3M Fire Barrier Pass-Through Device

Product Data Sheet

Date: March 2015 Supersedes: New

Product Description & Intended Use	3M [™] Fire Barrier Pass-Through Device is a one-piece, hinged metal enclosure, containing a fixed fire resistance intumescent material and foam seals and is used to reinstate the fire resistance performance of wall and floor constructions where they have been provided with apertures for the penetration of insulated metallic pipes In addition, the unique intumescent property of this material allows 3M [™] Fire Barrier Pass-Through Device to expand and
	help maintain a firestop penetration seal for integrity (E) against the passage of flame and insulation (I) against the rise of temperature as service penetrations are exposed to fire.
Key Features	 Fire classification up to EI 180 to EN 1366-3 Tested in minimum 150 mm fire resistance walls (drywalls & masonry) and floors (aerated concrete) Strong intumescent property: expands when heated to seal around services consumed by fire. Single mounting bracket available for all devices Triplex and Sixplex mounting brackets available for square devices. The hinged device can be positioned quickly and securely and is also suitable for retrofitting service penetrations



Category	Description			
Colour	Red Powder-Coated Metal			
Resistance to Fire in accordance with EN 13501-2	Up to EI 180			
Reaction to fire in accordance with clause 8 of EN 13501-1: 2007+A1:2009	Classification : E			
Intumescent expansion ratio (EOTA TR N° 024)	NPD			
Curing Time	Not applicable			
Airborne Sound Insulation	NPD			
Water Permeability	NPD			
Working Life	Assumed at 25 years in ETA, clause 1.2, subject to the use in accordance with that clause.			
Use Category	Z_1 – Internal conditions with high humidity, excluding temperatures below 0°C. Z_2 – Internal uses in high humidity conditions other than Z_1 Category, excluding temperatures below 0°C.			
Durability and serviceability	Z ₁ – Internal conditions with high humidity classes including than Z ₂ excluding temperatures below 0°C ("internal dry conditions")			

Reference Documents	DoP N°	3M FB PTD 1121-CPR-JA0012
	ETA 10/0034 R1	European Technical Approval for 3M™ Fire Barrier Pass-Through Device
		Validity: from June 2013 to June 2018
	ETA 10/0034	European Technical Approval for 3M™ Fire Barrier Pass-Through Device
		Validity: from September 2010 to September 2015

Typical Physical Properties

Performance Characteristics

Supporting Construction	Supporting Construction					
Flexible Walls Thickness			Min. 150 mm			
Note: The wall must have a m comprise timber or steel studs of 12.5 mm thick, 'Type F' Gyp timber stud walls, no parts of t mm to a stud, the cavity must and the stud and minimum 10 according to EN 13501-1, is p penetration seal and the stud. an insulated or un-insulated ca	hinimum t is lined on osum boa the penet be close 0 mm of rovided v The part avity.	thickness both fa ards acc tration s d betwe insulation vithin the tition co	aces of 100 mm and aces with minimum 2 layers cording to EN 520. In shall be closer than 100 een the penetration seal on of class A1 or A2 he cavity between the instruction may comprise			
Rigid Walls Thickness		Μ	lin. 150 mm			
Note: The wall must have a n comprise concrete, aerated co density of 650 kg/m3.	ninimum oncrete o	thickne r masoi	ss of 100 mm and nry, with a minimum			
Rigid Floors Thickness		M	in. 150 mm			
Note: The floor must have a comprise aerated concrete wit	minimum th a minir	thickne num de	ess of 150 mm and ensity of 650 kg/m3.			
• The supporting construe 13501-2 for the required	supporti ction must d fire resis	ng con be clas tance pe	struction sified in accordance with EN eriod.			
Apertures Details						
Apertures Sizes in Flexible	Walls					
	Single		65 x 65 mm			
• Square	Triplex		65 x 130 mm			
Shan	Sixplex	(130 x 195 mm			
	Single		105 x 105 mm			
• Square	Triplex		105 x 210 mm			
large	Sixplex	<u> </u>	210 x 310 mm			
Round sr	mall		Ø 55 mm			
Round la	rae		Ø 115 mm			
Apertures Separation	- 3-	Min. 2	200 mm			
Cross-Sectional Fill		Max.	60% of the of the aperture			
Service Support		Min. 3 the w Min. 4	350 mm from both faces of all 400 mm above a floor			
 Specific considerations for penetrations seals: The seals may only be penetrated by the services described in ETA 12/0559 or in this Technical Data Sheet; other parts or support constructions must not penetrate the seal. The service support construction must be fixed to the building element containing the penetration seal or a suitable adjacent building element, on both sides (walls) of the penetration in such a manner that in the case of fire, no additional load is imposed on the seal. Furthermore it is assumed that this support is maintained for the required period of fire resistance. 						

Performance Characteristics

(Continued)

Services in Flexible or Rigi	d Walls and Rigid Floors (min. 150 mm)						
Cables and pipes shall not be Throug	e mixed within a single system 3M™ Pass- gh Devices module.						
Metal Pipes							
Copper pipes	19 mm Ø and 0.9 mm wall thickness						
Insu	lated Metal Pipes						
Copper Pipe Insulated Elastomeric	19 mm Ø and 0.9 mm wall thickness insulated with 19 mm thick Continuous Sustained insulation.						
Cor	nbustible Pipes						
PVC Pipes	Up to 50 mm Ø by 2.4 mm wall thickness						
Specific considerations for un	-insulated and insulated pipes penetrations						
 Single or bundle pipes. See Fire Resistance Classification Chart for details on numbers of cables. Pipes must be perpendicular to the seal surface Compressed air systems must be switched off by other means in case of fire The approval does not address any risks associated with leakage of dangerous liquids or gases caused by failure of the pipe(s) in case of fire Classifications for pipes relate to C/U (pipe end capped inside & uncapped outside the furnace) refer to national regulations The function of the pipe seal in case of pneumatic dispatch systems, pressurised air systems etc. is guaranteed only when the systems are shut off in case of fire. The assessment does not cover the avoidance of destruction of the seal or of the abutting building element(s) by forces caused by temperature changes in case of fire. This has to be considered when designing the piping system. The durability assessment does not take account of the possible effect of substances permeating through the pipe on the penetration seal. Elastomeric insulation material is defined as a generic insulation products 							
elastomeric foam (FEF) Class Bs3d0 Reaction t	products. Specification.", which has a minimum o Fire performance, when classified according						
 Elastomeric insulation s PVC-U to EN 1452-1, E 	hall be continuous and sustained. N 1329-1, EN 1453-1 and PVC-C to EN 1566-1						
Tele	ecommunication						
Telecommunication / Optical Fibre Cables	15 to 18 mm Ø, sheathed telecommunication/optical fibre cables, single or in bundles*.						
E	ectrical Cable						
Polyolefin Sheathed (H07Z-F)	15.1 to 18.8 mm Ø, 1 x 95 mm ²						
EPR/Chloroprene Sheathed (H07RN-F)	20.9 to 26.5 mm Ø, 4 x 10 mm ²						
Specific considerations for cab	les penetration seals:						
 Cables maybe singular * Cables bundle – Seve bound closely together Classification Chart for 	 Cables maybe singular or in bundle. * Cables bundle – Several cables running in the same direction and bound closely together by mechanical means. See Fire Resistance Classification Chart for details on numbers of cables. 						
 Classification Chart for details on numbers of cables. For tied cable bundles the space between cables shall be sealed. The cables type's covers currently and commonly used in building practice in Europe subject to the cable size, except tied bundles, waveguides and non-sheathed cables (wires). Optical fibre cables are covered. Tied bundles with diameter of less than or equal to the bundle tested made from cables of a diameter not greater than 21 mm are valid. See EN 1366-3: 2004-2009 for cables field of direct application details. 							
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	Flexible Wall* ≥ 150 mm								
System compromising of up to 2 x 3, secured	System compromising of 63.5 mm square 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame								
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service Penetrant		Е	I		
Pass-Through Devices	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Empty	63.5 mm square	No Services in Device(s)		120	60		
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall ⁻	Pipe Wall Thickness		I		
Copper Pipes (singles or multiple – bundles up to 3 pipes)	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	30 C/U		
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	Ι		
CS Elastomeric Insulation ¹	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	19 mm Ø	0.9 mm	19mm	120 C/U	45 C/U		
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall ⁻	Thickness	E	I		
PVC ²	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	Up to 19 mm Ø	2.4 mm		120 C/U	60 C/U		
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	C	Cable Description		E	Ι		
Telecommunications/Optical Fibre Cables			Diameter range 15	to 18 mm Ø single o to 4 cables	or bundles of up	120	45		
Electrical Cables	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195	Centrally located	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K power cables, single or bundles of up to 4 cables			120	15		
Electrical Cables	mm		Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 power cables, single or bundles of up to 3 cables			120	60		

Fire Resistance Classification | 3M[™] Fire Barrier Pass-Through Devices 63.5 mm square

* Flexible Walls = The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12.5 mm thick, "Type F" Gypsum boards according to EN 520. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seals and the stud and minimum 100 mm of insulation of class A1 or A2 according to 13501-1, is provided within the cavity between the penetration seals and the stud and minimum for minimum for minimum of misuated or using a second g to 1950 F1, is provided within the cavity between the penetration seal and the stud. The partition construction may comprise an insulated or un-insulated cavity.
 Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.
 Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction

to Fire performance, when classified according to EN 13501-1

2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity

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I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations.

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 102 mm square

Flexible Wall* ≥ 150 mm									
System compromising up to 2 x 3, secured in	System compromising of 102 mm square 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame								
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service	Penetrant	E	I		
Pass-Through Devices	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Empty	102 mm square	No Services in Device(s)		120	60		
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I		
Copper Pipes (singles or multiple – bundles up to 3 pipes)	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	30 C/U		
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I		
CS Elastomeric Insulation ¹	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	19 mm Ø	0.9 mm	19mm	120 C/U	45 C/U		
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	-		
PVC ²	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 50 mm Ø	2.4 mm		120 C/U	60 C/U		
Electrical & Telecom	Maximum Aperture Size	Position of service(s)		Cable Description		E	I		
Telecommunications/Optical Fibre Cables			Diameter range 15 t	o 18 mm Ø single or 4 cables	bundles of up to	120	60		
Florida da	Single: 105 x 105 mm Triplex: 105 x 210mm	Centrally located	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K power cables, single or bundles of up to 4 cables			120	60		
Electrical Cables	Sixplex:210 x 310 mm		Diameter range 20 sheathed to 4 x 10 n bun	PR/Chloroprene cables, single or	120	60			

* Flexible Walls = The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12.5 mm thick, "Type F" Gypsum boards according to EN 520. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seals and the stud and minimum 100 mm of insulation of class A1 or A2 according to 13501-1, is provided within the cavity between the penetration seal and the stud. The partition construction may comprise an insulated or un-insulated cavity.

Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Pire performance, when classified according to EN 13501-1.
 PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations.

Fire Resistance Classification	3M [™] Fire Barrier Pass-Through Devices 51 mm round Ø
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Flexible Wall* ≥ 150 mm									
System compromising of Ø 51 mm round 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame									
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service Penetrant		E	I		
Pass-Through Devices	55 mm Ø	Empty	51 mm Ø	No Services in Device(s)		120	120		
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I		
Copper Pipes (singles or multiple – bundles up to 3 pipes)	55 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	30 C/U		
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I		
CS Elastomeric Insulation ¹	55 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	120 C/U	45 C/U		
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	I		
PVC ²	55 mm Ø	Centrally located	Up to 19 mm Ø	2.4 (mm	120 C/U	90 C/U		
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	с	able Description		E	I		
Telecommunications/Optical Fibre Cables			Diameter range 1	I5 to 18 mm Ø sin of up to 7 cables	gle or bundles	120	60		
	55 mm Ø	Centrally located	Diameter range Polyolefin low sm power cables, sir	e 15.1 to 18.8 mm oke and fume she ngle or bundles of	, 1 x 95 mm² athed, H07Z-K up to 7 cables	120	15		
Electrical Cables	ש ווווו ככ	,,,	Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 power cables, single or bundles of up to			120	120		

* Flexible Walls = The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12.5 mm thick, "Type F" Gypsum boards according to EN 520. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seals and the stud and minimum 100 mm of insulation of class A1 or A2 according to 13501-1, is provided within the cavity between the penetration seal and the stud. The partition construction may comprise an insulated or un-insulated cavity.

Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

 Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations.

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices Ø 102 mm round

Flexible Wall* ≥ 150 mm									
System compromising of 102 mm round Ø 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame									
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service Penetrant		E	I		
Pass-Through Devices	115 mm Ø	Empty	102 mm round Ø	No Services in Device(s)		120	120		
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	Ι		
Copper Pipes (singles or multiple – bundles up to 3 pipes)	115 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	30 C/U		
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I		
CS Elastomeric Insulation ¹	115 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	120 C/U	45 C/U		
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	Ι		
PVC ²	115 mm Ø	Centrally located	Up to 50 mm Ø	2.4	mm	120 C/U	NPD		
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	С	able Description		E	-		
Telecommunications/Optical Fibre Cables			Diameter range 15	5 to 18 mm Ø sing up to 7 cables	le or bundles of	120	30		
	115 mm Ø	Centrally located	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K			120	15		
Electrical Cables			Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN- 7 power cables, single or bundles of up to 3 cables			120	90		

* Flexible Walls = The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12.5 mm The kall must have a minimum thickness of 100 mm and comprise timber of steel studs lined on both faces with minimum 2 layers of 12.5 m thick, "Type F" Gypsum boards according to EN 520. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seals and the stud and minimum 100 mm of insulation of class A1 or A2 according to 13501-1, is provided within the cavity between the penetration seal and the stud. The partition construction may comprise an insulated or un-insulated cavity.
 Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.
 Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to

Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

2. PVC-U E = Integrity

I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations NPD = No Performance Determined

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 63.5 mm square

Rigid Wall* ≥ 150 mm									
System compromising c	System compromising of 63.5 mm square 3M [™] Fire Barrier Pass-Through Devices, either individual or in block								
of up to 2 x 3, secured in	n a single frame								
Plank	Maximum	Position of	PTD No Sonvice D		Popotrant	_			
Didlik	Aperture Size	service(s)	Dimension				1		
Pass-Through Devices	Single: 65x65 mm		63 5 mm						
	Triplex: 65x130 mm	Empty	square	No Services	in Device(s)	240	60		
	Sixplex: 130x195 mm		Square						
Motal Pipos	Maximum	Position of	Pino Diamotor	Dino Wall	Thicknoss	_			
	Aperture Size	service(s)	Fipe Diameter	Fipe waii	THICKNESS	E	1		
Copper Pipes (singles or	Single: 65x65 mm	Controlly				240	45		
multiple – bundles up to 3	Triplex: 65x130 mm		Up to 19 mm Ø	0.9	mm	240	15		
pipes)	Sixplex: 130x195 mm	locatod				C/U	C/U		
Insulated Conner Dines	Maximum	Position of	Dina Diamatar	Pipe Wall	Insulation	Ŀ	-		
Insulated Copper Pipes	Aperture Size	service(s)	Pipe Diameter	Thickness	Thickness		I		
CS Elastomeric Insulation ¹	Single: 65x65 mm	Centrally	19 mm Ø	0.9 mm		040	45		
	Triplex: 65x130 mm				19mm	240	45		
	Sixplex: 130x195 mm	located				C/U	C/U		
Combustible Dince	Maximum	Position of	Dina Diamatar	Dina Wall Thickness		F			
Compustible Pipes	Aperture Size	service(s)	Pipe Diameter	Pipe wall	Inickness	E	I		
	Single: 65x65 mm	Controlly		2.4 mm		240	60		
PVC ²	Triplex: 65x130 mm	Centrally	Up to 50 mm Ø			240	60		
	Sixplex: 130x195 mm	located			C/U	C/U			
Floatrian & Talacom	Maximum	Position of	C			E			
Electrical & Telecom	Aperture Size	service(s)	Ca	able Description			I		
Telecommunications/Optical			Diameter range 1	5 to 18 mm Ø sir	gle or bundles	040	45		
Fibre Cables			c	of up to 4 cables		240	45		
			Diameter range 15.1 to 18.8 mm, 1 x 95 mm ²						
	Single: 65x65 mm	O a refera lla a	Polyolefin low smo	oke and fume she	eathed, H07Z-K	240	45		
	Triplex: 65x130 mm	Centrally	power cables, sin	gle or bundles of	up to 4 cables				
Electrical Cables	Sixplex: 130x195 mm	located	Diameter r	ange 20.9 to 26.5	5 mm Ø,				
			EPR/Chloropr	ene sheathed to	4 x 10 mm²	0.40	00		
			H07RN-7 power of	ables, single or b	undles of up to	240	30		
				3 cables	-				

* Rigid Walls = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650

kg/m³. Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to

Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity

I = Insulation
 C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 102 mm square

Rigid Wall* ≥ 150 mm								
System compromising of 102 mm square 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame								
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service	Penetrant	E	I	
Pass-Through Devices	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Empty	102 mm square	No Services in Device(s)		240	90	
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	I	
Copper Pipes (singles or multiple – bundles up to 3 pipes)	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 19 mm Ø	0.9 mm		240 C/U	15 C/U	
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I	
CS Elastomeric Insulation ¹	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	19 mm Ø	0.9 mm	19mm	240 C/U	45 C/U	
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		Е	I	
PVC ²	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 19 mm Ø	2.4 mm		240 C/U	90 C/U	
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Ca	able Description	I	Е	I	
Telecommunications/Optical Fibre Cables			Diameter range 1	I5 to 18 mm Ø sir of up to 4 cables	igle or bundles	240	45	
Electrical Cables	Single: 105 x 105 mm Triplex: 105 x 210mm	Centrally	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K power cables, single or bundles of up to 4 cables			240	NPD	
	Sixplex:210 x 310 mm	IOCATEO	Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 power cables, single or bundles of up to 3 cables			240	45	

* Rigid Walls = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m3. Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building

equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations

NPD = No Performance Determined

Fire Resistance Classification | 3M[™] Fire Barrier Pass-Through Devices 51 mm round Ø

Rigid Wall* ≥ 150 mm									
System compromising o	System compromising of 51 mm round 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of								
up to 2 x 3, secured in a	single frame								
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service	Penetrant	E	Ι		
Pass-Through Devices	55 mm Ø	Empty	51 mm Ø	No Services	in Device(s)	240	120		
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	I		
Copper Pipes (singles or multiple – bundles up to 3 pipes)	55 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	15 C/U		
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I		
CS Elastomeric Insulation ¹	55 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	240 C/U	45 C/U		
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	Ι		
PVC ²	55 mm Ø	Centrally located	Up to 43 mm Ø	2.4 mm		240 C/U	240 C/U		
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			E	I		
Telecommunications/Optical Fibre Cables			Diameter range 15 to 18 mm Ø single or bundles of up to 4 cables			240	120		
	55 mm Ø	Centrally located	Diameter range Polyolefin low smo power cables, sin	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K power cables, single or bundles of up to 4 cables Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 power cables, single or bundles of up to		240	180		
Electrical Cables			Diameter r EPR/Chloropr H07RN-7 power c			240	NPD		

* Rigid Walls = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³.

Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations

NPD = No Performance Determined

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 102 mm round Ø

Rigid Wall* ≥ 150 mm								
System compromising o of up to 2 x 3, secured ir	f 102 mm round n a single frame	d Ø 3M™ Fire Ba e	arrier Pass-Thro	ugh Devices, e	either individu	al or in l	olock	
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service Penetrant E			l	
Pass-Through Devices	115 mm Ø	Empty	102 mm Ø	No Services	in Device(s)	120	90	
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I	
Copper Pipes (singles or multiple – bundles up to 3 pipes)	115 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		120 C/U	15 C/U	
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	ļ	
CS Elastomeric Insulation ¹	115 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	120 C/U	45 C/U	
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	Ι	
PVC ²	115 mm Ø	Centrally located	Up to 19 mm Ø	2.4 mm		120 C/U	NPD	
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			E	Ι	
Telecommunications/Optical Fibre Cables			Diameter range 15 to 18 mm Ø single or bundles of up to 7 cables			120	90	
	115 mm Ø	Centrally located	Diameter range 15.1 to 18.8 n Polyolefin low smoke and fume s		, 1 x 95 mm² athed, H07Z-K up to 3 cables	120	NPD	
Electrical Cables			Diameter r EPR/Chloroprene 7 power cables, si	ange 20.9 to 26.5 sheathed to 4 x 1 ingle or bundles o	mm Ø, 0 mm² H07RN- f up to 7 cables	120	90	

* Rigid Walls = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum

density of 650 kg/m³. **Note** = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1.Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2.PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity

I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations NPD = No Performance Determined

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 63.5 mm square

Rigid Floor* ≥ 150 mm							
System compromising c of up to 2 x 3, secured in	of 63.5 mm squa n a single frame	are 3M™ Fire Ba e	arrier Pass-Thro	ugh Devices,	either individu	al or in	block
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service	Penetrant	E	I
Pass-Through Devices	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Empty	63.5 mm square	No Services in Device(s)		240	60
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	Е	Ι
Copper Pipes (singles or multiple – bundles up to 3 pipes)	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	Up to 19 mm Ø	0.9 mm		240 C/U	30 C/U
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I
CS Elastomeric Insulation ¹	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	19 mm Ø	0.9 mm	19mm	240 C/U	45 C/U
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I
PVC ²	Single: 65x65 mm Triplex: 65x130 mm Sixplex: 130x195 mm	Centrally located	Up to 19 mm Ø	2.4 mm		240 C/U	60 C/U
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			Е	I
Telecommunications/Optical Fibre Cables			Diameter range 1	5 to 18 mm Ø sir of up to 4 cables	ngle or bundles	240	60
	Single: 65x65 mm Triplex: 65x130	Centrally located	Diameter range Polyolefin low smo power cables, sir	• 15.1 to 18.8 mm oke and fume she	, 1 x 95 mm² eathed, H07Z-K up to 4 cables	240	30
Electrical Cables	mm Sixplex: 130x195 mm		Diameter r EPR/Chloropr H07RN-7 power c	range 20.9 to 26.5 rene sheathed to cables, single or b 3 cables	5 mm Ø, 4 x 10 mm² bundles of up to	240	60

* Rigid Floors = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³.

Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity

I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 102 mm square

Rigid Floor* ≥ 150 mm							
System compromising of 1 to 2 x 3, secured in a single	02 mm square : e frame	3M™ Fire Barrie	Pass-Through	Devices, eithe	r individual or	in block	of up
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service Penetrant E			I
Pass-Through Devices	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Empty	102 mm square	No Services in Device(s)		240	NPD
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	Ι
Copper Pipes (singles or multiple – bundles up to 3 pipes)	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 19 mm Ø	0.9 mm		240 C/U	NPD
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I
CS Elastomeric Insulation ¹	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	19 mm Ø	0.9 mm	19mm	240 C/U	NPD
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I
PVC ²	Single: 105 x 105 mm Triplex: 105 x 210mm Sixplex:210 x 310 mm	Centrally located	Up to 19 mm Ø	2.4 mm		240 C/U	NPD
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			E	Ι
Telecommunications/Optical Fibre Cables	Single: 105 x 105		Diameter range 15	5 to 18 mm Ø sing up to 4 cables	le or bundles of	240	NPD
Electrical Cables	mm Triplex: 105 x 210mm	Centrally located	Diameter range Polyolefin low sm power cables, sir	e 15.1 to 18.8 mm oke and fume she ngle or bundles of	, 1 x 95 mm² athed, H07Z-K up to 4 cables	240	NPD
	Sixplex:210 x 310 mm		Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 240 power cables, single or bundles of up to 3 cables				NPD

* Rigid Floors = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³.

 Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.
 Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

2

E = Integrity

I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations

NPD = No Performance Determined

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 51 mm round Ø

Rigid Floor* ≥ 150 mm

System compromising of 5 2 x 3, secured in a single fi	1 mm round 3M rame	1™ Fire Barrier P	ass-Through De	evices, either ir	ndividual or in	block of	up to	
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension	No Service	Penetrant	E	I	
Pass-Through Devices	55 mm Ø	Empty	51 mm Ø	No Services	in Device(s)	240	240	
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	Ι	
Copper Pipes (singles or multiple – bundles up to 3 pipes)	55 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		240 C/U	15 C/U	
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I	
CS Elastomeric Insulation ¹	55 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	240 C/U	45 C/U	
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I	
PVC ²	55 mm Ø	Centrally located	Up to 43 mm Ø	2.4 mm		240 C/U	240 C/U	
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			E	Ι	
Telecommunications/Optical Fibre Cables			Diameter range 15 to 18 mm Ø single or bundles of up to 4 cables			240	240	
	55 mm Ø	Centrally located	Diameter range Polyolefin low sm power cables, sir	e 15.1 to 18.8 mm, oke and fume she ngle or bundles of	, 1 x 95 mm² athed, H07Z-K up to 4 cables	240	NPD	
Electrical Cables			Diameter r EPR/Chloroprene power cables, sir	range 20.9 to 26.5 sheathed to 4 x 10 ngle or bundles of	mm Ø,) mm² H07RN-7 up to 3 cables	240	240	

* Rigid Floors = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³. Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction 1. to Fire performance, when classified according to EN 13501-1

PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1 2.

E = Integrity I = Insulation

C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations NPD = No Performance Determined

Fire Resistance Classification | 3M™ Fire Barrier Pass-Through Devices 102 mm round Ø

Rigid Floor* ≥ 150 mm								
System compromising of 102 mm round Ø 3M [™] Fire Barrier Pass-Through Devices, either individual or in block of up to 2 x 3, secured in a single frame.								
Blank	Maximum Aperture Size	Position of service(s)	PTD Dimension No Service Penetrant E I					
Pass-Through Devices	115 mm Ø	Empty	102 mm Ø	No Services	in Device(s)	60	NPD	
Metal Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall	Thickness	E	I	
Copper Pipes (singles or multiple – bundles up to 3 pipes)	115 mm Ø	Centrally located	Up to 19 mm Ø	0.9 mm		60 C/U	NPD	
Insulated Copper Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness	Insulation Thickness	E	I	
CS Elastomeric Insulation ¹	115 mm Ø	Centrally located	19 mm Ø	0.9 mm	19mm	60 C/U	NPD	
Combustible Pipes	Maximum Aperture Size	Position of service(s)	Pipe Diameter	Pipe Wall Thickness		E	I	
PVC ²	115 mm Ø	Centrally located	Up to 50 mm Ø	2.4 mm		60 C/U	NPD	
Electrical & Telecom	Maximum Aperture Size	Position of service(s)	Cable Description			E	I	
Telecommunications/Optical Fibre Cables			Diameter range 15 to 18 mm Ø single or bundles of up to 4 cables			60	NPD	
	115 mm Ø	Centrally located	Diameter range 15.1 to 18.8 mm, 1 x 95 mm ² Polyolefin low smoke and fume sheathed, H07Z-K power cables, single or bundles of up to 4 cables		, 1 x 95 mm ² eathed, H07Z-K up to 4 cables	60	NPD	
Electrical Cables			Diameter range 20.9 to 26.5 mm Ø, EPR/Chloroprene sheathed to 4 x 10 mm ² H07RN-7 power cables, single or bundles of up to 3 cables				NPD	

* Rigid Floors = The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650

kg/m³. Note = The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period. 1. Elastomeric insulation material is defined as a generic insulation material manufactured to EN 14304: 2009 "Thermal insulation products for building equipment and industrial installations. Factory made flexible elastomeric foam (FEF) products. Specification.", which has a minimum Class Bs3D0 Reaction to Fire performance, when classified according to EN 13501-1. 2. PVC-U to EN 1452-1, EN 1329-1, EN 1453-1 and PVC-C to EN 1566-1

E = Integrity

Insulation
 C/U = Pipe end capped inside & uncapped outside the furnace. For further information refer to national regulations
 NPD = No Performance Determined

Handling	3M [™] Fire Barrier Pass-Through Device require no special measures for safe handling or protection against explosion fires.				
	Not for use				
	 Do not apply 3M[™] Fire Barrier Pass-Through Device when surrounding temperature is than less 0°C and in conditions where seals may be exposed to rain or water spray within 18 hours of application. Do not apply 3M[™] Fire Barrier Pass-Through Device to building materials that bleed oil, plasticizers or solvent (e.g. impregnated wood, oil-based sealants or green or partially vulcanized rubber). Do not apply 3M[™] Fire Barrier Pass-Through Device to wet or frost-coated surfaces or to areas that are continuously damp or immersed in water. Avoid repeated freeze / thaw exposures of the 3M[™] Fire Barrier Pass-Through Device to installation. 				
Storage	3M [™] Fire Barrier Pass-Through Device packaged in corrugated cardboard boxes. Product is stable under normal storage conditions. Normal stock and stock rotation practices are recommended. Pallets should not be stacked.				
	 Store dry in a cool place Storage temperature: not under 0°C and not over 35°C Take care of sufficient ventilation Keep out of reach of children 				
Shelf Life	3M [™] Fire Barrier Pass-Through Device shelf life is indefinite when stored in original unopened packaging in a dry warehouse environment.				
Maintenance	3M [™] Fire Barrier Pass-Through Device does not required maintenance when installed in accordance with the applicable European Technical Approval (ETA - 10/0034) and the 3M [™] Fire Barrier Pass-Through Device Installation Guide.				
Repair	 3M[™] Fire Barrier Pass-Through Device which are damaged should not be used. Once installed, if any section of the 3M[™] Fire Barrier Pass-Through Device is damaged and the following procedure will apply: Remove the damaged 3M[™] Fire Barrier Pass-Through Device and replaced it with a new 3M[™] Fire Barrier Pass-Through Device in accordance with the applicable ETA – 10/0034 or with the Installation Guide. 				
Precautionary Information	Refer to product label and Material Safety Data Sheet for health and safety information before using the product. For information please contact your local 3M Office. www.3M.com				

For Additional Information	To request additional product information or to arrange for sales assistance, call:
Important Notice	All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law
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Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations

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