



MLB Specifier's Manual

Cast iron drainage pipe system
with heavy-duty corrosion protection outside
for bridges and buildings

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APPLICATION, CHARACTERISTICS

Application

The European standard EN 877 is the product standard for cast iron drainage pipe systems DN 40 up to DN 600. This standard specifies product requirements and test criteria regarding the cast iron quality, dimensions and wall thicknesses. The core fitting programme is described in the German DIN 19522. EN 877 also defines the resistance of coatings as well as requirements on the couplings, making a difference between normal building drainage (installation within a building, in concrete or outside onto a building) and underground installation.

Düker SML and the standard Düker coupling programme correspond completely to the requirements of EN 877 for normal building drainage, the resistance of the inside coating surpassing the standard requirements by far.

For underground installation, the standard requires an outside pipe coating with a zinc layer of at least 130 g/m², and an additional cover coat. These requirements are fulfilled by the pipe systems Düker TML and MLK-protect, but also MLB, together with "Inox" couplings. Originally, the MLB outside coating is based on the technical delivery conditions of the German railway company, nowadays on the regulation "TL/TP ZTV-ING Stahlbau", annex A.

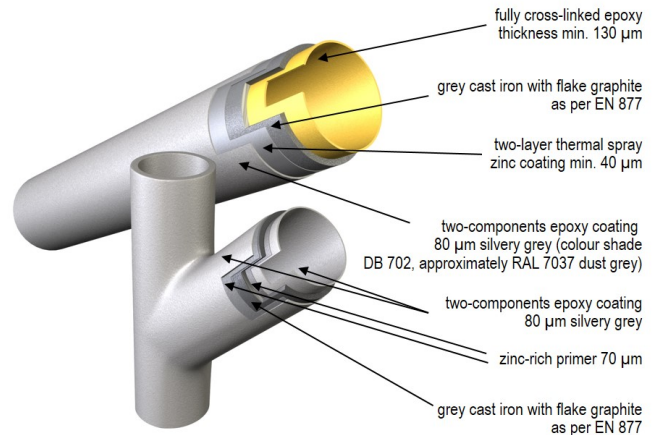
According to this German regulation, Düker MLB is suitable for outside installation for the drainage of roads, tunnels and bridges with its typical aggression by exhaust gas, road salt etc. However it should also be considered that EN 877 allows its use for underground installation.

Material and coating

The material of all Düker drainage pipe systems is gray cast iron GG as per EN 1561, at least EN-GJL-150. This is an alloy of iron and carbon with a high content in graphite, which is finely distributed in the base material in the shape of flakes. This material distinguishes itself by excellent corrosion resistance (as compared with steel) as well as high stability, wear resistance, temperature and temperature cycle resistance.

The hot mould centrifugal casting procedure used by Düker produces extremely smooth inside pipe walls, which facilitates an even coating, so the high-quality coating material can fulfil its protection purpose, and at the same time remains flexible and insensitive to temperature changes.

The inside coating of Düker MLB surpasses the standard requirements of EN 877 by far; the outside coating corresponds to ZTV-ING part 4 steel construction, annex A, table A 4.3.2, construction part no. 3.3.3.



Planning and installation

Planning and installation of MLB pipelines are to be carried out as per the following standards and regulations:

- EN 12056 Gravity drainage systems inside buildings
- EN 752 Drain and sewer systems outside buildings
- EN 1610 Construction and testing of drains and sewers
- German STLK LB 111 standard catalogue for the road and bridge construction area 111: drainage
- German ZTV-ING Additional technical contract conditions and directives for engineering constructions

and other European, national or local standards and regulations.

Transport, handling and storage

During transport, storage, handling and installation, special care must be taken in order to avoid damage to the outside coating. This comprises surface-conserving hoisting devices, on-site stocking on wooden planks, if necessary with intermediate protection layers and covers. Any dirt and saw dust must be removed immediately. Possible damages, which are in our experience inevitable, must be repaired on site after installation (repair coating see page 10).

APPLICATION, CHARACTERISTICS

Material requirements couplings and fixings

As per the latest requirements of German ZTV-ING steel construction, all couplings must consist of the material no. 1.4571 or 1.4401 as per EN 10088. Therefore, the CE-couplings (material no. 1.4301), which used to be applied very often in bridge drainage, are no longer admissible here. Instead, "Inox" couplings must be used (see range of couplings page 11 and 12). The same applies also for underground installation.

Fixings for bridge drainage must also consist of stainless steel, material no. 1.4571 or 1.4401 as per EN 10088.

CE conformity

In 2008, the relevant product standard EN 877 for cast iron drainage pipe systems became a so-called harmonized standard. This means that it now contains an annex ZA with details about the product characteristics and testing required for CE marking.

The manufacturers are now required to apply the CE marking to their products as per EN 877 in order to confirm the product's suitability for the free trade inside the EU. The CE marking replaces certain national marks such as the German "Ü" conformity mark.

Since 01 July 2013, the Construction Products Regulation (CPR) is to be applied to all building products following a harmonized product standard. As per the CPR, the CE marking is based on a Declaration of Performance DOP.

All Düker DOPs can be downloaded on www.dueker.de/dop.

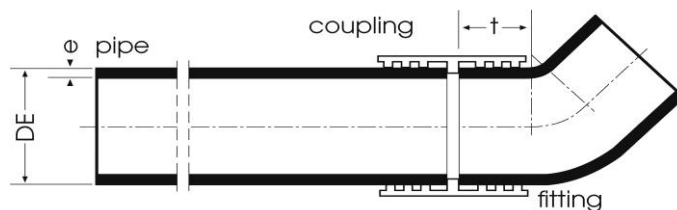
However, and unlike former "Ü" mark, the CE marking on cast iron drainage pipe products is not based on any third-party quality tests. All tests (with the exception of a fire test for the European classification "non-combustible") are carried out and confirmed only by the manufacturer himself. For this product, the CE marking is not an effective statement about product quality.

GEG quality association cast iron drainage technology

In order to fulfil the increasing safety requirements of our partners in plumbing, trade, planning and authorities, the European cast iron pipe industry as well as suppliers of accessories founded the IZEG. IZEG and the integrated quality association GEG award a RAL quality label to cast iron drainage pipes and fittings that have passed a number of tests defined in the RAL GEG quality directives.

Those awarded with the RAL GEG quality label are subject to an initial test as well as regular third-party surveillance by an authorized institute. The requirements for this label are considerably higher than those of EN 877, particularly regarding the resistance of the inside coating. Unlike the CE marking, this quality label guarantees users a permanently high product quality.



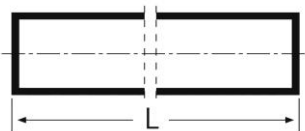

MLB pipes and fittings (EN 877 and DIN 19522)

nominal diameter	exterior Ø	wall thickness pipes and fittings		insertion lengths (sealing zone)	Admissible inside pressure load	pipe weight empty	pipe weight filled	surface ca m ²		
		e	min.							
DN	DE	tolerance	e	min.	t	pipes up to	fittings up to**	ca.kg/m	ca.kg/m	per m
100	110	+2/-1	3,5	3,0	40	10 bar	10 bar	8,5	16,8	0,35
125	135	+2/-2	4,0	3,5	45	10 bar	10 bar	11,6	24,3	0,42
150	160	+2/-2	4,0	3,5	50	10 bar	5 bar	14,0	32,2	0,50
200	210	+2,5/-2,5	5,0	4,0	60	10 bar	5 bar	23,8	55,3	0,65
250	274	+2,5/-2,5	5,5	4,5	70	10 bar	3 bar	32,1	86,4	0,85
300	326	+2,5/-2,5	6,0	5,0	80	10 bar	3 bar	45,1	122,5	1,02
400	429	+2/-3	6,3	5,0	80	10 bar	2 bar	64,1	200,3	1,35
500*	532	+2/-3,5	7,0	5,2	80	6 bar	2 bar	82,0	292,7	1,67
600*	635	+2/-4	7,7	5,8	80	4 bar	2 bar	108,5	410,0	1,99

* on request

** except inspection pipes, cleaning connecting pipes and saddles.

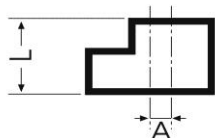
All dimensions in mm

Pipes

MLB pipe DIN 19522

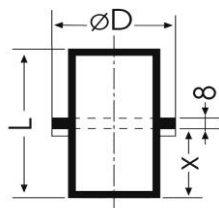
L= 3000mm

DN	kg	item no.
100	25,4	660189
125	34,8	660279
150	42,1	660369
200	71,5	660459
250	96,3	660659
300	135,3	660669
400	192,2	660609
500	245,9	224893
600*	325,5	232218

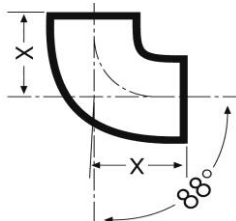
*on request

**Reducers
(adapters)**


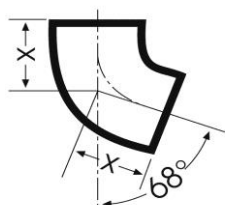
MLB		reducer DIN 19522		
DN	A	L	kg	item no.
125x100	12,5	95	1,5	662559
150x100	25	105	2,2	662589
150x125	12,5	110	2,2	662599
200x100	50	115	4,1	662609
200x125	37,5	120	4,1	662619
200x150	25	125	4,3	662629
250x150	57	140	6,8	662639
250x200	32	145	7,0	662649
300x150	83	150	10,7	662499
300x200	58	160	11,4	663719
300x250	26	170	12,4	663729
400x300	51,5	180	15,0	662449

Down pipe supports


MLB		down pipe support DIN 19522			kg	item no. support without bearing ring
DN	D	X	L			
100	145	96	200	2,3	229636	
150	195	96	200	4,0	661589	
200	245	96	200	6,0	661599	
250	340	146	300	19,5	229022	
300	390	146	300	25,5	226910	

Bend 88°


MLB		bend DIN 19522		
DN	X	kg	item no.	
100	110	2,1	661179	
125	125	3,2	661239	
150	145	4,9	661299	
200	180	8,8	662789	

Bends 68°


DN	X	kg	item no.
100	90	1,9	661159
125	105	2,9	661219
150	120	4,9	661279
200	145	7,7	661339

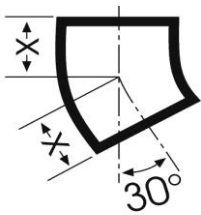
Bends 45°



MLB		bend DIN 19522	
DN	X	kg	item no.
100	70	1,6	661149
125	80	2,3	661209
150	90	3,5	661269
200	110	6,5	661329
250	130	10,3	661379
300	155	17,3	661399
400	257	36,0	661289
500*	375	100,0	228708
600*	426	150,0	235497

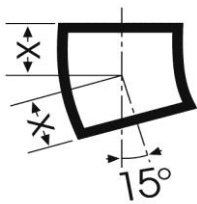
*on request

Bends 30°



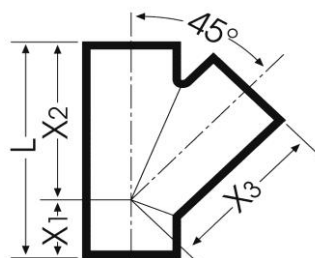
DN	X	kg	item no.
100	60	1,3	661139
125	70	2,0	661199
150	80	3,0	661259
200	95	5,4	661319
250	110	9,7	661369
300	130	15,5	661389

Bends 15°



DN	X	kg	item no.
100	50	1,0	661129
125	60	1,7	661189
150	65	2,5	661249
200	80	4,6	661309

branches 45°



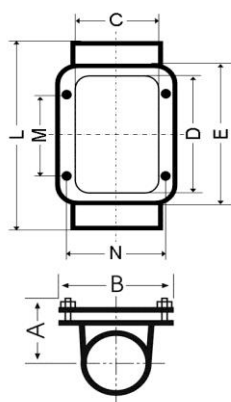
Due to the appearance of the European standard for SML pipes and fittings DIN EN 877, the new version of German DIN 19522 also had to be changed regarding dimensions and measures of SML fittings (values in brackets=old standard version)

Düker produces these items exclusively as per the latest version of DIN 19522. Due to possible stocks of the old standard version please check the actual dimensions of delivered fittings when pre-manufacturing or pre-installing.

MLB	branch DIN 19522						item no.
DN	X1	X2	X3	L	kg		
100 x 100	70	205(190)	205(190)	275(260)	4,2		663159
125 x 100	60	220(210)	220(210)	280(270)	5,2		663249
125 x 125	80(75)	240(230)	240(230)	320(305)	6,4		663279
150 x 100	55	240(225)	240(225)	295(280)	6,6		663369
150 x 125	70	255(245)	255(245)	325(315)	8,0		663399
150 x 150	90	265	265	355	9,2		663429
200x 100	40	265(260)	265(260)	305(300)	10,0		663519
200 x 125	55	280	280	335	11,9		663549
200 x 150	75	300	300	375	13,3		663579
200 x 200	115	340	340	455	17,2		663609
250 x 100	15	310(305)	310(305)	325(320)	15,4		663639
250 x 125	35	335(330)	335(330)	370(365)	17,7		664509
250 x 150	55	350	350	405	20,2		664519
250 x 200	90	385(380)	385(380)	475(470)	25,1		663649
250 x 250	130	430	430	560	31,5		663659
300 x 100	5	345	345	350	22,0		663669
300 x 125	15	360	360	375	23,9		664529
300 x 150	35	380	380	415	26,9		664539
300 x 200	70	415	440	485	34,0		664449
300 x 250	115	465	465	580	42,1		663679
300 x 300	155	505	505	660	50,1		663689
400 x 300	105	555	565	660	60,0		663699
500 x 300*	85	635	680	720	100,0		228711
600 x 300*	35	690	755	725	113,0		235496

*on request

Inspection pipes for horizontal and down pipes, with rectangular opening



MLB	inspection pipe DIN 19522									
DN	A	B	C	D	E	L	M	N	kg	item no.
100	83	160	100	200	230	340(320)	130	130	7,6	669400
125	101	190	125	225	255	370(355)	150	160	10,3	669401
150	112	215	150	250	280	395	170	180	14,5	669402
200	137	262	200	300	330	465	200	235	22,0	669403
250	170	330	259	350	426(380)	570(540)	230	300	36,5	669404
300	195	380	309	400	476(430)	640(610)	280	350	51,0	669405

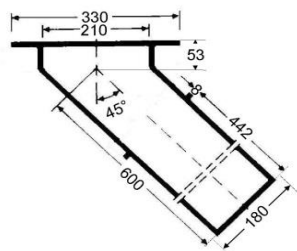
DN 100 to DN 200 with toroidal sealing ring in EPDM. DN 250 and DN 300 with 6 hermetic plug screws and flat sealing in EPDM.

Plugs



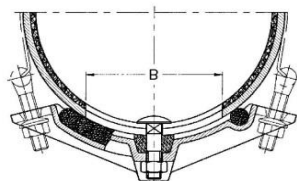
MLB		plug DIN 19522		
DN	L	kg	item no.	
100	40	0,5	665529	
125	45	1,1	665539	
150	50	1,7	665549	
200	60	3,1	665559	
250	70	6,0	665569	
300	80	9,5	665579	

Cleaning connecting pipes
for pressure flushing of bridge
drainage pipes



MLB		cleaning connecting pipe		
DN		kg	item no.	
150	dimensions see drawing	28,6	665209	

Cleaning saddles
with template for cutting
the opening



MLB		cleaning saddle		
DN	A	B	kg	item no.
200	500	145	13,1	227942
250-300	500	150	13,2	227943
400-500	500	155	13,2	227169

In case of inside pressure above 0.5 bar, clamp brackets are to be used (two clamp brackets per cleaning saddle)

**Clamp brackets for
cleaning saddle**

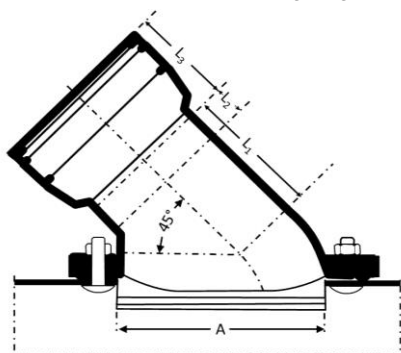
(single units. For one cleaning saddle you require two clamp brackets.)

MLB		clamp bracket for cleaning saddle		
DN			item no.	
200			237435	
250			237436	
300			237437	
400			237438	
500			237439	

consisting of a clamp strap, two nuts and two bolts. Material: no. 1.4571/1.4401 as per EN 10088.

Connection saddles 45°

with template for cutting
the opening
with socket and sealing ring

**Düker pro-cut tape**

as cut edge protection

**RESICOAT® RS 2K**

Epoxidmaterial transparent

MLB connection saddle							
DN	A	B	L1	L2	L3	kg	item no.
200x150	240	145	160	40	120	14,2	221848
250-300x150	240	150	160	40	120	14,4	221849
400-500x150	240	155	160	40	120	13,5	221850

Düker pro-cut tape

Spool with 10 m each

item no.

239071

Butyl rubber with fluor polyethylene sheet. One spool is sufficient for approx. 30 cut edges DN 100.

MLB repair material

50 ml double cartridge with mixing tube
as touch-up paint

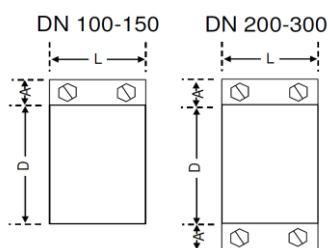
item no.

240308



CV Inox				
DN	A	D≈	L	item no.
100	18	115	54	239777
125	18	140	65	239778
150	18	170	65	239779
200	18	220	78	239780
250	18	286	78	239781
300	18	338	78	239782

Double screw coupling



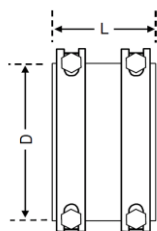
two parts from DN 200

Material metal collar:	stainless steel, austenitic chromium nickel steel, 1.4571/1.4401 as per EN 10088
Material locking parts:	stainless steel, austenitic chromium nickel steel, 1.4571/1.4401 as per EN 10088; screw, washer, square nut: A4
Material sealing:	EPDM. NBR on request for waste water containing oil, animal grease, solvents or petrol
Axial restraint:	-
Screw size:	hexagonal screws (slotted on DN 100): M 8
Torque:	alternately, uniformly hand tight
Marking:	CV Inox



Düker CV Inox dual ring coupling			
DN	D	L	item no.
400	445	110	239783

Double screw coupling

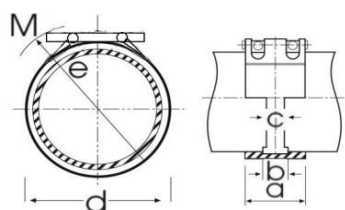


Material metal collar:	stainless steel, austenitic chromium nickel steel, 1.4571/1.4401 as per EN 10088
Material locking parts:	stainless steel, austenitic chromium nickel steel, 1.4571/1.4401 as per EN 10088; screw, washer, square nut: A4
Material sealing:	EPDM
Axial restraint:	-
Screw size:	hexagonal screws M8
Torque:	35 - 40 Nm



Connect-F Inox coupling

DN	a	b	c	≈d	≈e	item no.
100	98	40	25	133	148	234834
125	113	50	35	166	194	234835
150	113	50	35	186	210	234836
200	138	74	35	240	270	234837
250	138	74	35	305	335	234838
300	138	74	35	360	390	234839
400	139	74	35	460	490	234840
500	140	74	35	565	595	234841
600	139	74	35	665	695	234842



coupling for installation in the soil or outside of buildings

Attention: particularly aggressive soils may call for an additional corrosion protection (e.g. shrinking hose)

Material metal collar: stainless steel 1.4571

Material locking parts: stainless steel, bolts 1.4401, screws 1.4404

Material sealing: EPDM

Axial restraint: -

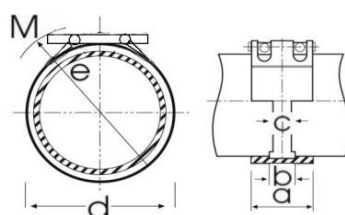
Screw size: DN 100: M 8; DN 125 - 150: M 10; DN 200 - 600: M 12

Torque: as stated on the coupling



Connect-G Inox coupling

DN	a	b	c	≈d	≈e	item no.
100	98	40	25	130	150	234845
125	115	50	35	165	195	234846
150	115	50	35	185	215	234847
200	140	67	35	240	270	234848
250	140	67	35	305	335	234849
300	140	67	35	360	390	234850
400	142	67	35	460	490	234851
500	142	67	35	565	595	234852
600	142	67	35	665	695	234853



coupling with axial restraint for installation in the soil or outside of buildings

Attention: particularly aggressive soils may call for an additional corrosion protection (e.g. shrinking hose)

Material metal collar: stainless steel, casing 1.4571, claw ring 1.4310

Material locking parts: stainless steel, bolts 1.4401, screws 1.4404

Material sealing: EPDM

Axial restraint: DN 100 - 400: up to 10 bar; DN 500: up to 6 bar; DN 600: up to 4 bar

Screw size: DN 100: M 10; DN 125 - 150: M 12; DN 200 - 600: M 16

Torque: as stated on the coupling

For further coupling models please refer to the SML specifier's manual.

Attention: all Düker metal coupling models without the designation "Inox" are unsuitable for bridge drainage (as per German ZTV-ING) and require further on-site corrosion protection in underground installation, e.g. tar wrapping.

For the coupling installation instructions please see the SML specifier's manual.

Sizing and arrangement of pipelines

We recommend to carry out sizing and installation as per German ZTV-ING part 8 section 5.

The basic rules are:

Collecting lines / longitudinal lines

- regular nominal width DN 200
- DN 150 possible in case of max. 3 drains
- slope minimum 2%
- sizing at least for a rain quantity of 115 l / (s*ha) for a duration of 15 minutes
- flow velocity between 1 m/s and 3 m/s
- inspection openings at least every 30 m as well as in the area of any cross lines or substantial changes of direction
- longitudinal line not to be imbedded in concrete

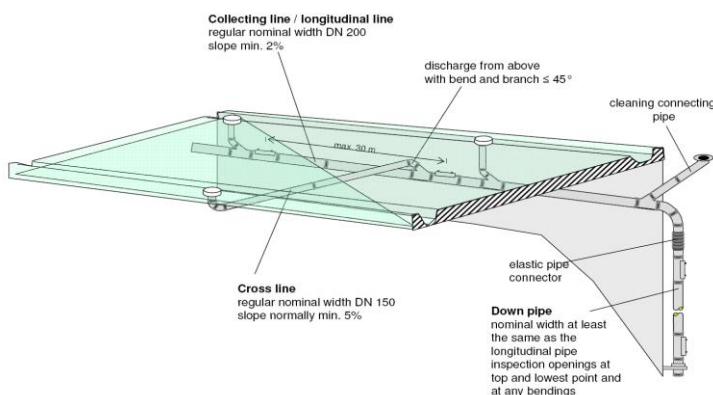
Cross lines

- regular nominal width DN 150
- slope normally at least 5%
- discharge into the longitudinal line from above with bend and branch $\leq 45^\circ$
- any changes of direction are to be realized with bends $\leq 45^\circ$

Down pipes

- nominal width at least the same as the longitudinal line
- inspection openings at the top and the lowest point as well as all bendings
- any changes of direction are to be realized with bends $\leq 45^\circ$
- down pipes not to be imbedded in concrete

Basic rules of ZTV-ING part 8 section 5



Fixings

Selection of material

On principle, stainless steel pipe fixings are to be used for bridge drainage.

Basic rules

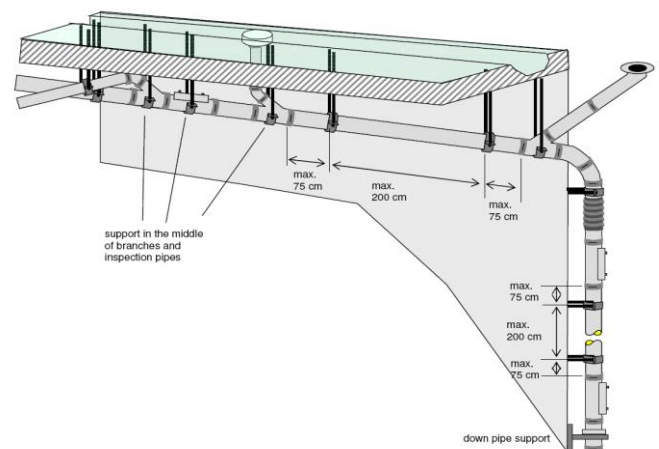
The distances between fixings should be as uniform as possible and not surpass 2 m. Pipes of a length of 1.5 to 3 m are to be fixed twice, shorter pipes once or twice depending on the nominal width (i.e. the weight). The fixing is to be made in uniform distances between the couplings, the distance before and after each coupling being no more than 0.75 m.

Horizontal pipelines must be fixed sufficiently at all changes of direction and branchings. The branches and inspection pipes themselves require a support in their middle, or or they should be secured with Connect-G-Inox couplings.

Down pipes must be fixed as per the basic rules. At the lowest point possible, a down pipe support is to be installed. This down pipe support may only carry as many meters of down pipe, as the bridge body can carry or as the plugs can transfer to the bridge body. After this height, another down pipe support must be installed. We recommend to install a down pipe support every five pipe lengths. The down pipe supports are to be installed with a support ring (see Düker SML range of products) with the help of consoles customary in trade. For dimensions above DN 300 we recommend to set fixed point fixings. German ZTV-ING gives typical recommendable installation examples, we recommend particularly the drawings Was 13 and Was 15.

Pipelines under pressure

In case of inside pressure, the pipelines must be secured against slipping, particularly at changes of direction. For this, couplings with axial restraint for the expected inside pressure are to be used (see indications on axial restraint on pages 10 to 11).



On-site coatings

Cut edge protection

For cut edge protection (uncoated cut pipe ends, cuttings for saddles), a two-component epoxy coating is available. Mix resin and hardener in equal parts and apply the mixture. Observe a drying period of approx 1 h (room temperature, approx. 20°C).

Repair of damaged coating

Damages to the outside coating must be repaired after installation. For this, a repair coating is available.

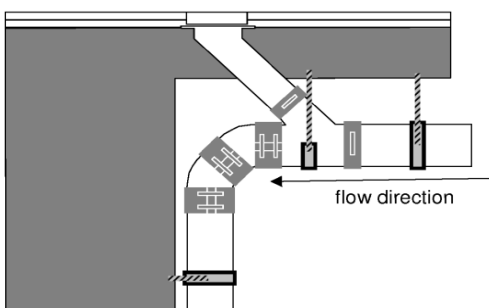
Overcoating




In case of a high danger of corrosion, Düker MLB must be overpainted with one or several cover coats that are compatible with the factory-made base coats. We recommend the overpainting as a matter of principle. German TL/TP, annex E, sheet 87, paragraphs 1.3.1 and 1.3.2 define the additional cover coat of PUR with a minimum layer thickness of 80 µm.

Cleaning connecting pipe

German ZTV-ING recommends to install cleaning openings for the introduction of a flushing hose of a high pressure cleaning device.

A cleaning connecting pipe is to be installed at the lower point of the longitudinal line, against the flow direction. In the road, a suitable cover is to be installed.



-  fixing
-  Connect-G-Inox coupling with axial restraint
-  Rapid-Inox coupling

Elastic pipe connector

Although cast iron pipes with their low length expansion coefficient, similar to concrete, have no problems with temperature-caused length expansion, flexible elements are normally required. These serve to compensate for movement between fixed and movable bridge components. For this, bridge drainage hoses should be installed, which are fixed with stainless steel hose clamps (see photo).

Such hoses are available e.g. from

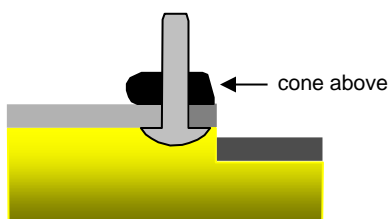
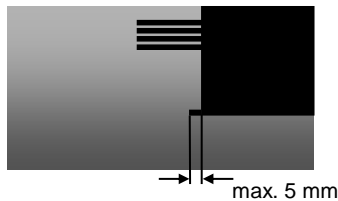
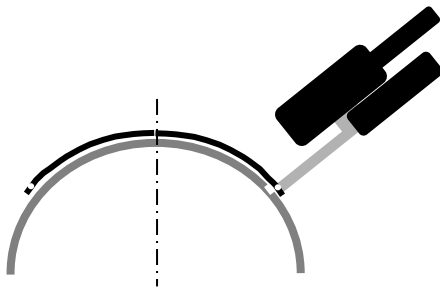
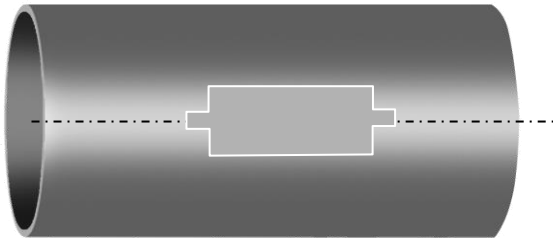
Raimund Höllein CAROLINENHUETTE
GmbH & Co. KG, D-Kallmünz
Tel. +49 9473 9407-0
www.hoellko.com

Senior Berghöfer GmbH, D-Bönnigstedt
Tel. +49 40 5566641
www.seniorauto.de

H.A.S. Vertriebs GmbH, D-Mörtenbach
Tel. +49 6209 791791
www.h-a-s.de



MLB cleaning saddle



Stick the cutting pattern onto the MLB pipe.

Watch out that the longitudinal axis of the pipe and the pattern are parallel.

Cut the rectangle along the white lines on the pattern with an angle grinder and a steel or diamond disc.

An oblique cut (in right angle to the pipe surface) is admissible and prevents the disc from slipping off.

Attention: the white lines mark the outer rim of the cutting!

In order to remove the waste more easily, it is admissible to overcut by a maximum of 5 mm in the corners.

The cutting of the slot marked on the pattern is done by cutting in with the disc several times.

After removing the waste from the pipe inside, draw off the rest of the pattern from the pipe and remove any burrs from the cut edges with a rough file or with the angle grinder with grinding disc.

Apply lubricant Anderol 757 or equivalent to the rubber joint, lay it onto the pipe with the cone above (see picture) and insert the mushroom head bolts from below, until the rectangular portion of the bolts rests in the slot so they can't twist any more.

Then fit the saddle onto the pipe.

For installation with clamp brackets (in case of inside pressures above 0.5 bar), lay the brackets around the pipe, insert the bolts into the lugs and tighten the nuts (SW 24) uniformly.

3	<p>pcs. Düker MLB branches 45°, DN x, supply and installation</p> <p>material: wages:</p>
4	<p>pcs. Düker MLB reducers, DN x, supply and installation</p> <p>material: wages:</p>
5	<p>pcs. Düker MLB plugs, DN, supply and installation.</p> <p>material: wages:</p>
6	<p>pcs. Düker MLB inspection pipes with rectangular opening, for horizontal and down pipes, DN, supply and installation</p> <p>material: wages:</p>
7	<p>pcs. Düker MLB down pipe supports including supporting ring with rubber ring, DN, supply and installation</p> <p>material: wages:</p>
8	<p>pcs. CV Inox couplings, lock with two screws, all parts made of material no. 1.4571/1.4401 as per EN 10088, sealing collar made of EPDM, DN, supply and installation.</p> <p>material: wages:</p>
9	<p>pcs. CV Inox dual ring couplings, lock with two screws, all parts made of material no. 1.4571/1.4401 as per EN 10088, sealing collar made of EPDM, DN 400, supply and installation.</p> <p>material: wages:</p>
10	<p>pcs. Connect-F Inox couplings, metal collar made of material no. 1.4571, locking parts made of material no. 1.4401, screws made of material no. 1.4404, sealing collar made of EPDM, DN, supply and installation.</p> <p>material: wages:</p>
11	<p>pcs. Connect-G Inox couplings, coupling with axial restraint, metal collar made of material no. 1.4571, locking parts made of material no. 1.4401, screws made of material no. 1.4404, claw ring made of material no. 1.4310, sealing collar made of EPDM, DN, supply and installation.</p> <p>material: wages:</p> <p>spools Düker pro-cut tape for cut edge protection, length 10 m, supply and application</p> <p>material: wages:</p>

50 ml double cartridges **RESICOAT® RS repair material** as touch-up paint on damages to the outside coating, supply and application

material:

wages:

* for further fittings please refer to the product range

DRAINAGE TECHNOLOGY

GLASS LINING TECHNOLOGIES

JOBGING FOUNDRY

FITTINGS AND VALVES

Düker GmbH & Co. KGaA

Würzburger Straße 10-16

D-97753 Karlstadt /Main

Phone +49 9353 791-570

Fax +49 9353 791-8570

Internet: www.dueker.de

: sales.drainage-tech@dueker.de