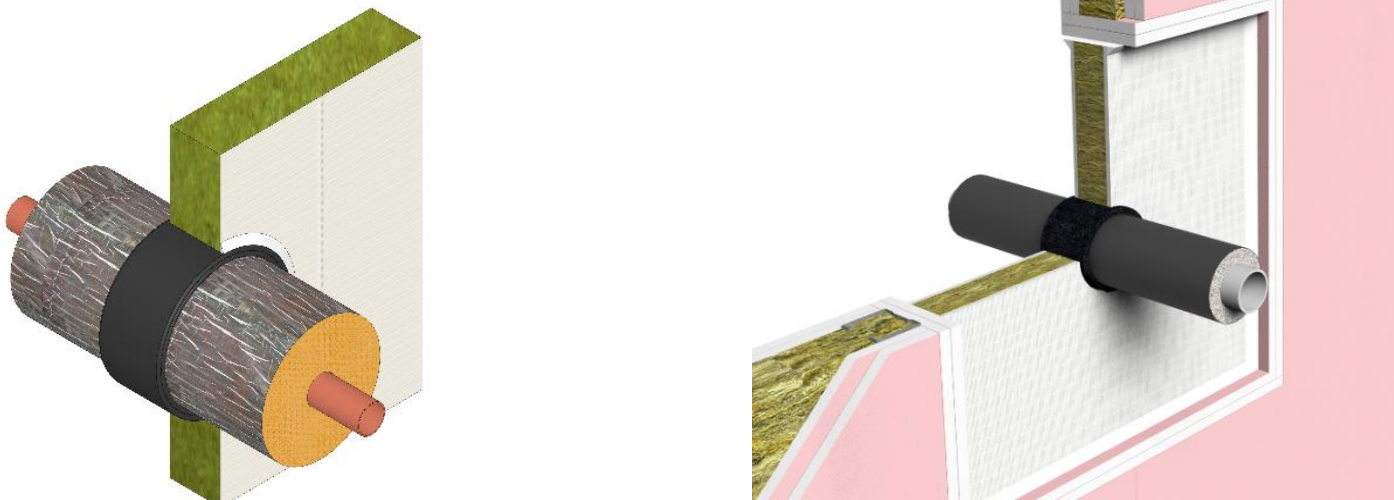
Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 2000mm by 1100mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service				CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓	✓		PIR / Phenolic	20	≤ 14	≥ 1	✓	✓	120	120	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≤ 28	≥ 1	✓	✓	120	120	✓	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≤ 14	≥ 1	✓	✓	120	120	✓	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	30	≤ 22	≥ 1	✓	✓	120	120	✓	✓			25mm annulus of FS709 HP Intumescent Sealant, 25mm depth, with a central 50mm rock fibre backing
✓	✓	✓		Glass fibre	≥ 50	≤ 15	≥ 1	✓	✓	120	120	✓		✓		2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Nitrile (Elastomeric)	35	≤ 15	≥ 1	✓	✓	120	120	✓		✓		2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	50	≤ 28	≥ 1	✓	✓	120	90	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≤ 28	≥ 1	✓	✓	120	90	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	20	≤ 48	≥ 1	✓	✓	120	90	✓	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

Service				CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)		Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100	
✓	✓	✓		Rock Fibre	≥ 40	≤ 15	≥ 0.7	✓	✓	90	90	✓	✓	✓	✓	-
✓	✓	✓		Rock Fibre	≥ 40	≤ 159	≥ 2	✓	✓	90	90	✓	✓	✓	✓	-
✓	✓	✓		Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	90	60	✓	✓	✓	✓	-
✓	✓	✓		PIR / Phenolic	50	≤ 42	≥ 1	✓	✓	120	30	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≤ 42	≥ 1	✓	✓	120	30	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Nitrile (Elastomeric)	25	≤ 22	≥ 0.9	✓	✓	120	30	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		Glass fibre	≥ 50	≤ 22	≥ 0.9	✓	✓	90	30	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	30	≤ 22	≥ 0.9	✓	✓	90	30	✓	✓			2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≤ 42	≥ 1	✓	✓	60	30	✓	✓	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓			PIR / Phenolic	30	≤ 22	≥ 1.8	✓	✓	90	90	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Nitrile (Elastomeric)	25	≤ 22	≥ 1.8	✓	✓	90	30	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓			Glass fibre	≥ 30	≤ 22	≥ 1.8	✓	✓	90	30	✓	✓	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

(*) Includes horizontal pipes from 90° to 45° to supporting construction

A31. NON COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION

Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 1100mm by 630mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


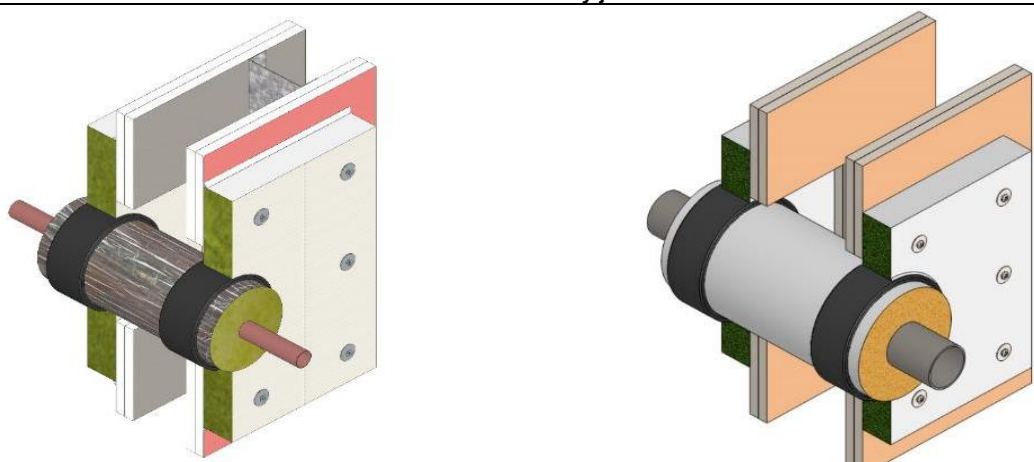
Service			CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓		PIR / Phenolic	30	≤ 22	≥ 1.8	✓	✓	90	90	✓	✓	2 layers of FP302 Intustrap (central to the seal). sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓		Glass Fibre	≥ 30	≤ 22	≥ 1.8	✓	✓	90	30	✓	✓	2 layers of FP302 Intustrap (central to the seal). sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	Rock Fibre	≥ 30	≤ 159	≥ 2	✓	✓	90	60	✓	✓	-
✓	✓	✓	Nitrile (Elastomeric)	25	≤ 22	≥ 0.9	✓	✓	120	30	✓		2 layers of FP302 Intustrap (central to the seal). sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	Glass fibre	≥ 50	≤ 22	≥ 0.9	✓	✓	90	30	✓		2 layers of FP302 Intustrap (central to the seal). sealed on both sides of FB750 Intubatt with FS702 Intumastic

A32. NON COMBUSTIBLE PIPES INSULATED CS - SINGLE BATT COMPRESSION (ASYMMETRIC)

Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by single compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 400mm by 400mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture on the opposite side of the wall to fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) of surface mounted FB750 Intubatt.


Service			CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓	✓	PIR / Phenolic	50	≤ 28	≥ 1	✓	✓	60	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≤ 28	≥ 1	✓	✓	60	60	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	PIR / Phenolic	50	≤ 42	≥ 1	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≤ 48	≥ 1	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≤ 48	≥ 1	✓	✓	60	15	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

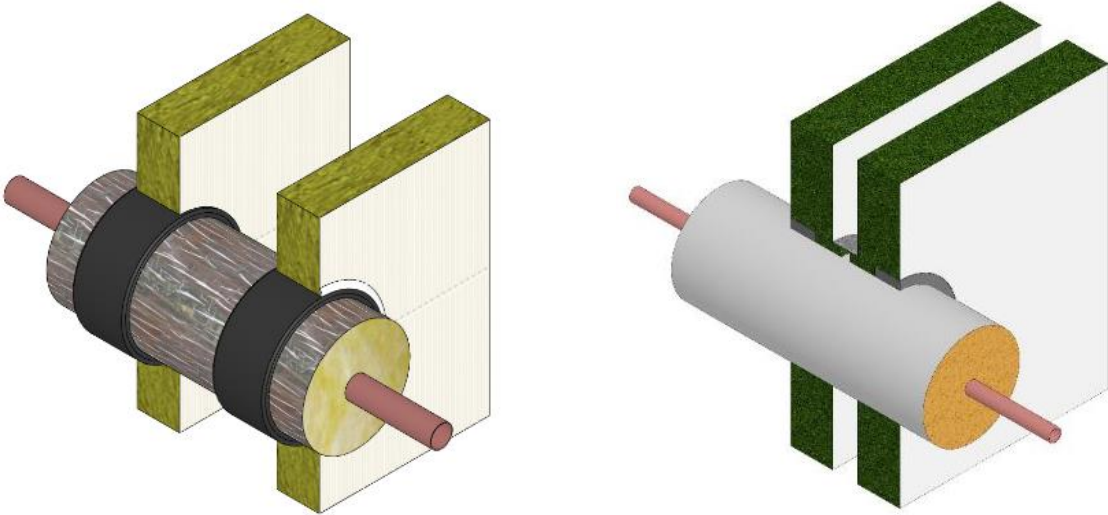
A33. NON COMBUSTIBLE PIPES INSULATED LS - DOUBLE BATT PATRESS

Non Combustible Pipes Insulated with Local Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 200mm by 200mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.


Service				LS Insulation (Local Sustained)			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	Length on both sides (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 14	≥ 1.2	✓	✓	120	120	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≥ 200	≤ 28	≥ 1.2	✓	✓	120	120	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≥ 200	≤ 14	≥ 1.2	✓	✓	120	120	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	50	≥ 200	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 28	≥ 1.2	✓	✓	120	90	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≥ 200	≤ 48	≥ 1.2	✓	✓	120	90	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	50	≥ 200	≤ 42	≥ 1.2	✓	✓	120	30	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 42	≥ 1.2	✓	✓	120	30	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≥ 200	≤ 42	≥ 1.2	✓	✓	60	30	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

(*) Includes horizontal pipes from 90° to 45° to supporting construction

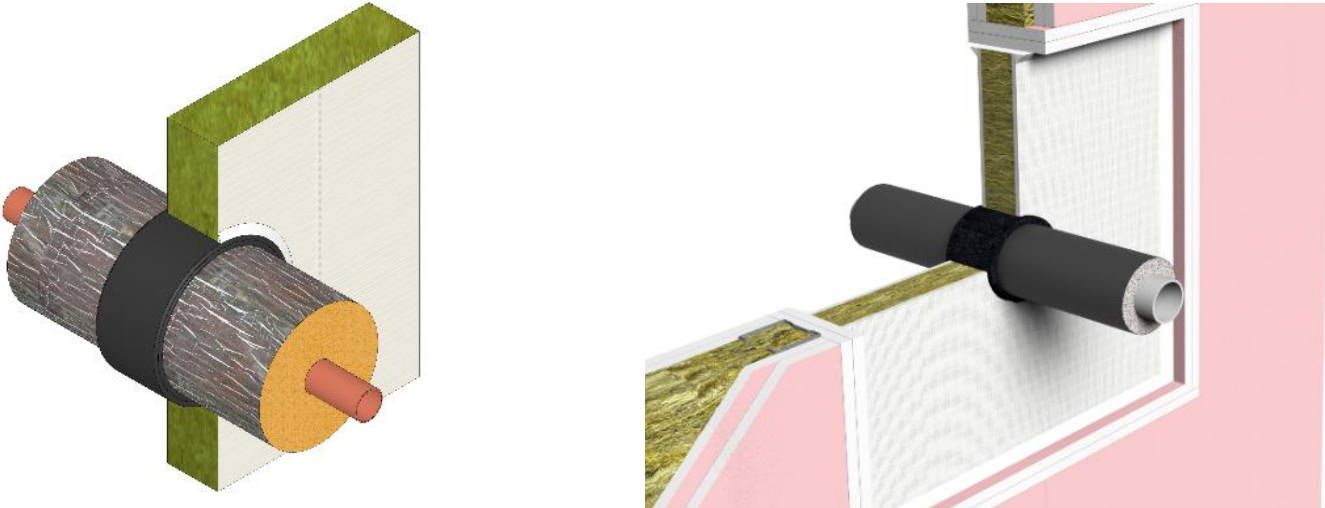
A34. NON COMBUSTIBLE PIPES INSULATED LS - DOUBLE BATT COMPRESSION

Non Combustible Pipes Insulated with Local Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 400mm by 400mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Service				LS Insulation (Local Sustained)			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements (both sides)
Cast Iron	Steel	Copper	-	Material	Thickness (mm)	Length on both sides (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 14	≥ 1	✓	✓	120	120	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≥ 200	≤ 28	≥ 1	✓	✓	120	120	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	(*)	PIR / Phenolic	20	≥ 200	≤ 14	≥ 1	✓	✓	120	120	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	50	≥ 200	≤ 28	≥ 1	✓	✓	120	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓		PIR / Phenolic	20	≥ 200	≤ 28	≥ 1	✓	✓	120	90	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	20	≥ 200	≤ 48	≥ 1	✓	✓	120	90	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓		PIR / Phenolic	50	≥ 200	≤ 42	≥ 1	✓	✓	120	30	✓	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	(*)	PIR / Phenolic	50	≥ 200	≤ 42	≥ 1	✓	✓	60	30	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

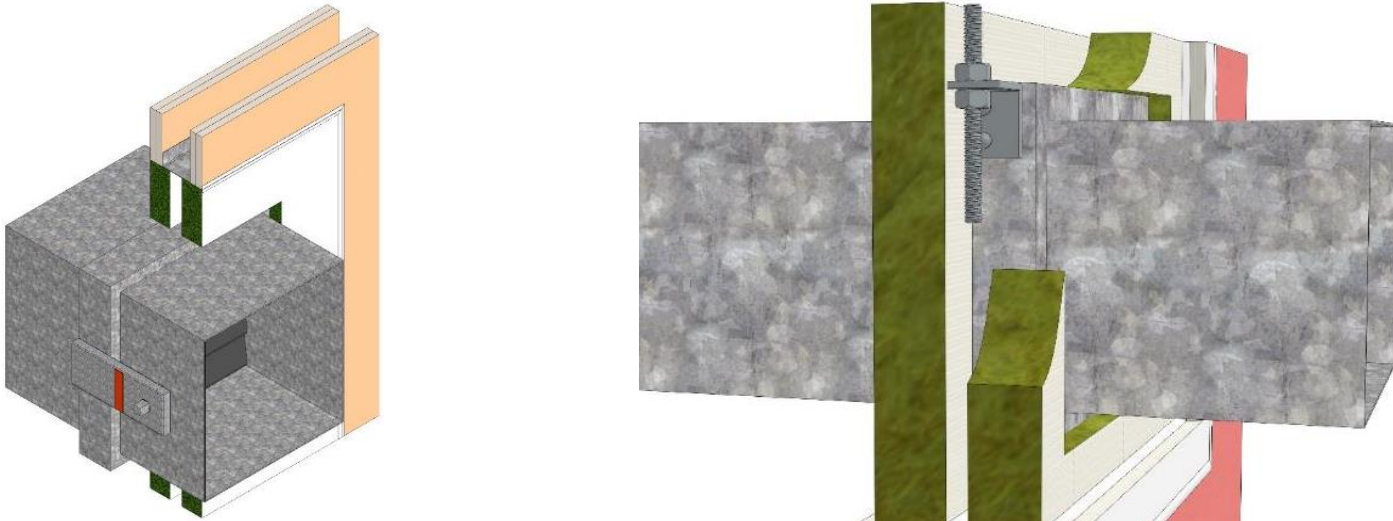
(*) Includes horizontal pipes from 90° to 45° to supporting construction

A35. NON COMBUSTIBLE PIPES INSULATED LS - SINGLE BATT COMPRESSION (ASYMMETRIC)

Non Combustible Pipes Insulated with Local Sustained Insulation passing through Flexible and Rigid Walls as identified below, protected by single compressed asymmetric FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 400mm by 400mm. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture on the opposite side of the wall to the fire. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) of surface mounted FB750 Intubatt.


Service			LS Insulation (Local Sustained)			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	Length on both sides (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 100	≥ 100	
✓	✓	✓	PIR / Phenolic	50	≥ 200	≤ 28	≥ 1	✓	✓	60	60	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≥ 200	≤ 28	≥ 1	✓	✓	60	60	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
✓	✓	✓	PIR / Phenolic	50	≥ 200	≤ 42	≥ 1	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≥ 220	≤ 48	≥ 1	✓	✓	60	30	✓	✓	2 layers of FP302 Intustrap (central to the seal), sealed on both sides of FB750 Intubatt with FS702 Intumastic
✓	✓	✓	PIR / Phenolic	20	≥ 200	≤ 48	≥ 1	✓	✓	60	15	✓	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth

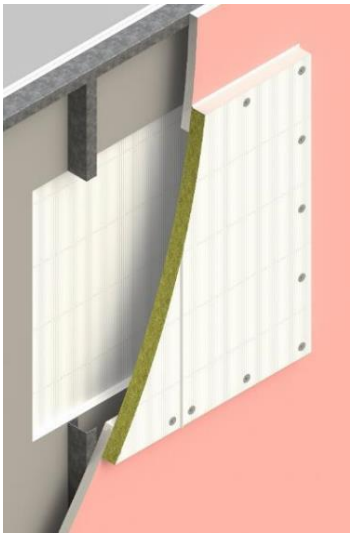
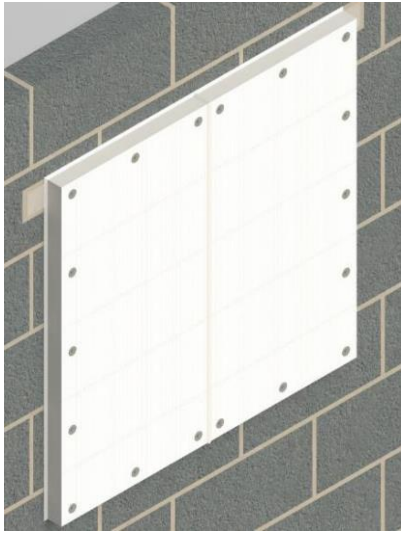
A36. DAMPERS - DOUBLE BATT COMPRESSION

Steel damper through Flexible and Rigid Walls as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: 700mm by 1400mm. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)


Service	Damper dimensions	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)	Flexible Wall thickness (mm)	Additional requirements
	(mm)	E (mins)	EI (mins)	≥ 130	≥ 130	
Steel damper	≤ 400x400x78	120	120	✓	✓	-

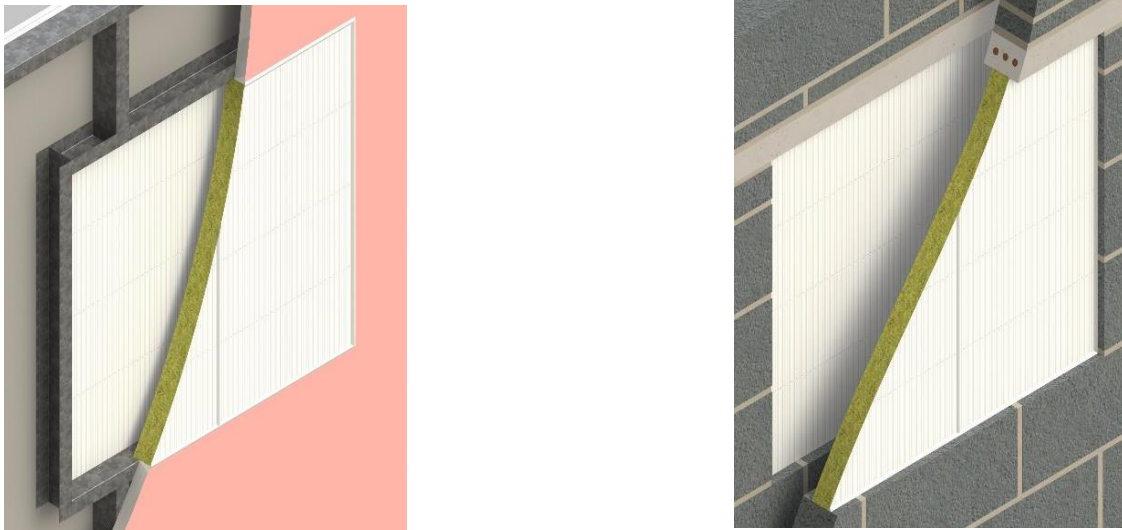
EI performance can only be claimed for the seal between the substrate and the damper ; the damper performance must be based on EN 1366-2 testing.

A37. BLANK SEALS - DOUBLE BATT PATRESS

Blank Seals installed in Flexible Walls or Rigid Walls as Identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: See below. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Boards surface mounted (pattress fit) on both sides of the wall with a minimum 75mm overlap around the opening. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt. For multiple layers of FB750 Intubatt so a single (or both) face, identically sized boards should be used, ideally with staggered joints where possible. Closing devices should be located in or on the outmost board. Board to board abutment should be bonded with 10mm bead of FS702 Intumastic and mechanically restrained using a 75mm spiral screw to the first and secured layer. Spiral fixings should be at max 200mm centres and no more than 50mm from any joint.
 

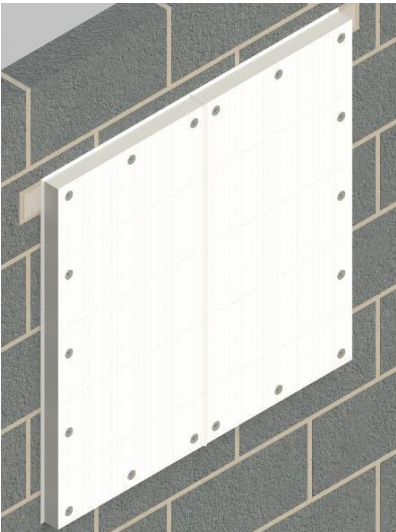
Opening size (mm)	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
≤ 1500x1500	240	240	✓	✓		
≤ 1500x450	120	120	✓	✓	✓	✓
≤ 1140x480	120	120	✓		✓	

A38. BLANK SEALS - DOUBLE BATT COMPRESSION

Blank Seals installed in Flexible Walls or Rigid Walls as Identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2. Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.
Maximum Opening size: See below. In Flexible Walls openings should be created using a steel frame. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture outer face flush with the face of the supporting construction. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved - Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.


Opening size (mm)	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
≤ 1500x1500	240	240	✓	✓		
≤ 1500x450	120	120	✓	✓	✓	✓
≤ 1140x480	120	120	✓		✓	

A39. BLANK SEALS - SINGLE BATT PATTRESS

Blank Seals installed in Rigid Walls as Identified below, protected by single FB750 Intubatt seal, pattress fitted to one side, sealed with FS702 Intumastic or FS712 Intucoat.			
Wall Details: Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.			
Maximum Opening size: See below. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.			
Installation Instructions: Single Layer board, surface mounted (pattress fit) with 75mm overlap beyond the aperture on the opposite side of the wall to the fire. FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt.			
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt.			
			
Opening size	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)
	E (mins)	EI (mins)	≥ 130
≤ 400x400	120	60	✓

A40. BLANK SEALS - SINGLE BATT COMPRESSION

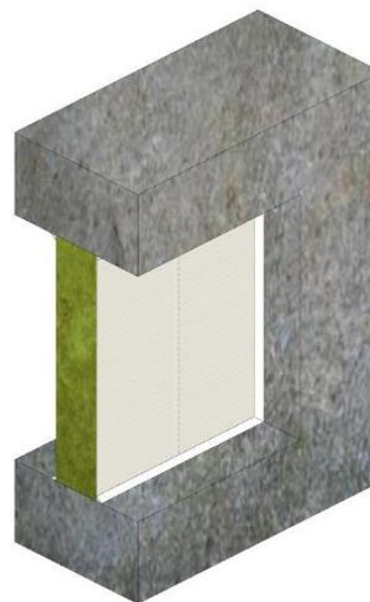
Blank Seals installed in Flexible Walls or Rigid Walls as Identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Wall Details: Flexible or Rigid Walls of minimum thickness as identified below, and with performance classified to EN 13501-2.
Flexible Walls constructed from steel or timber faced studs with a minimum of 2x12.5mm EN 520 type F boards on each side of studs.

Maximum Opening size: See below. In Flexible Walls openings should be created using a steel frame with a plasterboard lining. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Single Layer board, compressed and bonded into the aperture at mid depth of the wall. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved Top to bottom of FB750 Intubatt, left/right is not required to be compressed and vice versa (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

The results below are also applicable when using multiple layers of FB750 Intubatt, including 1 layer (or more) surface mounted on both sides of the wall.



Opening size (mm)	Integrity	Integrity & Insulation	Rigid Wall thickness (mm)		Flexible Wall thickness (mm)	
	E (mins)	EI (mins)	≥ 130	≥ 100	≥ 130	≥ 100
≤ 300x300	120	120	✓		✓	
≤ 1800x1200	120	30	✓	✓	✓	✓

FLOORS

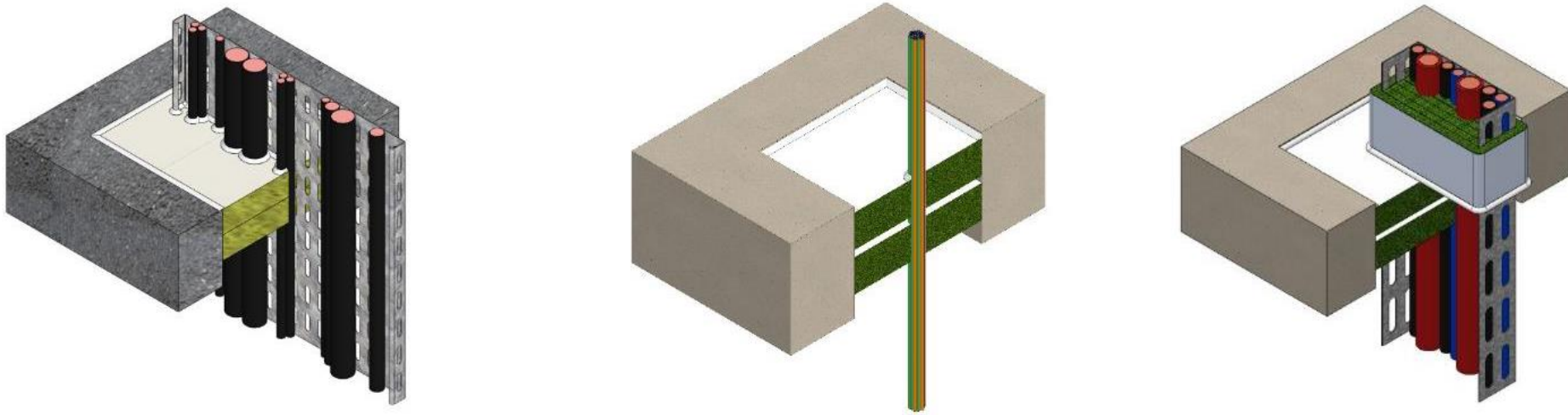
A41. CABLES & CABLE CARRIERS - DOUBLE BATT PATRESS

Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Rigid Floors as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 1100mm by 450mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double layer board, surface mounted (pattress fit) on under side of the floor with a minimum 75mm overlap around the opening. The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration.
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt to the under side of the floor, or double / multiple layers compressed and bonded within the floor, or double / multiple layers to the upper face of the floor.


Service	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
	E (mins)	EI (mins)	≥ 150	
Bundle of ≤ 42mm diameter, comprising ≤ 8 Twin & earth cables, each ≤ 17mm diameter within a ≤ 55mm x 3.2mm HDPE conduit	240	240	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
2 bundles of ≤ 20 Twin & earth cables, each ≤ 17mm diameter	240	240	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 Ethernet Cat 5 cables, each ≤ 6mm diameter	180	120	✓	-
Bundle of ≤ 5 Fibre optic cables, each ≤ 8mm diameter	180	120	✓	-
Bundle of ≤ 3 Fire alarm cables, each ≤ 13mm diameter	180	120	✓	-
Bundle of ≤ 6 lighting cables, each ≤ 10mm diameter	180	120	✓	-
Bundle of ≤ 25 Ethernet Cat 5 cable, each ≤ 6mm diameter	60	60	✓	-
Bundle of ≤ 8 Twin & earth cables, each ≤ 17mm diameter	60	60	✓	-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

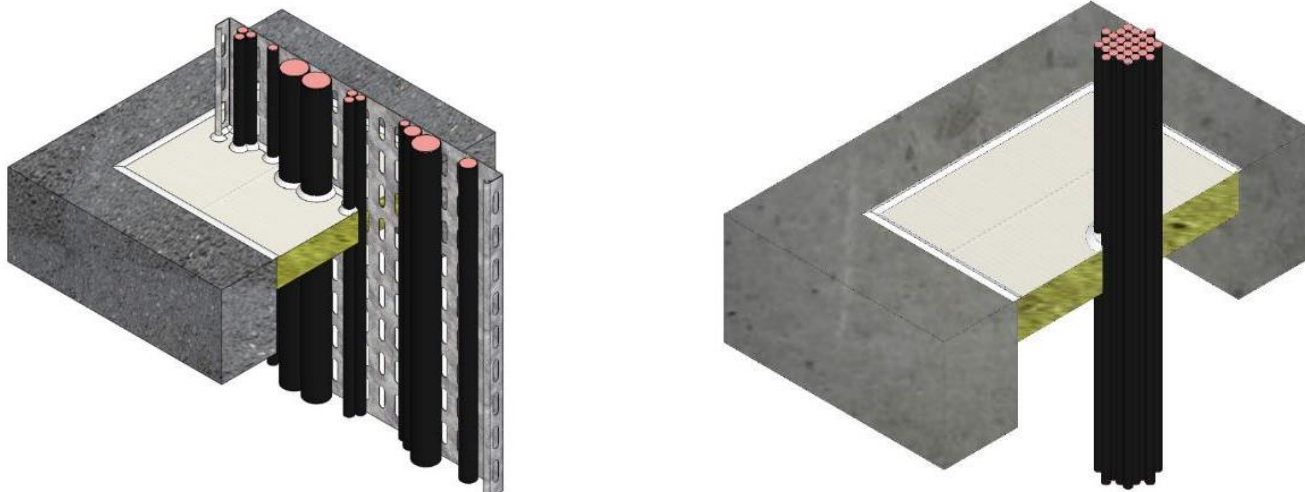
A42. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION

Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Rigid Floors as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 1100mm by 450mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture within the floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved between two opposite sides of FB750 Intubatt, the perpendicular sides are not required to be compressed (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.


Service		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements (top side only)
		E (mins)	EI (mins)	≥ 150	
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 300mm width & minimum 1.3mm thickness	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 500mm width & minimum 1mm thickness	C	120	60	✓	-
Bundle of ≤ 10 Fire alarm cables, each ≤ 10mm diameter	A	240	180	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 5 twin & earth cables, each ≤ 17mm diameter	A	240	180	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 A1 cables, each ≤ 12mm diameter	B	120	120		200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 A2 cables, each ≤ 12mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
Bundle of ≤ 10 A3 cables, each ≤ 12mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
≤ 2 type B cables, each ≤ 19mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
1 type C1 cable ≤ 41mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
1 type C2 cable ≤ 50mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
1 type C3 cable ≤ 37mm diameter	B	120	120	✓	200mm extension of 1 layer of FI025 Intuflex, sealed to FB750 Intubatt with FS702 Intumastic
1 type C2 cable ≤ 50mm diameter	C	120	90	✓	-
≤ 2 type B cables, each ≤ 19mm diameter	C	120	60	✓	-
1 type C1 cable ≤ 41mm diameter	C	120	60	✓	-
1 type C3 cable ≤ 37mm diameter	C	120	60	✓	-
1 type G1 cable ≤ 15mm diameter	C	120	30	✓	-
1 type G2 cable ≤ 20mm diameter	C	120	30	✓	-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%
A : Batts fitted together, flush to lower surface. Data covers applications mid-depth or flush to upper surface.
B : Batts fitted together mid-depth. Data covers flush to upper surface.
C : Batts fitted together flush to upper surface.

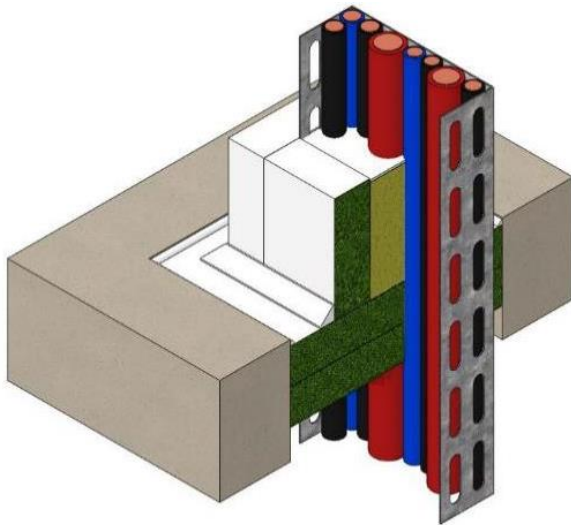
A43. CABLES & CABLE CARRIERS - SINGLE BATT COMPRESSION

Cables, Metal Cable Trays, Trunking, Baskets and Ladders passing through Rigid Floors as identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 350mm by 550mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Single Layer board, compressed and bonded into the aperture flush with upper surface of the floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved between two opposite sides of FB750 Intubatt, the perpendicular sides are not required to be compressed (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, and using single/ multiple layers of surface mounted FB750 Intubatt on the upper face.


Service	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
	E (mins)	EI (mins)	≥ 150	
Metal Cable Trays, Trunking, Baskets and Ladder ≤ 500mm width and ≥ 1mm thickness	60	30	✓	-
≤ 2 type B cables, each cable ≤ 19mm diameter	60	30	✓	-
1 type C1 cable ≤ 41mm diameter	60	30	✓	-
1 type C2 cable ≤ 50mm diameter	60	30	✓	-
1 type C3 cable ≤ 37mm diameter	60	30	✓	-
1 type G1 cable ≤ 15mm diameter	60	30	✓	-
1 type G2 cable ≤ 20mm diameter	60	30	✓	-

Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

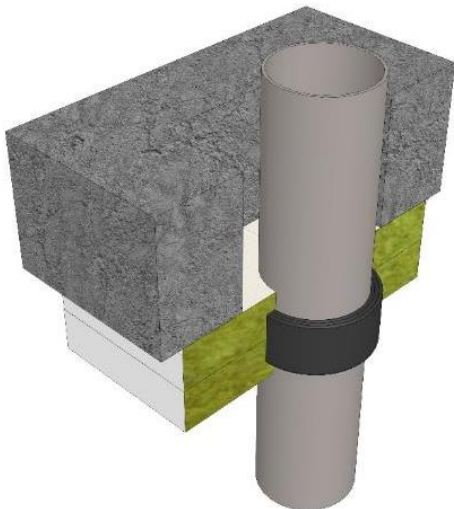
A44. CABLES & CABLE CARRIERS - DOUBLE BATT COMPRESSION BATT BOX

Cables, Metal Cable Trays, Trunking, Baskets and Ladders insulated within a batt box passing through Rigid Floors as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 1800mm by 600mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture within the floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression is achieved between two opposite sides of FB750 Intubatt, the perpendicular sides are not required to be compressed (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression). Cut FB750 Intubatt to form batt box detail around cable tray(s) as per detail drawing below. FS702 Intumastic or FS712 Intucoat is to be used to bond and form a seal between the batt box and the double batt seal and the abutment of the floor and board to board joints. Position the batt box around the penetration and position the centre of the batt box inline with the centre of the proposed FB750 Intubatt seal. The remaining aperture within the batt box should be completely filled with FI064 Soft Joint Filler, and coated to upper face with 3mm WFT FS702 Intumastic. Batt Box is only required to be installed round cables, trays (perforated or non-perforated), ladders, baskets and trunking. If included within a mixed penetration seal, the rest of the seal should be completed as per the normal double batt requirement.
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.


Service	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)
	E (mins)	EI (mins)	≥ 150
Metal Cable Trays, Trunking, Baskets and Ladders ≤ 500mm width	120	120	✓
Bundle of ≤ 10 type A1 cables, each cable ≤ 12mm diameter	120	120	✓
Bundle of ≤ 10 type A2 cables, each cable ≤ 12mm diameter	120	120	✓
Bundle of ≤ 10 type A3 cables, each cable ≤ 12mm diameter	120	120	✓
1 type C1 cable ≤ 41mm diameter	120	120	✓
1 type C2 cable ≤ 50mm diameter	120	120	✓
1 type C3 cable ≤ 37mm diameter	120	120	✓
1 type D1 cable ≤ 55mm diameter	120	120	✓
1 type D2 cable ≤ 65mm diameter	120	120	✓
1 type D3 cable ≤ 52.5mm diameter	120	120	✓
Bundle of ≤ 100mm diameter type F data cables, each cable ≤ 13mm diameter	120	120	✓
1 type G1 cable ≤ 15mm diameter	120	120	✓
1 type G2 cable ≤ 20mm diameter	120	120	✓
≤ 2 type B cables, each cable ≤ 19mm diameter	120	90	✓
≤ 2 type E cables ≤ 25mm diameter	120	90	✓

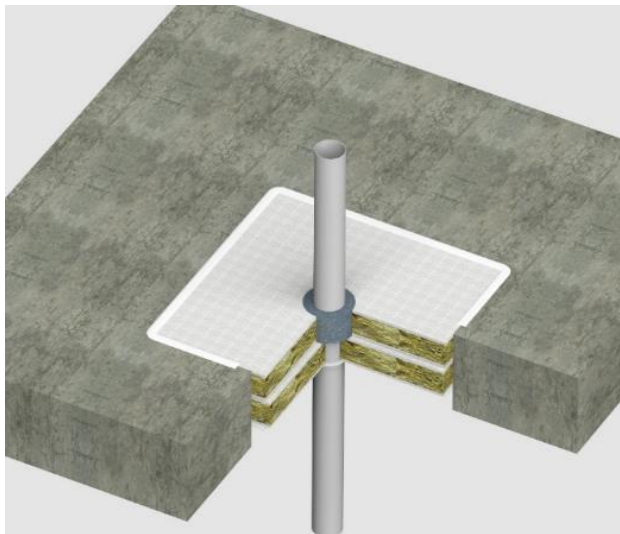
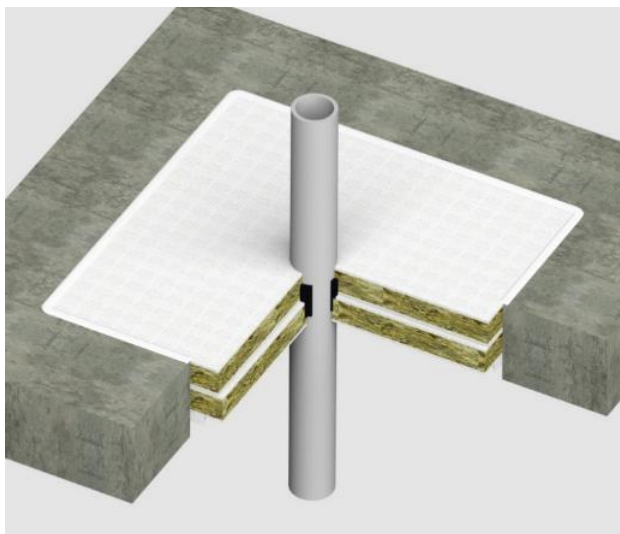
Cable diameters can be increased up to 25%, and cable bundle diameters can be increased up to 10%

A45. COMBUSTIBLE PIPES - DOUBLE BATT PATGRESS

Combustible Pipes Uninsulated passing through Rigid Floors as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floor of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 400mm by 400mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double layer board, surface mounted (pattress fit) on under side of the floor with a minimum 75mm overlap around the opening. The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration.
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt to the under side of the floor, or double / multiple layers compressed and bonded within the floor, or double / multiple layers to the upper face of the floor.


Service	Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 150	
PVC-U pipe (+ PVC-C)	≤ 55	3.2	✓	✓	240	240	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	≤ 110	3.2	✓	✓	240	120	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
HDPE pipe	≤ 55	3.2	✓	✓	60	60	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic

A46. COMBUSTIBLE PIPES - DOUBLE BATT COMPRESSION

Combustible Pipes passing through Rigid Floors as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 1100mm by 1100mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture within the floor, unless otherwise stated. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.
 

Service		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
		(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 150	
ABS pipe	A	≤ 55	3.2	✓	✓	240	180	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
ABS pipe	B	≤ 110	7.3	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
ABS pipe	B	≤ 90	6,0	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
ABS pipe	B	≤ 110	11.2	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
ABS pipe	B	≤ 114	11.2	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
ABS pipe	B	≤ 114	7.3	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
ABS pipe	B	≤ 90	6,0	✓	✓	60	60	✓	2 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
ABS pipe	B	≤ 40	2.7	✓	✓	60	60	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
ABS pipe	B	≤ 40	2.7	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PVC-U pipe (+ PVC-C)	C	≤ 160	3.2	✓	✓	180	120	✓	4 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	B	≤ 125	7.4	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PVC-U pipe (+ PVC-C)	B	≤ 40	1.9	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PVC-U pipe (+ PVC-C)	B	≤ 90	5.4	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PVC-U pipe (+ PVC-C)	B	≤ 125	4.8	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PVC-U pipe (+ PVC-C)	A	≤ 110	3.2	✓	✓	60	60	✓	2 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	B	≤ 125	7.4	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	B	≤ 40	1.9	✓	✓	60	60	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	B	≤ 90	5.4	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	B	≤ 125	4.8	✓	✓	60	60	✓	4 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic

Service		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
		(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 150	
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 40	3.7	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 110	6.6	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 110	6.6	✓	✓	60	60	✓	2 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 40	3.7	✓	✓	60	60	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 110	3.4	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PE pipe (+ ABS, San+ PVC, PVC-U & PVC-C)	B	≤ 110	3.4	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
HDPE pipe	B	≤ 90	8.2	✓	✓	60	60	✓	1 layer of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
HDPE pipe	C	≤ 90	8.2	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 110	10,0	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 90	8.2	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 40	1.8	✓	✓	60	60	✓	20mm annulus of FS709 HP Intumescent Sealant, 50mm depth
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 90	8.2	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 110	10,0	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 40	1.8	✓	✓	60	60	✓	2 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic
PP pipe (+ HDPE, PVC-U & PVC-C)	B	≤ 110	2.7	✓	✓	60	60	✓	3 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic

A : Batts fitted together, flush to lower surface. Data covers applications mid-depth or flush to upper surface.

B : Batts fitted together flush to upper surface.

C : First Batt fitted flush with top surface in compression. Second Batt fitted on top of first batt surface with a minimum overlap of 75mm from service over batt only or substrate (as required).

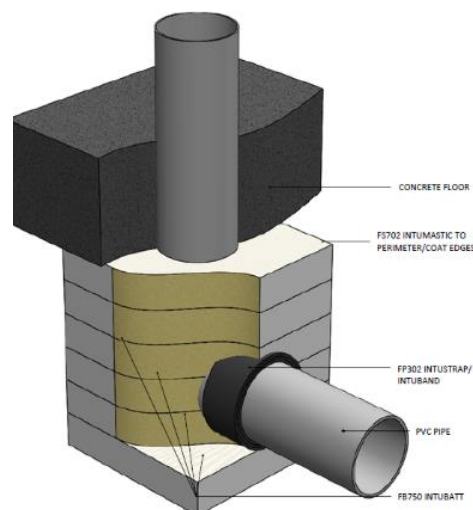
A47. COMBUSTIBLE PIPES – MULTIPLE BATT PATRESS

Combustible Pipes Insulated with No insulation passing through Rigid Floors as identified below, protected by multiple pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.

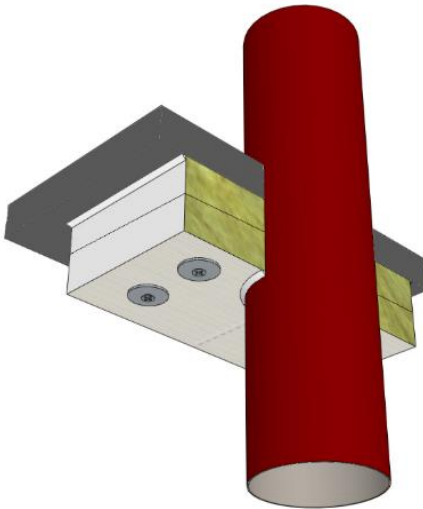
Maximum Opening size: Circular hole appropriate to the pipe in consideration. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Multiple layer board, surface mounted (pattress fit) on under side of the floor with a minimum 75mm overlap around the opening. The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullfire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration.



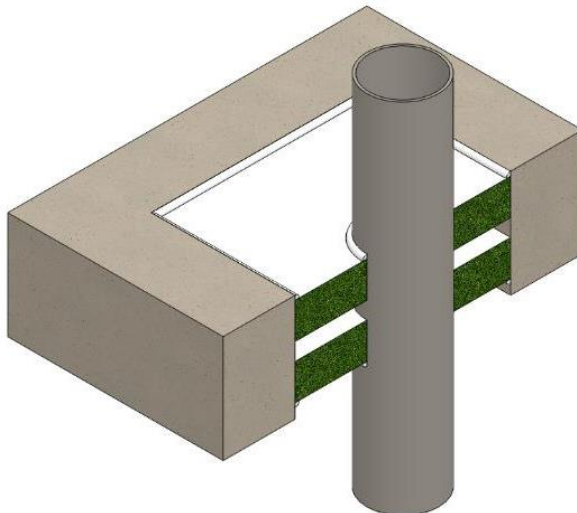
Service	Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
	(mm)	(mm)	C/C	U/C	E (mins)	EI (mins)	≥ 150	
PVC-U pipe (+ PVC-C)	≤ 110	4,8	✓	✓	180	120	✓	7 layers of FB750 Intubatt (400mm x 350mm) placed around the elbow of the pipe + 3 layers of FP302 Intustrap, where the pipe exits the seal, sealed within FB750 Intubatt with FS702 Intumastic
PVC-U pipe (+ PVC-C)	≤ 50	2,0	✓	✓	240	240	✓	4 layers of FB750 Intubatt (400mm x 350mm) placed around the elbow of the pipe + 1 layer of FP302 Intustrap, where the pipe exits the seal, sealed within FB750 Intubatt with FS702 Intumastic

A48. NON COMBUSTIBLE PIPES - DOUBLE BATT PATTRESS

Non Combustible Pipes through Rigid Floors as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 500mm by 500mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double layer board, surface mounted (pattress fit) on under side of the floor with a minimum 75mm overlap around the opening. The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration.
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt to the under side of the floor, or double / multiple layers compressed and bonded within the floor, or double / multiple layers to the upper face of the floor.


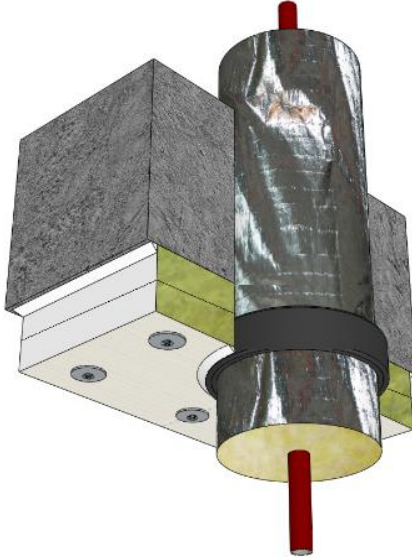
Service			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓		≤ 160	≥ 6	✓	✓	120	30	✓	-
✓	✓		≤ 220	≥ 6.9	✓	✓	60	15	✓	-

A49. NON COMBUSTIBLE PIPES – DOUBLE BATT COMPRESS

Non Combustible Pipes through Rigid Floors as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 1800mm by 600mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture flush with upper surface of the floor, unless otherwise stated. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubat compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.


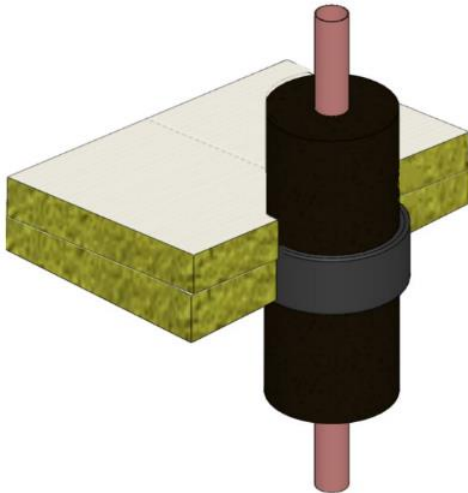
Service			Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓		≤ 220	≥ 8.5	✓	✓	120	15	✓	-

A50. NON COMBUSTIBLE PIPES INSULATED CS – DOUBLE BATT PATRESS

Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Rigid Floors as identified below, protected by double pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 400mm by 400mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double layer board, surface mounted (pattress fit) on under side of the floor with a minimum 75mm overlap around the aperture. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration.
The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt to the under side of the floor, or double / multiple layers compressed and bonded within the floor, or double / multiple layers to the upper face of the floor.


Service			CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓		Nitrile (Elastomeric)	40	≤ 220	≥ 6	✓	✓	240	30	✓	2 layers of FP302 Intustrap (Central to seal) sealed within FB750 Intubatt with FS702 Intumastic
✓	✓		Glass Fibre	≥ 50	≤ 220	≥ 6	✓	✓	90	30	✓	2 layers of FP302 Intustrap (Central to seal) sealed within FB750 Intubatt with FS702 Intumastic

A51. NON COMBUSTIBLE PIPE INSULATED CS – DOUBLE BATT COMPRESS

Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Rigid Floors as identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 400mm by 400mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture flush with upper surface of the floor, unless otherwise stated. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.


Service			CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	EI (mins)	≥ 150	
✓	✓	✓	Glass Fibre	≥ 50	≤ 22	≥ 0.8	✓	✓	120	120	✓	2 layers of FP302 Intustrap, flush with lower face of seal, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓	✓	Nitrile (Elastomeric)	35	≤ 22	≥ 0.8	✓	✓	120	120	✓	2 layers of FP302 Intustrap, flush with lower face of seal, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓		Glass Fibre	≥ 50	≤ 220	≥ 6	✓	✓	90	30	✓	2 layers of FP302 Intustrap, flush with lower face of seal, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓		Nitrile (Elastomeric)	38	≤ 220	≥ 6	✓	✓	30	30	✓	2 layers of FP302 Intustrap, flush with lower face of seal, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓		Nitrile (Elastomeric)	60	≤ 160	≥ 6.9	✓	✓	60	15	✓	4 layers of FP302 Intustrap, central to the seal, sealed within FB750 Intubatt with FS702 Intumastic

A52. NON COMBUSTIBLE PIPE INSULATED CS – SINGLE BATT PATTRESS

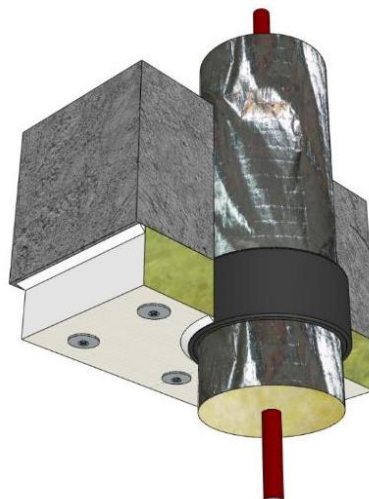
Non Combustible Pipes Insulated with Continuous Sustained Insulation passing through Rigid Floors as identified below, protected by single pattress (surface mounted) FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Floor Details: Rigid Floor of minimum thickness as identified below , and with performance classified to EN 13501-2.

Maximum Opening size: 400mm by 400mm. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

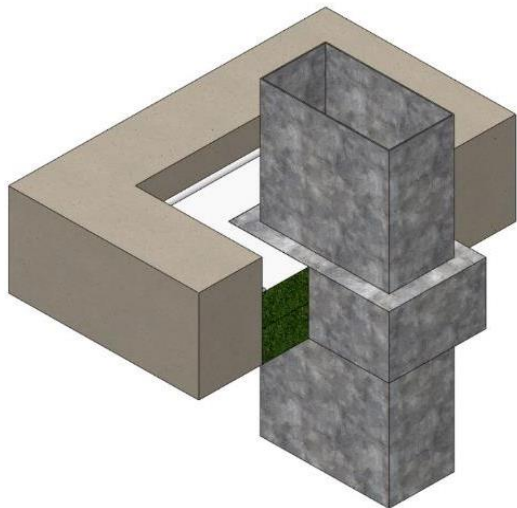
Installation Instructions: Single layer Board surface mounted (pattress fit) to underside of the floor with a minimum 75mm overlap around the aperture. (Overlap on the lowest edge can be reduced to 30mm in the event of an obstruction preventing the 75mm overlap). The overlap should be bonded with a 10mm bead of FS702 Intumastic placed 20-60mm from the board edges, and additionally mechanically restrained using 75mm steel screws with a 25mm washer at maximum 300mm centres, 10-65mm from the board perimeter and no more than 50mm from a board joint. A low torque setting should be used to ensure that the embedment of fixing into the board does not exceed 15mm. The fixings may be left exposed or covered using FS702 Intumastic. The FB750 Intubatt should be installed in as few cut pieces as possible. All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. External sides of the Board may be required to be coated for aesthetic reasons or to prevent fibre migration. (In situations where the required overlap cannot be achieved due to a perpendicular fire resisting wall / soffit, it is possible to reduce the overlap, down to as low as 0mm, provided the board edge is bonded to the adjoining compartment using a 10mm bead of FS702 Intumastic, and subsequently pointed to all mated edges)

The results below are also applicable when using multiple layers of surface mounted FB750 Intubatt to the under side of the floor, or single / multiple layer(s) compressed and bonded within the floor, or single / multiple layer(s) to the upper face of the floor.



Service			CS Pipe Insulation (Continuous Sustained)		Pipe diameter	Pipe wall thickness	Pipe end configuration		Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
Cast Iron	Steel	Copper	Material	Thickness (mm)	(mm)	(mm)	C/C	C/U	E (mins)	El (mins)	≥ 150	
✓	✓		Glass Fibre	≥ 50	≤ 220	≥ 6	✓	✓	90	30	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic
✓	✓		Nitrile (Elastomeric)	38	≤ 220	≥ 6	✓	✓	30	30	✓	2 layers of FP302 Intustrap, sealed within FB750 Intubatt with FS702 Intumastic

A53. DAMPERS – DOUBLE BATT COMPRESS

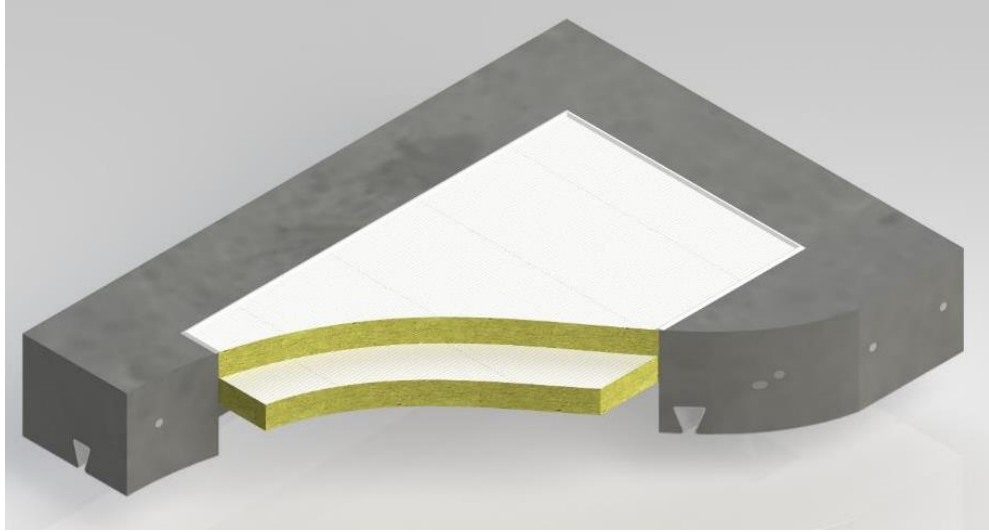
Dampers through Rigid Floors as identified below, protected by double FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: 450mm by 450mm. Multiple apertures must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture flush with lower surface of the floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt, FB750 Intubatt to non combustible service, or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt Compressed edge. If compression of FB750 Intubatt is achieved between two opposite sides, the perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Apertures for penetrating services are to be tightly fitted and sealed. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. Service openings should be cut no more than 15mm away from non combustible services, and/or, openings should be cut to suit the requirements of any additional required Nullifire product, if the service type is combustible or insulated CS or LS. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of FB750 Intubatt compressed in the opening, including double/multiple layers of surface mounted FB750 Intubatt to the upper face.


Service	Damper dimensions	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional requirements
	(mm)	E (mins)	EI (mins)	≥ 150	
Steel damper	≤ 375x375x78	120	120	✓	-

Batts fitted together, flush to lower surface. Data covers applications mid-depth or flush to upper surface.

EI performance can only be claimed for the seal between the substrate and the damper ; the damper performance must be based on EN 1366-2 testing.

A54. BLANK SEALS - DOUBLE BATT COMPRESSION

Blank Seals installed in Rigid Floors as Identified below, protected by double compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.
Floor Details: Rigid Floors of minimum thickness as identified below, and with performance classified to EN 13501-2.
Maximum Opening size: See below. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.
Installation Instructions: Double Layer board, compressed and bonded into the aperture flush with upper surface of floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved between two opposite sides of FB750 Intubatt, perpendicular sides are not required to be compressed (the non compressed seal could be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)
The results below are also applicable when using multiple layers of compressed and bonded FB750 Intubatt within the floor, or double / multiple layers to the upper face of the floor.


Opening size (mm)	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional Requirements
	E (mins)	EI (mins)	≥ 150	
≤ 450x400	120	120	✓	Opening framed with 95mm x 45mm European Redwood Cedar battens. Battens and FB750 Intubatt subsequently coated with 0.4mm DFT of Nullifire SC803 Intumescent Coating
≤ 350x400	120	120	✓	First Batt Fitted flush with lower surface of opening. Second batt surface mounted below opening with 75mm overlap
≤ 500x500	120	60	✓	-

A55. BLANK SEALS - SINGLE BATT COMPRESSION

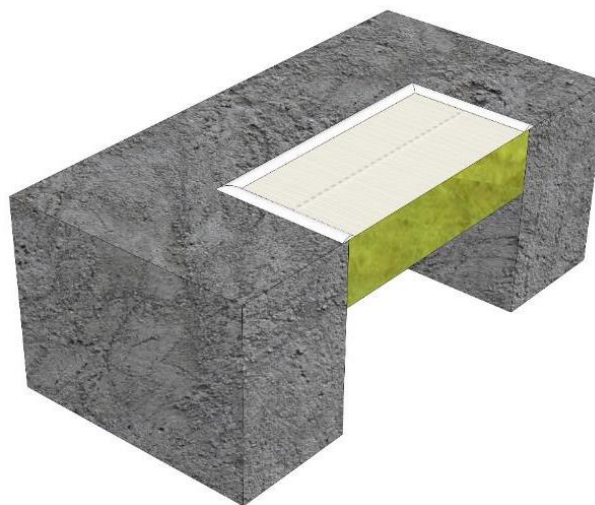
Blank Seals installed in Rigid Floors as Identified below, protected by single compressed FB750 Intubatt seal, sealed with FS702 Intumastic or FS712 Intucoat.

Floor Details: Rigid floors of minimum thickness as identified below, and with performance classified to EN 13501-2.

Maximum Opening size: See below. Multiple openings must be separated by a minimum of 200mm for fire resistance requirements. Check separation requirements with the system owner of the supporting construction.

Installation Instructions: Single Layer board, compressed and bonded into the aperture flush with upper surface of floor. FB750 Intubatt should be installed in as few cut pieces as possible and tightly compressed to two opposite sides. This is achieved by the addition of 2mm to the required cut dimension. Compression may be applied - FB750 Intubatt to FB750 Intubatt or FB750 Intubatt to Substrate. Compression must be achieved over a minimum 60% of the FB750 Intubatt compressed edge. If compression is achieved between two opposite sides of FB750 Intubatt, perpendicular sides are not required to be compressed (the non compressed seal should be fully abutted and bonded). All joints are to be bonded using FS712 Intucoat to full width of the FB750 Intubatt or FS702 Intumastic applied as a 10mm bead along the full length joint centre line. FS702 Intumastic should be used to point all service and substrate interfaces, to a minimum of a 6mm bead. Imperfections should be filled with FS702 Intumastic to the full depth of the FB750 Intubatt. (Imperfections in cut on a compressed edge may not exceed 40% of the area available to receive compression)

The results below are also applicable when using multiple layers of compressed and bonded FB750 Intubatt within the floor, or single / multiple layers to the upper face of the floor.

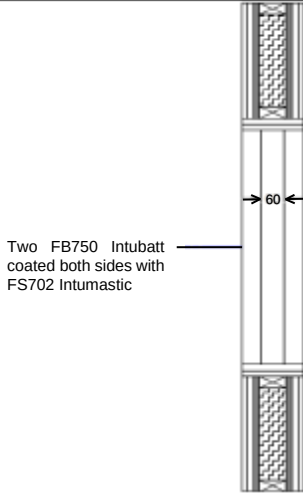
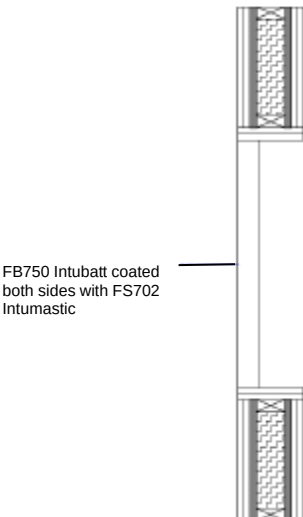
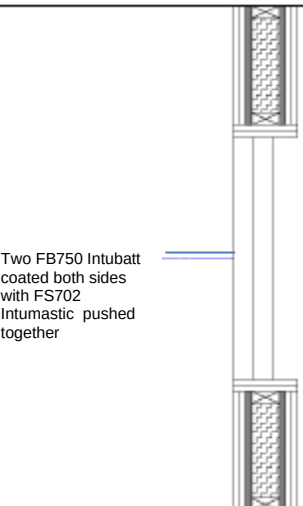


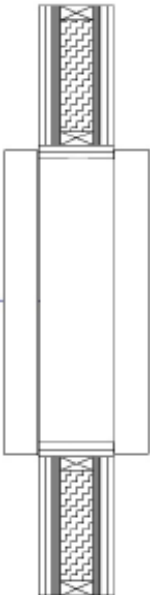
Opening size (mm)	Integrity	Integrity & Insulation	Rigid Floor thickness (mm)	Additional Requirements
	E (mins)	EI (mins)	≥ 150	
≤ 450x400	120	120	✓	Opening framed with 95mm x 45mm European Redwood Cedar battens. Battens and FB750 Intubatt subsequently coated with 0.4mm DFT of Nullifire SC803 Intumescent Coating
≤ 500x500	120	60	✓	-

Annex B: Air Permeability

Product tested : Nullifire FB750 Intubatt with perimeter sealed with Nullifire FS702 Intumastic			
	Pressure (Pa)	Leakage (m ³ /h)	Leakage (m ³ /m ² /h)
Results under positive chamber pressure	50	0.2	0.3
	100	0.4	0.5
	150	0.6	0.8
	200	0.6	0.8
	250	0.7	0.9
	300	0.8	1.1
	450	1.1	1.5
	500	1.1	1.5
	600	1.4	1.9
Results under negative chamber pressure	50	0.5	0.7
	100	0.5	0.7
	150	0.5	0.7
	200	0.5	0.7
	250	0.6	0.8
	300	0.6	0.8
	450	0.7	0.9
	500	1.0	1.4
	600	1.1	1.5

Annex C: Airborne sound insulation

Configuration	Performance
 Two FB750 Intubatt coated both sides with FS702 Intumastic	Dnew - 53 (-1;-5) dB Rw (1.87m2) - 40 (-4;-7) dB Rw (14.2m2) - 49 (-4;-7) dB
 FB750 Intubatt coated both sides with FS702 Intumastic	Dnew - 31 (-1;-3) dB Rw (1.87m2) - 24 (-1;3) dB Rw (14.2m2) - 33 (-1;-3) dB
 Two FB750 Intubatt coated both sides with FS702 Intumastic pushed together	Dnew - 39 (-1;-4) dB Rw (1.87m2) - 32 (-2;-4) dB Rw (14.2m2) - 42 (-2;-4) dB

 Two FB750 Intubatt fixed on source and receive room	Dnew - 39 (-1;-4) dB Rw (1.87m2) - 32 (-2;-4) dB Rw (14.2m2) - 42 (-2;-4) dB
 15mm soundbloc plasterboard placed over test aperture FB750 Intubatt coated both sides with FS702 Intumastic	Dnew - 26 (0;-1) dB Rw (1.87m2) - 46 (-1;-6) dB Rw (14.2m2) - 55 (-1;-6) dB
 Two FB750 Intubatt coated both sides with FS702 Intumastic 100	Dnew - 50 (-1;-5) dB Rw (wall area) - 51 (-2;-6) dB Rw (specimen area 0.6 m²) - 38 (-1;-5) dB Dnew - 57 (-2;-9) dB Rw (wall area) - 58 (-1;-5) dB Rw (specimen area 0.3 m²) - 42 (-2;-9) dB

CERTIFICATO DI PROVA¹

N° CSI1296FR

CLASSIFICATION REPORT

N° CSI1296FR

Certificato di Prova di resistenza al fuoco dell'elemento:

Resistance to fire classification report for element: IDRA 1B 60

Descrizione

Description : Vedi / see pag. 2

A nome di

On behalf of : Dierre S.p.A.

Indirizzo

Address : Strada Statale per Chieri n° 66/15
I-14019 - Villanova D'Asti (AT)

Norma tecnica:

EN 13501-2:2003 - Classificazione al fuoco di prodotti ed elementi da costruzione - Parte 2: Classificazione sulla base dei dati di prova derivati da prove di resistenza al fuoco, elementi di ventilazione esclusi

Technical standard:

EN 13501-2:2003 Fire classification of construction products and building elements - Part 2: Classification using test data from fire resistance tests, excluding ventilation services

Regola tecnica:

Decreto 21 Giugno 2004 Norme tecniche e procedurali per la classificazione di resistenza al fuoco ed omologazione di porte ed altri elementi di chiusura (GURI n.155 del 5-7-2004)

Technical rule

Decreto 21 Giugno 2004 Norme tecniche e procedurali per la classificazione di resistenza al fuoco ed omologazione di porte ed altri elementi di chiusura (OJ IR n.155 5-7-2004)

Data / Date 27.11.2006

¹ Clausola nazionale: in base al D.M. 21.06.2004 il presente documento viene denominato Certificato di Prova invece di Rapporto di classificazione

¹ National clause: according to D.M. 21.06.2004 this document is named Certificato di Prova instead of Rapporto di Classificazione

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati /
Only the full copy of this classification report allows a normal use of results



CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR

Data / Date 27.11.2006

1. INTRODUZIONE / INTRODUCTION

Questo Certificato di Prova di resistenza al fuoco determina la classificazione attribuita all'elemento **IDRA 1B 60** in conformità alle procedure stabilite nella EN 13501-2:2003. / *This resistance to fire classification report defines the classification assigned to the element IDRA 1B 60 in accordance with the procedures given in EN 13501-2:2003.*

2. DETTAGLI DELL'ELEMENTO CLASSIFICATO / DETAILS OF CLASSIFIED ELEMENT

2.1. Tipo di funzione / Type of function

L'elemento **IDRA 1B 60** è definito come una porta tagliafuoco a battente ad anta singola². La sua funzione è di resistere all'incendio nel rispetto delle caratteristiche di prestazione al fuoco riportate nel paragrafo 5 della norma EN 13501-2:2003 / *The element IDRA 1B 60 is defined as a double leaf hinged fire door. Its function is to resist fire in respect of the fire performance characteristics given in clause 5 of EN 13501-2: 2003.*

2.2. Descrizione / Description

L'elemento **IDRA 1B 60** è compiutamente descritto nel/nei rapporto/i di prova in sussidio della classificazione elencato/i in 3. / *The element IDRA 1B 60 is fully described in the test report(s) in support of the classification listed in 3.*

Dimensioni anta(e) / size of the door leaf(ves)

Anta / Leaf	
Larghezza ³ dell'anta (interna al telaio fisso ⁴) / Width ² of the door leaf (inside the frame ³) [mm]	1300
Altezza dell'anta (interna al telaio fisso) / Height of the door leaf (inside the frame) [mm]	2615
Spessore dell'anta (interno al telaio fisso ³) / Thickness of the door leaf (inside the frame ³) [mm]	62.9
Larghezza del vetro / Width of the glazing [mm]	800
Altezza del vetro / Height of the glazing [mm]	600
Spessore del vetro / Thickness of the glass [mm]	25

Modalità di fissaggio all'elemento di supporto/Type of fixing to the supporting element	Telaio fissato con tasselli/ Frame fixed with dowels
---	--

² Definizione 3.1.1 UNI EN 12433-1 / 3.1.1 Definition UNI EN 12433-1

³ Definizione 8.2 UNI EN 12433-2 / 8.2 Definition UNI EN 12433-2

⁴ Dimensioni al netto del copribattuta / Without overlap dimensions

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results



CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

3. RAPPORTI DI PROVA E RISULTATI DI PROVA IN SUPPORTO DI QUESTA CLASSIFICAZIONE / TEST REPORTS AND TEST RESULTS IN SUPPORT OF THIS CLASSIFICATION

Questo Certificato di Prova è comprovato dai seguenti rapporti di prova: / This classification report is supported by the following test reports:

Nome dell'organizzazione che ha eseguito la/prove / Name of organisation that performed the test(s)	CSI S.p.A.
Indirizzo dell'organizzazione e numero di notifica/ Titolo della organizzazione / Address of organisation and notification number / Status of the organisation	V.le Lombardia 20 20021 Bollate (MI) Italia / Italy Laboratorio autorizzato, ai sensi della legge n.818/1984 e della sua attuazione con decreto ministeriale 26 marzo 1985, per il settore di attività "porte ed elementi di chiusura resistenti al fuoco" codice MI02FR01A Authorized Laboratory, in accordance with n.818/1984 law and implementation 26 th March 1985 Decree, for "the fire resistant shutter assemblies activity sector" MI02FR01A code.
Rapporto di prova di resistenza al fuoco dell'elemento / Resistance to fire test report of element	IDRA 1B 60
A nome di / On behalf of	Dierre S.p.A.
Indirizzo / Address	Strada Statale per Chieri n° 66/15 I-14019 - Villanova D'Asti (AT)
Numero di identificazione del rapporto di prova / Identification number of test report	CSI1296FR
Data della prova / Date of test	

3.1. Condizioni di esposizione / Exposure conditions

Tabella 1 / Table 1

Curva temperatura tempo / Temperature/time curve :	standard / standard
Direzione della esposizione / Direction of exposure :	entrambi i lati / both sides
Numero di lati esposti / Number of sides exposed :	n.a. / n.a.
Carico applicato / Load applied :	n.a. / n.a.
Prototipo provato con i giochi regolati tra il valore medio e massimo/ Prototype tested with the gaps set between the middle value and the maximum value within the range of gaps	No/ No
Condizioni di supporto / Support conditions :	Costruzione di supporto rigida normalizzata (alta densità) / Rigid standard supporting constructions (high density)



CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

3.2. Risultati di prova / Test results

Tabella 2 / Table 2

	Lato 1/Side 1	Lato 2 /Side 2
Capacità portante / Loadbearing capacity		
Tempo al collasso / Time of collapse [min] :	n.a. / n.a.	n.a. / n.a.
Criterio di deformazione superato dopo / Deformation criterion exceeded after [min] :	n.a. / n.a.	n.a. / n.a.
Carico applicato / Load applied :	n.a. / n.a.	n.a. / n.a.
Integrità / Integrity		
Tempo all'innesco del tampone di cotone / Time of ignition of cotton pad [min]	68	75
Tempo al verificarsi della fiamma persistente / Time of occurrence of sustained flaming [min]	n.a. / n.a.	n.a. / n.a.
Tempo di fallimento del criterio del calibro per fessure / Time of failure of gap gauge criterion [min]	n.a. / n.a.	n.a. / n.a.
Isolamento termico / Thermal insulation		
Tempo dopo il quale l'incremento di temperatura medio sulla faccia non esposta supera 140°C / Time after which the maverage temperature rise on the unexposed side exceeds 140°C [min]	n.a. / n.a.	n.a. / n.a.
Tempo dopo il quale l'incremento di temperatura massimo sulla faccia non esposta supera 180 °C / Time after which the maximum temperature rise on the unexposed side exceeds 180 °C [min]	65	n.a. / n.a.
Tempo dopo il quale l'incremento di temperatura massimo sulla faccia non esposta supera 180 °C (procedimento aggiuntivo) / Time after which the maximum temperature rise on the unexposed side exceeds 180 °C [min] (supplementary procedure)	n.a. / n.a.	n.a. / n.a.
Tempo dopo il quale l'incremento di temperatura massimo sulla faccia non esposta supera 360 °C / Time after which the maximum temperature rise on the unexposed side exceeds 360 °C [min]	n.a. / n.a.	n.a. / n.a.
Radiazione / Radiation		
Andamento dell'irraggiamento ad intervalli di 5 minuti / The full radiation history at 5 min intervals	n.a. / n.a.	n.a. / n.a.
Tempo dopo il quale il criterio di 15 kW/m ² viene superato / Time after which the criterion of 15 kW/m ² is exceeded [min]	n.a. / n.a.	n.a. / n.a.
Azione meccanica / Mechanical action		
Esito positivo della richiesta della prova d'urto / The successful application of the impact test	n.a. / n.a.	n.a. / n.a.
Auto-chiusura (esclusivamente per porte) / Self-closing (for doors only)		
Presenza e funzionalità superata di un dispositivo di autochiusura / The presence and successful functioning of a self closing device:	n.a. / n.a.	n.a. / n.a.

NOTA / NOTE

Lato 1 / Side 1= apertura lato forno (lato cerniere esposte) / Opening into furnace

Lato 2 / Side 2 = apertura lato opposto forno (lato cerniere NON esposte) / Opening away from furnace

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results



CSI
Certificazione e Testing

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

4. CLASSIFICAZIONE / CLASSIFICATION

4.1. Riferimento della classificazione / Reference of classification

Questa classificazione è stata condotta conformemente al paragrafo 7.5.5 della EN 13501-2: 2003. / *This classification has been carried out in accordance with clause 7.5.5 of EN 13501-2: 2003.*

4.2. Classificazione / Classification

Questo elemento **IDRA 1B 60** è classificato secondo la seguente combinazione di parametri di prestazione e classi. Non sono consentite altre classificazioni. / *This element IDRA 1B 60 is classified according to the following combinations of performance parameters and classes. No other classifications are permitted.*

E	6	0
---	---	---

E	l ₂	6	0
---	----------------	---	---

Il termine (sn) significa esposizione semi-naturale, (incSlow) significa curva d'incendio a lento sviluppo, (ef) significa curva d'incendio esterno ed (r) significa temperatura costante dove opportuno / *The designation (sn) stands for semi-natural fire exposure, (incSlow) for the slow heating curve, (ef) for external fire performance and constant temperature (r) if appropriate*



CSI
Certificazione e Testing

Pag / Pag 6
di/ of
di Pagine / Pages 13

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

5. CAMPO DI APPLICAZIONE DIRETTA/ FIELD OF DIRECT APPLICATION

L'elemento **IDRA 1B 60** ha il seguente campo di applicazione diretta in conformità con la norma EN13501-2: 2003 / *The element IDRA 1B 60 has the following field of direct application in accordance with EN 13501-2: 2003.*

5.1. Materiali e costruzioni / Materials and constructions

Se non diversamente specificato nel testo che segue, la costruzione della porta deve essere uguale a quella del prodotto sottoposto a prova. Il numero delle ante e le caratteristiche funzionali (per esempio scorrevoli, a rotazione, a semplice o doppia azione) non devono essere variati.

Unless otherwise stated in the following text the construction of the door assembly shall be the same as that tested. The number of leaves and the mode of operation (e.g. sliding, swinging, single action or double action) shall not be changed.

Tabella 3 / Table 3

Limitazioni specifiche per materiali e costruzioni / Specific restrictions on materials and construction	Variazioni consentite / permissible variations
Limitazioni specifiche per costruzioni di acciaio / <i>Specific restrictions on steel constructions</i> Rif./ Ref. (*) 13.2.2 b)	Le dimensioni dello scossale di acciaio di un telaio ad imbotte possono aumentare, per consentire l'alloggiamento di spessori della costruzione di supporto maggiori. Lo spessore dell'acciaio può anche essere aumentato fino al 25%. Il numero di elementi di rinforzo per porte non coibentate ed il numero ed il tipo di fissaggi di tali elementi nella intelaiatura del pannello possono essere aumentati proporzionalmente all'aumento delle dimensioni, ma non ridotti. <i>The dimensions of steel wrap around frames may be increased to accomodate increased supporting construction thicknesses. The thickness of the steel may also be increased by up to 25%. The number of stiffening elements for uninsulated doors and the number and type of fixing of such members within the panel fabrication may be increased proportionally with the increase in size but shall not be reduced.</i>
Limitazioni specifiche per costruzioni di vetro / <i>Specific restrictions on glazed constructions</i> Rif./ Ref. 13.2.2 c)	Il tipo di vetro e la tecnica di fissaggio al bordo, compresi il numero ed il tipo di ancoraggi per metro sul perimetro, non devono variare rispetto a quelli sottoposti a prova. Il numero di aperture vetrare e ciascuna delle dimensioni del vetro in ogni pannello vetrato presente in un campione di prova di legno o di acciaio, possono essere diminuiti ma non aumentati oltre la dimensione del pannello vetrato sottoposto a prova. La distanza fra il bordo delle parti vetrare ed il perimetro dell'anta o la distanza fra le parti vetrare non devono essere ridotte rispetto a quelle del campione di prova. Altri posizionamenti entro la porta si possono modificare esclusivamente a condizione che ciò non comporti l'eliminazione o il riposizionamento di

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results

GRUPPO
IMQ

CSI S.p.A.
Viale Lombardia n° 20
20021 BOLLATE (MI)



CSI
Certificazione e Testing

Pag / Pag 7
di / of
di Pagine / Pages 13

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

	componenti strutturali. <i>The type of glass and the edge fixing technique, including type and number of fixings per metre of perimeter, shall not be changed from those tested. The number of glazed apertures and each of the dimensions of glass in each pane included within a test specimen of timber or steel construction may be decreased but shall not be increased beyond the tested panel size. The distance between the edge of glazing and the perimeter of the door leaf, or the distance between glazed apertures shall not be reduced from those incorporated in test specimens. Other positioning within the door can only be modified if this does not involve the removal or re-positioning of structural members.</i>
Verniciatura / Paint Rif./ Ref. (*) 13.2.3 a)	Ove si preveda che le vernici di finitura non contribuiscano alla resistenza al fuoco della porta, sono accettabili altre vernici. / <i>Where the paint finish is not expected to contribute to the fire resistance of the door, alternative paints are acceptable.</i>
Laminati ornamentali / Decorative laminates Rif./ Ref. (*) 13.2.3 b)	Laminati ornamentali e piallacci di legno di spessore fino ad 1,5 mm possono essere applicate sulle facce (ma non sui bordi). / <i>Decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces (but not the edges).</i>
Telai / Frames Rif./ Ref. (*) 13.2.4	Il numero di ancoraggi, utilizzato per la porta resistente al fuoco alla costruzione di supporto, può essere aumentato ma non ridotto, mentre il loro passo può essere ridotto ma non aumentato. / <i>The number of fixings used to attach fire resisting doors to supporting constructions may be increased but shall not be decreased and the distance between fixings may be reduced but shall not be increased.</i>
Ferramenta / Hardware Rif./ Ref. (*) 13.2.5	Modifiche nella ferramenta sono consentite purché provate in altra porta di configurazione simile. / <i>Changes in hardware are permitted provided the alternative hardware has been demonstrated in another doorset of similar configuration.</i> Il numero dei dispositivi vincolanti il movimento come serrature, scroccchi e cerniere può essere aumentato ma non ridotto. / <i>The number of any movement restrictors such as locks, latches and hinges may be increased but shall not be decreased.</i>

(*) UNI EN 1634-1: Ottobre 2001 Prova di resistenza al fuoco per porte ed elementi di chiusura Porte e chiusure resistenti al fuoco / EN 1634-1: January 2000 Fire resistance tests for door and shutter assemblies – Part 1 Fire doors and shutters

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results

GRUPPO
IMQ

CSI SPA
Viale Lombardia n° 20
20021 BOLLATE (MI)



5.2. Variazioni di dimensioni secondo il tipo di prodotto / *Size variation related to product type*

Per porte che soddisfino il criterio di irraggiamento non sono ammessi aumenti delle dimensioni a meno che non sia soddisfatto anche il criterio di isolamento.

Per porte che rispettano insieme i criteri di irraggiamento e di isolamento le dimensioni possono essere aumentate come descritto al punto 5.3.. Diminuzioni delle dimensioni sono ammesse sia sulle porte che soddisfano il criterio di irraggiamento sia su quelle che soddisfano i criteri di irraggiamento e di isolamento.

Le variazioni ammesse sono descritte al punto 5.3..

No increases in size are permitted for doors satisfying the radiation criterion unless the insulation criterion is also satisfied. Doors that satisfy both the radiation and insulation criteria may have their sizes increased as outlined in 5.3.. Size decreases are permitted for both doors which satisfy radiation and those which satisfy insulation and radiation. Permissible variations are detailed in 5.3..

Tabella 4 / Table 4

Variazioni di dimensioni secondo il tipo di prodotto / <i>Size variation related to product type</i>	Variazioni consentite / <i>permissible variations</i>
Porte su cardini e su perni / <i>Hinged and pivoted doors</i> Rif./ Ref. (*) 13.3.3.2	a) Per variazioni di dimensioni (vedere Tabella 5) Per le prove di categoria "A" senza superamento del limite per la classificazione non è ammesso alcun incremento. Sono ammesse riduzioni illimitate rispetto al campione sottoposto a prova, salvo per le porte metalliche isolate, per le quali la variazione è limitata. Per le prove di categoria "B", gli incrementi sono ammessi a condizione che la porta sia stata sottoposta a prova con i giochi regolati fra il valore medio e il valore massimo dell'esecuzione indicata dal committente. Se non regolati fra il valore medio e il valore massimo, non è ammesso l'incremento con l'estensione di tempo della categoria "B". Tuttavia il risultato della prova è ancora applicabile a porte o elementi di chiusura con giochi inferiori alla media dei valori medio e massimo misurati. a) <i>For size variations (see table 5)</i> <i>For category 'A' tests, with no overrun of classification period, no increase is allowed. Unlimited reductions from the tested specimen are permitted with the exception of insulated metal doors where the size reduction is limited. For category 'B' tests increases are only permitted provided that the door is tested with the gaps set between the middle value and the maximum value within the range of gaps given by the sponsor. If the gaps were not set between the middle value and the maximum value, then no size increases are permitted using category 'B' time extensions. However, the test result is still applicable to door or shutter assemblies with gaps less than the average of the medium and maximum measured values.</i> b) Altre modifiche Per porte di dimensioni minori, il posizionamento relativo



CSI
Certificazione e Testing

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

	dei dispositivi che vincolano i movimenti (per esempio cerniere, scroccchi, ecc.) deve mantenersi come nella prova o le distanze fra di loro possono variare della stessa percentuale di riduzione per cui si è ridotto il prodotto. Per porte di dimensioni maggiori deve essere applicato quanto segue: • l'altezza dello scrocco sul livello del pavimento deve essere maggiore o uguale a quella di prova e l'aumento in altezza deve essere almeno proporzionale all'aumento di altezza della porta; • la distanza del cardine superiore dal bordo superiore della porta deve essere uguale o minore di quella del prodotto sottoposto a prova; • la distanza fra il cardine inferiore e il bordo inferiore della porta deve essere uguale o minore di quella del prodotto sottoposto a prova; • qualora si utilizzino 3 cardini o dispositivi che impediscono le distorsioni, la distanza fra il bordo inferiore della porta e il vincolo centrale deve essere maggiore o uguale a quella del prodotto sottoposto a prova. b) <i>Other changes</i> <i>For smaller door sizes the relative positioning of movement restrictors (e.g. hinges, latches, etc) shall remain the same as tested or any change to the distances between them will be limited to the same percentage reduction as the decrease of specimen size. For larger door sizes the following shall also be applied:</i> • <i>the height of the latch above floor level shall be equal to, or greater, than the tested height, and such increase in height shall be at least proportional to the increase in door height</i> • <i>the distance of the top hinge from the top of door shall be equal to, or less than, that tested</i> • <i>the distance of the bottom hinge from bottom of door shall be equal to, or less than, that tested</i> • <i>where three hinges or distortion preventers are used, the distance between the bottom of the door and centre restraint shall be equal to, or greater than, that tested.</i> c) Pannelli laterali o pannelli sopra-luce Le regole di variazione rispetto ai campioni sottoposti a prova per i pannelli laterali e pannelli sopra-luce sono le stesse di quelle che si applicano in generale alle porte su cardini. Qualora a causa delle dimensioni del forno (3 m × 3 m), si possa sottoporre a prova un solo pannello laterale, a condizione che il pannello sia posto dal lato serratura e che sia conseguito il superamento del limite per la classificazione (categoria "B"), si può aggiungere un secondo pannello dal lato opposto, di dimensioni fino a quelle del primo pannello. L'aggiunta di un secondo pannello laterale non è permessa per porte
--	--

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results

GRUPPO
IMQ

CSI S.p.A.
Viale Lombardia n° 20
20021 BOLLATE (MI)



CSI
Certificazione e Testing

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR

Data / Date 27.11.2006

	che soddisfano il criterio di irraggiamento, a meno che esse non soddisfino il criterio di isolamento. Per similitudine, il risultato di una prova su una porta con pannello laterale sul lato serratura è valido anche nel caso non siano accoppiati pannelli laterali. c) <i>Side and transom panels</i> <i>The rules for variation to tested specimens of side and transom panel arrangements are the same as those applied generally to hinged doors. If only one side panel can be tested due to the constraints of the furnace (3 m x 3 m) size then providing the latch side, side panel is tested using the maximum furnace opening available and providing a type 'B' overrun time has been proven, a second panel up to the same size may be added to the opposite side. The addition of a second side panel is not allowed for doors satisfying the radiation criterion, unless they also satisfy the insulation criterion.</i> <i>Similarly the result of a test on a door assembly incorporating a side panel on the latch side is also applicable when no side panel is fitted.</i> d) <i>Strutture di legno</i> Il numero, le dimensioni, le posizioni e l'orientamento di ogni giunto nel telaio di legno non devono essere cambiate. Qualora nel campione vi siano piallacci ornamentali di spessore maggiore o uguale a 1,5 mm o altri rivestimenti che danno vantaggi costruttivi, questi sono parte del campione e non devono essere sostituiti con altri di spessore o resistenza minori. d) <i>Timber constructions</i> <i>The number, size, location and orientation of any joints in the timber framing shall not be changed. Where decorative veneers of 1,5 mm or greater thickness, or other claddings which themselves provide constructive benefits, are part of the specimen, they shall not be substituted with alternatives of lesser thickness or strength.</i>
--	---

(*) UNI EN 1634-1:Ottobre 2001 Prova di resistenza al fuoco per porte ed elementi di chiusura Porte e chiusure resistenti al fuoco / EN 1634-1:January 2000 Fire resistance tests for door and shutter assemblies – Part 1 Fire doors and shutters



CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

5.3. Variazioni di dimensioni consentite / Permissible size variations

Tabella 5 / Table 5

Tipo di porta / Door Type	Concessioni per la categoria "A" Category 'A' allowances	Concessioni per la categoria "B" Category 'B' allowances
1) Porte su cardini e perni / hinged and pivoted doors (*)	È ammessa la riduzione senza limite delle misure per tutti i tipi di porta, con esclusione di quelle in acciaio che soddisfano il criterio di isolamento, per le quali il limite di riduzione è al 50% della larghezza e al 75% dell'altezza del prototipo provato. Aumenti delle misure non sono ammessi. <i>Unlimited size reduction is permitted for all types except insulated steel doors where a reduction to 50 % width and 75 % height of the tested specimen is the limit of variation. Size increase is not permitted.</i>	n.a./n.a.

(*) Se i giochi non sono regolati secondo 7.3 (UNI EN 1634-1) non è ammesso l'incremento con l'estensione di tempo della categoria B. Tuttavia il risultato di prova è ancora applicabile a porte o elementi di chiusura con giochi inferiori alla media dei valori medio e massimo misurati / *If the gap were not set according to 7.3 (EN 1634-1) then no size increases are permitted using category 'B' time extensions. However, the test result is still applicable to door or shutter assemblies with gaps less than the average of the medium and maximum measured values.*

5.4. Costruzioni di supporto / Supporting constructions

La resistenza al fuoco di una porta sottoposta a prova su una costruzione di supporto normalizzata può conservare la sua validità o meno quando è montata su altri tipi di costruzioni. Generalmente i tipi rigido e flessibile non sono intercambiabili fra loro e vengono date regole per l'applicazione diretta nell'ambito di ciascun gruppo (vedi tabella 6).

The fire resistance of a door assembly tested in one form of standard supporting construction may or may not apply when it is mounted in other types of construction. Generally, the rigid and flexible types are not interchangeable and rules governing the direct application within each group are given in table 6.

Tabella 6 / Table 6

Costruzioni di supporto Supporting constructions	Variazioni consentite / permissible variations
Costruzione di supporto rigida normalizzata (alta densità) / <i>Rigid standard supporting constructions (high density)</i> Rif./ Ref. (*) 13.5.2	La resistenza al fuoco di una porta sottoposta a prova in una costruzione di supporto rigida normalizzata, come indicato nella EN 1363-1, può essere attribuita a porte montate nello stesso modo in muri di tipo rigido, come segue:



CSI
Certificazione e Testing

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR

Data / Date 27.11.2006

	a) mattoni o calcestruzzo leggero con peso specifico di almeno 800 kg/m³ con spessori di almeno: • 100 mm per una durata di resistenza al fuoco fino a 90 min; • 150 mm per una durata di resistenza al fuoco maggiore di 90 min; b) calcestruzzo pieno o a blocchi con peso specifico di almeno 1 200 kg/m³ con spessori come indicati in a). <i>The fire resistance of a door assembly tested in a rigid standard supporting construction as specified in EN 1363-1 can be applied to a door assembly mounted in the same manner in a wall of the rigid type as follows:</i> a) <i>masonry or lightweight concrete with a density of at least 800 kg/m³ having thicknesses of at least:</i> • 100 mm for a fire resistance periods up to 90 minutes • 150 mm for fire resistance periods in excess of 90 minutes b) <i>solid concrete or concrete blocks with a density of at least 1200 kg/m³ with thickness requirements as in a)</i>
Regole specifiche per porte su cardini o su perni / <i>Specific rules for hinged or pivoted door assemblies</i> Rif./ Ref. (*) 13.5.5	a) Per ante di porte di legno su telai di legno, il risultato della prova effettuata su una costruzione di supporto normalizzata rigida è applicabile a quella porta montata in una costruzione di supporto flessibile. Per ante di porte di legno su telai di legno, il risultato della prova effettuata su una costruzione di supporto normalizzata flessibile è applicabile a quella porta montata in una costruzione di supporto rigida. b) Per ante di porte di legno su telai di metallo, il risultato della prova effettuata su una costruzione di supporto normalizzata flessibile è applicabile a quella porta montata in una costruzione di supporto rigida ma non viceversa. c) Per ante di porte di metallo coibentate su telai di metallo, non è possibile trasferire il risultato della prova effettuata su una costruzione di supporto normalizzata rigida ad una costruzione di supporto flessibile, né viceversa. I tipi rigidi e flessibili sono ammessi solo a seguito di prova eseguita su ciascun tipo di costruzione di supporto normalizzata. d) Per ante di porte di metallo non coibentate, il risultato della prova effettuata su una costruzione di supporto normalizzata rigida è applicabile ad una porta montata in una costruzione di supporto flessibile ma non viceversa. Queste regole presuppongono che i metodi di fissaggio impiegati in ogni tipo di costruzione di supporto sono appropriati per quel tipo di costruzione. a) <i>For timber door leaves hung in timber frames the result of a test in a rigid standard supporting construction is applicable to that door assembly mounted in a flexible</i>

Solo la copia completa di questo Certificato di Prova permette un normale impiego dei risultati
Only the full copy of this classification report allows a normal use of results

GRUPPO
IMQ

CSI SpA
Viale Lombardia n° 20
20021 BOLLATE (MI)



CSI
Certificazione e Testing

CERTIFICATO DI PROVA / CLASSIFICATION REPORT CSI1296FR
Data / Date 27.11.2006

	construction. For timber door leaves hung in timber frames the result of a test in a flexible standard supporting construction is applicable to that door assembly mounted in a rigid construction. b) For timber door leaves hung in metal frames the result of a test in a flexible standard supporting construction is applicable to that door assembly mounted in a rigid construction but not vice versa. c) For insulated metal door leaves hung in metal frames there is no applicability of results in rigid standard supporting construction to flexible constructions or vice versa. To cover rigid and flexible types, tests shall be undertaken in each type of standard supporting construction. d) For uninsulated steel doors, the result of a test in a rigid standard supporting construction is applicable to that door assembly mounted in a flexible construction, but not vice versa. The rules above assume that the fixing methods used in each type of supporting construction are appropriate to that construction.
--	---

6. LIMITAZIONI / LIMITATIONS

6.1. Restrizioni / Restrictions

Non esistono restrizioni alla durata di validità del presente Certificato di Prova
No restrictions are given on the duration of the validity of this classification report

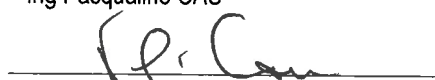
6.2. Avvertenza / Warning

Questo certificato di prova non costituisce omologazione o certificazione del prodotto
This document does not represent type approval or certification of the product.

Il Responsabile della Divisione Costruzioni /
Head of Construction Division
Ing Paolo Mele


CSI S.p.A.
Viale Lombardia n° 20
20021 BOLLATE (MI)

Il Direttore del Laboratorio /
Managing Director
Ing Pasqualino CAU


CSI S.p.A.
Viale Lombardia n° 20
20021 BOLLATE (MI)

Energieopslag en/of -opwekking op daken van collectieve woongebouwen

Handreiking voor een veilige plaatsing van zonnepanelen
in combinatie met Elektriciteit Opslag Systemen



Instituut Fysieke Veiligheid
Kennisonwikkeling en onderwijs
Postbus 7010
6801 HA Arnhem
Kemperbergerweg 783, Arnhem
www.ifv.nl
info@ifv.nl
026 355 24 00

Colofon

Ondanks de aan de samenstelling van de tekst bestede zorg kan de samensteller geen aansprakelijkheid aanvaarden voor schade ontstaan door eventuele fouten c.q. onvolkomenheden in deze handreiking.

Om deze publicatie te kunnen blijven ontwikkelen en verbeteren, ontvangen wij graag commentaar en suggesties ter verbetering. Vragen of opmerkingen kunt u sturen naar info@ifv.nl, onder vermelding van 'Energieopslag en/of -opwekking op daken van collectieve woongebouwen. Handreiking voor een veilige plaatsing van zonnepanelen in combinatie met Elektriciteit Opslag Systemen.'

Een *handreiking* is een publicatie die de status heeft van een adviserend document. In een handreiking wordt organisatie- en/of toepassingsgerichte methodiek vastgelegd. Het gaat daarbij om leerervaringen en leerpunten, best practices, deskundigen-, beleids- en uitvoeringsadviezen.

Titel:	Energieopslag en/of -opwekking op daken van collectieve woongebouwen. Handreiking voor een veilige plaatsing van zonnepanelen in combinatie met Elektriciteit Opslag Systemen
Datum:	08 oktober 2020
Status:	Definitief
Versie:	1.1
Auteurs:	T.F.T. Hessels MSc. (IFV), R.W. ter Veer (Voor de VVE bv)
Met dank aan:	M. Meijer (LIOGS VRR), S. Lepelaar (VRH), ing. L.L. van Ruiven AlFireE
Review:	dr. ir. N. Rosmuller
Eindverantwoordelijk:	dr. ir. N. Rosmuller

Inhoud

	Handreiking voor een veilige plaatsing van zonnepanelen in combinatie met Elektriciteit Opslag Systeem	1
	Inleiding	4
1	Het systeem	6
1.1	Systeem van zonnepanelen en EOS	6
1.2	Wet- en regelgeving	7
1.3	Risico's	8
1.4	Samenvatting	10
2	Tips voor de veiligheidsregio's	11
2.1	Risicobeheersing	11
2.2	Incidentbestrijding	12
3	Maatregelen die eigenaren, VvE's en corporaties kunnen nemen	13
3.1	Bouwkundig	13
3.2	Installatietechnisch	14
3.3	Organisatorisch	15
4	Handvatten voor het bevoegd gezag	16
5	Categorisering maatregelen	17
6	Procesgang van plaatsing van een EOS op een collectief woongebouw	18
	Literatuurlijst	20

Inleiding

Aanleiding

Het aantal zonnepanelen op daken in Nederland neemt de laatste jaren flink toe (CBS, 2020). Daarmee is ook de behoefte gegroeid om de energie uit deze zonnepanelen op te slaan; de eventueel overtollige energie van overdag kan dan op een ander moment worden gebruikt). Dit opslaan van energie gebeurt in zogeheten Elektriciteit Opslag Systemen (EOS), vaak ook 'buurtbatterijen' (en/of gebouwbatterijen) genoemd. Binnen Nederland ontstaan steeds meer initiatieven om deze EOS op collectieve woongebouwen of kantoorgebouwen te plaatsen, zoals recentelijk in Apeldoorn is gebeurd (Installatiejournaal, 2019). De verwachting van Voor de VVE is dat het aantal EOS'en op daken van collectieve woongebouwen de komende jaren zal toenemen. Het plaatsen van deze EOS'en op daken van collectieve woongebouwen brengt, naast positieve aspecten, ook nieuwe veiligheidsrisico's met zich mee. Vastgestelde wet- en regelgeving of normering op het gebied van veiligheid ontbreken echter voor de combinatie van dit soort energieopslagsystemen op daken.

Doel en doelgroep

De hierboven genoemde ontwikkeling en het ontbreken van wet- en regelgeving vormen de aanleiding tot het schrijven deze handreiking. Hierin worden de veiligheidsaspecten van EOS'en op daken nader verkend en worden handvatten gegeven voor veiligheidsregio's, (verenigingen van) eigenaren van collectieve woongebouwen en bevoegd gezagen. Deze handreiking is dan ook bedoeld voor adviseurs Risicobeheersing van de brandweer / veiligheidsregio (en in het verlengde de repressieve dienst), alsook voor het bevoegd gezag en eigenaren van collectieve woongebouwen.

Het IFV heeft deze handreiking opgesteld, samen met Voor de VVE BV en de Veiligheidsregio Noord- en Oost Gelderland.

Afbakening

Deze handreiking heeft betrekking op alle collectieve woongebouwen waarbij er sprake is van een vorm van energieopslag in combinatie met zonnepanelen.

Een collectief woongebouw kan gedefinieerd worden als: een gebouw waarin twee of meer woningen zijn gelegen die te bereiken zijn door een of meer gemeenschappelijke verkeersruimte(s). Gezinswoningen zoals rijtjeshuizen, vrijstaande huizen of twee-onder-een-kapwoningen vallen buiten de reikwijdte van deze handreiking.

Het gaat in deze handreiking om een installatie die voorziet in de stroomopslag/opwekking voor de aanwezige woonunits en niet voor alleen de noodverlichting. Als vuistregel kan

hiervoor gehanteerd worden dat het gaat om een installatie waarbij minimaal 10.000 wattpiek (Wp) aan zonnepanelen ligt en/of een totaal van minimaal 10KWh aan accuopslag aanwezig is.¹ Gekozen is voor de grens 10KWh om ook installaties voor individuele wooneenheden binnen het collectieve woongebouw in de handreiking te betrekken. Het is daarbij irrelevant of het één systeem betreft of meerdere systemen in hetzelfde gebouw: deze handreiking geldt voor het geheel van alle systemen samen.

Deze handreiking heeft de status van een adviserend document op het gebied van brandveiligheid. Arbeidsveiligheid valt erbuiten. Naast dit document is er voor installaties van meer dan 100KWh de circulaire [Risicobeheersing lithium-ion energiedragers](#). Tevens is de [PGS-37-normering](#) in ontwikkeling. Deze heeft betrekking op de veiligheidsaspecten van de opslag van li-ion batterijen en buurbatterijen en wordt verwacht eind 2021. Het voornemen bestaat om de PGS-37 op dat moment in het Besluit activiteiten leefomgeving (Bal) onder de Omgevingswet te scharen en van toepassing te verklaren op het in gebruik hebben van een EOS. Mogelijk dat de PGS-37 hiervoor richtlijnen voorschrijft. Waar nodig zal deze handreiking dan worden geactualiseerd.

Leeswijzer

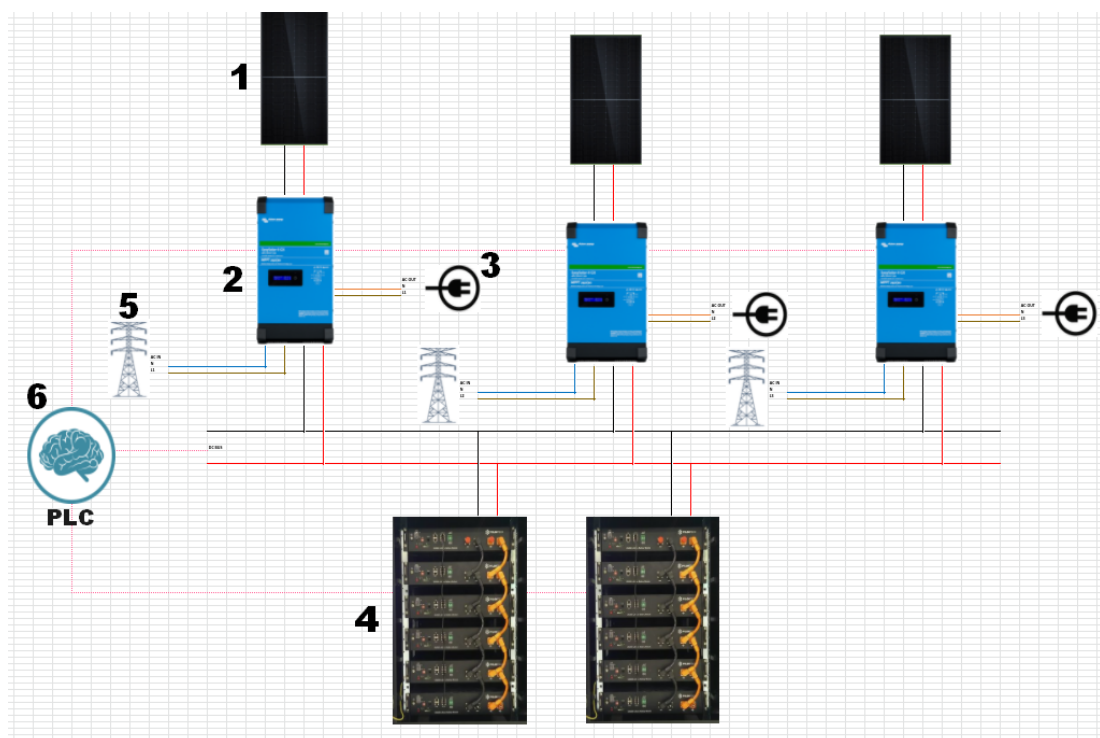
In hoofdstuk 1 wordt het systeem van 'EOS'en op daken' beschreven. Vervolgens zullen per hoofdstuk voor elke afzonderlijke doelgroep van deze handreiking enkele concrete handvatten (tips) ten behoeve van de brandveiligheid worden aangereikt. Als eerste worden de tips besproken voor de veiligheidsregio / brandweer (hoofdstuk 2). In respectievelijk hoofdstuk 3 en 4 worden handvatten aangereikt voor de eigenaar / beheerder / VvE en voor het bevoegd gezag. In hoofdstuk 5 worden de maatregelen ingedeeld in categorieën en hoofdstuk 6 ten slotte biedt een schematisch overzicht van de (administratieve) procesgang van de plaatsing van een EOS op een collectief woongebouw.

¹ Het vermogen van zonnepanelen wordt uitgedrukt in Wattpiek. Wattpiek is het maximale piekvermogen dat het zonnepaneel opwekt onder laboratoriumcondities.

1 Het systeem

1.1 Systeem van zonnepanelen en EOS

Deze handreiking gaat over een systeem waarbij zonnepanelen en een EOS op het dak van een collectief woongebouw aanwezig zijn en er sprake is van meer dan 10KWh aan energieopslag. Het systeem levert stroom aan alle individuele wooneenheden en aan de algemene ruimtes in het woongebouw. In Afbeelding 1.1 hieronder is zo'n systeem gevisualiseerd.



Afbeelding 1.1 Visualisatie EOS op dak collectief woongebouw

Het systeem is opgebouwd uit meerdere componenten. De zonnepanelen (1) leveren de energie. Vanaf deze panelen gaat de stroom naar de omvormer (2). Deze zet de gelijkspanning om naar wisselspanning en levert de stroom in eerste instantie door aan de woning (3). Is er in de woning geen vraag naar energie, dan levert de omvormer de stroom aan de accu's in het EOS (4) met hun bijbehorende 'Battery Management System' (BMS), dat de accu's van het EOS beheert en monitort. Indien er noch vanuit de woningen en noch vanuit de accu's een vraag naar energie komt, wordt de stroom geleverd aan het net (5). Links in de afbeelding staat de 'programmable logic controller' (PLC) (6). De PLC is aanwezig indien er meerdere omvormers en accu's met elkaar in verbinding staan. De PLC draagt in die situatie zorg voor het beheer over alle individuele componenten ter voorkoming van een storing.

1.2 Wet- en regelgeving

Als een EOS op het dak van een collectief woongebouw geplaatst wordt, dient het (in combinatie met het woongebouw) ten minste te voldoen aan de technische eisen van het Bouwbesluit 2012 op het gebied van onder meer constructieve veiligheid en brandveiligheid. De plaatsing van een EOS heeft namelijk als gevolg dat de hoogte en het volume van het bouwwerk toenemen, omdat een dergelijke installatie volgens artikel 1.3 van de Woningwet wordt beschouwd als een onderdeel van het bouwwerk. Mede afhankelijk van de omvang en positie van het EOS kan zowel een omgevingsvergunning voor het bouwen als een vergunning om te mogen afwijken van het bestemmingsplan (strijdig planologisch gebruikt) noodzakelijk zijn.

Omdat het EOS onderdeel is van de elektrische installatie van het gebouw, is daarop volgens de NEN 1010 (aangestuurd door het Bouwbesluit 2012) van toepassing. Daarnaast kan de verzekering een SCIOS Scope 12 keuring eisen voor de elektrische installatie. Ook is de Arbowet van toepassing voor het veilig werken in, aan en rondom het EOS door bijvoorbeeld onderhoudsmedewerkers (NEN, 2020).

Een EOS op het dak van een collectief woongebouw kan, overigens net als de bijbehorende zonnepanelen, de brandveiligheid van dat gebouw beïnvloeden. Zo kan het de oorzaak zijn van een brand, bijdragen aan een 'reguliere' brand (door de brandlast te vergroten) en zorgen voor specifieke risicovolle verbrandingsproducten (toxische verbrandingsproducten, zware metalen en, specifiek voor zonnepanelen, glassplinters / -schilfers in het effectgebied). Wijzigingen van het gebruik van het collectieve woongebouw ten opzichte van de oorspronkelijke bouw -of omgevingsvergunning die de brandveiligheid van het woongebouw negatief beïnvloeden, kunnen voor het bevoegd gezag aanleiding zijn om in gesprek te gaan met de eigenaar om de brandveiligheid van het woongebouw te verbeteren.

In het uiterste geval kan het bevoegd gezag toepassing geven aan artikel 13 van de Woningwet (de verplichting tot het treffen van (aanvullende) voorzieningen). Toepassing van dit artikel 13 is echter alleen mogelijk als het bevoegd gezag kan motiveren dat er in de desbetreffende situatie naar zijn oordeel sprake is van een onveilige situatie.

Intermezzo: artikel 13 van de Woningwet

Het bevoegd gezag kan degene die als eigenaar van een gebouw of een bouwwerk, niet zijnde een gebouw, dan wel uit anderen hoofde bevoegd is tot het daaraan treffen van voorzieningen, verplichten tot het binnen een door het bevoegd gezag te bepalen termijn treffen van voorzieningen waardoor de staat van dat gebouw of dat bouwwerk komt te liggen op een niveau dat hoger is dan het niveau dat overeenkomt met de voorschriften, bedoeld in [artikel 1b, tweede lid](#), zonder dat dit hoger komt te liggen dan het niveau dat overeenkomt met de voorschriften, bedoeld in artikel 1b, eerste lid, mits die voorzieningen:

- a. onderdeel zijn van een onderhoudsplan voor een gebouw als bedoeld in [artikel 12d, eerste lid](#), en niet binnen de daarvoor in het onderhoudsplan gestelde termijn zijn uitgevoerd, dan wel
- b. naar het oordeel van het bevoegd gezag anderszins noodzakelijk zijn.

Bron: https://wetten.overheid.nl/BWBR0005181/2020-08-01#HoofdstukIII_Artikel13

In de *Circulaire risicobeheersing lithium-ion energiedragers* wordt eveneens de regelgeving behandeld die van toepassing is op de bouw van een EOS, waarbij echter niet specifiek

wordt ingegaan op de plaatsing op een dak (Ministerie van Infrastructuur en Waterstaat, 2020). In de circulaire wordt gesteld dat, “hoewel het Bouwbesluit en het Bbl geen specifieke eisen geven voor een EOS er wel bepaalde eisen relevant zijn” (p.30). Voor deze relevante eisen wordt doorverwezen naar Bijlage 3.3.2 van de circulaire.

Naast de circulaire is er de *Handreiking Elektriciteit Opslag Systemen (EOS > 25 kWh Li-ION)* (Veiligheidsregio Haaglanden, Veiligheidsregio Rotterdam-Rijnmond en LIOGS, 2019). Hierin wordt een scala aan concrete maatregelen geadviseerd waar een EOS aan ‘moet’ voldoen. Adviezen uit deze handreiking zijn deels ook meegenomen in de bovengenoemde circulaire en zullen waarschijnlijk ook meegenomen worden in de nog in ontwikkeling zijnde PGS-37-normering.

Naast deze documenten bestaat er de NFPA 885², een standaard uit de Verenigde Staten over stationaire en mobiele EOS'en. Deze standaard geeft minimumrichtlijnen om de risico's die gepaard gaan met elektriciteitsopslag te beheersen. Het voornaamste verschil tussen de voorliggende handreiking en de NFPA 885 is dat laatstgenoemde een automatisch blussysteem voorschrijft, terwijl wij dat – hoewel een dergelijk systeem zeker van waarde kan zijn – hier niet expliciet voorschrijven.

1.3 Risico's

Een EOS op het dak van een collectief woongebouw (zoals weergegeven in afbeelding 1.1) brengt nieuwe risico's met zich mee ten opzichte van een 'conventioneel' dak waarop geen EOS in combinatie met zonnepanelen is geplaatst. Het systeem is, zoals hierboven geschreven, opgebouwd uit in ieder geval de zonnepanelen en het EOS. De risico's van beide elementen worden hieronder eerst afzonderlijk benoemd. Vervolgens wordt ingegaan op de risico's wanneer deze elementen gecombineerd op een dak aanwezig zijn.

1.3.1 Risico's zonnepanelen

In het *Infoblad energietransitie ten behoeve van de veiligheidsregio's* (Instituut Fysieke Veiligheid, 2019a) en in *Brandincidenten met fotonvoltaïsche (PV) systemen in Nederland. Een inventarisatie* van TNO (2019) zijn de volgende risico's en aandachtspunten bij (het plaatsen van) zonnepanelen genoemd.

- > Kortsluiting (in de omvormer) wegens falen van materiaal of door ontwerpfouten kan brand in zonnepanelen veroorzaken.
- > Bij brand kan de isolatie van de bekabeling van zonnepanelen smelten, waardoor brandweerlieden kans lopen op een elektrische schok. Dit resulteert op zijn beurt in brandwonden, het niet kunnen loslaten van objecten die op dat moment worden vastgehouden (lock-on) en hartritmestoornissen.
- > Wegens extra gewicht op het dak, kan er tijdens brandbestrijding sprake zijn van instortingsgevaar.
- > Er dient rekening gehouden te worden met de bereikbaarheid bij brand door brandweerpersoneel. Als de brand niet goed te bereiken is, is deze ook niet goed te blussen.
- > Verbrandingsproducten: toxiciteit, zware metalen, glassplinters/schilfers (Instituut Fysieke Veiligheid, 2019b; Rosmuller, 2020).

² NFPA 885: [Standard for the Installation of Stationary Energy Storage Systems](#).

1.3.2 Risico's van EOS

In de *Handreiking Elektriciteit Opslag Systemen (EOS > 25 kWh Li-ION)* zijn twee (brand)scenario's beschreven voor incidenten met een EOS. In het eerste scenario is er sprake van een lithium-ion accu die te veel opwarmt en in een 'thermal runaway' raakt, met als gevolg een zichzelf in stand houdende brand. In geval van monitoring van het EOS als geheel en in het bijzonder het accugedeelte, kan er tijds worden ingegrepen door de betrokken accu te verwijderen. Mocht dit niet tot het gewenste resultaat leiden dan kan brand worden voorkomen door gebruik te maken van een doeltreffend (automatisch) blussysteem.

Het tweede scenario dat in de bovengenoemde handreiking wordt beschreven, is het 'worst case' scenario. Wanneer één van de accu's tot ontbranding komt (thermal runaway) is het lastig om een dergelijke brand te blussen. Als gevolg van de duur van de brand of van de constructie en montage van de accu's kunnen andere accu's ook betrokken raken of tot een thermal runaway overgaan. Een dergelijke brand kan gedurende lange tijd (meerdere uren tot dagen) woeden en herontsteken. Bij dergelijke branden komen naast hitte ook giftige stoffen vrij (onder andere waterstoffluoride, lithiumoxide en zoutzuur). Het effectgebied is afhankelijk van de meteorologische omstandigheden, de grootte van de brand en de bereikbaarheid van het EOS voor hulpdiensten. Het kan tot enkele kilometers ver reiken (zie bijvoorbeeld de brand te Drogenbosch in België van november 2017).³

1.3.3 Risico's van EOS op een dak

Een EOS op een dak van een collectief woongebouw brengt ten opzichte van een EOS op de grond extra risico's met zich mee, omdat bij plaatsing op een dak de beheers- en bestrijdbaarheid van brand verslechteren. Als het EOS zich op een dak bevindt, wordt de bereikbaarheid van het incident aanzienlijk bemoeilijkt en neemt de lengte van de aanvalsweg van de brandweer toe. Ook nemen de complexiteit van de aanvalsweg en de logistiek toe, omdat het EOS zich op hoogte bevindt en de brandweer zich toegang moet verschaffen tot het dak. Daarnaast loopt brandpersoneel het risico te vallen door het werken op hoogte.

Indien een EOS zich op de grond bevindt en er geen sprake is van accucompartimentering, is het gangbaar om de container met accu's van buitenaf vol te laten lopen met water. Als het EOS zich op een dak bevindt, is dit echter niet mogelijk, omdat de constructie van het woongebouw hier normaliter niet op berekend is. Hierdoor moet het water in de accu-compartimenten in de container worden ingebracht, wat leidt tot een toename van risico's voor het brandweerspersoneel. Dit betekent dat de bestrijdbaarheid van het incident ook in dit opzicht aanzienlijk complexer wordt in vergelijking met een situatie waarin een EOS op de grond is geplaatst.

Naast deze extra risico's brengt het plaatsen van een EOS op het dak van een collectief woongebouw vanuit risico-oogpunt ook een tweetal *voordelen* met zich mee.

- > Doordat het EOS zich op het dak bevindt, is de kans op vernieling aanzienlijk lager dan wanneer het 'buiten op de stoep' is geplaatst.

³ <https://www.tijd.be/ondernemen/milieu-energie/megabatterij-veroorzaakt-brand-bij-engie-electrabel-in-drogenbos/9952306.html>

- > Door de hoge plaatsing van het EOS zal – in geval van een brand– de rookwolk zich boven leefniveau bevinden. Hierdoor bestaat de mogelijkheid dat er – afhankelijk van de weersomstandigheden – minder hinder van de rook wordt ondervonden in de directe omgeving en de bewoners van het wooncomplex.

Concluderend kan gesteld worden dat door de plaatsing van het EOS op een dak de bestrijdbaarheid van incidenten als gevolg van de langere aanvalsweg, complexe bereikbaarheid en logistiek aanzienlijk lastiger is dan die bij incidenten met een EOS op de grond (maaiveld). Daarom geniet vanuit de optiek van beheersbaarheid van brand en brandbestrijding de plaatsing van een EOS op de grond de voorkeur. Vaak is een dergelijke plaatsing echter niet mogelijk.

1.4 Samenvatting

De plaatsing van een EOS op daken van (collectieve) woongebouwen is een nieuwe ontwikkeling en brengt nieuwe risico's met zich mee. Zo wordt de bestrijding van incidenten veel complexer. Op het moment van schrijven van deze handreiking is er nog geen passende wet- en of regelgeving die de plaatsing van EOS'en op daken van woongebouwen reguleert.

Om deze hiaten op te vullen, zijn in de volgende hoofdstukken per doelgroep (veiligheidsregio, eigenaar en bevoegd gezag) maatregelen gepresenteerd die de brandveiligheid van EOS op daken van collectieve woongebouwen kunnen verbeteren.

2 Tips voor de veiligheidsregio's

2.1 Risicobeheersing

Conform de Wet Veiligheidsregio's artikel 25.1.e heeft de brandweer de taak om te adviseren over zaken betreffende bereikbaarheid, bestrijdbaarheid en zelfredzaamheid. Met name wat betreft de eerste twee aspecten is de adviesrol van de brandweer met betrekking tot een EOS op het dak van een collectief woongebouw van belang.

De veiligheidsregio kan op twee mogelijkheden worden betrokken bij de advisering rondom de plaatsing van een EOS op collectieve woongebouwen. De eerste mogelijkheid is dat er een vergunning wordt aangevraagd bij het lokale bevoegd gezag en de veiligheidsregio hier een advies over geeft. De tweede mogelijkheid is wanneer er geen vergunningsplicht is, maar de brandweer door bijvoorbeeld de eigenaar van het woongebouw over de plaatsing wordt geïnformeerd. De veiligheidsregio kan dan, in het kader van de Wet Veiligheidsregio's, alsnog advies geven. Bij beide mogelijkheden kan bij de advisering aansluiting worden gezocht met bestaande handreikingen, zoals de *Handreiking Elektriciteit Opslag Systemen (EOS > 25 kWh Li-ION)* of de *Circulaire risicobeheersing lithium-ion energiedragers* (en uiteraard dit voorliggende document).

Voor de afdeling Risicobeheersing van de veiligheidsregio / brandweer worden concreet de volgende handvatten gegeven.

1. Vanuit de optiek van beheersbaarheid van brand en brandbestrijding geniet de plaatsing van een EOS op de grond de grote voorkeur boven de plaatsing op een dak. Gespreksruimte blijft echter mogelijk indien plaatsing van een EOS op een dak de enige mogelijkheid is of ten behoeve van lokaal maatwerk.
2. Gelet op het feit dat de oorzaak van een groot deel van de branden in PV-installaties (zonnepanelen) voortvloeit uit slecht uitgevoerd installatiewerk of een slecht ontwerp, wordt geadviseerd aandacht te besteden aan kwaliteitscontrole, een goede opleiding van installateurs en het regelmatig laten uitvoeren van onafhankelijke controles (TNO, 2019). Vraag altijd om een keuringsrapport van de elektrische installatie bij oplevering conform de SCIOS⁴ Scope 12.⁵
3. Zorg dat een eventuele doorvoer van leidingen door het dak voldoet aan de eisen van brandwerendheid en brandvertraging conform het Bouwbesluit.
4. Zorg voor een deugdelijk en goed uitvoerbaar noodplan ten behoeve van de incidentbestrijding. Er wordt in ieder geval geadviseerd om in dit plan de aanvalsroutes, de locatie van het EOS, de hoeveelheid accu's, de aanwezige preventieve voorzieningen en locatie van de noodschakelaar op te nemen.

⁴ De stichting SCIOS is eigenaar van, beheert en ontwikkelt het kwaliteitssysteem ten behoeve van installatie-eigenaren en inspectie- en installatiebedrijven voor de inspectie en het onderhoud van technische installaties.

⁵ SCOPE 12 wordt naar verwachting medio Q3 (2020) geaccrediteerd. Zie voor meer informatie: <https://www.scios.nl/Scopes>.

2.2 Incidentbestrijding

5. Stel indien nodig de installatie zo snel mogelijk veilig in samenspraak met de beheerder. Dit proces dient beschreven te zijn in het noodplan.
6. Handhaaf veiligheidsafstanden⁶ bij de incidentbestrijding en gebruik voorgeschreven persoonlijke beschermingsmiddelen (1000V handschoenen, een droog bluspak en ademlucht of helm met vizier).
7. Wees bewust van een lastige bereikbaarheid van de brand (bijvoorbeeld door gladde oppervlaktes, smalle looproutes, een toegang via mangaten of een redvoertuig, een gebrek aan compartimentering, mangaten en de hoogte op zichzelf).
8. Wees bewust van de maximale dakbelasting in relatie tot het gewicht van de installatie, het gebruikte bluswater (inclusief het bluswater wat gebruikt wordt voor het afvullen van het accucompartiment in het EOS) en het aanwezige personeel en materiaal.
9. Zorg voor het in de vorige paragraaf genoemde aanvals- c.q. noodplan wanneer een EOS op het dak van een collectief woongebouw wordt geplaatst. Doe dit in samenspraak met de gebouweigenaar.
10. Bespreek en oefen met de risico's van EOS en raak bekend met het object waar het op is geplaatst.
11. Houd er rekening mee dat niet alle systemen centraal kunnen worden afgeschakeld: zo kan het afschakelen van de omvormers losstaan van het afschakelen van het EOS van het net of van de zonnepanelen. Hierdoor is het mogelijk dat op bepaalde delen van de installatie nog stroom staat, terwijl verwacht wordt dat deze is uitgeschakeld.
12. Zoek bij incidenten contact op met de installatie- en gebouwbeheerder(s): zij kunnen indien gewenst informatie over het EOS verschaffen.

⁶ Zoals beschreven in Brandweer Nederland (2020) [Brandweeroptreden nabij elektriciteit](#). Arnhem: IFV.

3 Maatregelen die eigenaren, VvE's en corporaties kunnen nemen

Per collectief woongebouw is het situatie-afhankelijk – bijvoorbeeld van de maximaal toegestane hoogte van het gebouw of van welstandseisen – of er een vergunnings- of meldingsplicht is voor de plaatsing van een EOS. Het wordt daarom geadviseerd aan de eigenaar / VvE / coöperatie vooraf met de betreffende gemeente contact op te nemen of en zo ja, welke vergunning voor het betreffende object noodzakelijk is.

De te nemen maatregelen zijn opgedeeld in een drietal onderdelen: bouwkundig, installatietechnisch en organisatorisch. De maatregelen hebben als doel om de bereikbaarheid en bestrijdbaarheid in geval van een calamiteit te vergroten, evenals de veiligheid van het systeem in algemene zin.

3.1 Bouwkundig

13. Er wordt geadviseerd een constructieberekening (in zowel nieuw- als oudbouw) uit te voeren die aantoont dat het EOS in combinatie met zonnepanelen en het bluswater in geval van calamiteit gedragen kan worden door het dak. Er wordt eveneens geadviseerd deze constructieberekening te laten goedkeuren door Bouw- en woningtoezicht.
14. Alle gemaakte doorvoeringen in het gebouw die een brandcompartiment doorbreken, dienen weer opnieuw brandwerend te worden gemaakt. Dit houdt in: doorvoeringen met een brandwerendheid van minimaal 60 minuten – waarbij de brandwerendheid van de doorvoeringen gelijk moet zijn aan de eisen wat betreft de brandwerendheid van de ruimte – in zowel het dak als bij de technische ruimte.
15. Overweeg om, indien deze niet volgens het Bouwbesluit verplicht aanwezig is, een droge stijgleiding 'door te trekken' tot het dak om in het bluswater voor de brandweer te voorzien. Er wordt geadviseerd om het debiet van de droge stijgleiding gelijk te laten zijn aan dat van een ondergrondse brandkraan: 800l/min.
16. Indien het gebouw (inclusief het EOS) hoger dan vijftien meter is ten opzichte van andere bebouwing binnen een straal van 500 meter, wordt geadviseerd een goedgekeurde bliksembeveiliging te plaatsen.
17. Op het dak dient valbeveiliging aanwezig te zijn en de vloer moet voldoende stroef zijn⁷, ook indien het dak nat is door regen- of bluswater.
18. Geadviseerd wordt de toegangsdeur tot het dak en tot het EOS minimaal één meter breed te maken.
19. Het EOS wordt geadviseerd zeszijdig, dus inclusief vloer, 60 minuten brandwerend te zijn.

⁷ Conform het Arbo-besluit 3.11.

20. Bereikbaarheid: zorg voor een goede bereikbaarheid van het EOS. We adviseren het EOS vrij te laten staan (vijfzijdig bereikbaar). Indien dit niet mogelijk is, wordt geadviseerd in samenspraak met de veiligheidsregio te kijken welke maatregelen kunnen worden getroffen om tot een gelijkwaardig veiligheidsniveau te komen.

3.2 Installatietechnisch

21. Er wordt geadviseerd voor de elektrische installatie een positief keuringsrapport conform de SCIOS Scope 12 keuringsnorm te verkrijgen.
22. De eigenaar wordt geadviseerd een compartimentering van de verschillende accu-pakketten toe te passen die 60 minuten brandwerend is. Hierdoor kan propagatie van de thermal runaway worden beperkt. Een voorbeeld hiervan is het plaatsen van een kolom van stalen beplating (of een gelijkwaardig alternatief)^{8,9} rondom een set accu's. In geval van een thermal runaway kan deze kolom dan gevuld worden met water door de hulpdiensten. Het langdurig koelen (met water) is immers de enige mogelijkheid om een thermal runaway tot stoppen te brengen. De gehele installatie vol laten lopen is daarbij geen mogelijkheid: de installatie zou door haar gewicht waarschijnlijk door het dak zakken.¹⁰ Met compartimentering wordt het toch mogelijk de bij het incident betrokken accu's onder te dompelen in water. Uit veiligheidsoogpunt voor brandweerpersoneel kan overwogen worden de watertoevoer naar de accu-compartimenten buiten de EOS-container te plaatsen.
23. Geadviseerd wordt het proces zoals genoemd bij punt 22 te automatiseren: indien door de installatie wordt gedetecteerd dat een accu 5 graden Celsius onder het punt zit waarop deze in thermal runaway gaat, in de meeste gevallen betreft het 78 graden Celsius kerntemperatuur, dient het betreffende accucompartiment automatisch te worden gevuld met water¹¹. Hierbij wordt geadviseerd het water continu te verversen om de temperatuur van het water zo laag mogelijk te houden.
24. De EOS-container zou moeten beschikken over een mogelijkheid om het gebruikte blus- of koelwater¹² af te voeren, bijvoorbeeld met een directe aansluiting op de regenwaterafvoer. Hierdoor kan eveneens het overtollige koelwater, dat uit de hierboven genoemde accupakketcompartimenten loopt, de container verlaten.
25. Er wordt geadviseerd minimaal één klimaatregeling te hebben in de technische ruimte die de omgevingstemperatuur van het EOS binnen het door de leverancier aangegeven temperatuurbereik houdt. Zie hiervoor eveneens paragraaf 5.6 van de *Handreiking Elektriciteit Opslag Systemen*.
26. De temperatuur van de accu's dient binnen de grenswaarden van de leverancier te blijven. Geadviseerd wordt dat de accu's in de EOS zichzelf ontladen tot minimaal 30% op het moment dat 80% van de temperatuurgrens waarop de BMS-noodstop in werking treedt, is bereikt. Het ontladen van de batterijen mag gebeuren met maximaal een keer nominale belasting conform de fabrieksopgave. Tevens wordt geadviseerd op 95% van de temperatuurgrens die de BMS-noodstop activeert de EOS te laten uitschakelen door de PLC-aansturing.

⁸ Het is van belang dat de compartimentering plaatsvindt op basis van productcertificaten.

⁹ Een thermal runaway kan temperaturen bereiken van 1000 graden. Een thermal runaway / brand in accu's laat zich kenmerken door een snel brandverloop (koolwaterstofkromme).

¹⁰ Indien compartimentering niet mogelijk is, moet het dak het gewicht van een container gevuld met bluswater kunnen dragen.

¹¹ Of een ander (erkend) vergelijkbaar blusmiddel bestemd voor dergelijke systemen.

¹² Als uitgangspunt kan hierbij gehanteerd worden: minimaal 800l/min.

27. Als door de PLC of het BMS wordt geconstateerd dat er afwijkingen zijn in reguliere laad- en ontlaadpatronen en/of er grote temperatuurschommelingen die het veilig in gebruik houden van de installatie belemmeren, moet de betreffende accu of het EOS in zijn geheel zichzelf uitschakelen.
28. Een eventueel aanwezige PLC-aansturing van het systeem zou zo gebouwd moeten zijn dat in geval van een calamiteit waarbij de PLC uitvalt, de complete zonnepaneel / EOS-installatie zichzelf uitschakelt.
29. Wij adviseren het EOS door middel van een makkelijk te bereiken noodknop of een PLC automatisch en handmatig van het elektriciteitsnet af te kunnen koppelen. Een alarmlicht of -signaal moet aangeven of dit daadwerkelijk gebeurd is.

3.3 Organisatorisch

30. De locatie van de technische ruimte (EOS) mag in geval van brand geen vluchtweg belemmeren.
31. Wij adviseren het systeem een signaal aan een 24/7 bewaakte particuliere alarmcentrale (PAC) te laten doorgeven indien de temperatuur van de installatie en de omgeving buiten de door de leverancier aangegeven specificaties komt, of indien er sprake is van een storing in het koelingssysteem. Indien er geen koppeling is met een bewaakte centrale, wordt geadviseerd dat het systeem de complexbeheerder in kennis stelt, zodat actie kan worden ondernomen. Indien de beheerder constateert dat de storing het veilig in gebruik houden van de installatie belemmert, dan wordt aangeraden de betreffende accu of het EOS in zijn geheel uit te schakelen. Geadviseerd wordt binnen één uur een vakbekwaam monteur (en beheerder) ter plaatse te laten komen om een diagnose van de storing te stellen en adequate maatregelen te treffen die het correct functioneren van de installatie waarborgen.
32. Informeer de betreffende veiligheidsregio over het EOS, inclusief situatietekeningen, en zorg voor het krijgen van een bevestiging dat deze informatie is aangekomen bij de veiligheidsregio.
33. Zorg voor een aanmeldbevestiging van het EOS bij de netbeheerder.
34. Plaats bij de ingang van het wooncomplex of bij het brandmeldpaneel én op de buurtbatterij waarschuwingstekens dat zich op het dak zonnepanelen bevinden en/of een buurtbatterij. Zie de *Handreiking Elektriciteit Opslag Systemen (EOS > 25 kWh Li-ION)* voor voorbeelden.

Intermezzo: overige elektrische installaties

Het plaatsen van zonnepanelen en/of een EOS kan samengaan met (ingrijpende) veranderingen in andere elektrische installaties van een collectief woongebouw. Deze veranderingen, zoals bijvoorbeeld het plaatsen van laadpalen of het faciliteren van laadmogelijkheden voor scootmobielen of iets dergelijks, behoeven andere maatregelen dan die getroffen moeten worden bij het plaatsen van een EOS. In de onderstaande documenten staan adviezen voor de betreffende situaties:

1. Instituut Fysieke Veiligheid (2020). [Brandveiligheid van parkeergarages met elektrisch aangedreven voertuigen](#). Arnhem: IFV.
2. Veiligheidsregio Haaglanden (2016). [Brandveilig stallen van scootmobielen in woongebouwen. Handreiking voor beheerders en gebruikers](#).

4 Handvatten voor het bevoegd gezag

Een vergunningsaanvraag voor een EOS op het dak van een collectief woongebouw is niet in alle gevallen nodig. Er zijn daardoor relatief weinig manieren om notie te krijgen van de plaatsing van een EOS op een woongebouw. De Algemene Plaatselijke Verordening biedt ruimte om de plaatsing van een EOS op daken van woongebouwen te reguleren.

Indien er sprake is van een vergunningsaanvraag voor de plaatsing van een EOS op een collectief woongebouw, wordt het lokale bevoegd gezag het volgende geadviseerd.

35. Betrek in een vroegtijdig stadium de gemeente, veiligheidsregio c.q. brandweer en netbeheerder in het traject voor advies over de veiligheidsrisico's.
36. Maak gebruik van de SCIOS Scope 12¹³ in de beoordeling van het EOS.
37. Vraag om een goedgekeurde constructieberekening die aangeeft dat de installatie c.q. de technische ruimte gedragen kan worden door het dak. Houd hierbij rekening met een eventuele calamiteit en met watergebruik door de brandweer.
38. Vraag om bevestiging / eis in de vergunning dat het EOS aan de in dit document genoemde maatregelen voldoet.
39. Zorg vóór het verlenen van de vergunning dat alle relevante betrokken partijen (het bevoegd gezag i.c. de omgevingsdienst, de veiligheidsregio, netbeheerder, verzekeraar en eigenaar) akkoord zijn met de randvoorwaarden en dat aan de eisen die aan een EOS worden gesteld, is voldaan. Zie daarvoor: Veiligheidsregio Haaglanden, Veiligheidsregio Rotterdam-Rijnmond en LIOGS, 2019).

¹³ Zie voor meer informatie: <https://www.scios.nl/Scopes>.

5 Categorisering maatregelen

In de onderstaande tabel is per hiervoor genoemde (genummerde) maatregel de aard van de maatregel opgenomen: we onderscheiden de maatregelcategorieën: bouwkundig, installatietechnisch, organisatorisch of repressief. Met deze tabel kan snel inzicht verkregen worden in welke maatregelen op welk aspect invloed hebben. Zo valt bijvoorbeeld af te lezen dat maatregel 33 (vijfzijdige bereikbaarheid van het EOS, zie hoofdstuk 3) organisatorisch van aard is.

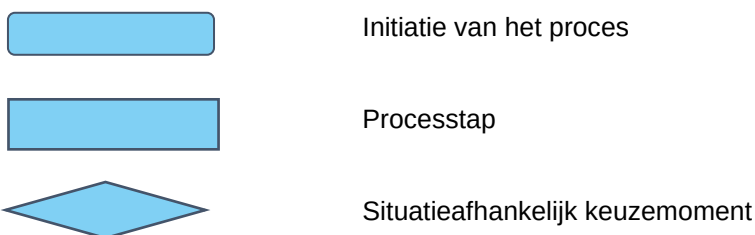
Nummer	Bouwkundig	Installatietechnisch	Organisatorisch	Repressief
1			X	
2		X		
3	X			
4				X
5				X
6				X
7				X
8				X
9				X
10				X
11				X
12				X
13	X			
14	X			
15	X			
16	X			
17	X			
18	X			
19	X			
20	X			
21		X		
22		X		
23		X		
24		X		
25		X		
26		X		
27		X		
28		X		
29		X		
30			X	
31			X	
32			X	
33			X	
34			X	
35			X	
36		X		
37	X			
38			X	
39			X	

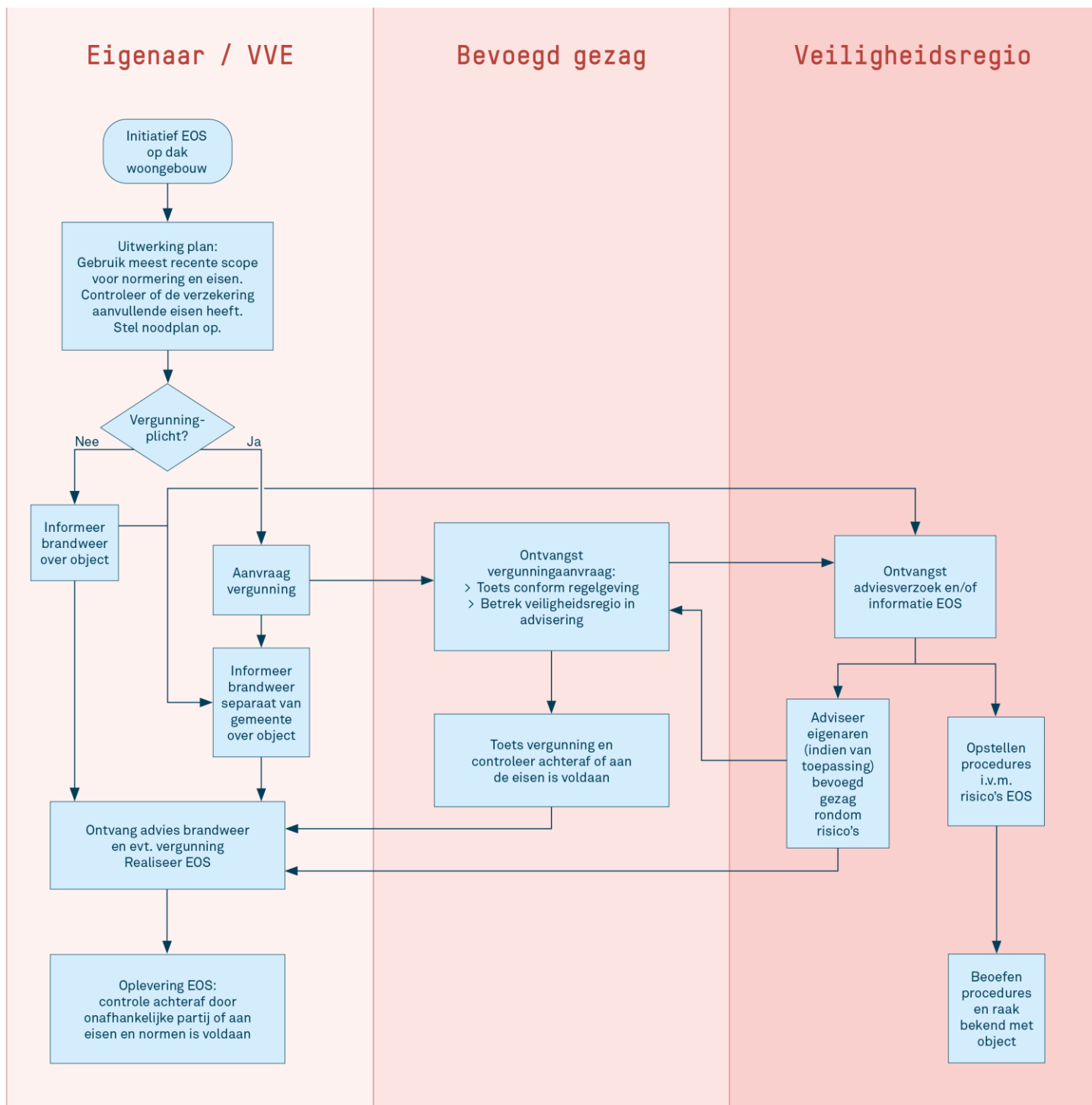
6 Procesgang van plaatsing van een EOS op een collectief woongebouw

Op basis van de ervaringen van de Veiligheidsregio Noord- en Oost-Gelderland, de projectontwikkelaar van de plaatsing van een EOS in Apeldoorn en de gemeente Apeldoorn is onderstaand processchema opgesteld ten behoeve van de veilige plaatsing van EOS'en op collectieve woongebouwen (indien plaatsing op de grond niet mogelijk is). Het schema heeft als doel om voor de betrokken partijen duidelijkheid te scheppen in het te volgen proces, en daarmee te zorgen dat alle betrokken partijen tijdig worden geïnformeerd over de plaatsing van een EOS.

Binnen de procesgang van de plaatsing van een EOS op een woongebouw spelen meerdere belangrijke partijen een rol: de eigenaar / VvE, het bevoegd gezag en de veiligheidsregio. De eigenaar / VvE is de initiatiefnemer en verantwoordelijk voor de plaatsing van het EOS. De gemeente verstrekt – indien van toepassing – de vergunning voor de plaatsing. De veiligheidsregio adviseert zowel het bevoegd gezag als de initiatiefnemer rondom de veiligheidsrisico's van het EOS. Naast deze drie partijen zijn ook de netbeheerder en verzekeraar belangrijke stakeholders als het aankomt op de plaatsing van een EOS. Deze dienen separaat, buiten het schema om, geïnformeerd te worden.

Elk van de drie partijen heeft in het schema een eigen verticale kolom. De betekenis van de figuren is in onderstaande legenda weergegeven.





Literatuurlijst

Brandweer Nederland (2020) [*Brandweeroptreden nabij elektriciteit*](#). Arnhem: IFV.

CBS (2020). [*Productie groene elektriciteit in stroomversnelling*](#).

Installatiejournaal (2019). [*Off-grid accu-opslagsysteem voor appartementen*](#).

Instituut Fysieke Veiligheid (2019a). [*Infoblad energietransitie ten behoeve van veiligheidsregio's*](#). Arnhem: IFV.

Instituut Fysieke Veiligheid (2019b). [*Een internationale verkenning naar fysieke veiligheidsaspecten van de energietransitie*](#). Arnhem: IFV.

Instituut Fysieke Veiligheid (2020). [*Brandveiligheid van parkeergarages met elektrisch aangedreven voertuigen*](#). Arnhem: IFV.

Ministerie van Infrastructuur en Waterstaat (2020). [*Circulaire risicobeheersing lithium-ion energiedragers*](#).

NEN (2020). [*Normontwerp veilig werken aan buurtbatterijen gepubliceerd voor commentaar*](#).

Rosmuller, N. (2020). [*Zijn zonnepanelen het nieuwe asbest ...?*](#)

TNO (2019). [*Brandincidenten met fotovoltaïsche \(PV\) systemen in Nederland. Een inventarisatie*](#). TNO 2019 P10287. Petten: TNO.

Veiligheidsregio Haaglanden (2016). [*Brandveilig stallen van scootmobielen in woongebouwen. Handreiking voor beheerders en gebruikers*](#).

Veiligheidsregio Haaglanden, Veiligheidsregio Rotterdam-Rijnmond en LIOGS (2019). [*Handreiking Elektriciteit Opslag Systemen \(EOS > 25 kWh Li-ION\)*](#).