



## VML Specifier's Manual

Compound pipe system

for drainage pipelines with thermal insulation,  
protected from condensed water and from frost

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# APPLICATION, CHARACTERISTICS

## VML Compound Pipe System

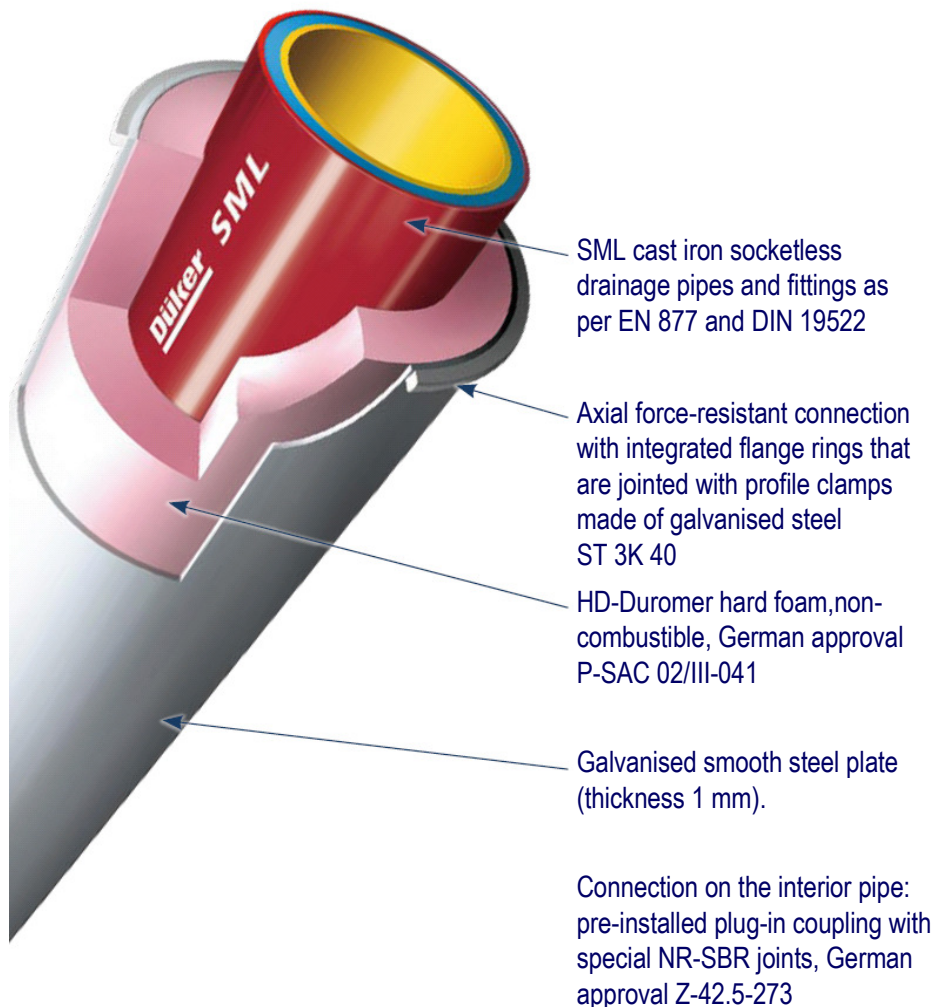
VML is a double-walled compound pipe system for drainage pipelines which have to be protected from cold, condensation or frost. For frost protection, VML pipes are delivered with additional integrated heating.

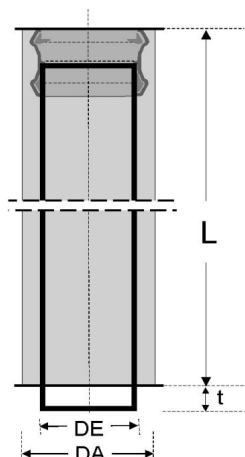
The system fulfils all requirements of EN 12056-1 (chapter 5.6.5), which says that rain water pipelines within buildings must be installed with protection from water condensation.

## Advantages and Areas of Application

- excellent thermal insulation due to the HD-Duromer hard foam
- condensed water insulation intended for normal ambient temperature of 25°C and relative humidity of < 70%
- protection for pipelines with danger of frost when using the pre-installed accompanying heating below the insulation foam (special execution)
- protection from mechanical influences, important for accessible insulated pipelines, e.g. in sports facilities or warehouses
- the connection with flange rings and profile clamps guarantees axial force resistance, e.g. within a flat roof siphonic drainage system.
- secure and aesthetic covering for accessible pipelines
- additional noise insulation
- for VML pipelines that are exposed to weather influences, VML pipes and fittings must be coated with a coating system that complies with the corrosion protection requirements.

## Pipe Composition





VML -Pipes and Fittings (EN 877 and 19 522)						
Nominal diameter DN	Exterior diameter interior pipe			t	Average weight of pipes and fittings kg/m	
	DE	tolerance	DA		empty	full
50	58	+2/-1	100	29	7,6	9,7
80	83	+2/-1	125	32	12,1	16,6
100	110	+2/-1	150	41	14,6	23,9
125	135	+2/-2	180	50	17,9	30,6
150	160	+2/-2	200	50	21,0	39,2
200	210	+2,5/-2,5	250	55	34,0	65,5

Larger pipe dimensions as special version on request

All dimensions in mm

### Pipes

VML -pipe			
L= 3000mm			
DN	kg	item no.	
50	18,5	235829	
80	25,9	235830	
100	33,5	235206	
125	45,1	235764	
150	52,5	235763	
200	98,3	236217	

### Pipes with integrated heating

VML -pipe			
L= 3000mm			
DN	kg	item no.	
50	18,8	236218	
80	26,2	236219	
100	33,8	235751	
125	45,4	236221	
150	52,8	235587	
200	98,6	236222	

### Pipes with integrated heating

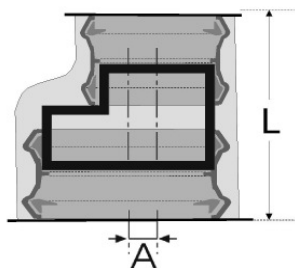
VML -pipe			
L= 2000mm			
DN	kg	item no.	
50	12,9	236223	
80	18,3	236224	
100	23,0	235753	
125	31,0	236225	
150	35,5	236226	
200	66,4	236227	

### Pipes with integrated heating

VML -pipe			
L= 1000mm			
DN	kg	item no.	
50	7,0	236228	
80	10,4	236229	
100	12,2	235754	
125	16,6	236231	
150	18,2	236232	
200	34,0	236233	

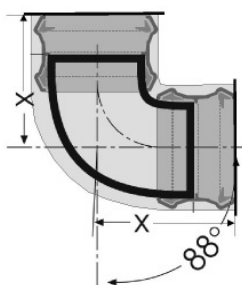
Shorter pipe cuttings than 1000mm and fittings can normally be executed without heating.

### Reducers



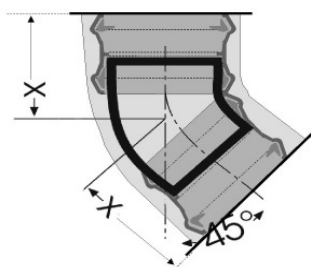
VML -reducer				
DN	A	L	kg	item no.
80x50	10,0	140	1,8	235835
100x50	26,0	155	2,0	236269
100x80	16,0	164	2,6	235836
125x50	38,5	169	2,7	236271
125x80	28,5	178	3,3	236272
125x100	12,5	192	3,1	235876
150x50	51,0	179	3,4	236273
150x80	41,0	188	4,2	236274
150x100	25,0	202	4,0	235837
150x125	12,5	216	4,2	235900
200x100	50,0	220	7,1	236275
200x125	37,5	235	7,5	236276
200x150	25,0	240	7,8	236277

### Bends 88°



VML -bend				
DN	X	kg	item no.	
50	106	1,8	235831	
80	125	3,2	235833	
100	154	4,0	235522	
125	178	5,6	235992	
150	198	7,7	236203	

### Bends 45°

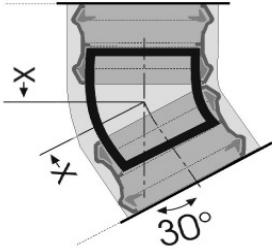


VML -bend				
DN	X	kg	item no.	
50	81	1,6	235832	
80	95	2,8	235834	
100	114	3,2	235200	
125	133	4,4	235772	
150	143	5,9	235765	
200	168	10,5	236257	

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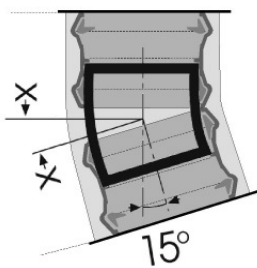
## VML RANGE OF PRODUCTS

## Bends 30°



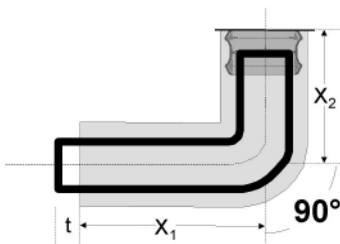
VML -bend			
DN	X	kg	item no.
50	76	1,5	236238
80	85	2,6	236256
100	104	2,9	235201
125	123	4,8	235771
150	133	5,3	236239
200	153	9,1	236241

## Bends 15°



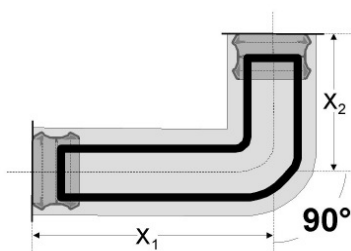
VML -bend			
DN	X	kg	item no.
50	71	1,4	236234
80	80	2,3	236235
100	94	2,6	235202
125	113	3,7	235770
150	118	4,8	236236
200	138	8,3	236237

Bends 90°  
with long spigot  
socket and spigot end



VML -bend					
DN	X1	X2	t	kg	item no.
50	141	141	59	2,8	236294

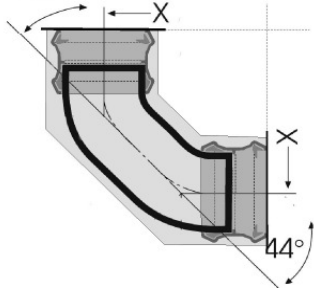
Bends 90°  
with long spigot  
two sockets



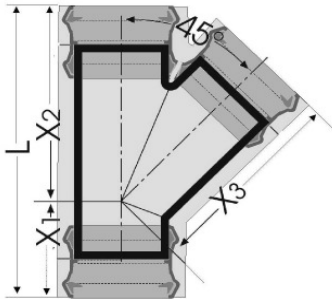
VML -bend				
DN	X1	X2	kg	item no.
50	231	141	2,9	236295

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## VML RANGE OF PRODUCTS

**Double Bends 88°**  
44°

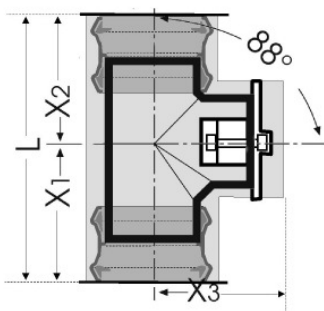
VML -double bend			
DN	X	kg	item no.
50	156	2,3	236296
80	182	4,3	236297
100	220	5,7	235865
125	253	8,3	236298
150	277	11,2	236299

**Branches 45°**

VML -branch						
DN	X1	X2	X3	L	kg	item no.
50x50	81	166	166	247	2,8	236258
80x50	75	185	181	258	3,9	235839
80x80	90	195	195	283	4,6	235838
100x50	79	209	196	288	4,4	236259
100x80	94	229	220	323	5,8	236261
100x100	114	249	249	363	6,7	235412
125x50	73	238	216	311	6,1	236262
125x80	93	253	235	346	7,5	236263
125x100	113	273	264	386	8,5	235875
125x125	133	313	293	446	10,0	235899
150x80	83	268	250	351	8,8	235767
150x100	108	293	284	401	10,3	235898
150x125	123	308	308	431	12,0	235769
150x150	143	318	318	461	13,8	236264
200x80	73	293	278	366	14,1	236265
200x100	98	318	305	416	15,5	236266
200x125	113	338	335	451	17,5	236267
200x150	133	358	355	492	21,4	236268

**Inspection pipes**

with round opening, 88°

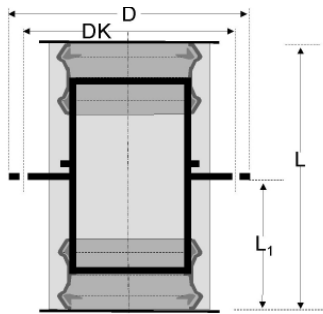


VML -inspection pipe						
DN	X1	X2	X3	L	kg	item no.
50	110	97	121	207	3,2	236285
80	131	117	129	248	5,6	236286
100	158	148	158	306	7,5	235525
125	190	176	188	366	11,4	235901
150	211	195	208	406	15,9	235766
200	245	235	225	480	17,5	236288

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## VML RANGE OF PRODUCTS

## Down pipe supports



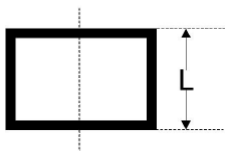
VML -down pipe support						
DN	D	DK	L	L1	kg	item no.
50	195	148	262	99	2,7	236289
80	215	166	268	102	3,5	236291
100	250	202	289	113	4,0	235203
125	275	225	306	121	5,2	236292
150	300	252	306	121	6,5	235588
200	360	310	318	123	13,4	236293

## Plugs



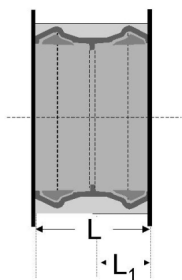
VML -plug				
DN	L	kg	item no.	
50	50	0,4	236278	
80	50	0,7	236279	
100	50	0,8	236281	
125	50	1,4	236282	
150	50	2,1	236283	
200	50	2,9	236284	

## Connection pipes



VML -connection pipe				
DN	L	kg	item no.	
50	58	0,3	235840	
80	64	0,5	235843	
100	82	0,7	235204	
125	100	1,2	236301	
150	100	1,4	235589	
200	110	3,0	236302	

## Socket connectors



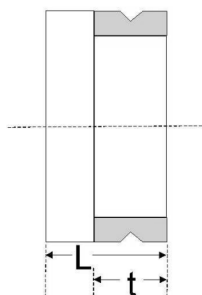
VML -socket connector					
DN	L	L1	kg	item no.	
50	60	29	0,7	236303	
80	66,5	32	0,9	236304	
100	85	41	1,0	235391	
125	103	50	1,2	235858	
150	103	50	1,4	235591	
200	113	55	1,9	236305	

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## VML RANGE OF PRODUCTS

**Flange rings**

with Duromer rigid foam insert



VML -flange ring				
DN	L	t	kg	item no.
50	70	45	0,3	236306
80	70	45	0,4	236307
100	70	45	0,5	235388
125	70	45	0,6	235857
150	70	45	0,7	235590
200	70	45	1,0	236308

**Profile clamps**

VML -profile clamp			
DN		kg	item no.
50		0,06	235842
80		0,08	235845
100		0,09	235210
125		0,10	235808
150		0,12	235592
200		0,20	236309

### Preparations

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- remove any dirt from the sealing ring
- clean VML connection pipes and spigot ends of VML pipes
- apply lubricant admissible for elastomeric seals to the pipe spigots (solutions of soap or dish washing liquid, but no oils or grease)

### Connecting pipes

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1. Set the spigot end of the VML pipe onto the plug-in socket and push into the connection, slightly turning, up to the stop.



2. Align VML pipes, bend open the profile clamp and lay it around the two closely touching flange rings.



3. Tighten the VML profile clamp.

### Connecting fittings

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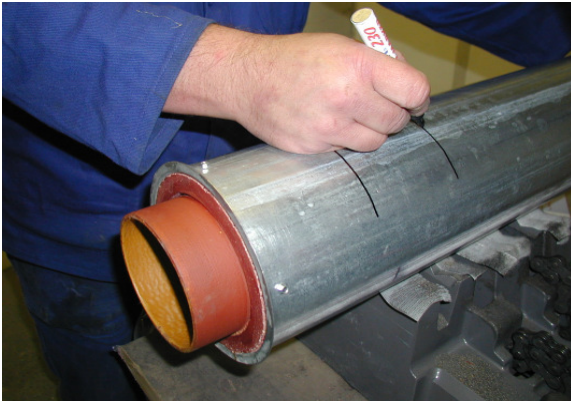
1. Push VML connection pipe into the push-in socket



2. Push on VML fitting and joint with profile clamp as per points 2 and 3 above.

### Shortening pipe lengths

VML pipes are delivered in standard lengths of 3 m. The required pipe lengths can be obtained on site with a pipe cutting machine or belt saw. The first step is to cut the VML pipe to the exact length and to remove the insulation from the spigot.

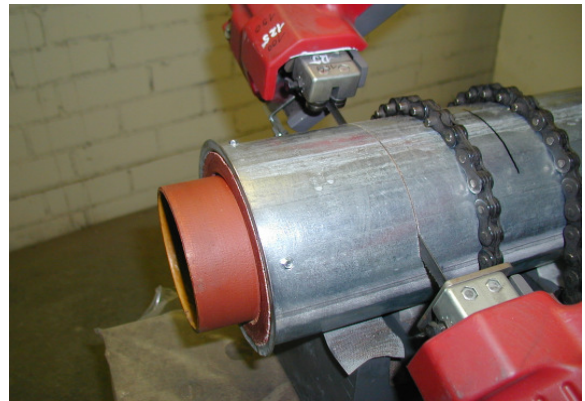


#### 1. Mark cutting positions.

Cut I: measure of complete required pipe length

Cut II: length of insulation removal as follows:

DN 50	74 mm
DN 80	77 mm
DN 100	86 mm
DN 125	95 mm
DN 150	95 mm
DN 200	100 mm



#### 2. Cut pipe at the required length (cut I).



#### 3. Cut steel pipe cover and insulation (cut III).

Maximum cutting depth 10 mm!!



#### 4. Remove steel plate cover and insulation.

### Inserting flange rings on cut pipes



1. Clean the VML pipe spigot.



2. Push in VML flange ring with HD-Duromer hard foam insert between interior and exterior pipe.



3. Beat in the VML flange ring uniformly using a wooden board, and align it in 90° angle to the pipe axis. The spigot end of the pipe must have the following length:

DN 50	29 mm
DN 80	32 mm
DN 100	41 mm
DN 125	50 mm
DN 150	50 mm
DN 200	55 mm



4. Fix VML flange ring with self-cutting screws  
Ø 4 mm, max. length 10 mm.

DN 50-80	min. 4 screws
DN 100-150	min. 6 screws
DN 200	min. 8 screws

### Basic rules

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- Fixings are to be placed in regular intervals between the connections, the distance before and after each profile clamp being no more than 0.25 m.
- For pipe lengths up to 0.75 m, one fixing in the middle of the pipe is sufficient.
- Horizontal pipelines must be fixed sufficiently at all changes of direction and branches. Pipelines fixed on pendulum clamps must be secured against any movement every 10 or 15 m with special fixed points.
- Down pipes are to be fixed in a maximum interval of 2.5 m. Every pipe length is to be fixed no more than 2.5 m below and above the profile clamp.

### Recommendations on heating

---

If drainage pipe installations are to be protected from frost and the resulting damages, e.g. in unheated warehouses, parking lots etc., an electrical pipe heating is required.

VML pipes with accompanying heating are delivered in the nominal dimensions DN 50 up to DN 200 in lengths of 1000, 2000 and 3000 mm, each pipe length with a connection cable of 1.0 m.

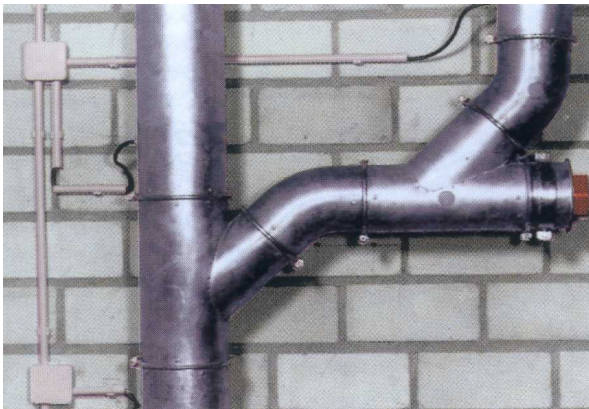
VML pipe lengths of less than 1000 mm as well as VML fittings do not normally require a heating, as the medium does not change its temperature significantly on these short lengths.

Only in the following cases must the VML pipeline including short pipe lengths and fittings receive an accompanying heating in order to avoid frost damages:

- VML pipelines with ongoing collection lines that are subject to frost
- VML draft pipes above the frost-safe depth at the connection to the collection line
- VML pipelines with free outlet of the drain water pipeline

VML pipes to length below 1 m and fittings with accompanying heating are available as special versions.

The pipe lengths or fittings with accompanying heating are connected to the on-site electric cable that must be laid parallel to the pipeline. Pipe lengths of less than 1000 mm length are to be cut out of VML pipes without heating according to the instructions. VML pipes with heating cannot be cut.



The complete electrical installation including the control panel must be carried out by a specialist for electrical installations. The VDE regulations and any other applicable local rules are to be observed.

### Technical data of the heating

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- connection tension: 230 V / 50 Hz
- heating performance at 10°C: 13.6-36.3 W/m heating band (see table on the following page)
- electrical connection: 1.0 m cable for each pipe length. cable: Y SL - IZ - 3 x 1.5 mm<sup>2</sup>
- max. temperature of medium: 65°C
- conductor in the heating band: tin-coated copper conductor 1 x 1.2 mm<sup>2</sup>
- min. bending radius of the heating band: 13 mm at 20°C

### Advantages of the self-limiting heating band

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- The performance of the heating band is always proportional to the overall length, i.e. 20.8 W/m at 10°C (e.g. length = 10 m = overall performance 208 W)  
The system length can vary between a minimal VML pipe length with accompanying heating (1 m) up to the maximum heatable pipe length of 134 m, with a corresponding electric fuse protection.
- The self-limiting effect avoids overheating or burn-through of the heating band.
- The self-limiting effect guarantees an economical frost protection, as the warmth generation is always adequate. In cold areas it uses more, in protected areas less energy.

### Particularities

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- Each heating element is to be connected with 230 V.
- If a thermostat is installed with heating bands of more than 60 m, special precautions are necessary.

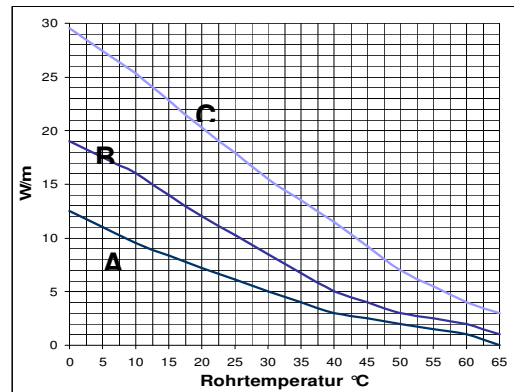
### Temperature - performance diagram

Power output at 230 V

A 3BTV2

B 5BTV2

C 8BTV2



### Overview

#### for pre-insulated VML pipe installations

DN	insulation thickness mm	heat loss W/m pipe	heating band type	assignment	heating performance W/m heating band	unregulated	
						min. temp. 1 °C	max. temp. 2 °C
50	21	10,8	3BTV	1	13,6	9	46
80	24	11,3	3BTV	1	13,6	9	46
100	20	19	5BTV	1	20,8	8	46
125	34	20,2	5BTV	1	20,8	5	45
150	20	26,6	8BTV	1	36,3	12	49
200	20	33,8	8BTV	1	36,3	7	48

<sup>1</sup> holding temperature at minimum ambient temperature, without additional thermostat

<sup>1</sup> holding temperature at maximum ambient temperature, without additional thermostat

### Parameters

minimum ambient temperature: -20 °C

maximum ambient temperature: 35 °C

holding temperature 5 °C

thermal conductivity: 0,035 W/(m/K)

(Lambda value of the insulation)

safety factor: 10%

### Maximum heating loop lengths of the heating bands

DN	fuse	heating band type	maximum heating band length m
50-80	C10A	3BTV2	87
100-125	C10A	5BTV2	67
150-200	C10A	8BTV2	38
50-80	C13A	3BTV2	114
100-125	C13A	5BTV2	87
150-200	C13A	8BTV2	49
50-80	C16A	3BTV2	134
100-125	C16A	5BTV2	107
150-200	C16A	8BTV2	61

heating band covered completely with aluminium adhesive tape on the cast iron pipeline

switch-on temperature: 10 °C

no.	qty.	item	unit price	amount
		<p><b>Title: Drainage pipe system – Düker – VML system</b></p> <p><b>Insulated pipe system made of socketless cast iron drainage pipes and fittings, with integrated thermal insulation and protection against condensation, consisting of:</b></p> <p><b>Interior pipe:</b>  Socketless cast iron drainage pipes and fittings, approved and manufactured as per EN 877, dimensions as per DIN 19 522, with conformity declaration and RAL quality seal of the GEG (quality association drainage technology cast iron). Pipes inside with a fully cross-linked two-component epoxy coating in ochre colour, outside with a reddish brown primer, fittings inside and outside with a fully cross-linked epoxy coating.</p> <p><b>Outside pipe:</b>  Casing of smooth galvanised steel plate*.</p> <p><b>Insulation layer:</b>  The insulation layer between inner and outer pipe consists of CFC-free Duromer rigid foam.  Safe condensation protection by optimum insulation, thermal conductivity of the CFC-free Duromer rigid foam at a medium temperature of 10 °C at a density of 130 kg/m<sup>3</sup> = 0,035 W/mK. Wall thickness 15-20 mm, non-combustible as per German DIN 4102, part 1, construction material class A2, approval P-SAC02/III-041.</p> <p><b>Note:</b>  The insulation thickness of the VML pipes is intended for a environmental temperature of 25 °C and an admissible relative humidity ≤ 70%. This also applies to the integrated socket connectors.</p> <p><b>Connections:</b>  On the inner pipe: socket connectors with special sealings made of NR-SBR,  Z-42.5-273, pre-installed and pre-insulated  On the outer pipe: flanged rings that are drawn together with profile clamps made of galvanised steel St 3K 40. Therefore the connection is axially restrained.</p> <p>Installation is carried out by inserting the pipe spigot ends into the pipe or fitting sockets – connection of several fittings with the help of connection pipes.</p> <p><b>Installation:</b> As per Düker installation instructions and in accordance with the technical regulations of EN 12056 / DIN 1986 part 100 / EN 752</p> <p><b>Handling instructions:</b> As per Düker installation instructions</p>		





**VML pipes with heating**

VML pipes with self-limiting heating band, with a 1 m connection cable 3 x 1.5 mm. Connection of the heating bands is carried out through a parallel electrical installation cable and water-tight connection boxes. Only VML pipes in the manufactured lengths of 1000 mm, 2000 mm and 3000 mm receive a heating.

Cut pipes below 1000 mm lengths and fittings generally are not equipped with a heating but are bridged with the parallel electrical installation cable.

The complete electrical installation as well as the control unit should be

Cut pipes below 1000 mm are cut from VML pipes (manufactured length 3000 mm) without heating.

VML pipes with heating may not be cut.

Each pipe length is to be equipped with a marking plate.

1 mtrs. **Düker – VML pipes with integrated heating** in lengths of 1000 mm, 2000 mm and 3000 mm with integrated socket connectors, **DN .....**, supply and installation

material: wages:

**Cut pipes**

2 pcs. **Düker – VML cut pipes without heating**, length below 1000 mm, cut from VML pipes of 3000 mm length, including necessary flanged rings, **DN .....**, supply and installation

material: wages:

3 **Düker – VML fittings** without heating  
see text Düker - VML without heating

material: wages:

\*\* in case of outside installation, VML pipelines must be coated after installation with a coating system that complies with the corrosion protection requirements.

DRAINAGE TECHNOLOGY

ENGINEERING

GLASS LINING TECHNOLOGIES

JOBGING FOUNDRY

FITTINGS AND VALVES

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