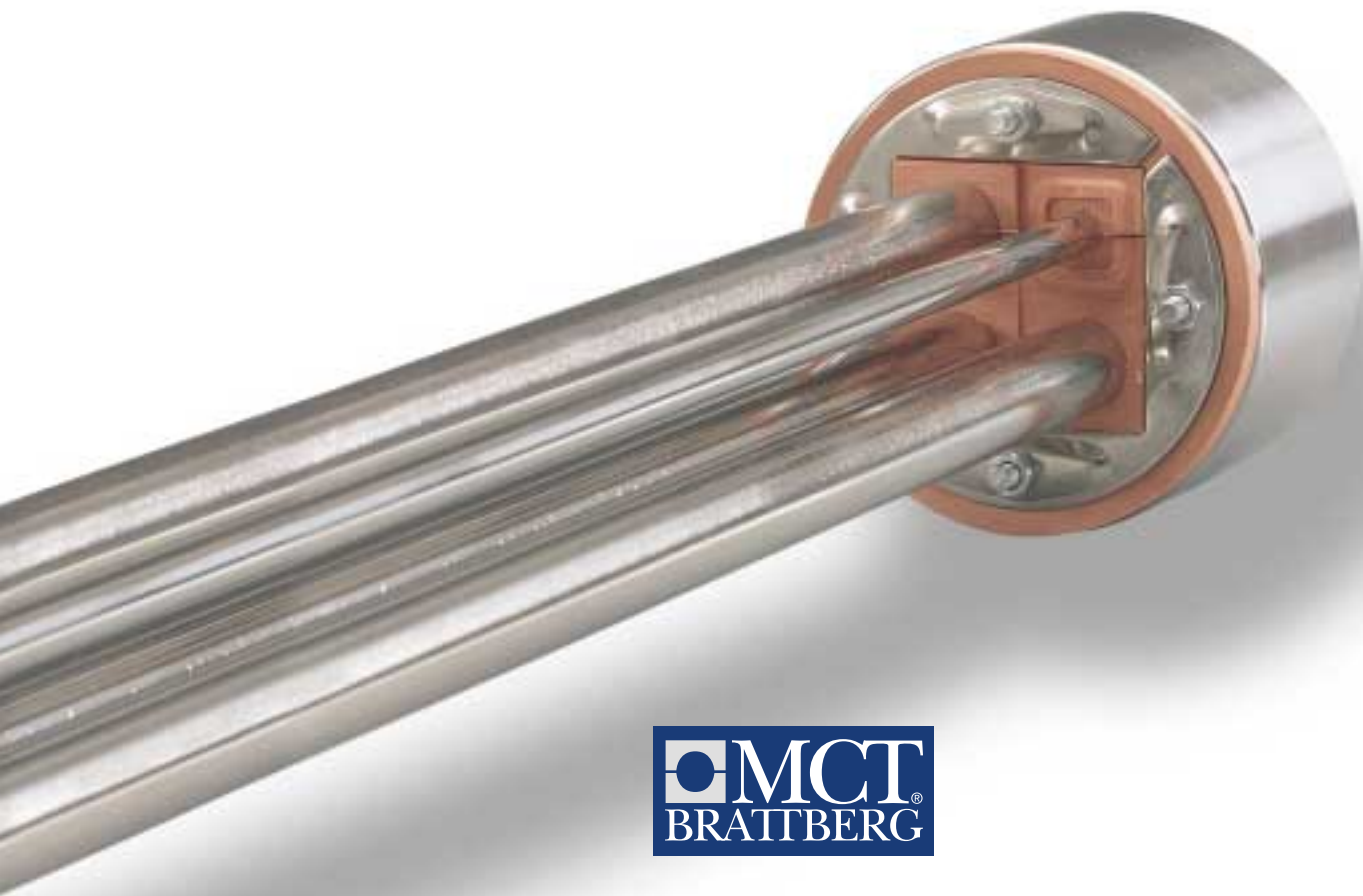


RGP

Pipe sealings





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of MCT Brattberg AB,
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Production:
TiotusenEtt Reklambyrå, Värnamo.

We reserve the right to make changes to
our products without prior notice.

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MCT Brattberg gives maximum safety

Accidents can never be predicted or totally avoided, but the consequences can always be limited. At sea it is very important to isolate fire centres and leakages. These safety zones are not allowed to fail in an accident. Holes for pipes and cables must not weaken the construction. MCT Brattberg pipe penetrations are constructed to live up to these demands.

NOT ONLY FIRE

MCT Brattberg pipe penetrations are not only fireproof, they are also resistant to gas pressure, explosion, water pressure, temperature variations, gamma-radiation and large pulling forces. MCT Brattberg can not be destroyed by vermin or rodents.


FLEXIBLE MODULAR SYSTEM

The core in the RGP is the Lycron modules, made from halogen free polymer, specially made for the Brattberg system. The modules are made to give an exact fit to different pipe dimensions. The modules are fitted carefully around the pipes and when compressed become absolutely tight.


The RGP is easy to reassemble if a pipe should need to be added or changed.

DOCUMENTED SAFETY

The RGP system is certified by Lloyd's and DNV for pipe penetrations in marine environments. From the results of our own tests we know that MCT Brattberg fulfil the requirements by a wide margin, which gives extra safety in the case of an accident. We started to install MCT Brattberg more than 30 years ago and during the years it has proven its capability in many real emergencies.



Several thousand people in a limited space. If a fire spreads here a catastrophe is soon evident. Cruise liner operator trusts in cable transits from MCT Brattberg AB.





Fire onboard a submarine is a nightmare - a leak in the hull a disaster. At Kockums shipyard, the world's most modern, conventionally powered submarines are built using transits from MCT Brattberg AB.



Safety is taken to the limit in nuclear power stations. Thousands of Brattbergs are installed here.



Enormous capital value and human life are at risk in a difficult environment. Safety demands are extremely high. MCT Brattberg has been part of safety on the North Sea oil installations since oil and gas started to be extracted in 1965.

Simplicity is the advantage

RGP pipe penetrations are easy to install and safe to use. The system has three components - a round metal frame/sleeve, which is either welded or bolted in place in the bulkhead or deck, an RGP plug and sealing blocks in the form of insert or spare blocks. You thread the round RGP plug around the pipe and into the sleeve and then fill the space between the plug and the pipe with sealing blocks. Finally, you tighten the nuts in the RGP plug so that the penetration is completely tight.

CERTIFIED

The MCT Brattberg pipe penetration system meets stringent safety requirements. It is certified for fire classes A0 to A60 and H0 to H120, for pipes up to 168 mm. For pipe dimensions up to 50 mm no extra insulation is required for A60.

FIREPROOF

If you use pipe dimensions from 50 mm up to 168 mm, you only need to insulate the fire side for the A60 class. The reason for this is that the insert blocks and the RGP plug are made of Lycron. The halogen-free rubber material has an

extremely low smoke index. When the Lycron is exposed to fire, the material expands and it seals even more tightly around the pipe. Type approvals see page 16.

MAINTENANCE-FREE

When installed permanently, an RGP pipe penetration is maintenance-free. The system is also gastight and watertight. It is certified for pressure up to 1.8 bar with a safety factor of 2.5 and is tested for pressure of explosion up to 27 bar. The pipe penetration also resists radiation and tensile stress.



1. The RGP plug is mounted in the sleeve, which is welded or bolted to the deck or bulkhead. The pipe is then pulled through the RGP plug. Open RGPO plugs are used if the pipes are already in place.



2. Insert the blocks around the pipe so that the penetration is completely filled



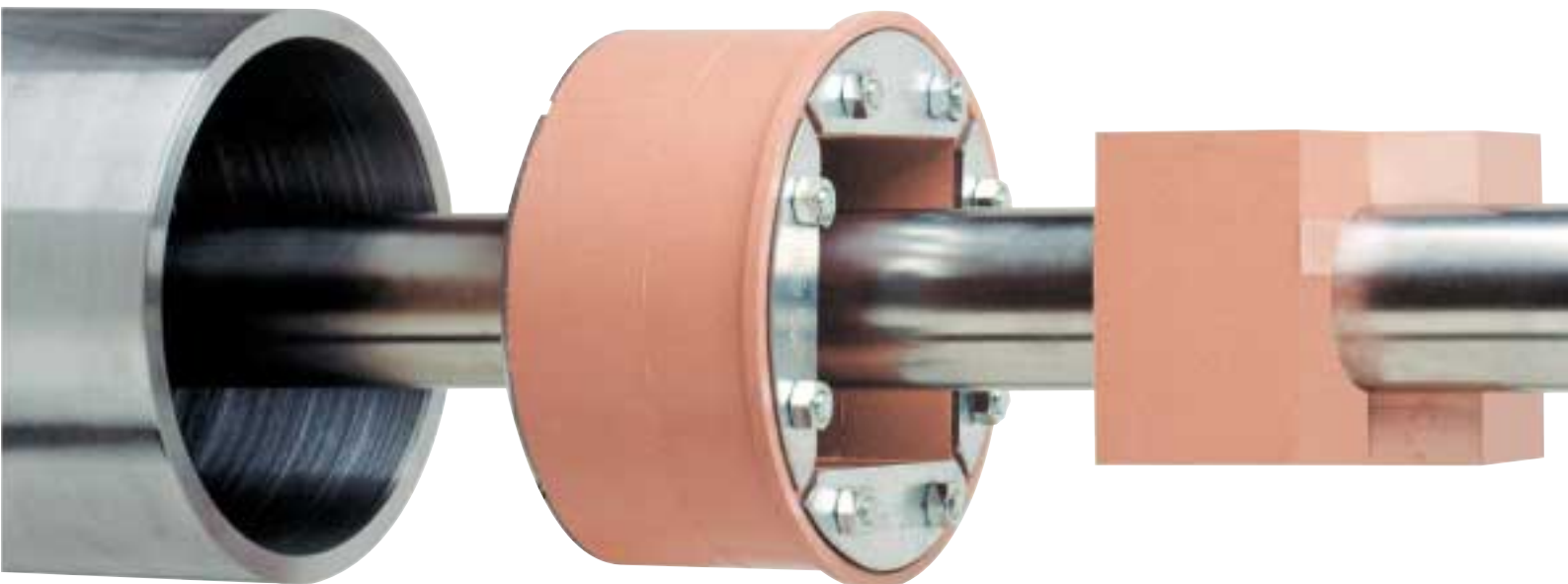
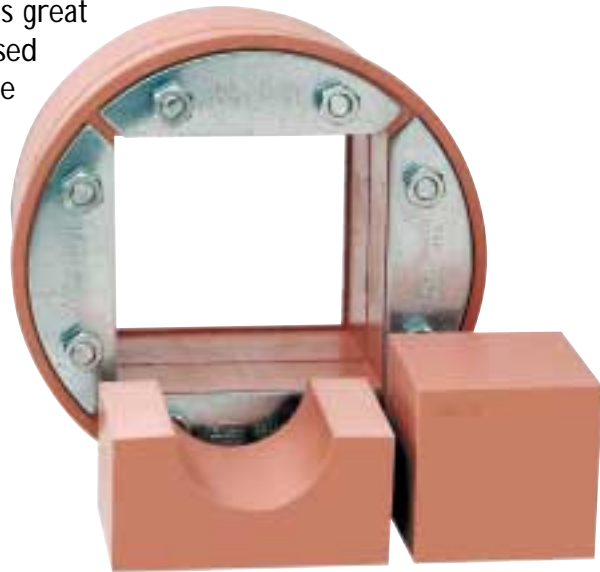
3. Finally, tighten the bolts to compress and complete the seal.

One solution for each dimension

MCT Brattberg's modular system gives great flexibility. The RGP system, which is used for marine applications, will take all pipe dimensions from 4 mm to 168 mm outer diameter.

FLEXIBLE SYSTEM

Using the RGP plan on page 19, it is easy to choose the dimensions of penetrations. You can read more about the sizes of RGP plugs on page 10. Information on insert blocks and spare blocks is on pages 12-13.



**The system has
three components:** Metalframe/sleeve

RGP-plug

Sealing blocks

Sleeves

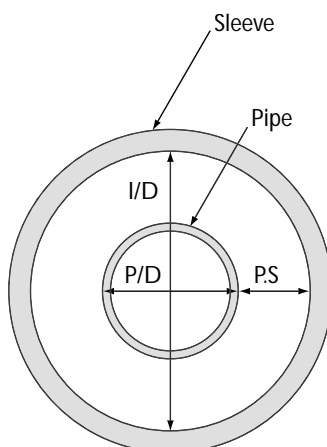
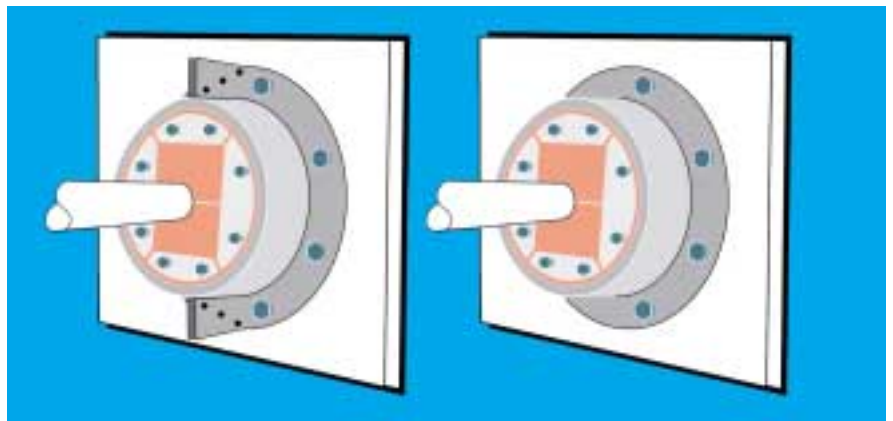
The round metal frame, the sleeve, is available in seven different sizes. Several types are available with and without flanges, for welding and for bolting. The bolted variant is also available as an open version for mounting when the pipe has already been drawn.

The maximum depth of the sleeve is 85mm, and it is mounted on one side of the deck/bulkhead. It's compact size is an advantage both in terms of weight and when the pipe may have a bend directly following a penetration. The standard materials are mild steel, stainless steel and aluminium.



WHEN WELDING SHOULD BE AVOIDED

The SFRB sleeve (see page 9) has a round flange with bolt holes. It is supplied complete with sealant, bolts and nuts. When the pipe has already been drawn use the SFRBO, an open variant.

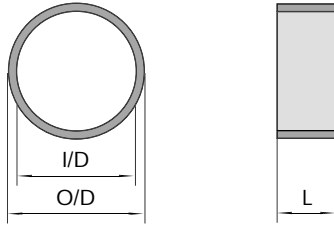


MINIMUM DISTANCE BETWEEN PIPE AND SLEEVE = P.S.

	Sleeve I/D mm	Max. pipe P/D mm	P.S mm
RGP-50/2"	51	16	17,5
RGP-70/3"	77	34	21,5
RGP-100/4"	102	54	24
RGP-125/5"	128	70	29
RGP-150/6"	153	70	34,5
RGP-200/8"	204	114	45
RGP-300	302	168	67

Size and weightcharts

TYPE S WITHOUT FLANGE

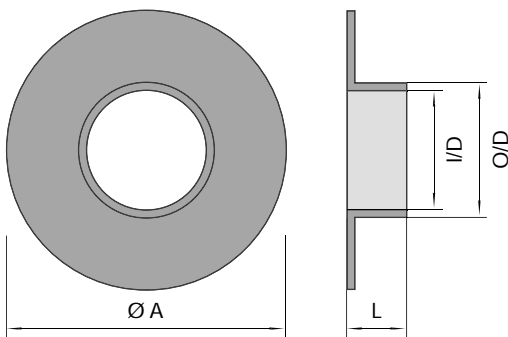


Type S without flange				
Type/size	O/D mm	I/D mm	L mm	Weight kg
S 50/2"	63	51 ¹⁾	70	0,6
S 70/3"	90	77 ¹⁾	70	0,8
S 100/4"	114	102 ¹⁾	70	1,1
S 125/5"	140	128 ¹⁾	70	1,4
S 150/6"	164	153 ¹⁾	82	1,9
S 200/8"	214	204 ¹⁾	82	2,5
S 300	316	302 ²⁾	85	4,5

¹⁾ 0-0,3 mm

²⁾ 0-0,5 mm

TYPE SFR WITH ROUND FLANGE



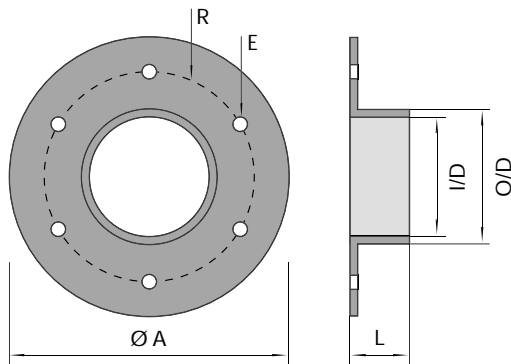
Type SFR with round flange					
Type/size	O/D mm	I/D mm	A mm	Weight kg	L mm
SFR 50/2"	63	51 ¹⁾	145	1,2	73
SFR 70/3"	90	77 ¹⁾	185	2,1	74
SFR 100/4"	114	102 ¹⁾	215	2,7	74
SFR 125/5"	140	128 ¹⁾	240	3,3	74
SFR 150/6"	164	153 ¹⁾	264	4,0	86
SFR 200/8"	214	204 ¹⁾	315	5,1	86
SFR 300	316	302 ²⁾	398	7,3	89

¹⁾ 0-0,3 mm

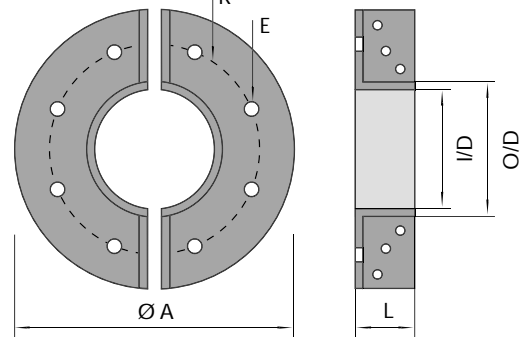
²⁾ 0-0,5 mm

TYPE SFRB AND SFRBO (OPEN) WITH ROUND FLANGE

SFRB



SFRBO



Type SFRB and SFRBO (open) with round flange								
Type/size	O/D mm	I/D mm	L mm	A mm	R mm	E mm	Qty of holes	Weight kg
SFRB (O) 50/2"	63	51 ¹⁾	73	145	52,5	9	4	1,2
SFRB (O) 70/3"	90	77 ¹⁾	74	185	68,0	9	4	2,1
SFRB (O) 100/4"	114	102 ¹⁾	74	215	82,0	9	4	2,7
SFRB (O) 150/6"	164	153 ¹⁾	86	264	108,0	11	6	4,0
SFRB (O) 200/8"	214	204 ¹⁾	86	315	132,0	11	6	5,1
SFRB (O) 300	316	302 ²⁾	89	398	179,0	11	12	7,3

¹⁾ 0-0,3 mm

²⁾ 0-0,5 mm

RGP – RGPO

RGP-PLUGS FOR PIPE TRANSITS IN MARINE ENVIRONMENTS.

The RGP plug should be installed in round holes or in pipe sleeves. There are seven sizes of RGP. The material is Lycron and the hardware is either galvanized steel or stainless steel. There is also an open sided version, RGPO to be used when pipes are already in place.



RGP is a circular seal for holes or pipes.



RGPO is an open-sided RGP frame.

Size in mm		
RGP SIZE	PACKING SPACE	LENGTH AND DIAMETER
RGP 50/2"		
RGP 70/3"		
RGP 100/4"		
RGP 125/5"		
RGP 150/6"		
RGP 200/8"		
RGP 300		

Weight in kilograms						
RGP 50	RGP 70	RGP 100	RGP 125	RGP 150	RGP 200	RGP 300
0,25	0,4	0,7	1,0	1,8	3,0	7,4

Pressure-tight installation

- The contact surfaces between the RGP plug and the frame must be well cleaned before the RGP is fitted. No lubricant must be used on these surfaces.
- For best results, however, the insert blocks should be lubricated carefully before fitting. The pipe penetration may be exposed to pressure no earlier than 48 hours after installation in order to obtain pressure equalisation in the penetration. At temperatures lower than 20°C, a longer pressure equalisation time is required.

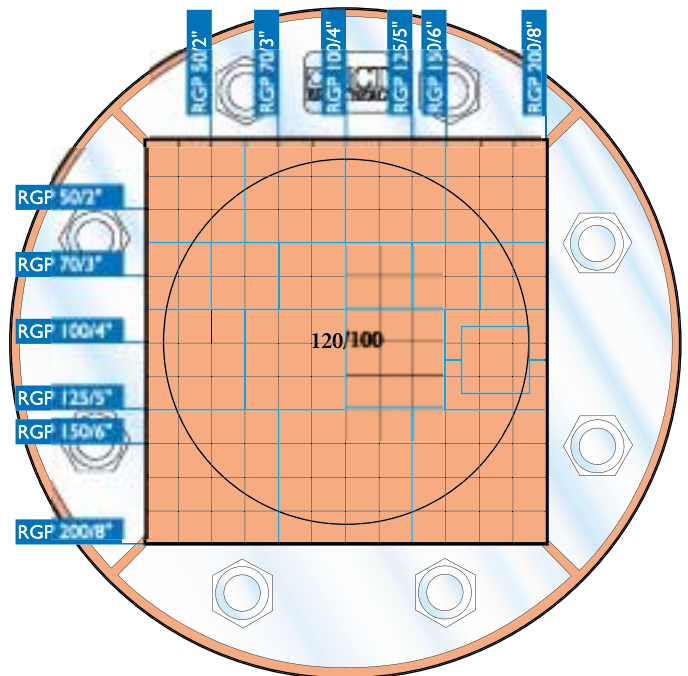
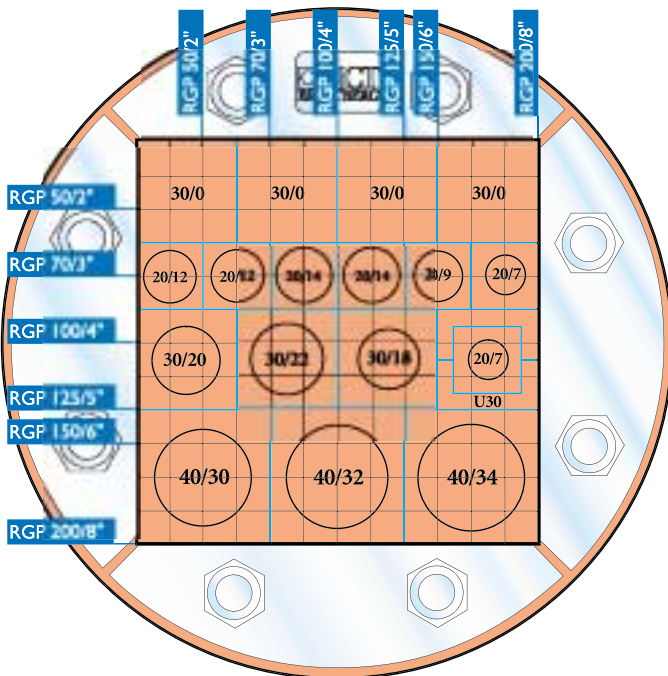
PRESSURE RATINGS (bar)		
RGP SIZE	Test pressure	Certified for
RGP-50/2"	4,5	1,8
RGP-70/3"	4,5	1,8
RGP-100/4"	4,5	1,8
RGP-125/5"	4,5	1,8
RGP-150/6"	4,5	1,8
RGP-200/8"	4,5	1,8
RGP-300	4,0	-

1 bar = 14.7 psi = 1 x 10⁵ Pascal = 10 m water column

Before installation

The RGP size and insert blocks are chosen using the RGP plan (page 19). Separate RGP plans can be ordered.

RGP-maximum number of pipes							
RGP SIZE	BLOCK SIZE						
	20	30	40	60	90	120	180
	MAXIMUM PIPE Ø						
	16	24	34	54	74	100	168
MAXIMUM NUMBER OF PIPES							
RGP-50/2"	1	-	-	-	-	-	-
RGP-70/3"	4	1	1	-	-	-	-
RGP-100/4"	9	4	1	1	-	-	-
RGP-125/5"	16	4	4	1	-	-	-
RGP-150/6"	16	9	4	1	1	-	-
RGP-200/8"	36	16	9	4	1	1	-
RGP-300	81	36	16	9	4	1	1

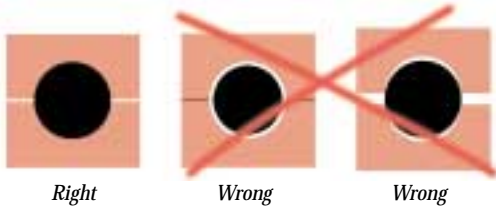
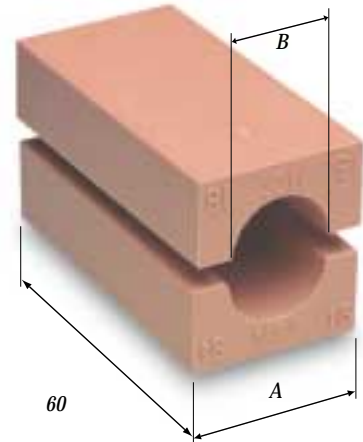


Standard Insert Blocks

Our range of blocks accomodates pipes between 4 and 168 mm in diameter. It is important that the insert block is the right size, with respect to the pipe, to ensure a proper seal.

With the sizing chart on next page you can choose the correct size of insert blocks.

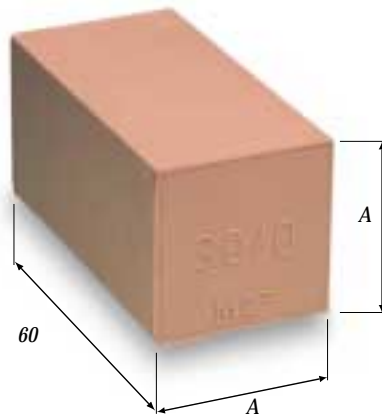
Blocks are referred to by their width (A) and hole diameter (B). Thus a block with a width of 20 mm and a hole diameter of 4 mm is referred to as 20/4. This designation is moulded into the block.



Spare Blocks

Surplus room in each frame is filled out with solid insert blocks. Called spares, they bear the designation A/0.

Blocks are referred to by their width (A), followed by the designation /0 (indicating solid). Thus a block with a width and height of 20 mm is referred to as 20/0. The length of insert blocks is always 60 mm.



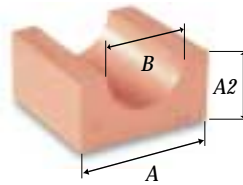
BLOCK SIZE Width (A) = Height (A)	BLOCK DESIGNATION
5 x 5 Only in strips of 24 pcs	24 x 5/0
10 x 10 Only in strips of 12 pcs	12 x 10/0
20 x 20	20/0
30 x 30	30/0
40 x 40	40/0
60 x 60	60/0
90 x 90	90/0
120 x 120	120/0
180 x 180	180/0

Size in mm

PIPE DIAM.	A			B
	20	30	40	
3-4	20/4			4
4-5	20/5			5
5-6	20/6			6
6-7	20/7			7
7-8	20/8			8
8-9	20/9			9
9-10	20/10			10
10-11	20/11			11
11-12	20/12	30/12		12
12-13	20/13	30/13		13
13-14	20/14	30/14		14
14-15	20/15	30/15		15
15-16	20/16	30/16		16
16-17		30/17		17
17-18		30/18		18
18-19		30/19		19
19-20		30/20		20
20-21		30/21	40/22	21
21-22		30/22	40/22	22
22-23		30/23	40/24	23
23-24		30/24	40/24	24
24-26			40/26	26
26-28			40/28	28

PIPE DIAM.	A			B
	40	60	90	
28-30	40/30			30
30-32	40/32	60/32		32
32-34	40/34	60/34		34
34-36		60/36		36
36-38		60/38		38
38-40		60/40		40
40-42		60/42		42
42-44		60/44		44
44-46		60/46		46
46-48		60/48		48
48-50		60/50	90/50	50
50-52		60/52	90/52	52
52-54		60/54	90/54	54
54-56			90/56	56
56-58			90/58	58
58-60			90/60	60

PIPE DIAM.	A		B
	90	120	
60-62	90/62		62
62-64	90/64		64
64-66	90/66		66
66-68	90/68		68
68-70	90/70		70
70-72		120/72	72
72-74		120/74	74
74-76		120/76	76
76-78		120/78	78
78-80		120/80	80
80-82		120/82	82
82-84		120/84	84
84-86		120/86	86
86-88		120/88	88
88-90		120/90	90
90-92		120/92	92
92-94		120/94	94
94-96		120/96	96
96-98		120/98	98
98-100		120/100	100
112-114		180/114	114
138-140		180/140	140
166-168		180/168	168



Blocks are referred to by their width (A) and hole diameter (B). Thus a module with a width of 20 mm and a hole diameter of 4 mm is referred to as 20/4.

Weight in grams per half

BLOCK	WEIGHT	BLOCK	WEIGHT	BLOCK	WEIGHT	BLOCK	WEIGHT	BLOCK	WEIGHT
24 x 5/0	58	20/12	13	30/24	21	60/50	77	120/78	462
12 x 10/0	113	20/13	12	40/22	57	60/52	59	120/80	448
20/0	38	20/14	11	40/24	54	60/54	61	120/82	437
30/0	84	20/15	10	40/26	50	90/50	287	120/84	425
40/0	150	20/16	9	40/28	47	90/52	279	120/86	415
60/0	338	30/12	36	40/30	42	90/54	273	120/88	403
90/0	766	30/13	36	40/32	37	90/56	262	120/90	385
120/0	1374	30/14	35	40/34	32	90/58	255	120/92	368
180/0	2990	30/15	34	60/32	131	90/60	243	120/94	360
20/4	18	30/16	33	60/34	127	90/62	239	120/96	351
20/5	18	30/17	31	60/36	122	90/64	229	120/98	332
20/6	17	30/18	30	60/38	116	90/66	220	120/100	313
20/7	17	30/19	28	60/40	110	90/68	211	120/108	243
20/8	16	30/20	27	60/42	104	90/70	204	180/114	1003
20/9	15	30/21	25	60/44	98	120/72	494	180/140	785
20/10	14	30/22	24	60/46	91	120/74	485	180/168	475
20/11	13	30/23	22	60/48	84	120/76	472		

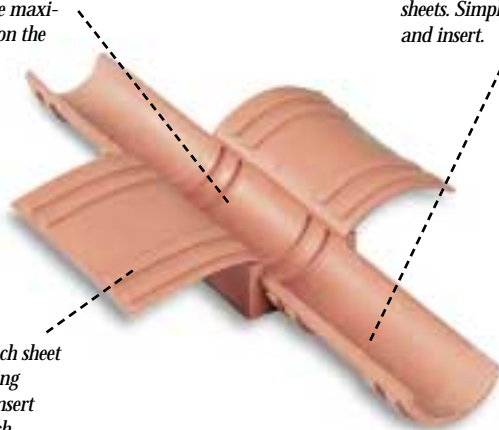
AddBlocks

There are eleven AddBlocks. Using the removable inserts, “wings”, each AddBlock can be made to fit any of five different pipe dimensions. Both AddBlocks and inserts have sizes clearly cast into them. Together they cover 66 different pipe diameters from 3,5 to 69,5 mm. It is important that you select the correct block and insert size.

Inserts have four locking ridges on the underside which fit into recesses in the main block.

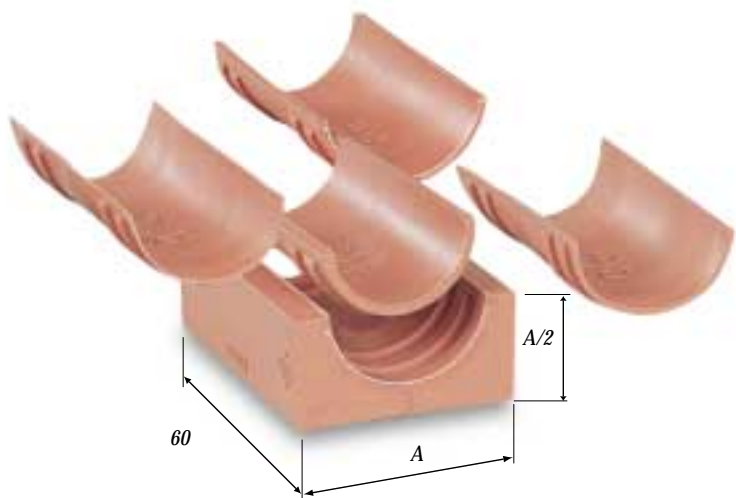
The AddBlocks basic dimension is given at bottom slot center, and that's the maximum cable dimension the block is designed for.

Dimensions are also clearly marked on the four insert sheets. Simply select, tear off and insert.



On the bottom of each sheet you'll find four locking devices to keep the insert in place, making each AddBlock thoroughly secure.

Eleven blocks and 66 dimensions



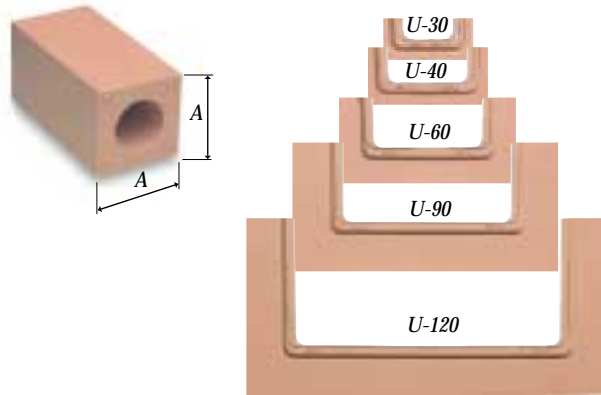
There are eleven AddBlocks and together they cover 66 pipe dimensions. The length is always 60 mm and the width of the base block is 20, 30, 40, 60 or 90 mm.

WEIGHT PER HALF (g)	ADDBLOCK DIMENSION	PIPE DIMENSION
23	20/4 - 8	3,5 - 8,5
23	20/9 - 13	8,5 - 13,5
45	30/14 - 18	13,5 - 18,5
43	30/19 - 23	18,5 - 23,5
71	40/24 - 28	23,5 - 28,5
62	40/29 - 33	28,5 - 33,5
150	60/34 - 38	33,5 - 38,5
136	60/39 - 43	38,5 - 43,5
128	60/44 - 48	43,5 - 49,5
348	90/50 - 58	49,5 - 59,5
318	90/60 - 68	59,5 - 69,5

U-Blocks

Using U-blocks the outer measurement (A-measurement) can be changed on both Standard blocks and AddBlocks. The edges lock the blocks into each other; considerably simplifying assembly.

U-blocks are available in five sizes: a standard 20/4 block can, for example, be transformed into the following sizes: 30/4, 40/4, 60/4, 90/4 and 120/4.

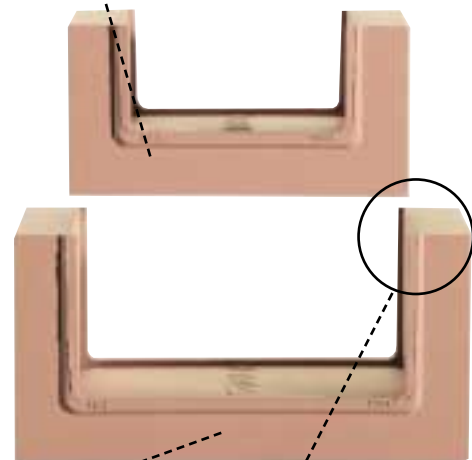


The total number of Spare blocks available once you start using U-Blocks.

Standard spare	Size available	Use the following blocks
20/0	30/0	U-30 and 20/0
	40/0	U-40, U-30 and 20/0
	60/0	U-60, U-40, U-30 and 20/0
	90/0	U-90, U-60, U-40, U-30 and 20/0
	120/0	U-120, U-90, U-60, U-40, U-30 and 20/0
30/0	40/0	U-40 and 30/0
	60/0	U-60, U-40 and 30/0
	90/0	U-90, U-60, U-40 and 30/0
	120/0	U-120, U-90, U-60, U-40 and 30/0
40/0	60/0	U-60 and 40/0
	90/0	U-90, U-60 and 40/0
	120/0	U-120, U-90, U-60 and 40/0
60/0	90/0	U-90 and 60/0
	120/0	U-120, U-90 and 60/0
90/0	120/0	U-120 and 90/0

U-Blocks are pre-lubricated, saving valuable time.

U-Blocks function according to the "Russian doll" principle.



U-Blocks are made of Lycron, the same halogen free material used in all other MCT Brattberg blocks.

The edges lock the blocks into each other, considerably simplifying assembly.

Type Approvals

MCT Brattberg has been tested and certified to cover all major requirements and regulations for cable and pipe transits given by established classification societies.

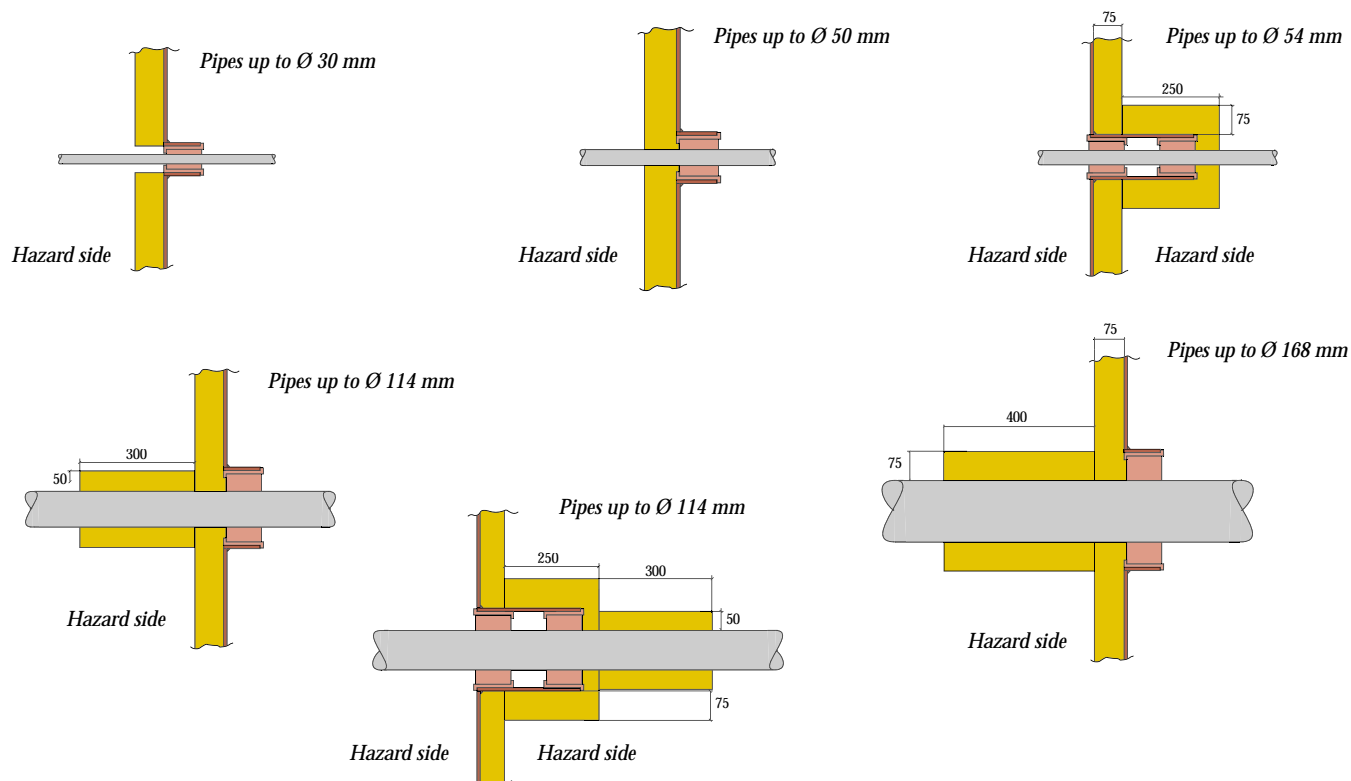
CLASS A

Standard time/temperature curve in accordance with IMO RES A517 (13) and 754 (18).

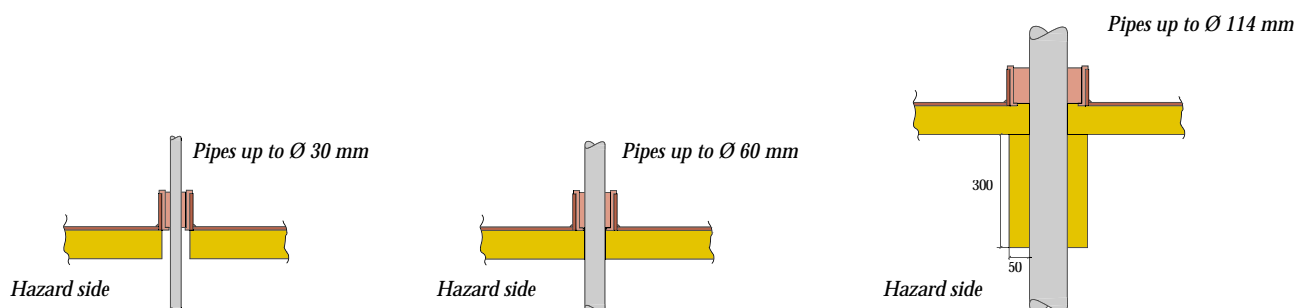
CLASS H

Hydro-carbon time/temperature curve according to the rules of Oljedirektoratet (N) and Department of Energy (UK).

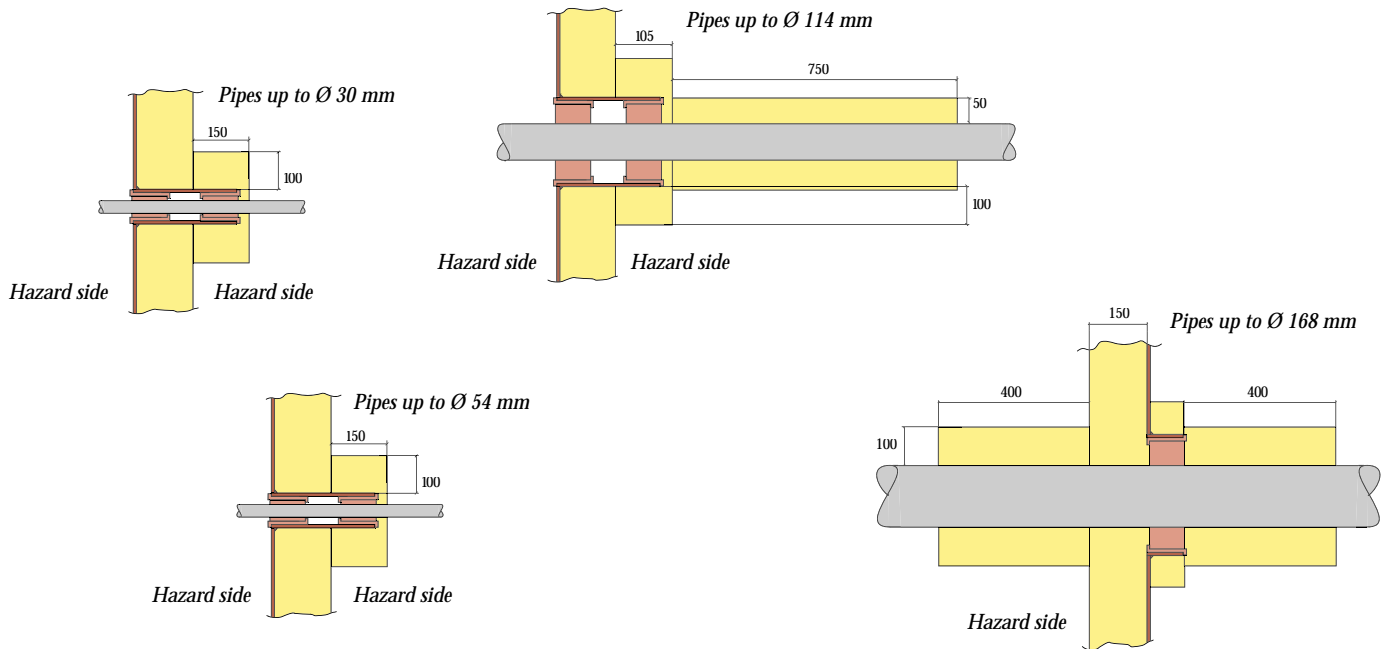
A-60 BULKHEAD



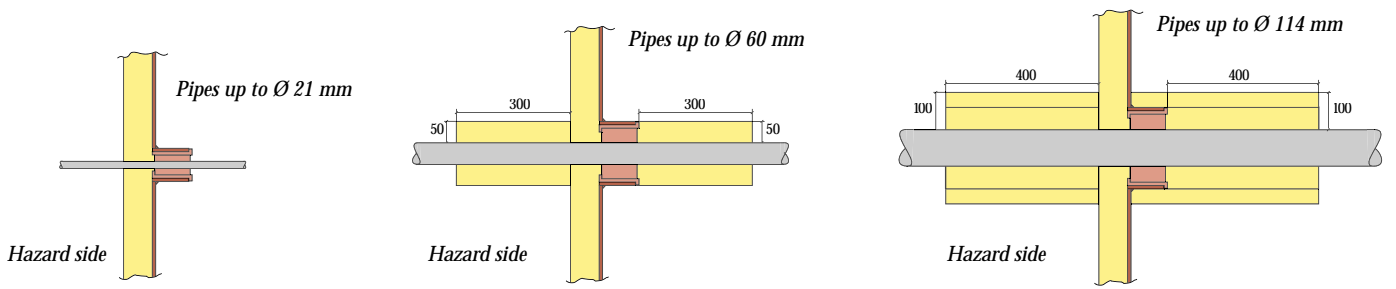
A-60 DECK



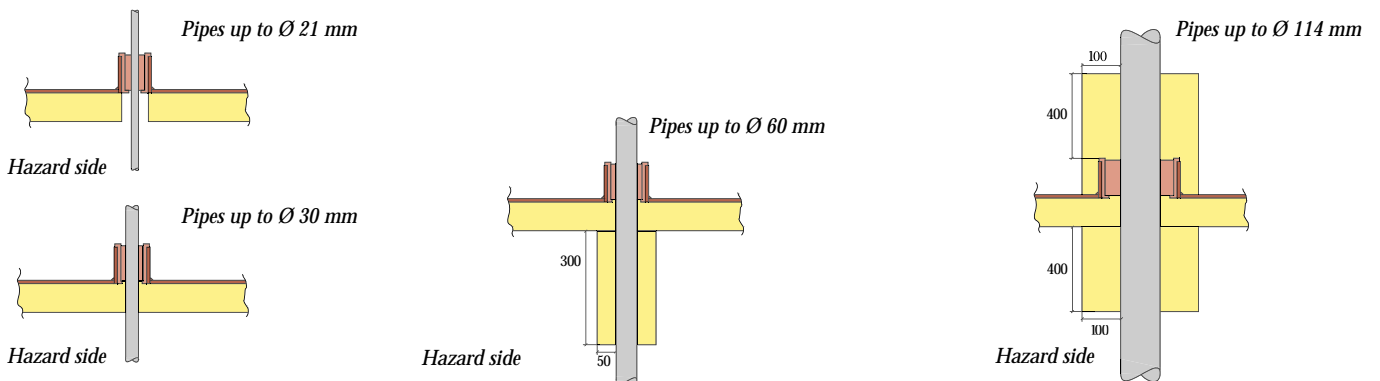
H-60 BULKHEAD



H-60/H-120 BULKHEAD

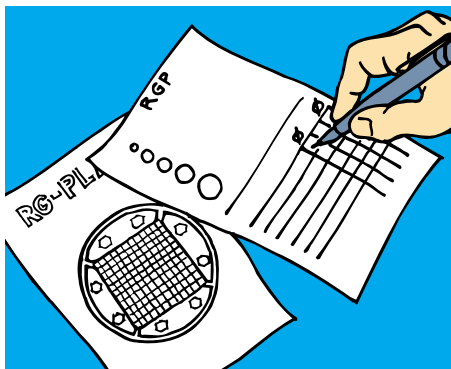


H-120 DECK

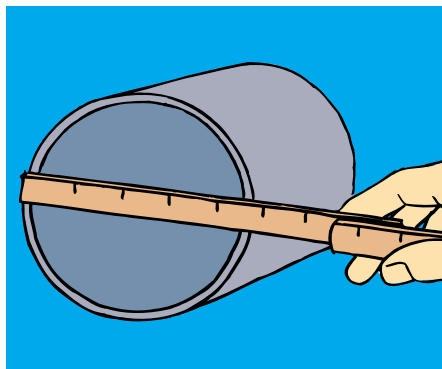


As testing is ongoing, please consult MCT Brattberg on approvals not shown.

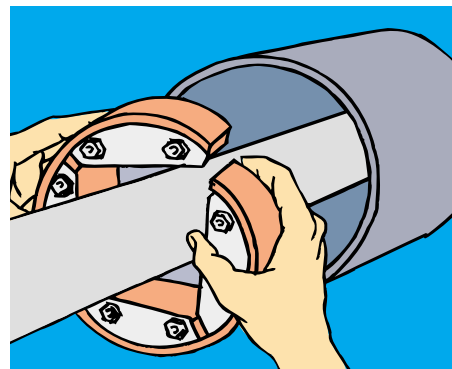
Installation Guide



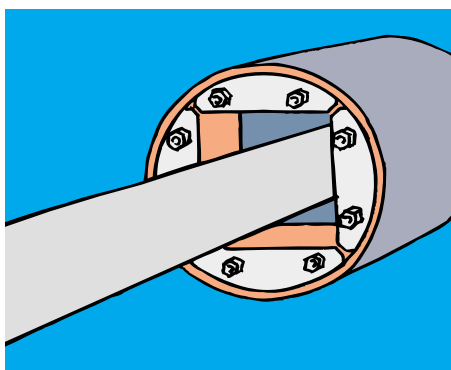
1 Use an RGP plan and enter the outer diameter and position of the pipe.



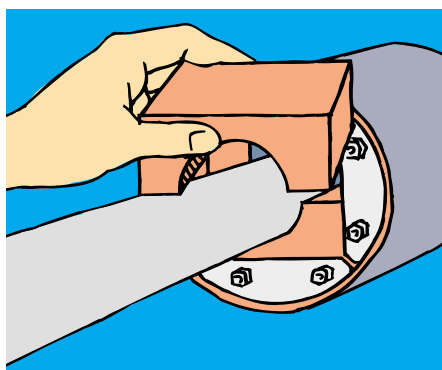
2 Measure the inner dimension of the pipe sleeve and check that the measures are within given tolerances.



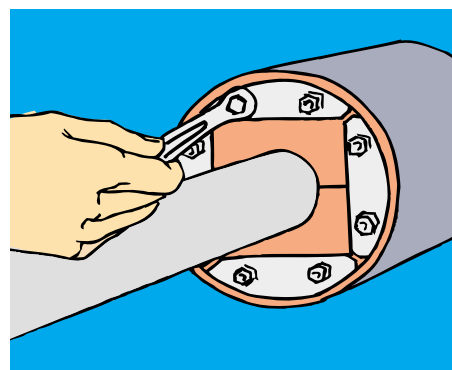
3 Pass the pipe through the sleeve and RGP plug or use an open RGPO plug if the pipe is already drawn. NB. The pipe must not be clamped in place as it must be possible to position it in the centre of the penetration.



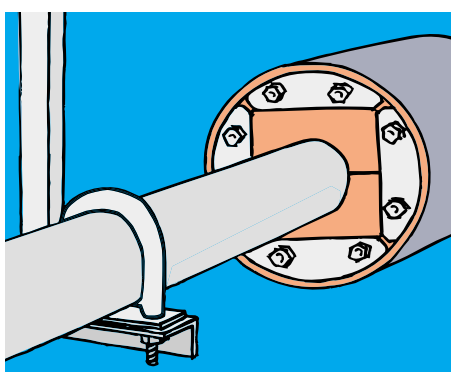
4 Insert the RGP-plug into the sleeve.



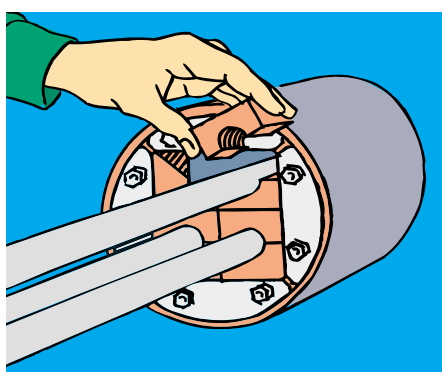
5 Fitting one centred pipe: fit the insert blocks around the pipe and press them into the RGP plug. For pressure-tight installation, see also page 9.



6 Tighten the bolts to compress and complete the seal. Approximately 10-12 mm should protrude on each bolt.



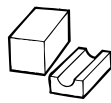
7 Clamp the pipe in place. The pipe penetration is now fire-, gas- and watertight.



8 Fitting several pipes: pass the pipes through the penetration and seal each pipe with insert blocks of the right size. Any remaining space should be filled with solid spare blocks.

RGP-plan

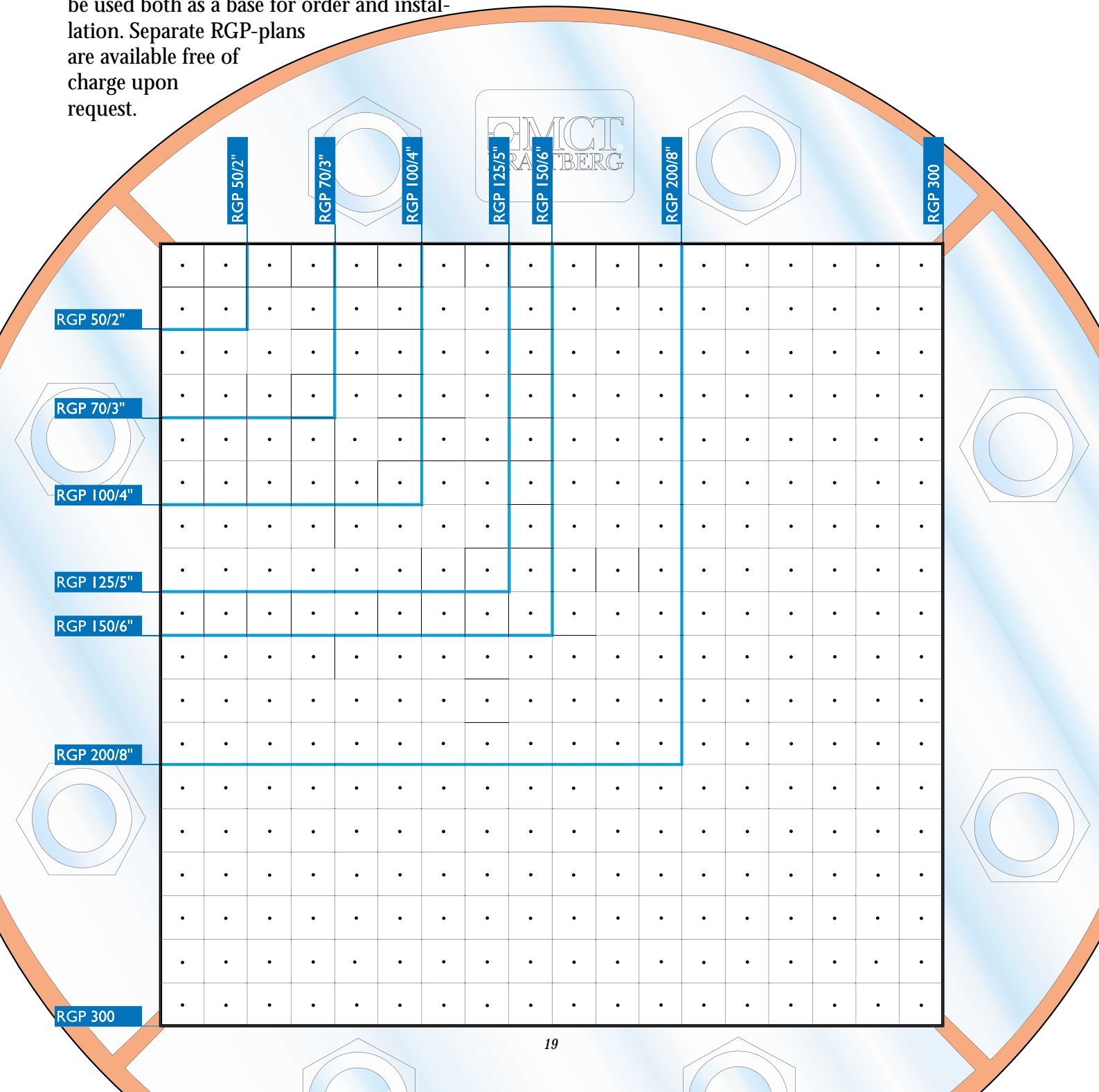
Use the plan to choose the right frame size and blocks. The numbers 50/2", 70/3", 100/4", 125/5", 150/6", 200/8" and 300 represent the size of the RGP. The packing space available for each frame size is shown on the plan (size 1:1). For example, packing space for RGP 200 is 120 x 120 mm. Draw up the lines for the pipes, choose the right insert blocks and spare blocks to fill the frame. The RG-plan can then be used both as a base for order and installation. Separate RGP-plans are available free of charge upon request.



Insert blocks _____

Lubricant _____

U-block _____





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