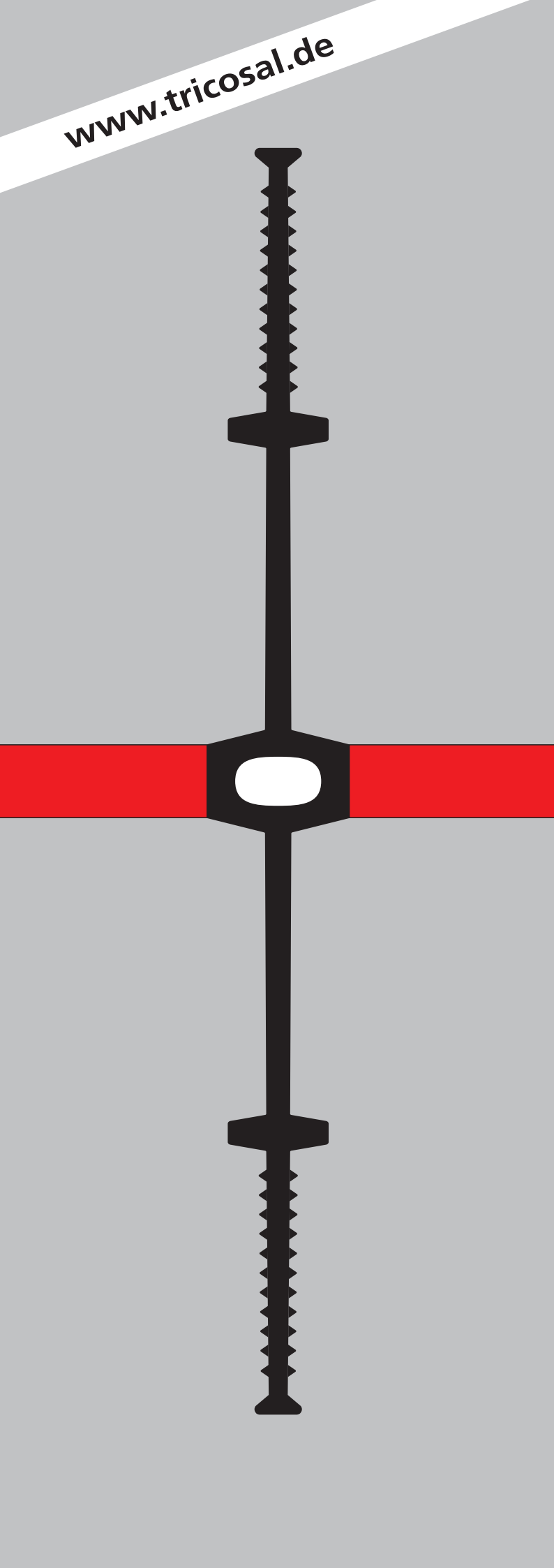
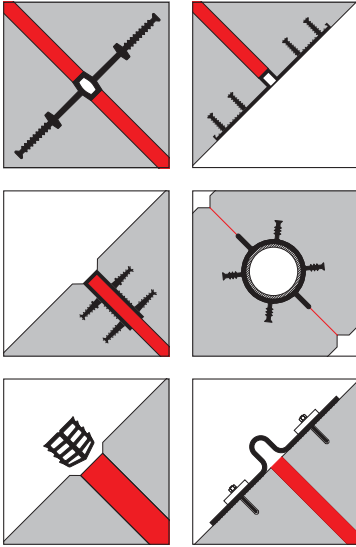


Delivery Programme

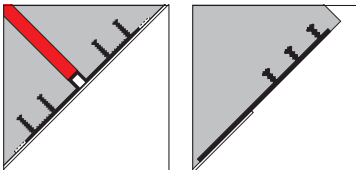
Waterstops



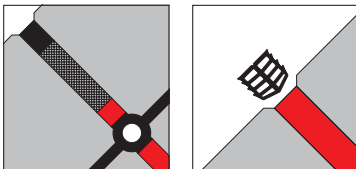
Tricosal waterstops and profiles



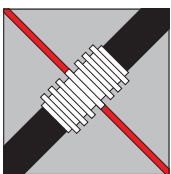
Tricosal special profiles for fixing membranes



Tricosal fire protection system for joints



MARO Pipe sealing system



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Quality / Supervision



Test Reports

Technical Advice / Service

Dimensions / Tolerances

Profile shapes

Tricosal waterstops are subject to a production quality assurance scheme. The supervision is carried out by the "Staatliches Materialprüfungsamt Nordrhein-Westfalen (MPA NRW)" – Federal Institute for Materials Testing, Dortmund.

Test reports showing physical and chemical properties are available on request.

The correct joint designs are a fundamental design factor in the efficiency of any structure. Our experienced engineers can offer expert advice to customers for joint design, waterstop material, profiles during the design, tendering or construction stages, to ensure the correct decisions are made.

1) Thermoplastic waterstops

For waterstops according to DIN 18541 minimum dimensions are specified.

For all other profiles the following tolerances are applicable:

Dimensions up to 10 mm:	Tolerance \pm 15 %
Dimensions from 11- 50 mm:	Tolerance \pm 10 %
Dimensions from 51- 250 mm:	Tolerance \pm 5 %
Dimensions > 250 mm:	Tolerance \pm 4 %

2) Elastomeric (rubber) waterstops

Dimensions and tolerances as specified in DIN 7865 are applicable.

Due to the physical properties of the thermoplastic materials, PVC-P and Tricomer, used in the waterstops, shape loss may occur in adverse temperature conditions, incorrect storage or transportation.

To rectify this thermal treatment at 60 - 80 °C is used. This is especially recommended when handling waterstops during low temperature periods and in case of external type waterstops with higher anchoring ribs.

Waterstops

- Survey of materials
- General information

Material
Compatibility with bitumen
Design, Dimensions, Physical properties
Quality Control
Jointing
Material
Compatibility with bitumen
Design, Dimensions, Physical properties
Quality Control
Jointing
Form of Delivery
Design (Colour)
Special Qualities

Thermoplastic Waterstops				
PVC-P, Standard Tricosal Specification		Tricomer®, DIN 18541		PE
NB	BV	NB	BV	
not compatible with bitumen	compatible with bitumen according to DIN 16937	not compatible with bitumen according to DIN 18541	compatible with bitumen according to DIN 18541	
Design, dimensions and physical properties were developed and specified by Tricosal, have a proven success for many years.		Design, minimum dimensions and physical properties are as specified by the DIN standard.		Polyethylene, modified to meet the physical properties of waterstop materials.
External and independent supervision by MPA Dortmund, together with in-house quality control system QA/QC.				In-house quality control system QA/QC.
Jointing by heated wedge or hot air welding tools or by semi-automatic welding machines available from Tricosal.				Jointing in accordance with Tricosal's instructions. Please ask for technical advice.
Elastomer				
Elastomer according to DIN 7865 part 1 + 2	Elastomer according to DIN 7865 part 2	Elastomer with fabric reinforcement		
Dimensional stability against hot bitumen				
Design, dimensions and physical properties are specified in the DIN standard.	Physical properties are specified in the DIN standard. Design and dimensions were developed by Tricosal.	Profiles for flanging constructions with nylon fabric reinforcement.		
External and independent supervision by MPA Dortmund, together with in-house quality control system QA/QC.		In-house quality control system QA/QC.		
By vulcanising (On site, only butt joints can be made by using vulcanising units which are available on hire.)		By vulcanising (Intersections and butt jointing only by Tricosal)		
General information				
Rolls, specified lengths, formpieces and systems				
black; capping joint profiles in grey colour, resp. grey cover plate; potable water quality in beige colour				
For specific applications, special types and qualities can be developed and manufactured, e.g. a potable water quality grade (health quality).				
Please contact us if special types and qualities are required.				

PVC-P

This material provides a wide spectrum of excellent properties at economic costs. It has been in use for more than 70 years.

Tricosal PVC-P waterstops are resistant against natural acidic and alkaline agents, resistant to ageing, with total homogeneous weldability being achieved.

The following grades are offered

- standard quality waterstops, not resistant to bitumen (PVC-P/NB)
- bitumen resistant waterstops according to DIN 16937 (PVC-P/BV)
- potable water quality waterstops (PVC-P/PH), available on special request

Tricomer® according to DIN 18541

Tricomer is a combination of PVC-P and NBR (nitrile butadiene rubber) materials/compounds. This special polymer was developed in our laboratories and has been modified to meet DIN requirements. The Tricomer material has been successfully used for nearly 20 years for the waterproofing of joints in concrete structures.

Tricomer has a high elongation at break, excellent resistance to chemicals and ageing, together with a constant elasticity similar to elastomer (rubber). It is used where a higher performance of the structure and the joint waterproofing is required. Tricomer waterstops are jointed by thermoplastic welding and thus facilitate the practical use. Tricomer waterstops are offered in the grades NB (not resistant to bitumen) and BV (bitumen resistant according to DIN 18541).

Elastomer (rubber) according to DIN 7865

Wide screened and interlaced high polymers (artificial rubber) in a vulcanised state are called Elastomer. The process of interlacing is non-reversible, therefore a special jointing process is required.

Tricosal elastomeric waterstops (internal and external types) are used for structures with large joint movements, frequent load changes and/or low temperatures as well as for high water pressures. The visual surface of the FFK-capping joint profiles have a grey and UV-stable vulcanised covering.

Physical Properties (Extract of Tricosal in-house standard specification)

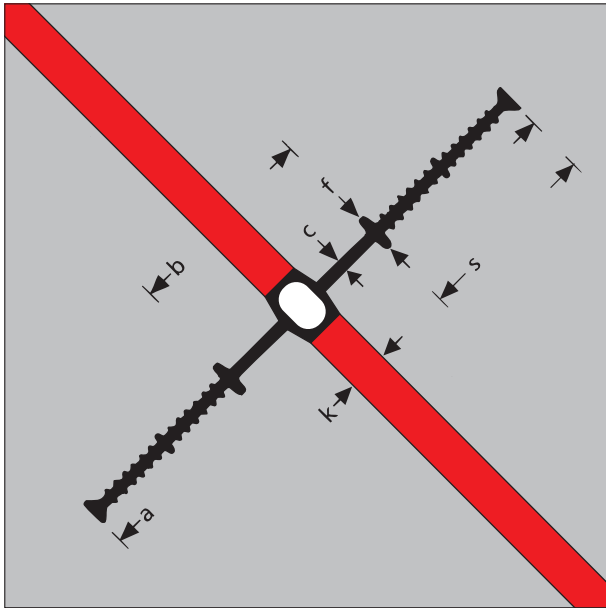
No.	Property	Tests to DIN	NB	BV
1	Tensile Strength in N/mm ²	53455	≥ 10	≥ 10
2	Elongation at break in %	53455	≥ 275	≥ 275
3	Shore-A-Hardness	53505	75 ± 5	75 ± 5
4	Behaviour after storage on bitumen (in accordance to DIN 16937- 28 days/70 °C) Change in %: Tensile Strength Elongation at break Modulus of elasticity	16726		≤ ± 20 ≤ ± 20 ≤ ± 50

Physical Properties (Extract of DIN 18541, part 2)

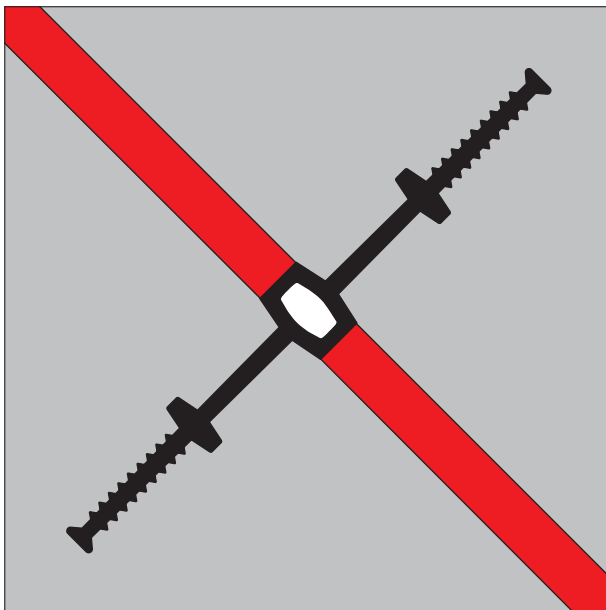
No.	Property	Tests to DIN	NB	BV
1	Tensile Strength in N/mm ²	53 455	≥ 10	≥ 10
2	Elongation at break	53 455	≥ 350	≥ 350
3	Shore-A-Hardness in %	53 505	67 ± 5	67 ± 5
4	Tear Strength in N/mm ²	53 507	≥ 12	≥ 12
5	Behaviour at low temperatures (-20°C), Elongation at break in N/mm ²	53 455	≥ 200	≥ 200
6	Behaviour after storage in bitumen (28 days/70 °C) Change in %: Tensile Strength Elongation at break Modulus of elasticity	53 455 53 455 53 455		≤ ± 20 ≤ ± 20 ≤ ± 50

Physical Properties (Extract of DIN 7865 part 2)

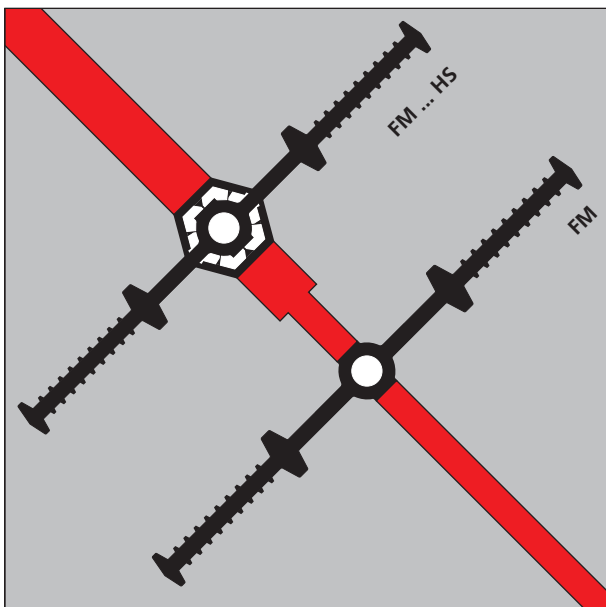
No.	Property	Test methods to DIN	requirements
1	Tensile Strength in N/mm ²	53 504	≥ 10
2	Elongation at break in %	53 504	≥ 380
3	Shore-A-Hardness	53 505	62 ± 5
4	Tear Strength in N/mm ²	53 507	≥ 8
5	Behaviour at low temperatures (-20°C), Shore-A-Hardness	53 505	≤ 90
6	Dimensional stability when exposed to hot bitumen	7865	No change in shape
7	Metal adhesion	7865	Structural fracture in the elastomer



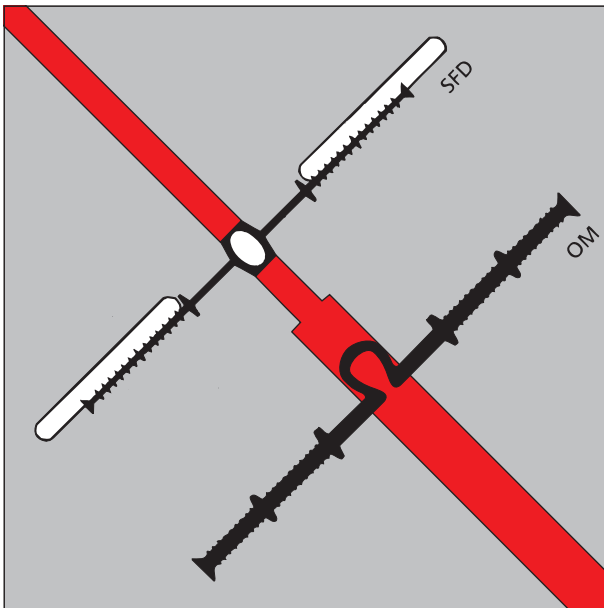
PVC-P Standard Quality	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
D 19	190	75	3,5	58	10	15
D 24	240	85	4	78	20	15
D 32	320	110	5	105	20	15
D 50	500	155	6	173	20	20
D 25/6	250	120	6	65	20	25
D 32/6	320	170	6	75	20	25
D 32/9	320	120	9	100	20	25



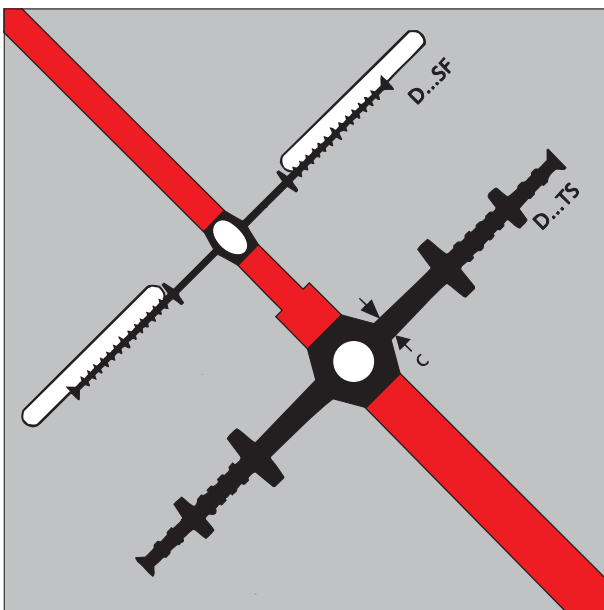
Tricomer DIN 18541	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
D 190	190	75	4	58	10	15
D 240	240	85	4,5	78	20	15
D 320	320	110	5,5	105	20	15
D 500	500	155	6,5	173	20	20
D 250/6	250	120	6	65	20	25
D 320/6	320	170	6	75	20	25
D 250/9	250	120	9	65	20	25
D 320/9	320	120	9	100	20	25



Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
FM 200	200	110	9	45	20	32
FM 250	250	125	9	63	20	32
FM 300	300	175	10	63	20	32
FM 350	350	180	12	85	20	38
FM 400	400	230	12	85	20	38
FM 500	500	300	13	100	20	38
DIN 7865 part 2						
FM 250-2	250	125	8	63	20	26
FM 300-2	300	175	8	63	20	28
FM 350-2	350	180	9	85	20	30
Expansion Joint waterstop with encased centre bulb						
FM 350 HS	350	180	12	85	35	38



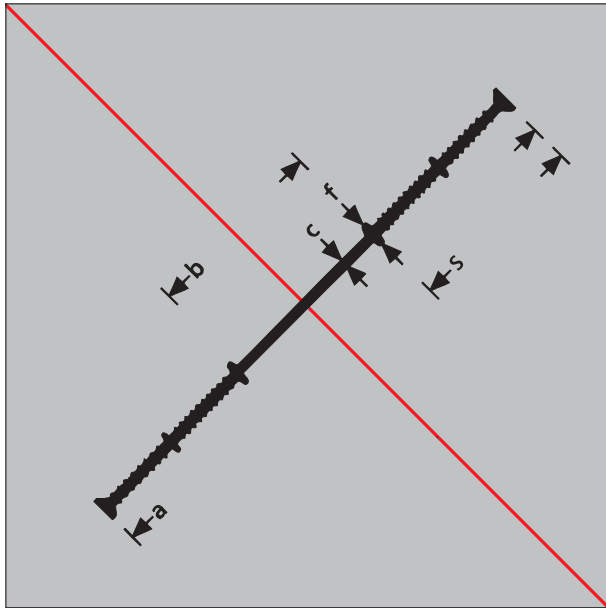
PVC-P Standard Quality	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
Expansion joint waterstops, externally reinforced with fixing loops:						
SFD 24	240	85	4	78	20	15
SFD 32	320	100	4,5	110	20	15
Expansion joint waterstops, omega shape:						
OM 25	250	75	6	88	30	15
OM 35	350	95	6	128	40	15
OM 50	500	190	7	155	50	20



Tricomer DIN 18541, part 2	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
Expansion joint waterstops, externally reinforced with fixing loops:						
D 240 SF	240	85	4,5	78	20	15
D 320 SF	320	110	5	105	20	15
Expansion joint waterstops, thick sections:						
D 260 TS	260	125	9	68	20	24
D 350 TS	345	175	11	85	20	27
D 400 TS	395	195	11	103	20	29



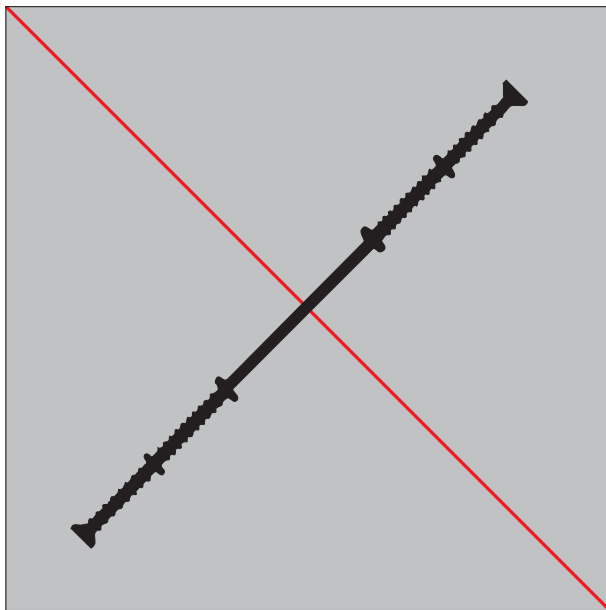
Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part*	Height of centre bulb	Height of anchoring ribs
	a	b	c	s	k	f
Expansion joint waterstops with steel plates:						
FMS 350	350	120	10	45	20	32
FMS 400	400	170	11	45	20	32
FMS 500	500	230	12	65	20	32
Expansion joint waterstops with steel plates and pre-formed, encased centre-bulb						
FMS 400 HS	400	170	11	45	35	32
FMS 500 HS	500	230	12	65	35	32
The profile range FMS ... HS is especially suitable for wide joints and contraction joints; but also for normal expansion joints when subsidence and seismic movements are expected.						
For further details see separate leaflet.						
* width of Elastomer (rubber) sealing part without steel plates						



PVC-P Standard Quality	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring ribs
	a	b	c	s	f
A 15	150	45	3	52.5	10
A 19	190	75	3	57.5	15
A 24	240	85	3.5	77.5	15
A 32	320	110	4.5	105	15
A 50	500	155	6	172.5	20

Construction joint waterstops, with internal steel bar reinforcement:

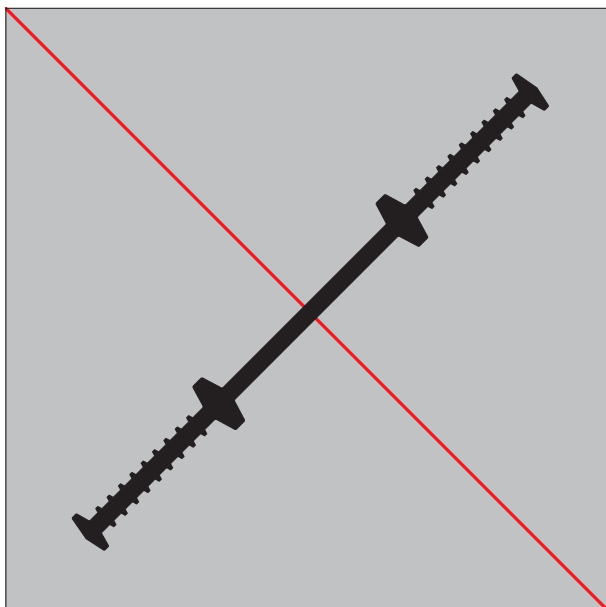
FIX 20		200	70	3,5	65	15
FIX 24		240	80	3,5	80	15
FIX 32		320	100	4	110	15



Tricomer DIN 18541	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring part
	a	b	c	s	f
A 190	190	75	3.5	57.5	15
A 240	240	85	4	77.5	15
A 320	320	110	5	105	15
A 500	500	155	6,5	172.5	20

Construction joint waterstops, with internal steel bar reinforcement:

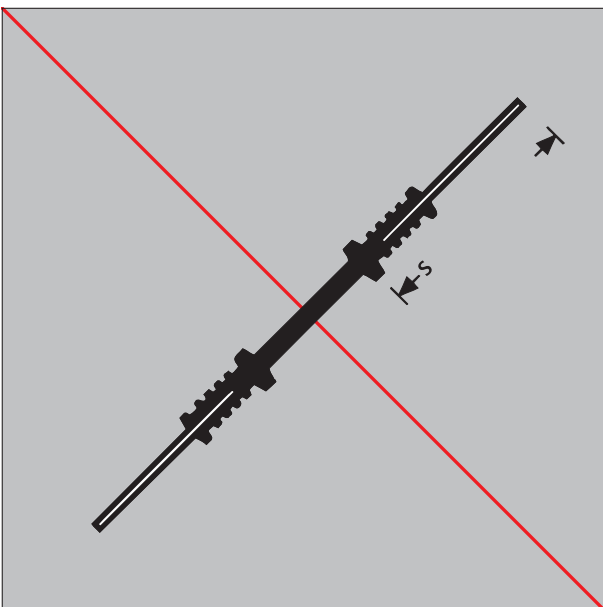
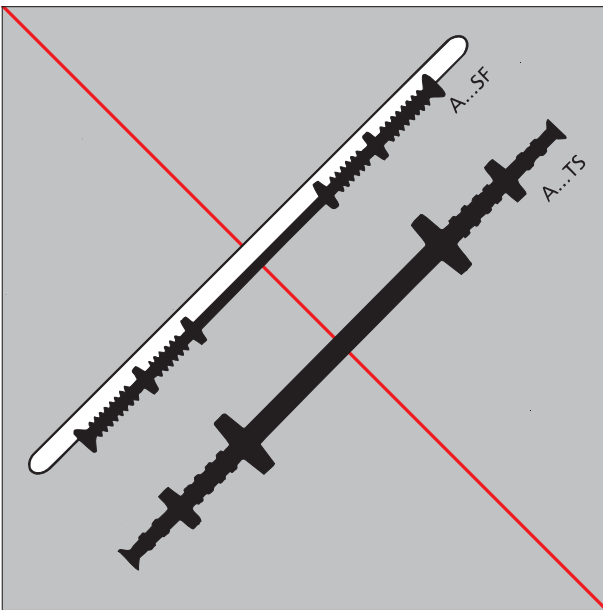
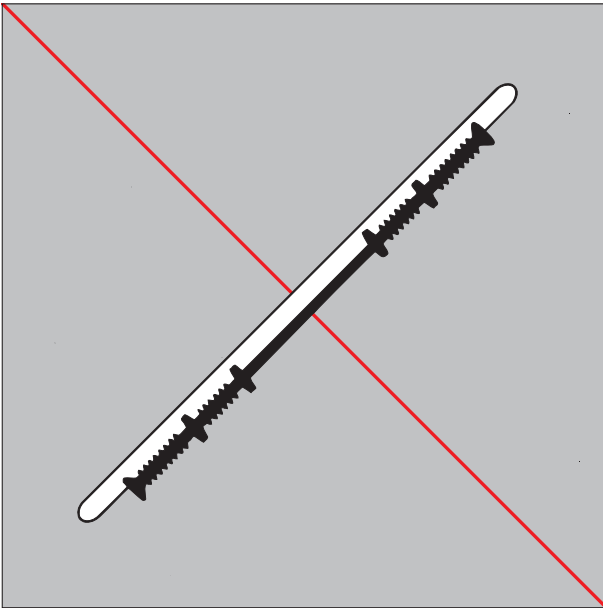
A 190 FIX		200	70	3,5	65	15
A 240 FIX		240	80	4	80	15
A 320 FIX		320	100	5	110	15



Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring part
	a	b	c	s	f
F 200	200	75	7	62.5	32
F 250	250	80	8	85	32
F 300	300	100	8	100	32

DIN 7865 part 2

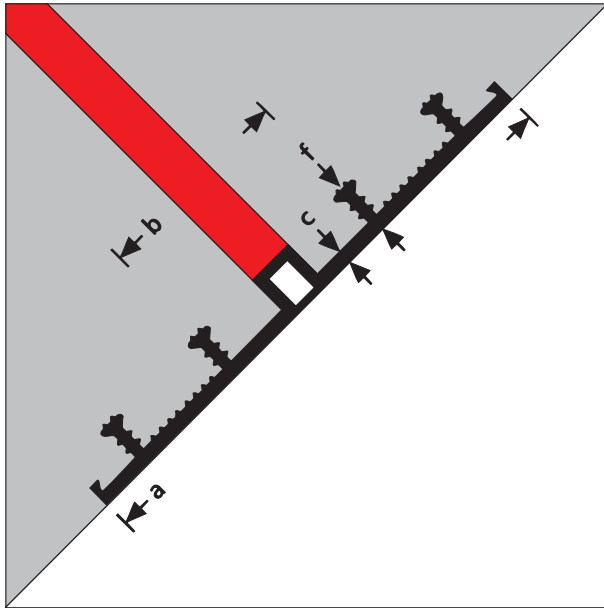
F 200-2	200	75	6	62.5	32
F 250-2	250	80	6	85	32
F 300-2	300	100	6	85	32



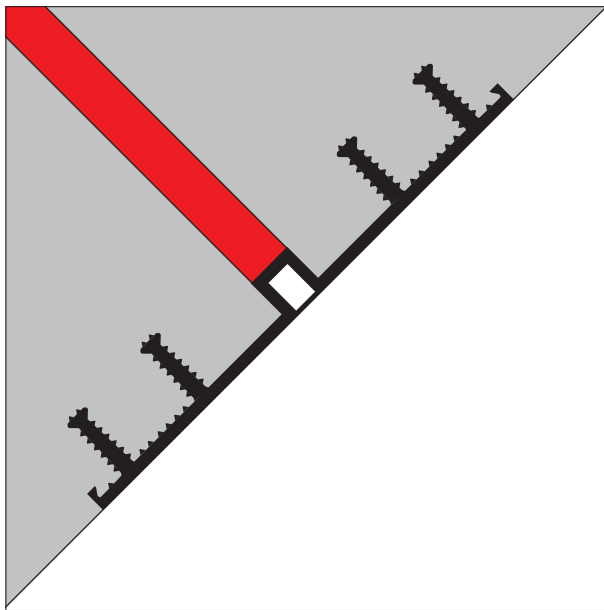
PVC-P Standard Quality	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring part
	a	b	c	s	f
Construction joint waterstops, externally reinforced with fixing loops:					
SFA 20	200	75	3	62.5	15
SFA 24	240	70	3,5	85	15
SFA 32	320	110	4	105	15

Tricomer DIN 18541, part 2	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring part
	a	b	c	s	f
Construction joint waterstops, externally reinforced with fixing loops:					
A 200 SF	200	75	3,5	62.5	15
A 240 SF	240	70	4	85	15
A 320 SF	320	110	5	105	15
Construction joint waterstops, thick sections:					
A 260 TS	260	113	9	72.5	24
A 320 TS	320	165	10	77.5	26

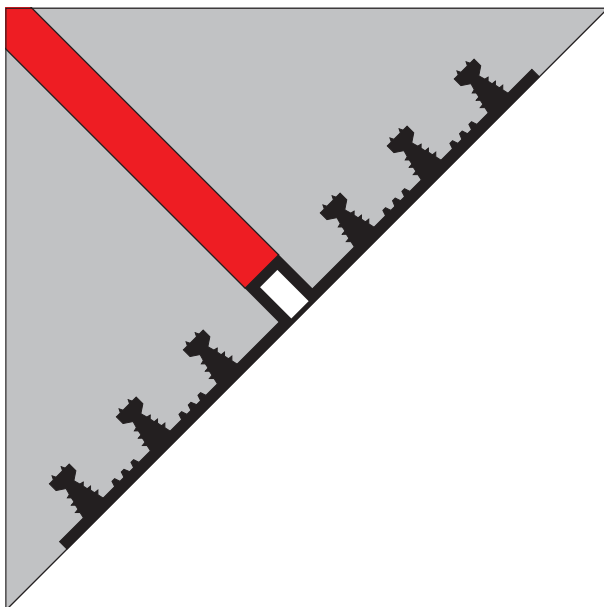
Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Height of anchoring part
	a	b	c	s	f
Construction joint waterstops with steel plates:					
FS 270	270	60	7	105	22
FS 310	310	80	8	115	22



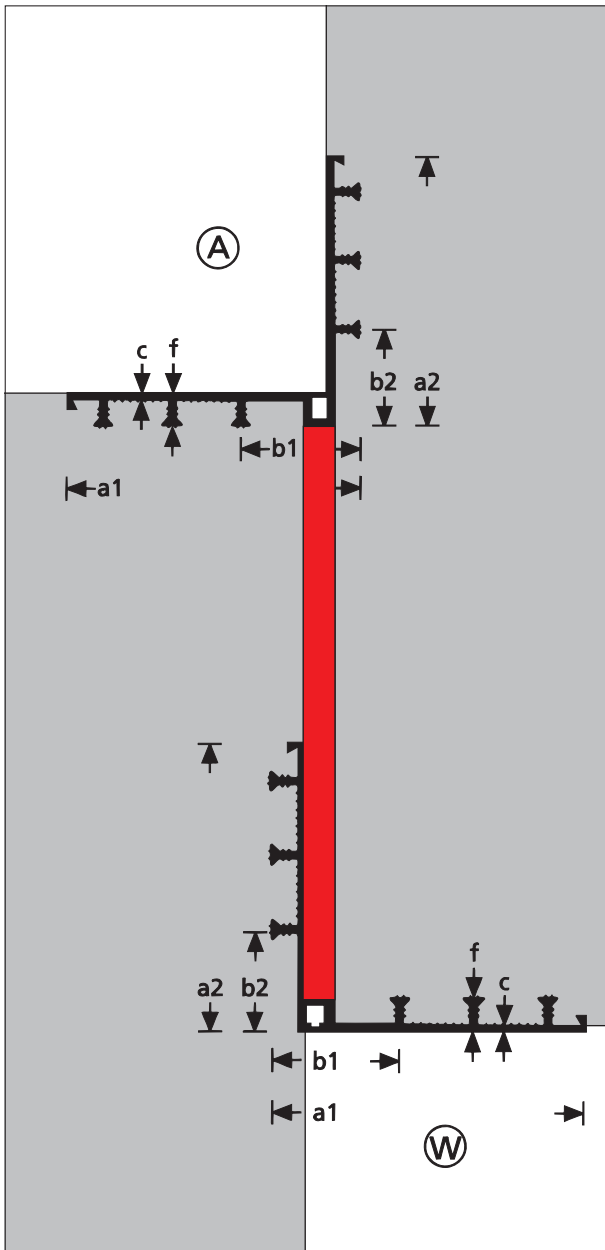
PVC-P Standard Quality	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
DF 19	190	92	3,5	16	4
DF 24	240	90	4	20	4
DF 24/2	240	90	4	25	4
DF 24/3	240	104	4,5	34	4
DF 32	330	104	4	20	6
DF 32/2	330	104	4	25	6
DF 32/3	330	104	4,5	34	6
DF 50	500	124	4	20	8
DF 50/2	500	124	4	25	8
DF 50/3	500	124	4,5	34	8



Tricomer DIN 18541	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
DA 240	240	90	4,5	20	4
DA 240/2	240	90	4,5	25	4
DA 240/3	240	104	5	35	4
DA 320	330	104	4,5	20	6
DA 320/2	330	104	4,5	25	6
DA 320/3	330	104	5	35	6
DA 500	500	124	4,5	20	8
DA 500/2	500	124	4,5	25	8
DA 500/3	500	124	5	35	8



Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
AM 250	250	100	6	31	4
AM 350	350	100	6	31	6
AM 500	500	150	6	31	8
DIN 7865 part 2					
AM 250-2	250	100	5.5	36	4
AM 350-2	350	100	5.5	36	6

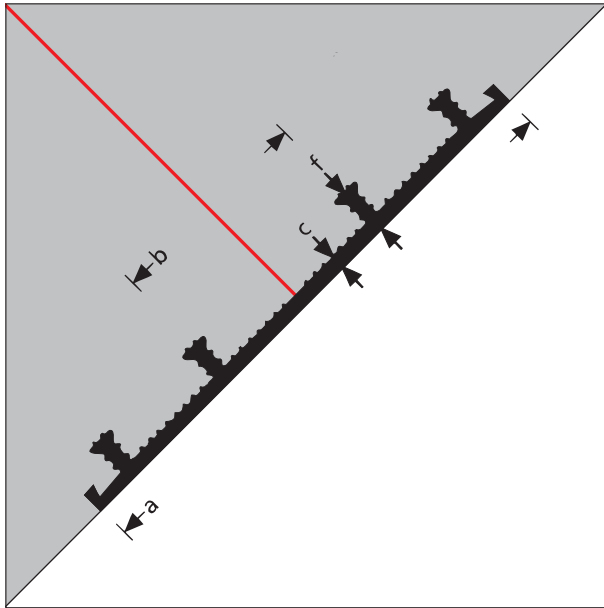


PVC-P Standard Quality	Total width	Width of expansion part	Web thickness	Sealing ribs	
	a1/a2	b1/b2	c	Height	Number
				f	N
DF 24 edge A	146/131	71/55	4	20	4
DF 24 edge W	146/131	71/55	4	20	4
DF 32 edge A	192/176	79/63	4	20	6
DF 32 edge W	192/176	79/63	4	20	6

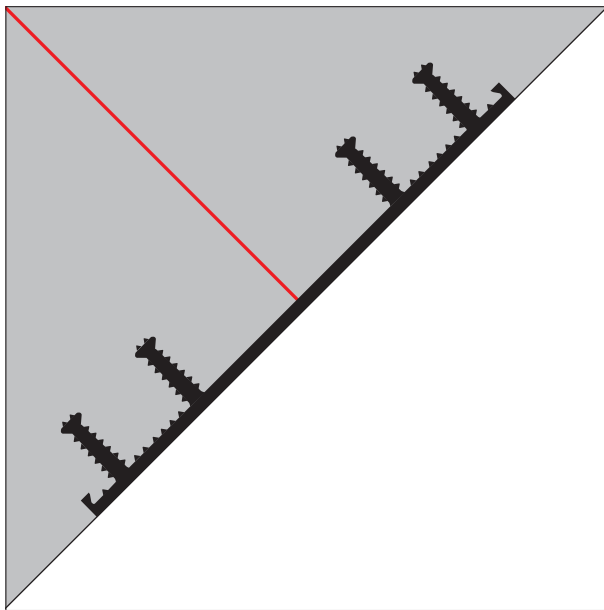
A = external anchors
W = internal/external anchors

Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Sealing ribs	
	a1/a2	b1/b2	c	Height	Number
				f	N
DA 240 edge A	146/131	71/55	4.5	20	4
DA 240 edge W	146/131	71/55	4.5	20	4
DA 320 edge A	192/176	79/63	4.5	20	6
DA 320 edge W	192/176	79/63	4.5	20	6

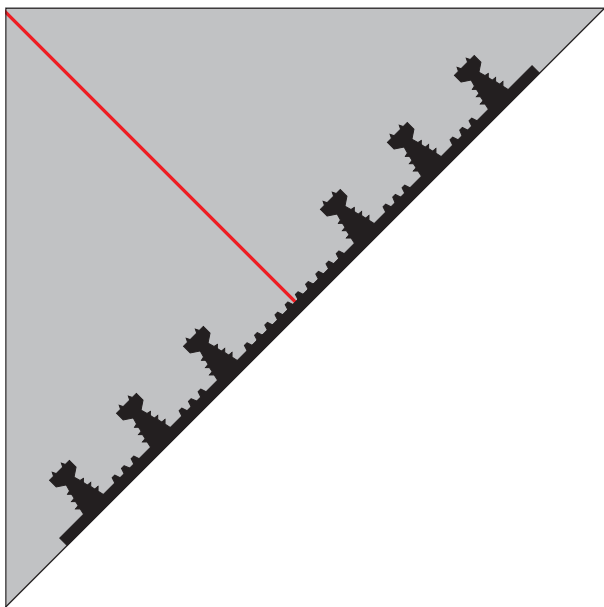
A = external anchors
W = internal/external anchors



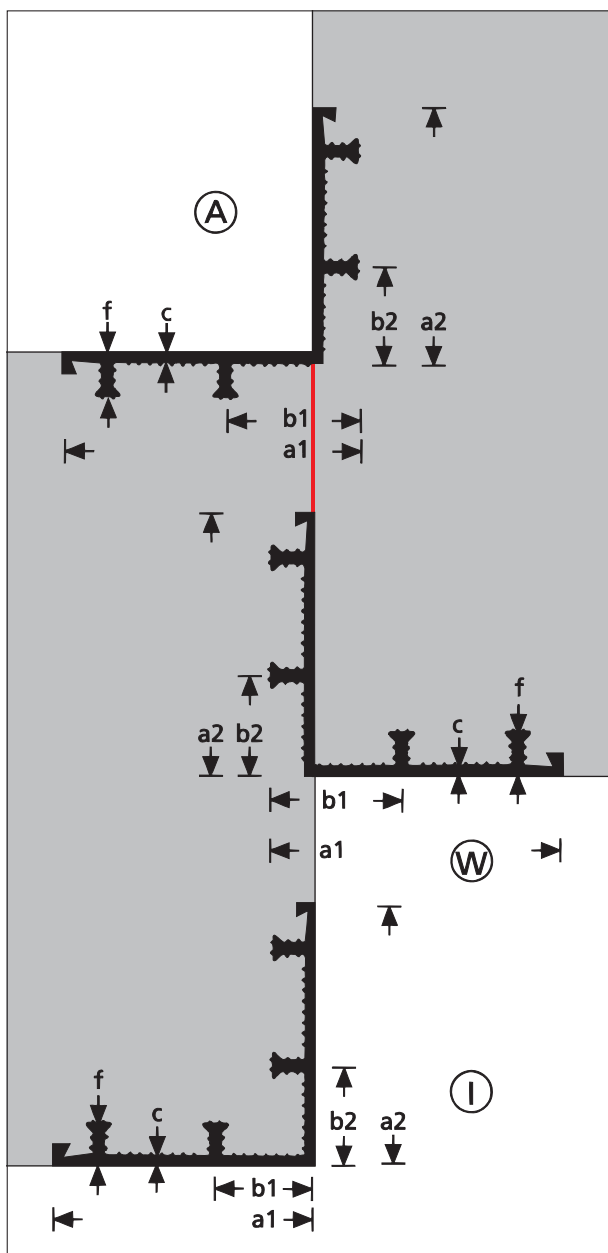
PVC-P Standard Quality	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
AF 19	190	92	3.5	16	4
AF 24	240	90	4	20	4
AF 24/2	240	85	4	25	4
AF 24/3	240	104	4.5	35	4
AF 32	330	104	4	20	6
AF 32/2	330	104	4	25	6
AF 32/3	330	104	4.5	35	6
AF 50	500	124	4	20	8
AF 50/2	500	124	4	25	8
AF 50/3	500	124	4.5	35	8



Tricomer DIN 18541	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
AA 240	240	90	4.5	20	4
AA 240/2	240	90	4.5	25	4
AA 240/3	240	104	5	35	4
AA 320	330	104	4.5	20	6
AA 320/2	330	104	4.5	25	6
AA 320/3	330	104	5	35	6
AA 500	500	124	4.5	20	8
AA 500/2	500	124	4.5	25	8
AA 500/3	500	124	5	35	8



Elastomer (rubber) DIN 7865	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
A 250	250	100	6	31	4
A 350	350	100	6	31	6
A 500	500	150	6	31	8
DIN 7865 part 2					
A 250-2	250	100	5.5	36	4
A 350-2	350	100	5.5	36	6

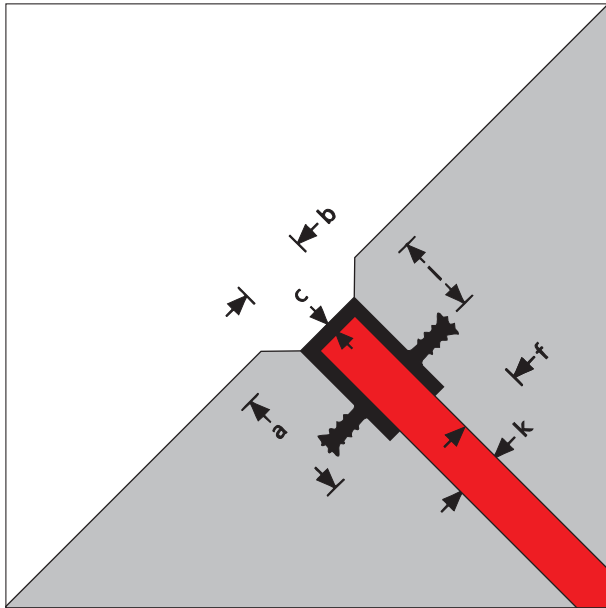


PVC-P Standard Quality	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a1/a2	b1/b2	c	f	N
AF 24 edge A	136/120	61/45	4	20	4
AF 24 edge W	136/120	61/45	4	20	4
AF 24 edge I	120/120	45/45	4	20	4
AF 32 edge A	181/165	68/52	4	20	6
AF 32 edge W	181/165	68/52	4	20	6
AF 32 edge I	165/165	52/52	4	20	6

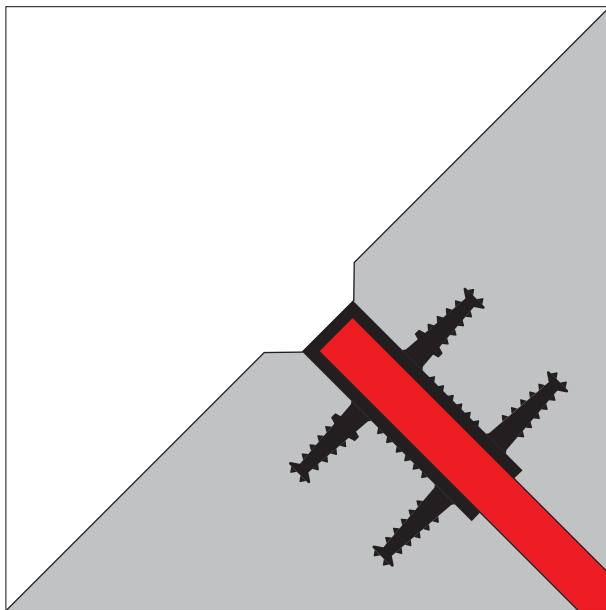
A = external anchors
W = internal/external anchors
I = internal anchors

Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a1/a2	b1/b2	c	f	N
AA 240 edge A	136/120	61/45	4.5	20	4
AA 240 edge W	136/120	61/45	4.5	20	4
AA 240 edge I	120/120	45/45	4.5	20	4
AA 320 edge A	181/165	68/52	4.5	20	6
AA 320 edge W	181/165	68/52	4.5	20	6
AA 320 edge I	165/165	52/52	4.5	20	6

A = external anchors
W = internal/external anchors
I = internal anchors

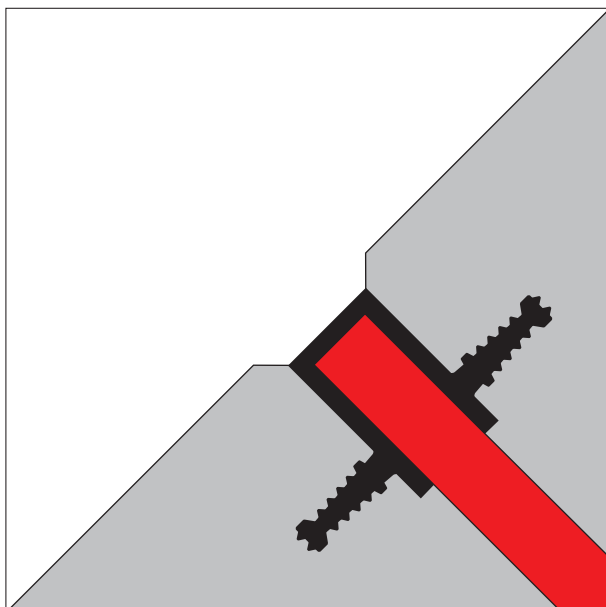


PVC-P Standard Quality	Total width	Height of loop	Width of joint cover part	Web thickness	Joint width *	Sealing ribs	
						Height	No.
	a	l	b	c	k	f	N
FF 5/2 FF 5/2/3	50 50	35 35	20 20	5 5	10 10	25 35	2 2
FF 5/3 FF 5/3/3	50 50	35 35	30 30	5 5	20 20	25 35	2 2
FF 7/3 FF 7/5	70 70	50 50	30 50	5 5	20 40	45 45	2 2
FF 10/3 FF 10/3/3	95 95	35 35	30 30	5 5	20 20	25 35	4 4
FF 14/4 FF 14/6	140 140	40 40	40 60	5 5	30 50	35 35	4 4
FF 14/3 FF 14/3/3	140 140	35 35	30 30	5 5	20 20	25 35	6 6



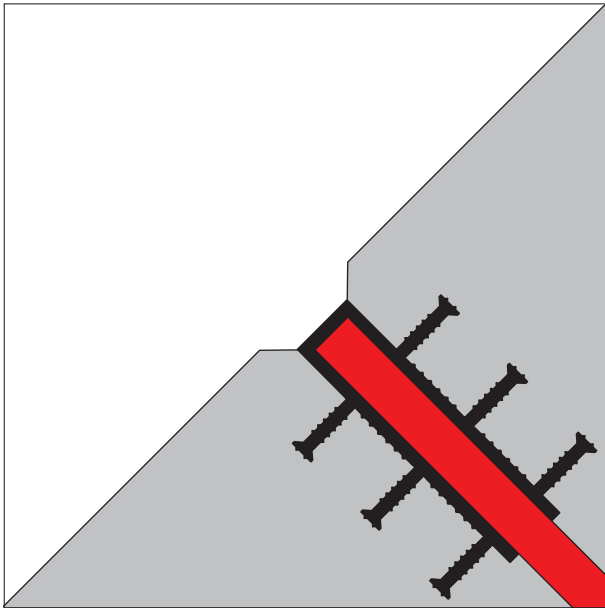
Tricomer DIN 18541	Total width	Height of loop	Width of joint cover part	Web thickness	Joint width *	Sealing ribs	
						Height	No.
	a	l	b	c	k	f	N
FA 50/2/3** FA 50/3/2 FA 50/3/3	50 50 50	35 35 35	20 30 30	5.5 5.5 5.5	10 20 20	35 25 35	2 2 2
FA 70/3/4 FA 70/5/4	70 70	50 50	30 50	5.5 5.5	20 40	45 45	2 2
FA 90/3/2 FA 90/3/3	95 95	35 35	30 30	5.5 5.5	20 20	25 35	4 4
FA 130/4/3** FA 130/6/3**	140 140	40 40	40 60	5.5 5.5	30 50	35 35	4 4
FA 130/3/2 FA 130/3/3	140 140	35 35	30 30	5.5 5.5	20 20	25 35	6 6

** DIN 18541 part 2



Elastomer (rubber) DIN 7865 part 2	Total width	Height of loop	Width of joint cover part	Web thickness	Joint width *	Sealing ribs	
						Height	No.
	a	l	b	c	k	f	N
FFK 5/2 FFK 5/3	55 55	35 35	20 30	5 5	10 20	35 35	2 2
FFK 7/3 FFK 7/4 FFK 7/5	70 70 70	50 50 50	30 40 50	5 5 5	20 30 40	45 45 45	2 2 2
FFK 10/3	100	35	30	5	20	45	4
FFK 14/3	145	35	30	5	20	35	6

* The profiles are designed for the given joint width (k). They can also be used for joints up to 10 mm.

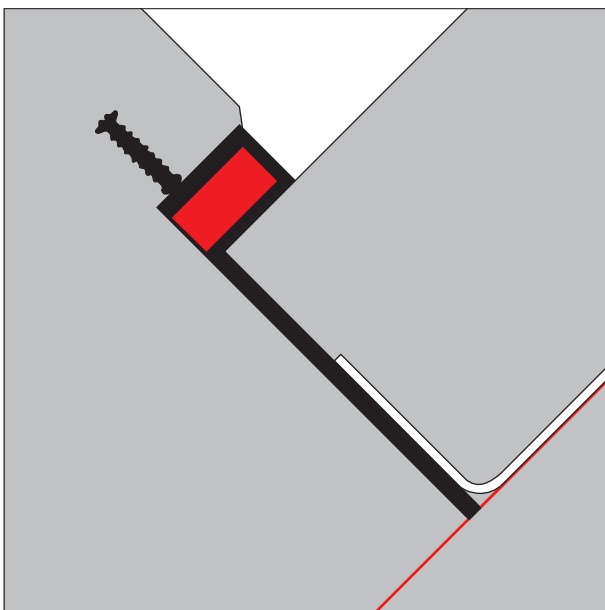


PVC-P Standard Quality	Total width	Width of joint cover part	Web thickness	Joint width*	Sealing ribs	
					Height	Number
	a	b	c	k	f	N
FF 7/2 P	70	20	10	10	25	2

Tricomer DIN 18541

FA 130/3 P	140	30	15	20	35	6
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For areas with surface loads (e.g. traffic areas and car parks) profiles with a thicker cover part are recommended.

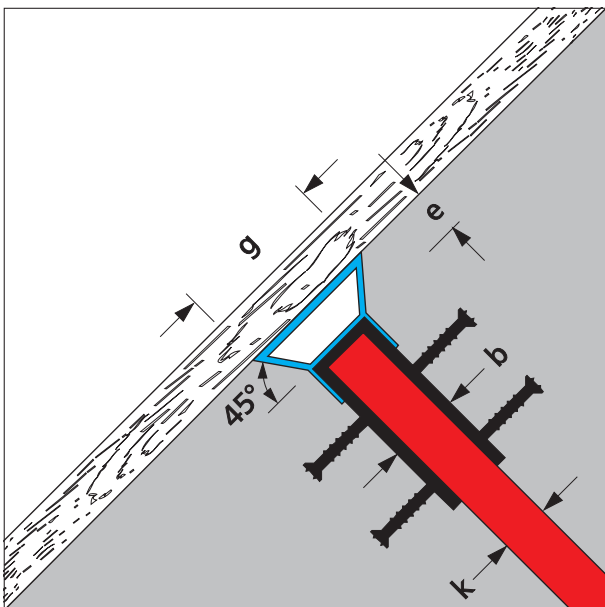


PVC-P Standard Quality	Total width	Width of joint cover part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	N
FF 5/5/15	50	30	5	45	1

Tricomer DIN 18541 part 2

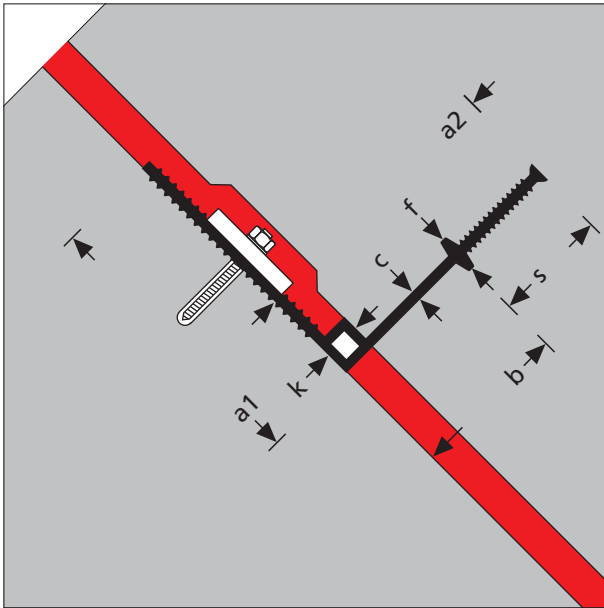
FA 5/5/15	50	30	6	45	1
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The 150 mm long flat leg of the profile is used as connector to waterproofing membranes.

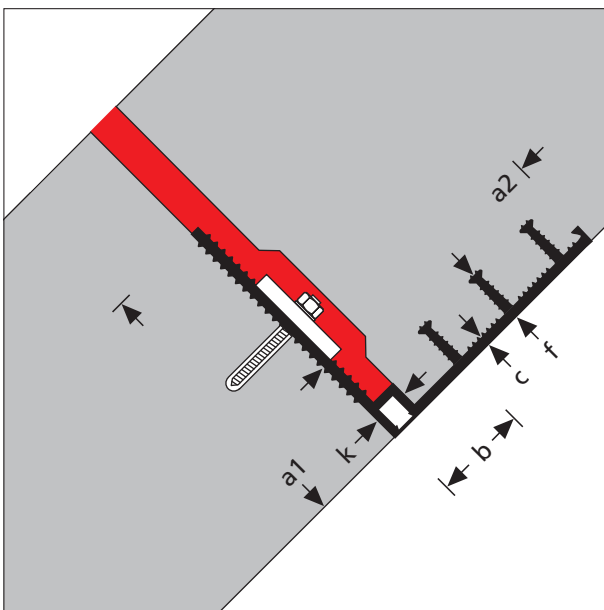


Spacer and joint former for capping joint waterstops	Joint width	Visible width	Height of chamfer	Width of spacer	Length
	k	b	e	g	
TFL 20	10	20	15	50	2500
TFL 30	20	30	15	60	2500
TFL 40	30	40	15	70	2500
TFL 50	40	50	15	80	2500

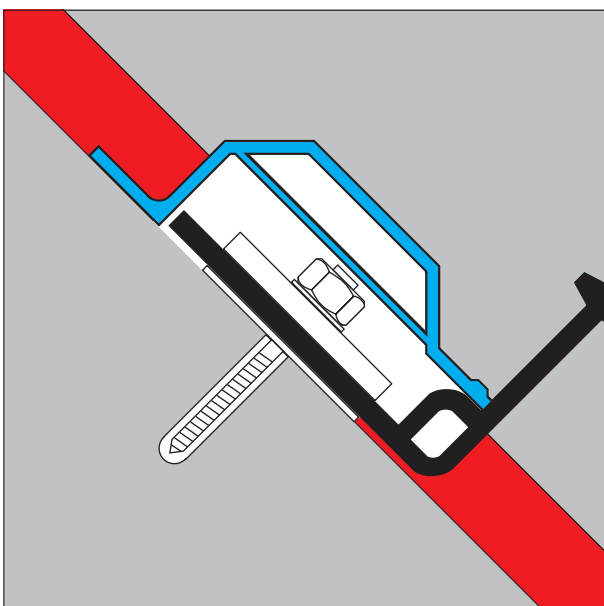
* The profiles are designed for the given joint width (k). They can also be used for joints up to 10 mm.



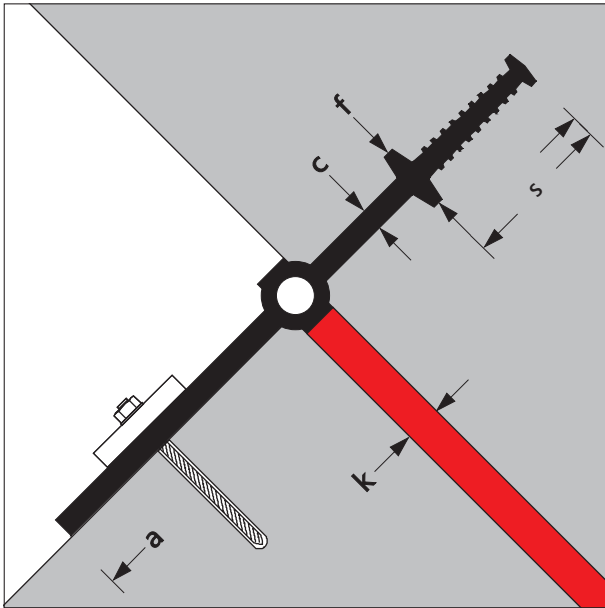
Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Width of sealing part	Width of centre bulb	Height of anchoring ribs
	a1/a2	b	c	s	k	f
D 320 K	179/170	95	5	95	22	23
Elastomer (rubber) DIN 7865 part 2						
FM 350 K	195/200	115	10	85	40	38



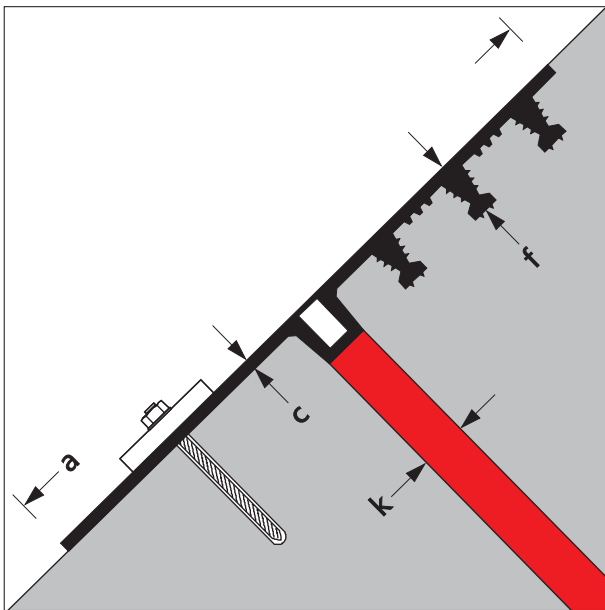
Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Width of centre bulb	Height of sealing ribs
	a1/a2	b	c	k	f
DA 320 K I DA 320 K A	179/204 179/204	88 88	5 5	22 22	35 35
Elastomer (rubber) DIN 7865 part 2					
AM 350 K I AM 350 K A	166/211 166/211	86 86	6 6	36 36	31 31



Protection Profile for one-sided flanging constructions	Height	Width of chamber	Joint width
	h	b	k
KSP 230	240	65	50
KSP provides space for joint movements in case of a one-sided flanging construction			

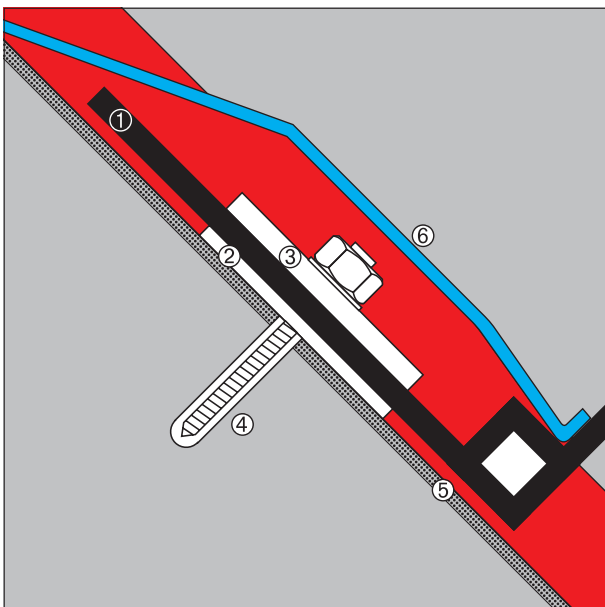


Elastomer (rubber) DIN 7865 part 2	Total width	Web thickness	Width of sealing part	Width of centre bulb	Height of anchoring ribs
	a	c	s	k	f
FM 350 KF	350	12	85	20	38

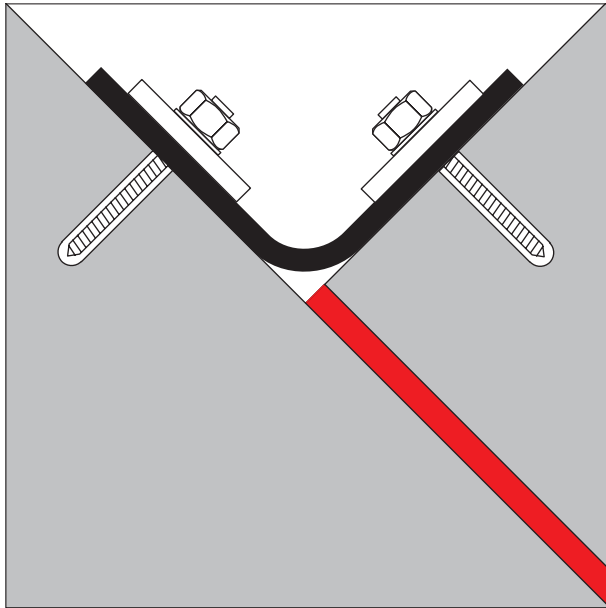


Tricomer DIN 18541 part 2	Total width	Web thickness	Width of centre bulb	Height of sealing ribs
	a	c	k	f
DA 320 KF	320	5	20	35

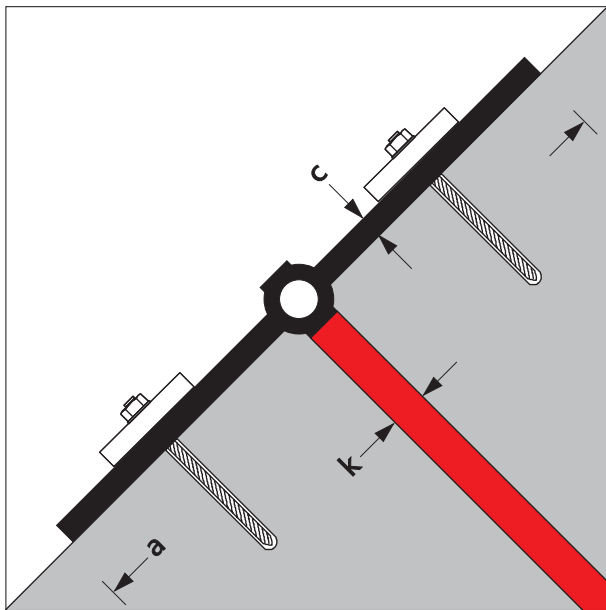
Elastomer (rubber) DIN 7865 part 2					
AM 350 KF	350	6	20	31	



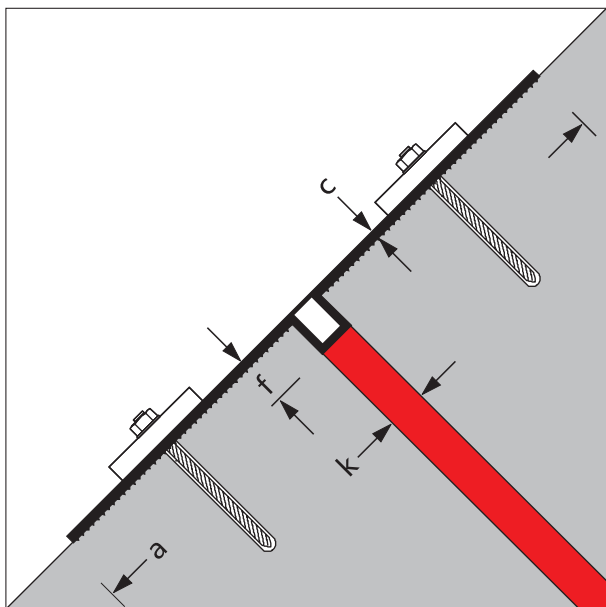
Accessories for loose flange constructions	
Basic versions, further dimensions on request	
①	Waterstop-flanging profile (s. S. 40/41)
②	Raw rubber sealing strip, Sizes in mm: 50 x 4, 80 x 4, 100 x 4, 120 x 4
③	Metal flange /galvanised or stainless steel) / V2A / V4A Sizes in mm: 40 x 6, 80 x 8, 80 x 10, 100 x 10, 100 x 12, 120 x 10, 120 x 12 Distance of holes e = 15 cm (in case of size 40 x 6 : e = 20 cm) 90° Internal and external edges in galvanized or stainless steel quality: 80 x 10, 100 x 10
④	Chemical Anchor, with Anchor bolt, Washer and Nut in galvanized or stainless steel quality M 10 x 115 for metal flange 40 x 6 M 12 x 160 for metal flange 80 x 8 M 16 x 190 for metal flange 80 x 10, 100 x 8/10/12 M 20 x 260 for metal flange 120 x 10/12
⑤	Tricosal-BETEC patching mortar for surface treatment
⑥	Protection Profile KSP 230



Tricomer DIN 18541 part 2	Total width	Web thickness	
	a	b	
FP 300*	300	5	
Elastomer (rubber)			
FPK 250	250	4	
FPK 300	300	4	
FPK 350	350	4	
FPK 400	400	4	
FPK 500	500	4	
<ul style="list-style-type: none"> • Eleastomer material, especially resistant to weathering and UV-light 			

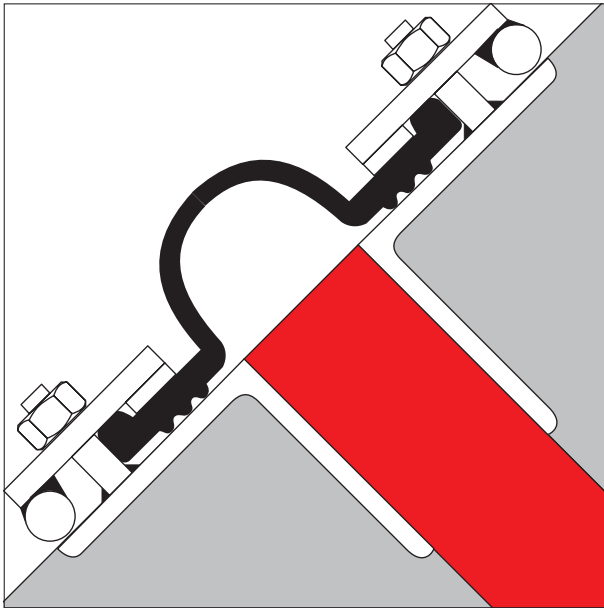


Elastomer (rubber) DIN 7865 part 2	Total width	Web thickness	Width of centre bulb	
	a	c	k	
FMG 350*	350	12	20	



Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Width of centre bulb	Height of centre bulb
	a	b	c	k	f
LF 320*	320	o. r.	5	20	25
Elastomer (rubber) DIN 7865 part 2					
AMG 350*	350	o. r.	6	25	31

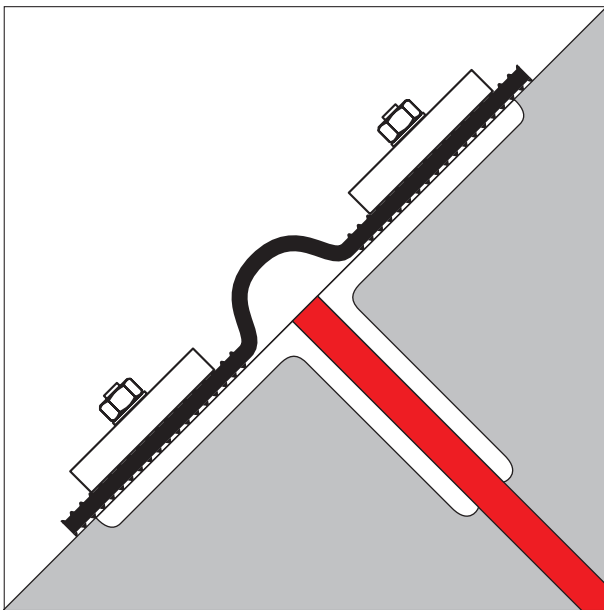
- Loose-/fixed flange constructions
- Loose flange constructions



Elastomer (rubber) Non-reinforced	Total width	Width of expansion part	Web thickness	Width of loop	Height of loop
	a	b	c	k	f
OK 24	240	130	8	96	68
OK 30	300	184	8	156	78

Elastomer (rubber) fabric reinforced					
OKB 16	160	70	8	31	42
OKB 24	240	130	8	96	68
OKB 30	300	184	8	156	78
OKB 35	350	230	9	200	100

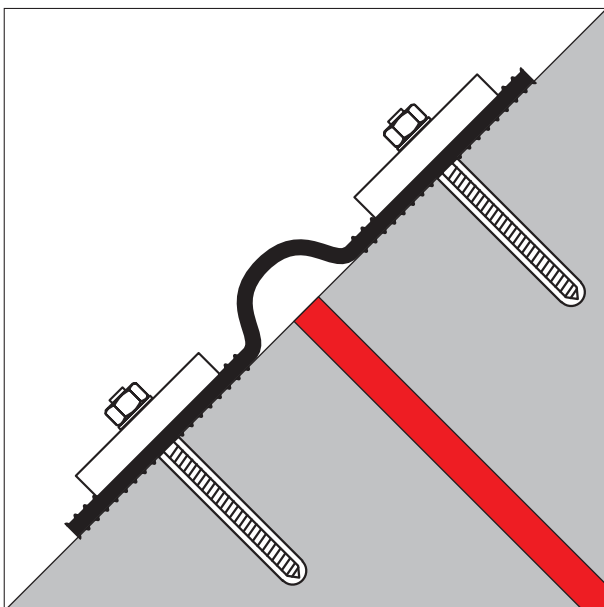
- Jointing: angle fabrications can only be factory made, butt jointing on site must be carried out by Tricosal applicators
- Fixing and installation is carried out without perforation of the profiles
- For further please contact our technical department.



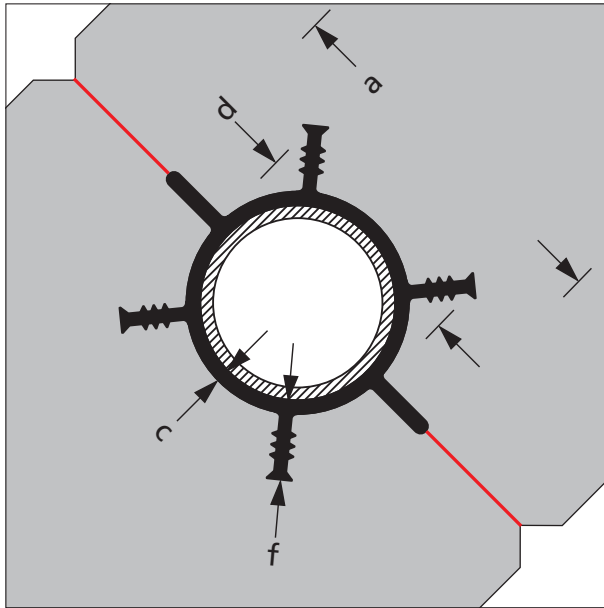
Tricomer DIN 18541 part 2	Total width	Width of expansion part	Web thickness	Width of loop	Height of loop
	a	b	c	k	f
ZW 360	360	66	7	40	60

Elastomer (rubber) Non-reinforced					
O 380	380	100	10	80	40

Elastomer (rubber) fabric reinforced					
OG 380	380	100	10	80	40



The flanging waterstop profiles ZW 360, O 380 and OG 380 can be used for both, loose flange or loose-/fixed flange constructions



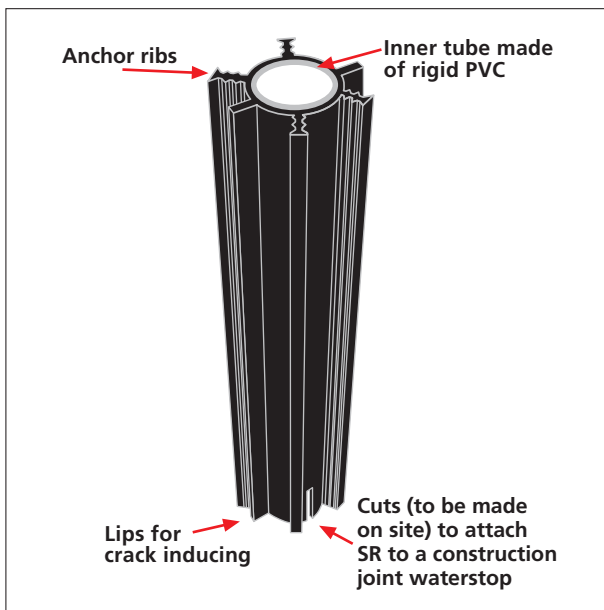
PVC-P	Total width	Diameter	Web thickness of outer tube	Height of anchoring ribs
	a	d	c	f
SR 6	110	64	4	21
SR 9	138	88	4	30
SR 18	235	175	5	35

Delivery lengths:

- Standard lengths: 3 m / 4 m / 5 m
- Special lengths: upon request

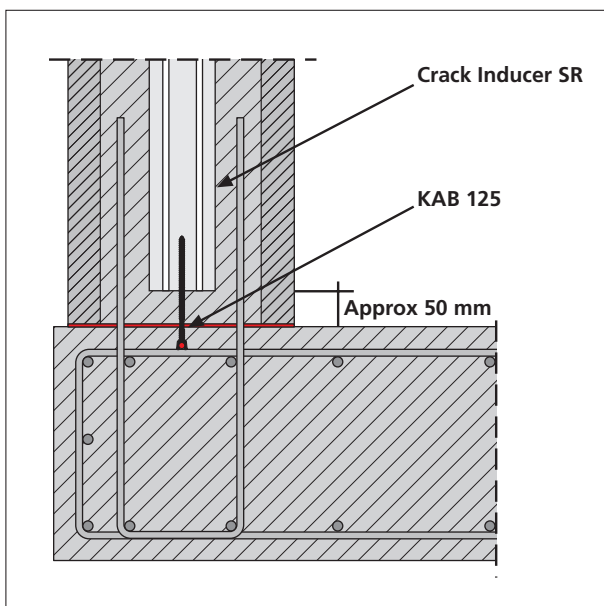
Use:

- SR 6: for Pre-Cast Double Walls (Hollow Elements) and thin walls
- SR 9: for walls up to 350 mm thickness
- SR 18: for walls from 300 to approximate 600 mm thickness



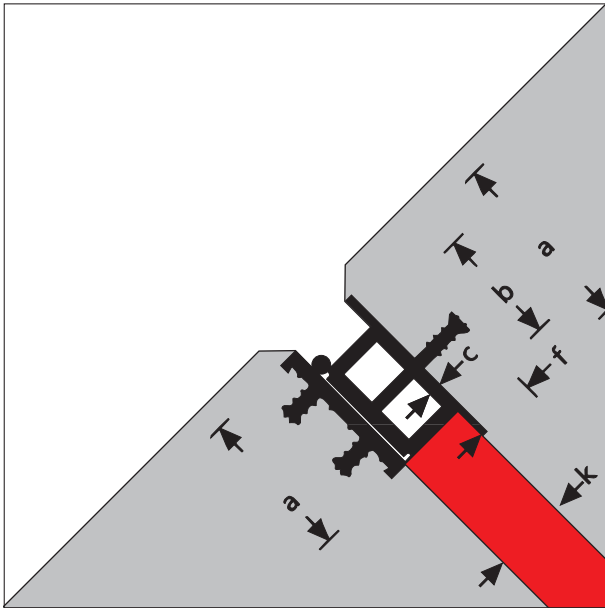
Advantages:

- Easy and safe installation
- Tested and approved waterproofing
- Controlled shrinkage cracking by reducing the cross section
- Waterproofing of the shrinkage crack by anchoring ribs of the tube
- Can be combined with KAB or FIX waterstops of the slab/wall waterproofing

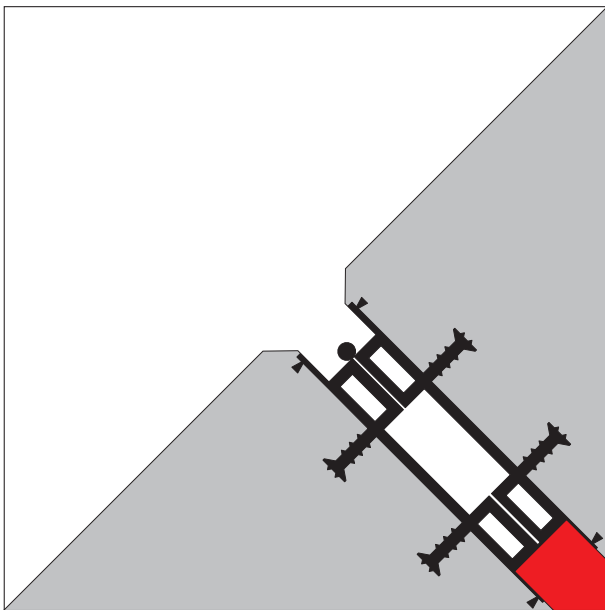


Installation Instructions

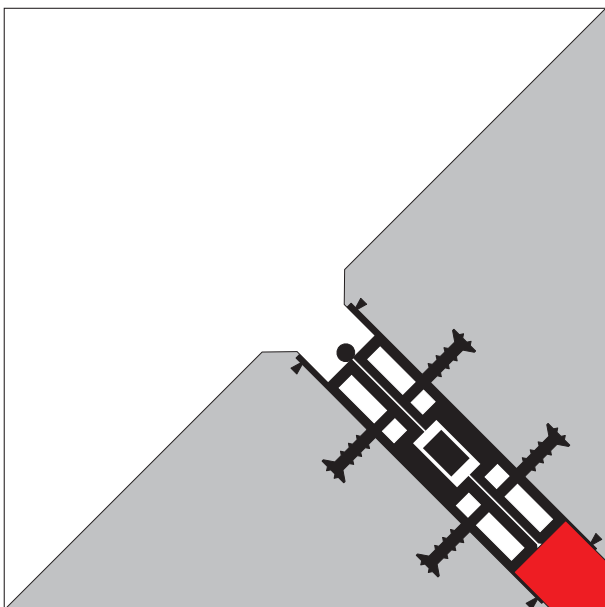
- A cut of approx. 6 cm is made in the under side of the crack inducer which is then pressed onto the Tricosal construction joint waterstop type FIX. A clearance of approx. 5 cm must be left from the slab.
- The crack inducer is supported in the upper wall by lateral timber supports fixed to the shuttering.
- The induction of cracks is controlled by triangular fillets installed on both sides of the concrete wall.
- If non-reinforced PVC waterstop is used, then a steel strip of approx. 40 cm length must be placed in the concrete behind the waterstop, opposite to the water side, to support the crack inducer.
- The internal pipe of the crack inducer can be filled during subsequent concreting. This must be done in all civil defence buildings.



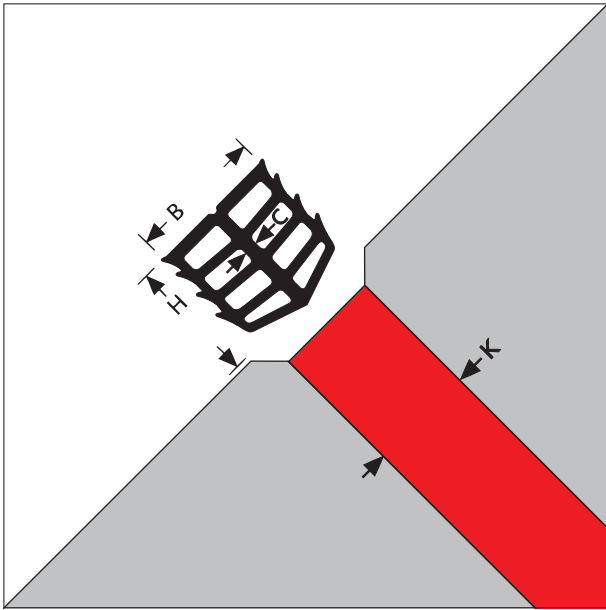
PVC-P Standard Quality	Total width	Effective width	Web thickness	Height of sealing ribs	Joint width
	a	b	c	f	k
GK 5	80	50	5	30	30
AF 6	60	50	5	20	-
Tricomer DIN 18541 part 2					
GK 50	80	50	5	30	30
AA 60	60	50	5	20	-



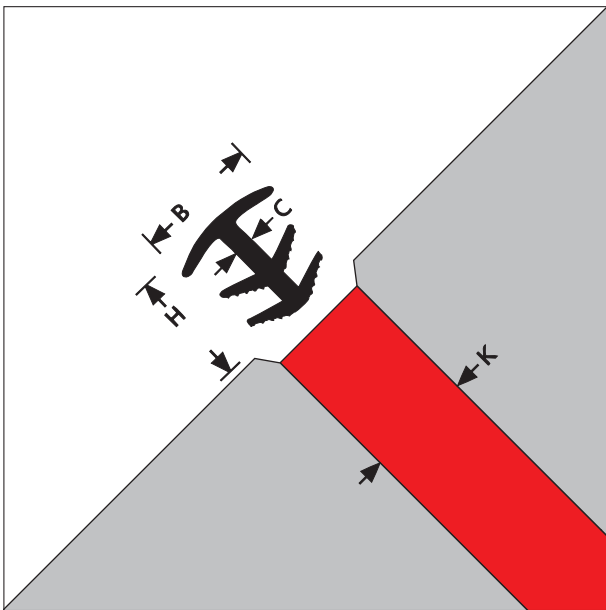
PVC-P Standard Quality	Total width	Effective width	Web thickness	Height of anchoring ribs	Joint width
	a	b	c	f	k
GK 10/3	140	100	5,5	35	30
Tricomer DIN 18541, part 2					
GK 100/3	140	100	5,5	35	30



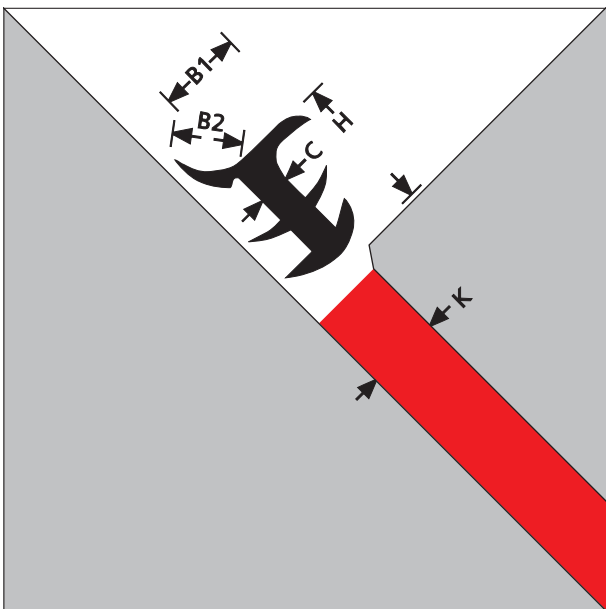
Tricomer DIN 18541, part 2	Total width	Effective width	Web thickness	Height of anchoring ribs	Joint width
	a	b	c	f	k
GK 100/3 T	140	100	5,5	35	30
In the centre of this profile system a hydrophilic rubber is placed as an additional security.					



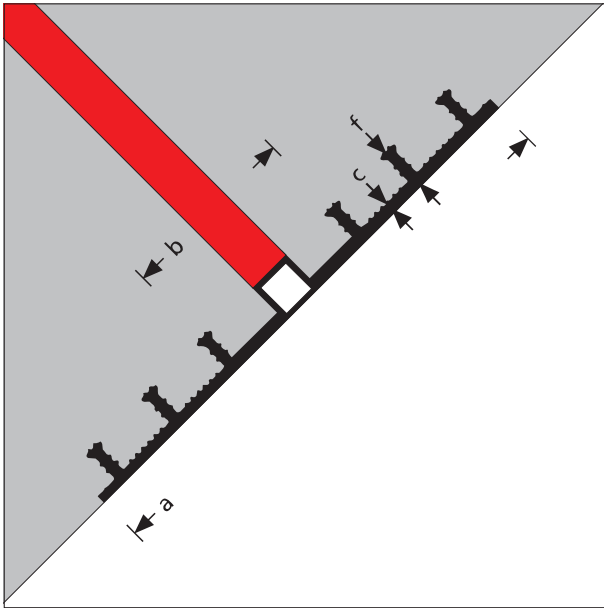
Tricomer grey DIN 18541 part 2	Joint width	Width of profile	Height of profile	Thickness
	K	B	H	C
MK 20/20	13-17	20	22	2
MK 30/30	20-25	30	30	3
MK 40/40	30-35	40	40	4
Elastomer (rubber) black				
MKN 10	8-13	15	22	6
MKN 15	13-20	25	25	3
MKN 20	20-25	31	25	3
MKN 25	25-32	37	30	3
MKN 30	30-38	43	35	3
MKN 40	37-42	52	40	3
MKN 50	43-52	62	50	4
MKN 60	50-60	75	60	4
special profiles and colours on request				



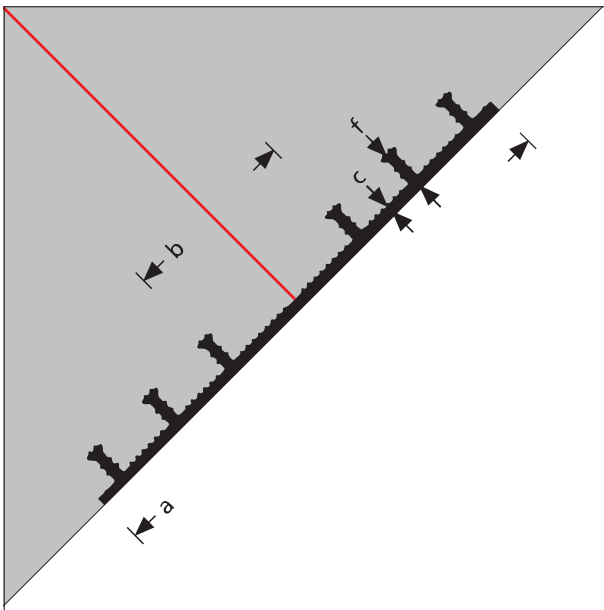
Tricomer grey DIN 18541 part 2	Joint width	Width of profile	Height of profile	Thickness
	K	B	H	C
F 15	10-13	15	35	6
F 30	13-20	30	30	4
F 35	21-25	35	35	5
F 50/40	22-35	50	45	5.5
F 66/33	20-28	66	43	14**
F 80/20*	15-20	80	50	5
* with width cover plate for overlapping joint flanges by approx. 15 mm ** multi hollow chambers, see MK types				
Elastomer (rubber) black				
FN 20	15-25	39	38	8
FN 30	25-35	55	40	16
FN 40	35-45	66	43	24
special profiles and colours on request				



Tricomer grey DIN 18541 part 2	Joint width	Width of profile	Height of profile	Thickness
	K	B1/B2	H	C
F 28/30 corner	17-23	21/23	34	5
Elastomer (rubber) black				
FN 20 Ecke	15-25	22/14	45	8
FN 30 Ecke	25-35	24/24	53	16
FN 40 Ecke	35-45	35/20	43	24
special profiles and colours on request				



PE modified	Total width	Width of expansion part	Web thickness	Anchoring ribs	
				Height	Number
	a	b	c	f	n
Expansion joint waterstops					
PE 240/25	240	110	4	30	4
PE 320/25	330	110	4	30	6



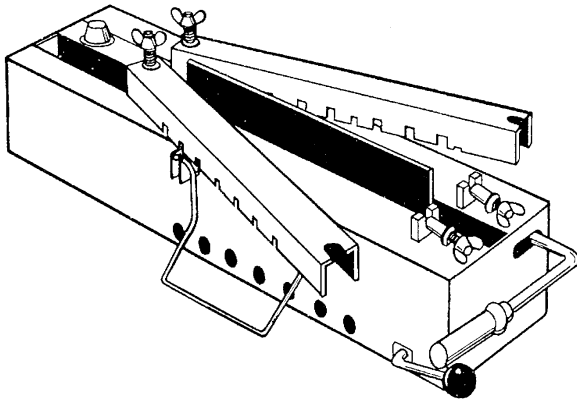
PE modified	Total width	Width of expansion part	Web thickness	Anchoring ribs	
				Height	Number
	a	b	c	f	n
Construction joint waterstops					
PEA 240/25	240	110	4	30	4
PEA 320/25	330	110	4	30	6

Material
Supply
Special properties
Jointing at site
Physical properties

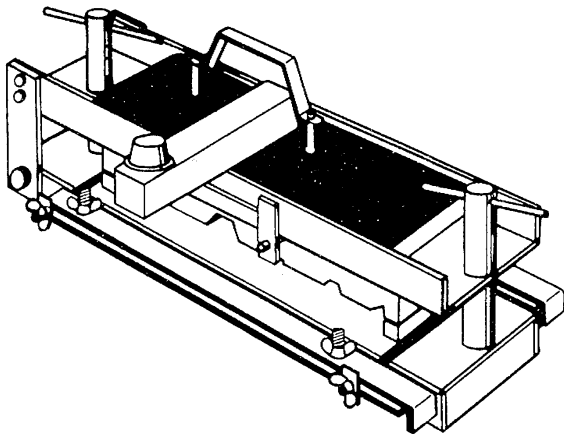
Thermoplastic PE- Copolymer, plasticised, which especially has been developed for the waterproofing of structures.

- black colour
- 20 m rolls; 5 m bars
- 100% recyclable
- excellent chemical resistance (equivalent with thermoplastic oleofines - LDPE)
- good behaviour at low temperatures
- high diffusion resistance
- jointing only with semi-automatic Tricosal welding machines
- jointing straight lengths of same profile type
- only butt joints can be made on site
- Tensile Strength > 14 N/mm²
- Elongation at break > 650%
- Shore hardness A 90

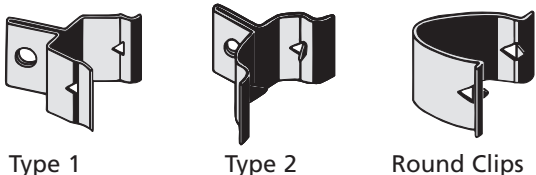
TC-Welding-Boy (semi-automatic)



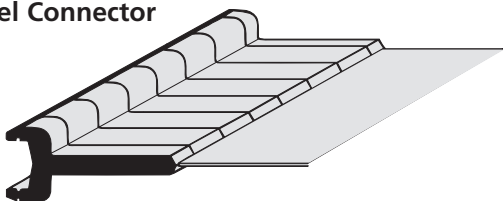
Vulcanizing Unit



Waterstop Clips



Steel Connector



PVC-P/Tricomer

Welding Equipment

Semi-automatic Welding Equipment with clamping moulds, dependant on equipment and profiles. Available on rental basis against rental fees and deposit payment.

Tools for hand welding:

Axe-shaped welding tool	200 W/250 W/300 W
Welding Tip	50 W
Welding Tongue	125 W
Hot Air Blower	

- Round Nozzle, short
- Round Nozzle, long
- Flat Nozzle
- Quick Welding Nozzle, round

Test equipment

Spark Tester for testing the welded joint

Welding Accessories:

Welding Foil
Welding Strip

Tools:

Special Knife
Special Tongs for waterstop clips

Accessoires for Installation:

Waterstop Clip Type 1
Waterstop Round Clip
Fixing Hanger for FIX-waterstops

Elastomer (rubber)

Vulcanizing Equipment:

with moulds, dependant on equipment and profiles. Available on rental basis against rental fees and deposit payment.

Note: vulcanizing units for capping joints are not available for rent! Site jointing only by Tricosal's technicians.

Vulcanizing Accessories:

Vulcanizing Solvent
Adhesion Foil
Strip Type 0
Strip Type 1
Bonding Agent for steel/rubber connections, including primer
Talcum
Plug

Tools:

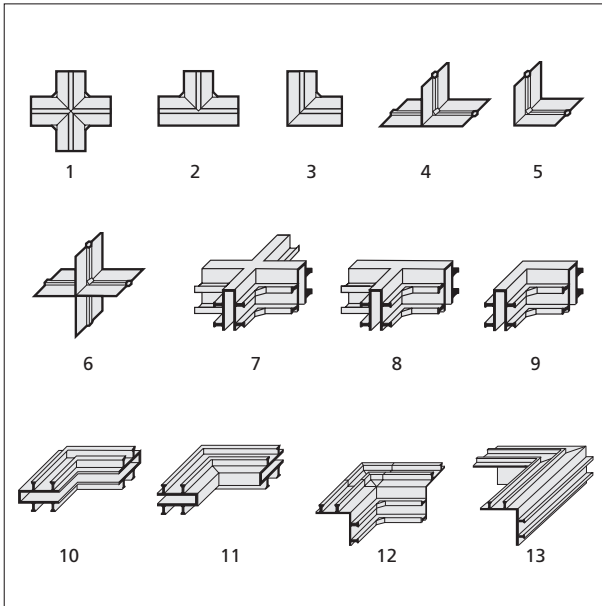
Special Knife
Roller
Round Wire Brush
Taping Rod
Grinder

Accessories:

Waterstop Clip Type 2
Steel Connector

Flanging Constructions

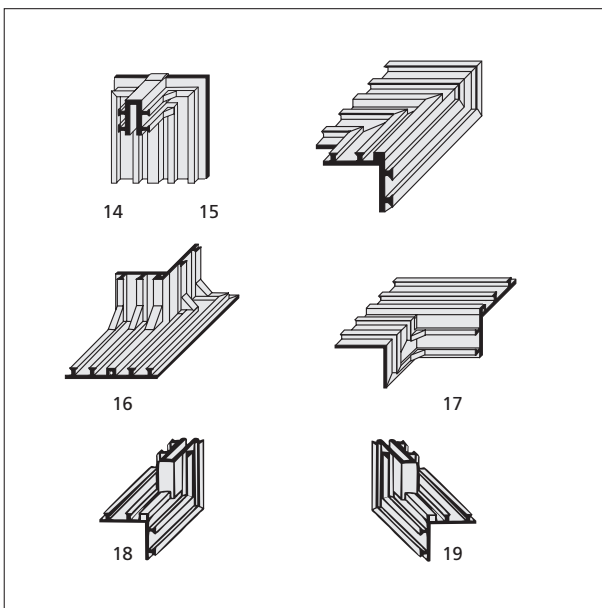
see page 17



Standard Junctions

PVC-P	Available Types: 1-13
Tricomer	Available Types: 1-13
Elastomer	Available Types: 1-11 Symmetric corner, type 12 - on request Angle corner, type 13 - on request
PE	Available Types: 1, 2, 3, 5

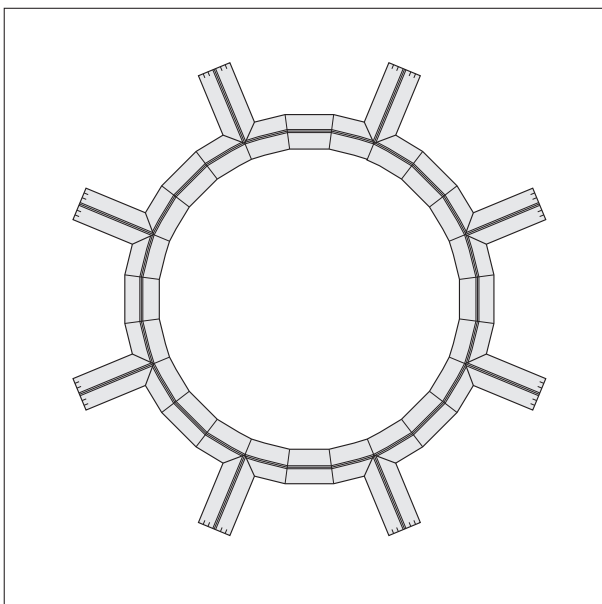
- | | |
|---------------------|--|
| 1. flat cross | 9. vertical edge |
| 2. flat T | 10. flat edge,
cover plate external |
| 3. flat edge | 11. flat edge,
cover plate internal |
| 4. vertical T | 12. symmetric corner |
| 5. vertical edge | 13. angle corner |
| 6/7. vertical cross | |
| 8. vertical T | |



Composite Junctions

PVC-P	Available Types: 14 – 19
Tricomer	Available Types: 14 – 19
Elastomer	on request
PE	–

The types shown (14 – 19) are only a selection of the possible composite types.



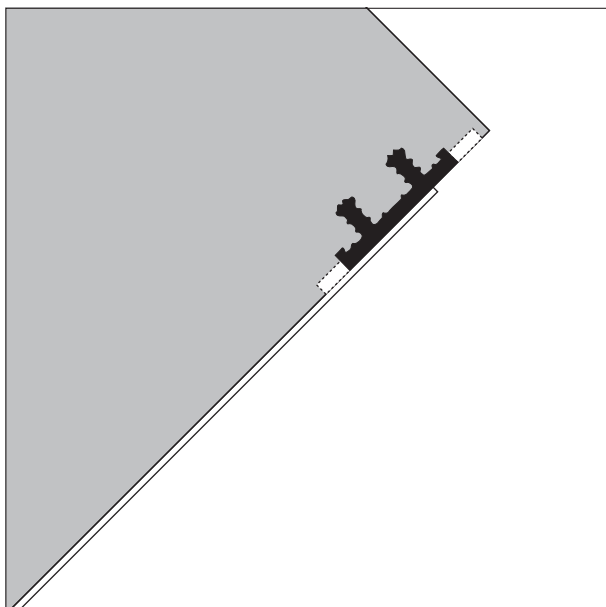
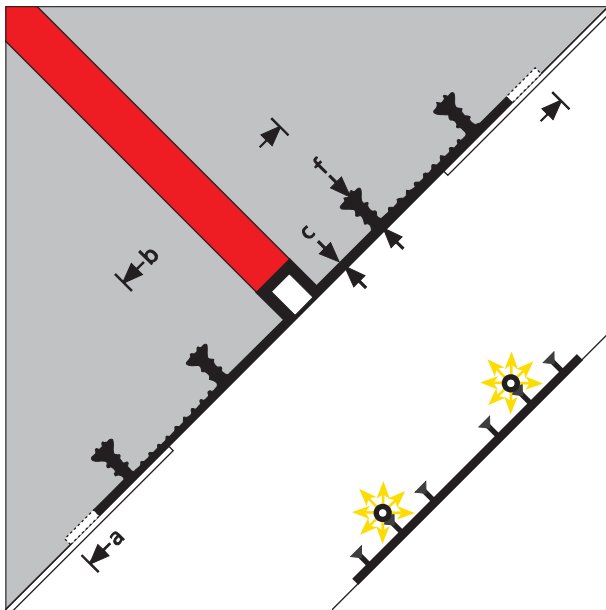
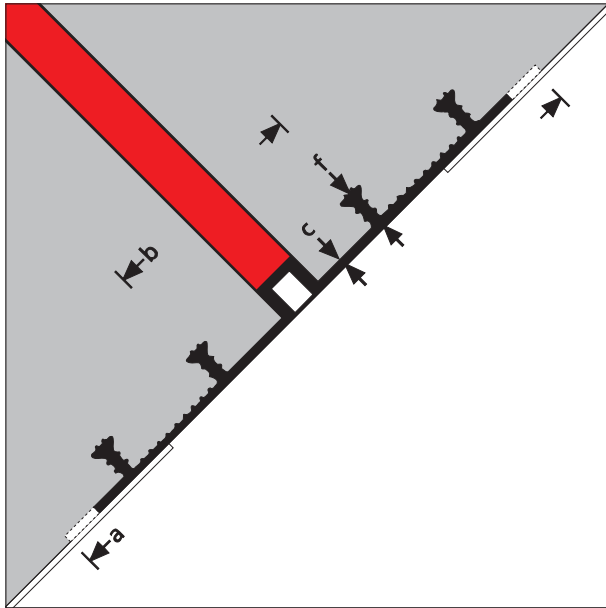
Waterstop Systems

One of our special services is the manufacture of waterstop systems, combining several numbers or types of junctions according to site requirements.

They are pre-fabricated to such a degree that only a few butt welds are necessary on site. The total length of a system should not be more than 10-20 m, depending on the type of profile.

Please contact us regarding the special terms and conditions for junctions and systems.

The sample shown is a polygon with connectors.



Tricosal	Total width	width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	n
DF 240/25 . .	240	110	4	30	4
DF 300/25 . . *	310	110	4	30	4
DF 320/25 . .	330	110	4	30	6
DF 400/25 . . *	400	110	4	30	6

When ordering please specify the profile type and material type required (e.g. PE for polyethylene)

* with lateral welding flanges 55 mm wide

Tricosal Profiles	Total width	width of expansion part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	n
For expansion joints					
DF 240/25	240	110	4	30	4
DF 300/25 *	310	110	4	30	4
DF 320/25	330	110	4	30	6
DF 400/25 *	400	110	4	30	6

For construction joints					
AF 240/25	240	110	4	30	4
AF 300/25 *	310	110	4	30	4
AF 320/25	330	110	4	30	6
AF 400/25 *	400	110	4	30	6

For construction joints with integrated injection channel					
AFI 600	600	270	4	35	6

When ordering please specify the profile type and material type required (e.g. PE for polyethylene)

* with lateral welding flanges 55 mm wide

Tricosal Profiles	Total width	Width of expansion part or Width of joint cover part	Web thickness	Sealing ribs	
				Height	Number
	a	b	c	f	n

with lateral welding flanges 55 mm wide

AF 60/15	60	–	4	20	2
AF 80/25	85	–	4	30	2
AF 155/25	155	–	4	30	2
AF 140/25	140	–	4	30	3
AF 200/25	200	–	4	30	3

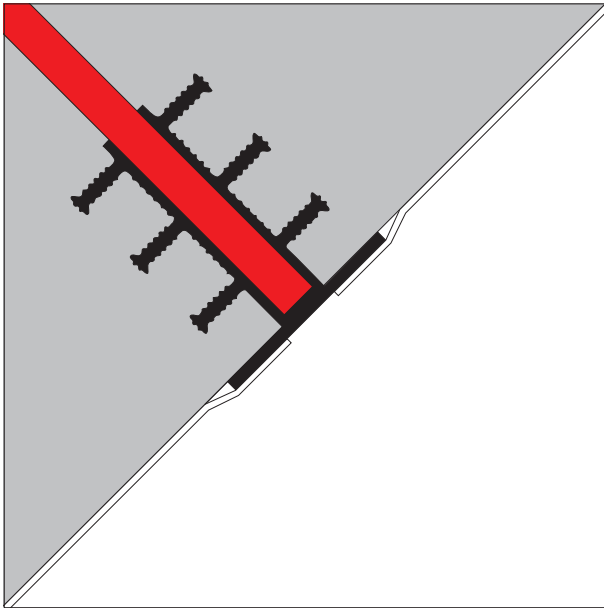
with extra wide welding flange

AF 320 / MOD	330	–	4	35	3
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capping joint profile with welding flange

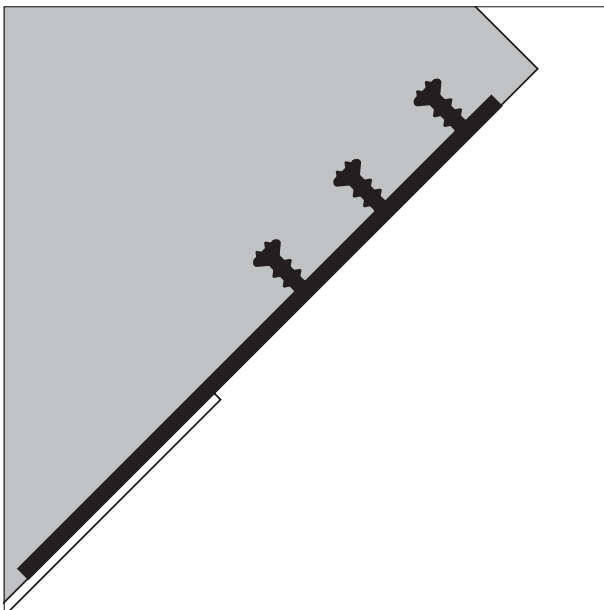
FF 14/3-10	140	100	6	25	6
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When ordering please specify the profile type and material type required (e.g. PE for polyethylene)



Tricosal	Total width	Width of joint cover part	Web thickness	Joint width	Anorching ribs	
					Height	Number
	a	b	c	k	f	n
FF 14/3-10 . .	140	100	6	20	25	6

When ordering please specify the profile type and material type required (see below).



Tricosal	Total width	Web thickness	Anchoring ribs	
			Height	Number
	a	c	f	n
AF 320 MOD/ . .	330	4	35	3

When ordering please specify the profile type and material type required (see below).

To ensure a homogeneous and durable welding of the membrane fixing profile with the waterproofing membrane, the material of the profiles has to be adjusted to the membrane.

The technique of jointing profiles with each other and with the membrane has to be specified in dependence of the material properties. In each case, please consult the technical department of Tricosal GmbH.

The membrane fixing profiles described and shown above cannot be manufactured from each raw material (PVC-P or PE), due to specific material properties. In each case a verification and adjustment with the waterproofing membrane is required.

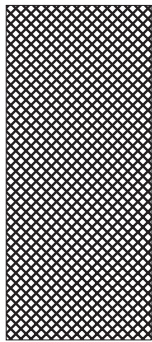
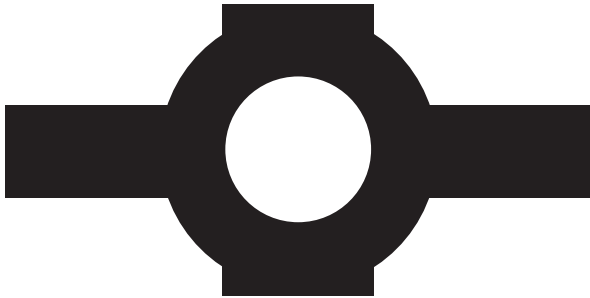
The following materials are available to match with the waterproofing membrane.

Supplement to the nomenclature of the profiles:

- PVC-P/NB
- PVC-P/BV
- PVC-P/TU translucent
- PE (polyethylen modified)

NB
BV
TU
PE

The dimensions shown in the tables refer to profiles made of PE. In case of other raw materials variations are possible.



Save buildings due to

- joints resisting fire
- waterstops protected from excessive temperatures

Expansion joints in constructions using waterstops must retain their function even after a fire and thus its spreading, but it is also essential to limit the temperature strain of the waterstop. Only this will guarantee that the waterstop, and thus the joint, will retain its function during and after the fire. The Tricosal® Fire Resisting System for Construction Joints offers this kind of protection.

The Tricosal® Brand-Ex-Profiles consist of foamed material free from asbestos and fibres, containing a specially developed ceramic impregnating agent will react in two stages.

- Security stage 1
The flexible seal is self-consistently turned into a ceramically compacted joint seal by the heat.
- Security stage 2
The joint is filled by expanding ingredients to prevent any unacceptable rise in temperature of the waterstop as well as burning through of the fire.

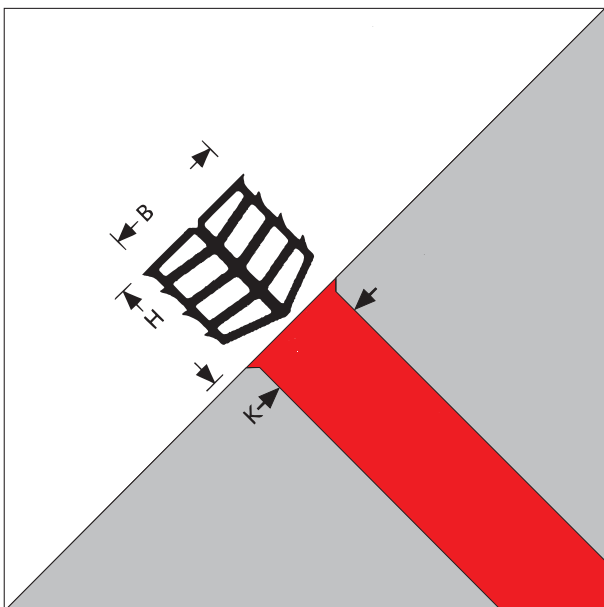
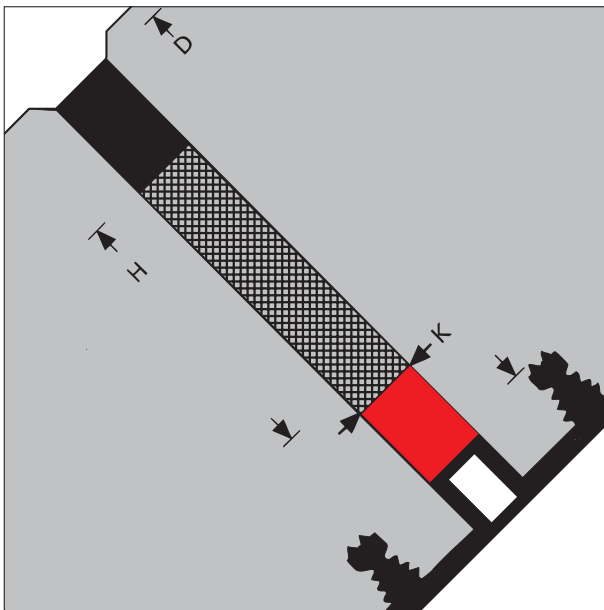
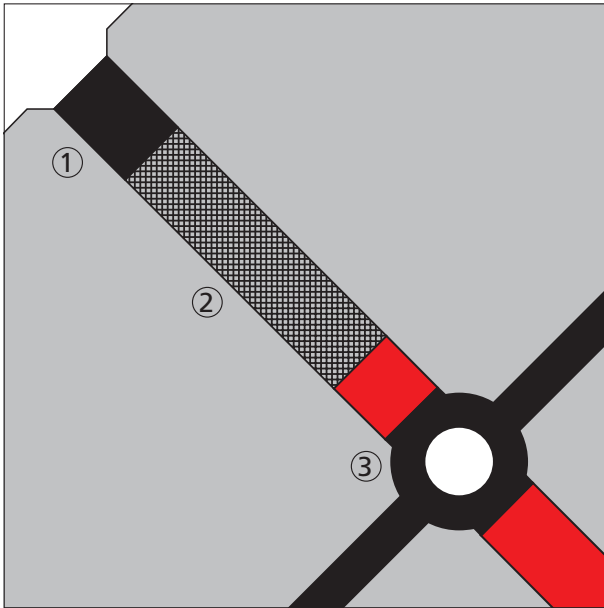
The components offered can be used in any of the following combinations:

- To protect the joint and the waterstop:
 - Brand-Ex-Profile without additional sealing of the joint
 - Brand-Ex-Profile with pre-compressed waterstops as external seal.
- As hardly inflammable seal of the joint:
 - MKB-Inset Profiles (self-extinguishing type)

A seal of the joint should be provided to protect the Brand-Ex-Profiles from mechanical damage. Should the construction be exposed to weathering or, e.g., be affected by thawing-salt smog, this additional sealing of the joint must be used.

Preferred applications:

- tunnels
- underground parking
- industrial constructions
- administrative buildings, hospitals
- pre-assembled constructions (also without waterstops)



Brand-Ex Profiles	Width of joint	maximum temp. in °K	Total height	Distance in mm	
				Tricomer	Elastomer
	K	T	H	D	D
TFB 90/20	16-23	60°	100	200	150
TFB 180/20	16-23	60°	150	250	200

- ① waterstop tape FB 20
- ② Brand-Ex-Profil "TFB"
- ③ waterstop

*In case of a fire, maximum rise in temperature at the waterstop for a fixed period of time

Technical Data

delivery unit: TFB 90/20: 3 rolls of 4 m each in one carton
TFB 180/20: 2 rolls of 4 m each in one carton

colour: concrete grey

weight: TFB 90/20: 0,75 kg/m
TFB 180/20 1,20 kg/m

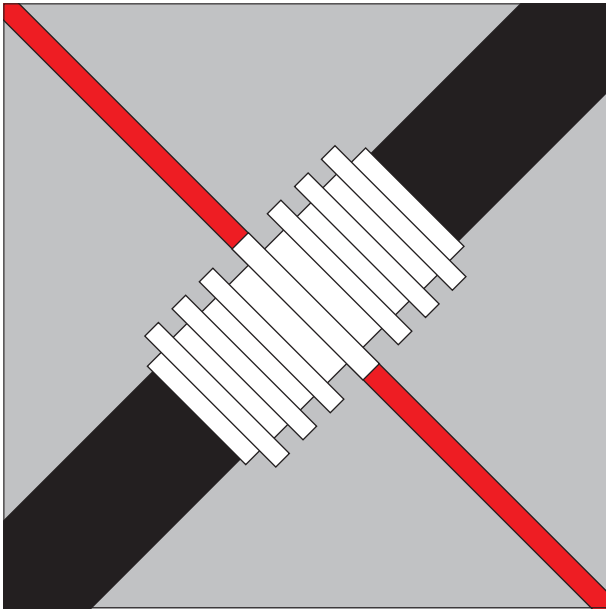
Brand-Ex-Profiles are only made to order and can be stored for 6 months.

The following details are required when ordering:

- duration of protection: 90 min. (F 90)
180 min. (F 180)
- width of joint: minimum and maximum values due to movements of the building (e.g., 16 to 23 mm)

Further information and notes for use can be taken from the Tricosal leaflet "Waterproofing Manual".

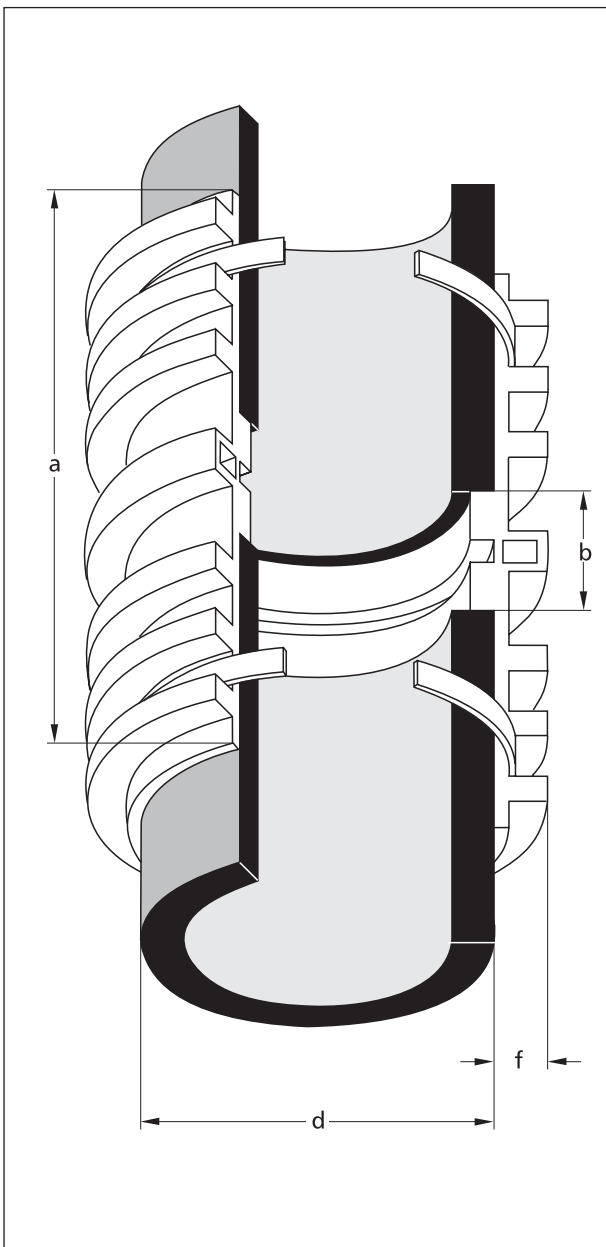
Profiles for Sealing Joints	width of joint	width of profile	height of profile	delivery unit
	K	B	H	
FB 20	20	17	30	7 rolls of 4 m each in one carton
<ul style="list-style-type: none"> • dark grey • watertight under heavy rain in accordance with German Industrial Standard (DIN) 18055 • pre-compressed waterstop tape 				
MKB 20	20	30	28	rolls of 20 m each
<ul style="list-style-type: none"> • black • permanently elastic • resistant to UV and weather 				



MARO pipe collar		Inner-Ø in mm up to ...*	Width of collar in mm	Height of sealing ribs in mm	Distance of pipes (Ex- pansion and spacing parts)
		d	a	f	b
MARO	200	299	330	20	75
MARO	300	399	330	35	75
MARO	400	499	330	35	75
MARO	500	599	330	35	75
MARO	600	699	330	35	75
MARO	700	799	500	35	75
MARO	800	899	500	35	75
MARO	900	999	500	35	75
MARO	1000	1099	500	35	75

Further dimensions on request

* The inner-Ø of the collar is selected in dependence of the outer diameter of the pipes



Function

Waterproofing by anchoring ribs (labyrinth system), accommodation of movements by an expansion part.

The collar is manufactured to size of a given pipe outer diameter and fixed with tightening steel straps.

The anchoring ribs are embedded into concrete and provide a waterproofing effect, like externally placed waterstops. In the area of the expansion joint the pipes are interrupted; the joint is bridged with the expansion part and the spacers. Different movements of adjacent structural members are accommodated by the expansion part of the collar.

Components/Packing

Pipe collar made of Tricomer BV-quality, DIN 18541, complete with 2 (two) stainless-steel straps

Note: The polystyrene protective packing between the ribs is for transportation only and has to be removed prior to the installation.

**Information/
Use**

All details contained in this leaflet are product descriptions. They are general recommendations based on extensive research and practical experience but do not consider the actual application work. No indemnity may be claimed from the information given.

Technical Changes

If necessary, please contact our technical department for more information. If required for specific applications, additional tests can be carried out in our laboratory to supplement the standard tests and the normal material compatibility information.

**Recommendations for use/
Technical Information**

We reserve the right to alter either the form of the profiles or the material properties in case of new technical developments.

Dimensions

The information and recommendations in our "Waterproofing Manual", leaflets and quotations have to be considered.

Drawings

The standard dimensions shown in the tables are quoted in mm, unless no other information is given.

Copyright

The drawings shown are schematic and may differ from the actual installation on site. The waterstop drawings shown are examples for the profiles listed in the right hand columns.

Edition

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March 1999

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