Düker

# SML

## Specifier's manual

Düker cast iron drainage pipe systems
for building drainage

# DÜKER SML PIPELINE SYSTEMS

According to EN 12056
"Gravity drainage within buildings"
as well as EN 752, parts 1 - 7,
"Drainage systems outside of buildings".

## Areas of application

The European standard EN 877 is valid for prefabricated parts of cast iron pipes for construction - normally as non-pressure pipelines - of building drainage systems as well as connecting drains. The nominal diameter range covers DN 40 to DN 600 inclusive. This standard contains requirements for material, dimensions and tolerances, mechanical features, composition, standard coatings for cast iron pipes, fittings and accessories. Further it contains functional requirements for all prefabricated parts including couplings. It is valid for pipes, fittings and accessories which are manufactured by casting process, no matter which type, or from cast parts, and for the corresponding couplings.
**Düker SML drainage pipe systems are in accordance with this standard and exceed its requirements by far in many respects. Also the demands of DIN 19522 and ISO 6594 are surpassed.**

## The material features

Düker drainage pipe systems are manufactured of grey cast iron GG according to EN 1561 - type at least EN-GJL-150 (formerly GG 15 according to DIN 1691) which means an iron and carbon alloy with high graphite content which is integrated in lamella form and finely distributed within the metallic base compound. This Düker-typical crystalline structure gives the material high strength, wear and temperature resistance, excellent corrosion resistance (as compared with steel), and a very high damping capacity. Düker SML drainage pipes distinguish themselves by robustness, durability, fire-resistance and silent operation - even without special insulation or soundproofing.

## Planning and installation

Düker SML drainage pipe systems are - without exception - permitted for all ranges of application of drainage systems in buildings. Planning and installation of the SML pipes have to follow EN 12056, the local rules and regulations as well as the Düker installation and fixing instructions (parts 3 and 4 of this brochure).

## SML coating

The SML drainage pipes are coated with a reddish brown 40 µm thick base coat on the outside according to the current standard. On the inside, the pipes are provided with a permanent cross-linked epoxy coating which distinguishes itself by high resistance against chemical and mechanical influences. The features of this high-quality coating go beyond the requirements of EN 877. This particularly protects Düker SML drainage pipe systems against domestic effluents which are becoming increasingly aggressive because of the new regulation that rain water and waste water must be disposed of separately, which means that pipe coatings are facing new challenges. The Düker hot permanent mould centrifugal casting process used in the production of our pipes guarantees a uniform, non-porous interior coating with fully cross-linked, elastic and 120 µm thick epoxy material. It also makes for an extremely smooth interior surface.
The expansion differences of epoxy / cast iron due to changes of temperature are absorbed better. This prevents chipping of the coating when the pipes are cut.

## Fittings

SML fittings are given an **interior** and **exterior** dip coating with high proof cross-linked epoxy (layer thickness approx. 60 µm).

# APPLICATION, FEATURES, PLANNING

## Applicable standards

Düker SML meets the requirements of

ISO 6594
EN 877
DIN 19522

and other international standards.

## Approvals

Düker SML is officially approved in

| | |
|---|---|
| Australia | No. WMKT 20057 |
| Czech Republic | No. J-30-20817-04 |
| Denmark | No. VA 2.11/13104-13105 |
| Finland | No. YM 110/6221/2006 |
| Germany | No. 110001436/01/01 |
| Hungary | No. A-725/2004 |
| Norway | No. 0401 and 0408 |
| Russia | No. POCC DE. E01.B26433 |
| Singapore | No. 030082 |
| Sweden | No. 0041/04 |
| Switzerland | No. 23005 |
| Ukraine | No. UA1.070.0059132-05 |
| United Kingdom | Agrément No. 04/4189 |

and numerous other countries.

## SML drainage pipe systems -Guarantee

Düker guarantees that the pipes, fittings and couplings supplied have been manufactured in accordance with the standards and approvals valid at the time of manufacturing. In the case of defects, Düker will, during a period of 5 years, replace the defective parts free of charge. Without specific agreement, Düker will not accept liability for consequential losses.

## IZEG Information centre / GEG quality association

Some non-European manufacturers destroy the quality reputation of cast iron sewage pipe systems. In order to withstand this trend and 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, among others, the following tests surpassing the requirements of EN 877:

Table 1-3. from RAL-GZ 698

| Additional requirements for the testing of interior coatings | | | | |
|---|---|---|---|---|
| **Medium/solution** | **concentration** | **pH-value** | **duration of test** | **temperature in °C** |
| Phosphoric acid | 25 % | 1.0 | 72 h | 40 |
| Acetic acid | 10 % | 2.0 | 48 h | 25 |
| Hydrogene pyroxide solution | 10 % | 3.5 | 48 h | 25 |
| Sulphuric acid | 0.1 N | 1.0 | 30 d | 50 |
| Lactic acid | 1 % | 2.0 | 48 h | 25 |
| Citric acid | 5 % | 1.5 | 30 d | 50 |
| Waste water according to EN 877 | | 7.0 | 30 d | 50 |
| Natriumhydrogencarbonat | 0.1 N | 11.4 | 30 d | 50 |
| Salt water | | 5.6 | 10 d | 50 |
| (Completely desalted) water | | 6.4 | 30 d | 50 |
| Salt spray | | | 1500 h | 35 |

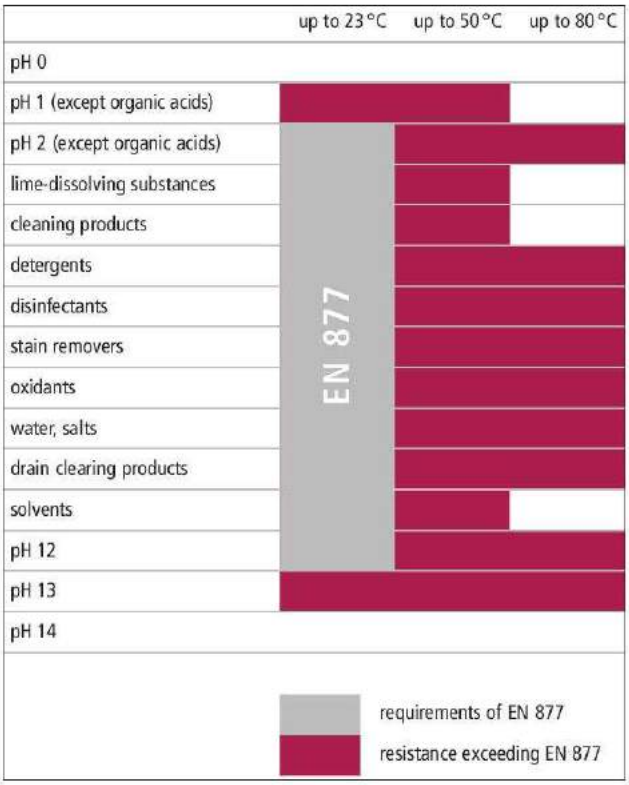
N=normal solution; d=days; h=hours

## Hubless cast iron drainage pipes from Düker

Since 1913 Düker has been offering all material-related advantages which are proven in cast iron - **high strength of material and resistance to wear, excellent temperature and corrosion resistance, considerable sound damping ability and above all the non-combustibility** - in cast iron drainage pipes.

Düker revolutionised the market in terms of building and laying techniques by developing cast iron spigot end drainage pipes which were approved for Düker for the first time in 1967 with the test certificate PA-I 1609. Just as before, the SML drainage pipe system today distinguishes itself by reliability and quality. For use in high-quality building drainage and on the basis of EN 877.

**Interior coating resistance of Düker SML pipes**
for domestic applications with discontinuous use




## EURO-NORM EN 877 DIN 19 522

**DENSITY:**
Approx. 7.2 kg/dm$^3$ (71.5 KN/m$^3$)

**MINIMUM TENSILE STRENGTH:**
150 MPa for fittings,
200 MPa for pipes

**COMPRESSIVE STRENGTH:**
Approx. 3 to 4 times the value of the
minimum tensile strength

**SHEARING STRENGTH:**
1.1 to 1.6 times the value of the minimum tensile strength

**CRUSHING STRENGTH:**
350 MPa (for DN < 250)
or 332 MPa (for DN ≥ 250)

**POISSON'S NUMBER:** 0.3

**COEFFICIENT OF LENGTH EXPANSION:**
0.0105 mm/mK (between 0° and 100 °C)

**THERMAL CONDUCTION COEFFICIENT:**
50 - 60 W/mK (at 20°C)

**MODULUS OF ELASTICITY:**
8 x 10$^4$ to 12 x 10$^4$ N/mm$^2$

**CHEMICAL RESISTANCE:**
For use with domestic effluents within a range of ph 2 - ph 12. Well above the values required by EN 877.

For non-domestic applications and for aggressive waste water we recommend to consult with Düker and where applicable to use a different coating such as Düker MLK.

# APPLICATION, FEATURES, PLANNING

## Düker Quality System

Düker was one of the first companies of the trade to achieve the ISO 9001 certification and was even awarded the "Bavarian Quality Award" in 1999. This quality award encourages us to continue doing what we started decades ago: keeping the quality standard of cast iron drainage pipes at a high level with continual new ideas, dependable system solutions and first-class finish of our products.

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body of TÜV SÜD Management Service GmbH

certifies in accordance with TÜV CERT procedures that

Eisenwerke Fried. Wilh. Düker GmbH & Co. KGaA
D-57755 Herscheid
D-53844 Lauftorf

has established and applies a Quality Management System for

Development, manufacture, supply and service of valves used in water- and gas industries, high pressure ductile iron fittings, drain pipes and fittings, highly acid resistant glass lined components, castings made to specification, plants for production of centrifugal cast iron as well as cookless cupola furnaces.

An audit was performed, Report No. 70000454

Proof has been furnished that the requirements according to

ISO 9001: 2000

are fulfilled. The certificate is valid until 2009-03-23

Certificate Registration No. 12 100 21864

## SML drainage pipe systems and environmental protection

Grey cast iron - the material from which Düker SML pipes are manufactured - is 100 % recyclable. Pipe cuttings can be included in the recycling circle without any trouble of waste disposal, also because **the coating is free of benzo(e)pyrene and other environmentally dangerous chemicals.**

## Cost considerations

Cost comparisons between SML pipeline systems and alternative materials must not only compare the cost of pipe per meter. An evaluation must also consider the following advantages of SML:

- Easy and fast installation with no specialists required; normal plumber's skills are sufficient.
- No special equipment required.
- No costly fire protection collars.
- Lower fire insurance premiums.
- Fewer brackets due to superior stability.
- No thermal expansion sockets.
- No calculation of deflection legs with anchored and sliding fixings.
- Excellent sound absorption, no overall noise insulation or additional noise protection walls necessary.
- High resistance to positive and negative pressure, axial restraint up to 10 bar possible, therefore no need to change material in sensitive areas.
- Lower maintenance costs for damages by use or vandalism.
- Full recyclability means lower removal costs at the end of the lifetime of the building.

Pipelines may not cross firewalls, staircase walls or other ceilings and walls that must be fireproof, unless a transmission of fire, water and heat is not to be expected.

## European Fire Resistance Regulations

Fire resistance indicates how well and how long a building component can hold back the fire and prevent it from penetrating from one room to another.

The basic criteria are:

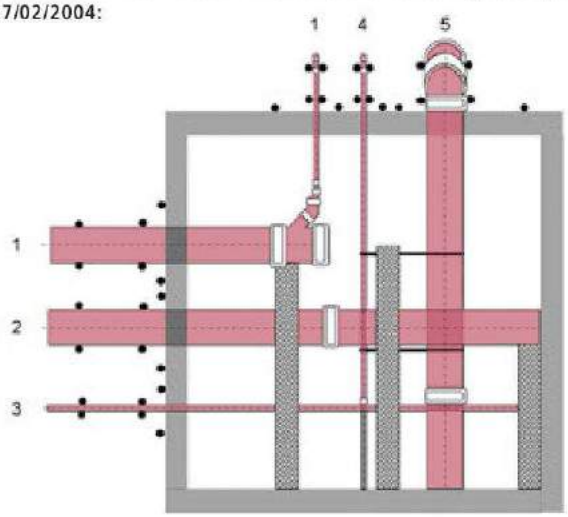
**R** load-bearing capacity (capacity to provide stability to the building)

**E** integrity (capacity to remain intact)

**I** insulation (capacity to maintain a low temperature on the unexposed side of the building element)

A product fulfilling these basic criteria for 30 minutes will be classified REI 30.

**In a fire test carried out on 04 December 2003 in Italy by CSI S.p.A. Bollate (Milan), Düker SML pipes with Rockwool mineral wool insulation reached the following results, certified by test report CSI 1094RF of 27/02/2004:**




• = temperature sensors

Pursuant to the relevant Italian regulations, the fire resistances of the various pipelines submitted to inspection by Düker Germany correspond to the following fire resistance classifications:

| | |
|---|---|
| pipeline 1 | REI 63 RE 180 |
| pipeline 2 | REI 180 RE 180 |
| pipeline 3 | REI 180 RE 180 |
| pipeline 4 | REI 180 RE 180 |
| pipeline 5 | REI 139 RE 180 |

# FIRE PROTECTION

In addition to the basic criteria R, E and I, a number of other safety properties can be evaluated, of which we will only consider S for smoke leakage.

## Non-combustibility (criterion E)

Düker sewage pipes consist of grey cast iron with lamellar graphite and are certified to correspond to EN 877. Annex F of EN 877 says that "Cast iron products in accordance with this European Standard are non-flammable and non-combustible. When exposed to fire they will maintain their functional characteristics and integrity for several hours, i.e. their walls will remain impervious to flames and gases and there will be no fracture, collapse or significant deformation. The integrity of connections through walls and ceilings is maintained." Düker sewage pipe are also classified in building material class A1 "non-combustible" as per German DIN 4102.

In order that the pipeline can be installed openly, the following conditions must be fulfilled:

- thickness of outer coating no more than 0.5 mm
- minor combustible materials for joints and clamps are admissible (rubber gaskets)
- pipes must be fixed with metal plugs
- possible insulations must be made of non-combustible material

## Combustion loads

With Düker sewage pipes it is not necessary to consider combustion loads – defined as the energy quantity emitted by a material by combustion. In necessary gangways a maximum of 7 kWh/m used to be allowed, but the latest German regulations forbid any combustion load in gangways and escape routes.

For comparison: polyethylene (PE) emits 12 kWh per kg, fuel oil 11.7 kWh per kg.

## Smoke generation (criterion S)

If installed with couplings whose rubber gaskets are completely covered by stainless steel collars (e.g. Dükorapid®), the pipe system remains closed in case of fire. Any smoke generated by heat effects on the inner coating remains in the pipeline and is then evacuated through the ventilation openings over the roof.

For comparison: 10 kg of polyethylene (PE) or polypropylene (PP) generate approx. 23.000 $m^3$ of poisonous smoke consisting of carbon monoxide, carbon dioxide and soot. With that quantity 100 large apartments with 100 $m^3$ each can be filled with enough smoke to leave the inhabitants no chance of survival.*

* taken from Bernd Prümer "Brandschutz in der Haustechnik", Gentner Verlag

## Length expansion (criterion R)

The length expansion coefficient of cast iron is only 0.0105 mm/(m·K). In case of a temperature change of 50 K and a pipeline length of 10 m the length expansion is only 5.25 mm. This expansion is compensated by the normal couplings.

For comparison: A 10 m polyethylene pipe in the same circumstances has a length expansion of 45 mm. Therefore special expansion compensators are required.

## Fire resistance of wall or ceiling pass-throughs

In general, any openings must be kept as small as possible. The opening remaining after pipe installation must be closed with a non-flammable building material.

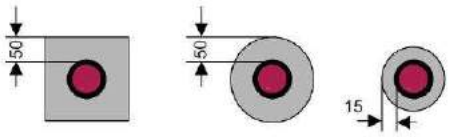
In most cases it is not recommendable to simply use cement mortar or concrete as this causes noise transmission to the wall.

We recommend to use mineral wool with a density of 90 kg/m³ and a fusion temperature ≥ 1000 °C. Do not use combustible material.

The distance from the outer pipe edge to the wall opening should be:

- no more than 50 mm in case of closing with mineral wool

- no more than 15 mm in case of intumescent material




If a branch is required directly above the ceiling, we recommend to use branches with long spigot, which facilitate the application of the mineral wool. However, it is not forbidden to place a coupling in the ceiling.

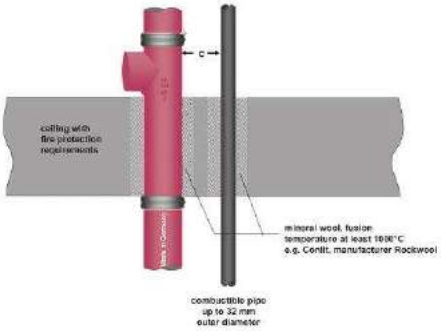
## Heat transmission (criterion I)

When passing cast iron pipes through walls or ceilings where a certain fire resistance duration is prescribed, the heat transmission through cast iron pipes must be considered. This is particularly important when combustible pipes are passed through the same wall or ceiling next to the cast iron pipe.

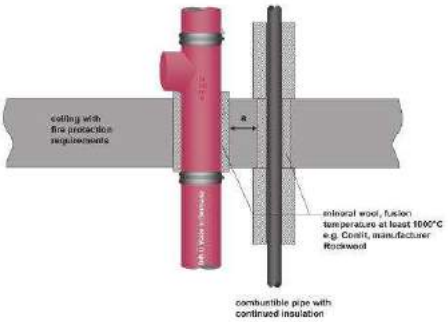
The German MLAR prescribes the following distances, which we recommend to observe:

1. DÜKER pipes next to other non-combustible pipes. The minimum distance c between the pipes is the outer diameter of the larger pipe.

2. DÜKER pipes next to combustible pipes up to 32 mm outer diameter without continued insulation. The minimum distance c between the pipes is five times the outer diameter of the combustible pipe and may not pass below the outer diameter of the cast iron pipe.



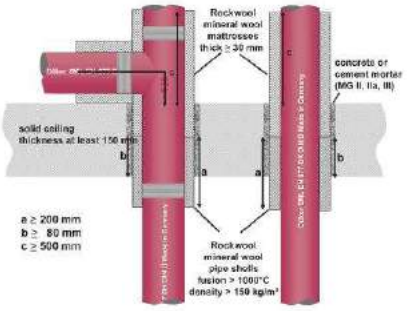

3. DÜKER pipes next to other pipes with continued insulation (prerogative for combustible pipes of more than 32 mm diameter). If the insulation is combustible, the minimum distance a between the pipe insulations is 160 mm, if it is non-combustible, 50 mm.



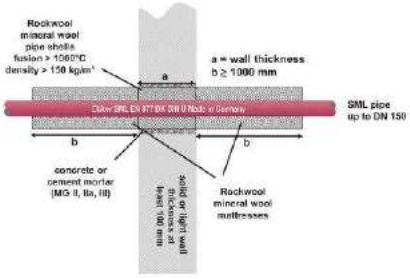

This also means that mixed installations are not to be recommended. A Düker EK Fix or any other coupling for connection of plastic pipes is not admissible near the break-through.

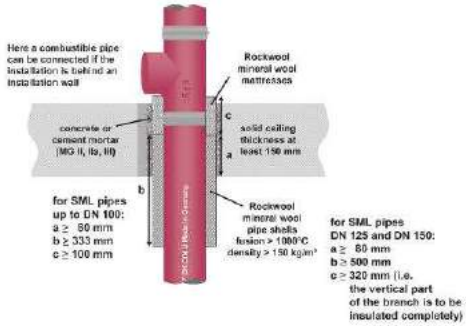
# FIRE PROTECTION

4. Only if the cast iron pipe is insulated as well in order to reduce its heat transmission, the minimum distance can be avoided. Certain solutions have been approved in Germany for this (with Dükorapid® / Rapid couplings only):




SML pipes up to DN 150

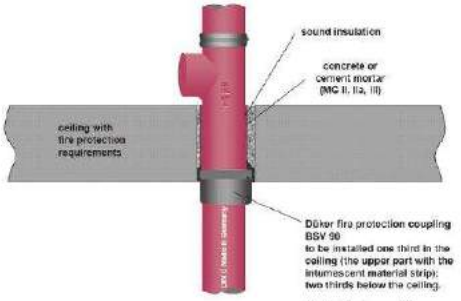



5. Düker has presented a new and faster solution for approval: The Düker fire protection coupling BSV 90 (see page 46). This coupling will also pass fire tests based on the future EN 1366-3, which calls for tests with only short open pipe spigots – a scenario that is not to be found in practice.

Inside the BSV coupling, the cast iron pipeline is interrupted by a piece of plastic pipe. Around the pipe piece, there are several layers of intumescent material, which increases its volume enormously when heated.

In case of a fire, the heat coming from the cast iron pipelines or from outside melts away the plastic pipe piece and makes the intumescent material swell so the pipe diameter is closed. The intumescent material gives thermal insulation – therefore prevents excessive heat transmission – and prevents any chimney effects.



# NOISE PROTECTION

Annex F of EN 877 says: "Cast iron pipe systems due to their high mass per unit area of their pipe walls as well as the joint design characteristics provide considerable noise reduction benefits when evacuating waste water within buildings. As a rule additional protection is therefore not required."

The noise reduction is also caused by the special structure of the material grey cast iron with lamellar graphite: Sound is refracted at the graphite lamellae and practically runs itself out of energy in the material.

**In order to prevent sound transmission through solids, contact to the masonry should be avoided:**

- the pipe system should not touch walls or ceilings at any point. Break-throughs should be closed with non-combustible mineral wool.

- fixing material should be equipped with rubber inserts, which must not be pressed too firmly to the pipe when closing the clamp.

- in very sensitive areas it may be advisable to use special noise-damping fixing clamps

- in vertical pipes, down pipe supports should not be spaced too far from each other in order to avoid too high pressure on the rubber ring.

**The water flow in the pipes must be eased to reduce flow noises:**

- transition from a down pipe of a height of 10 m or more to a horizontal pipe should be carried out using a bend with steadying distance

- connection of a down pipe to a horizontal line must be carried out with 45° branch and 45° bend

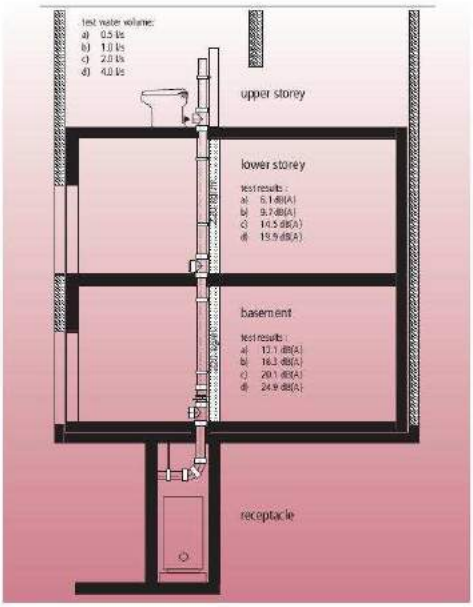
- connection of a horizontal pipe to a down pipe should be carried out with 88° branch with 45° access angle

The actual noise level depends largely on correct installation, but also on the quantity of water and on the weight per m² of walls and ceilings.

## Tests and certificates

As certified by certificate No. P-BA 443/1995 of Fraunhofer Institute, Düker cast iron pipes reached a noise level of 19.9 dB(A) in the room diagonally across from the pipeline. This was measured with walls of 220 kg/m² and a water volume of 4.0 l/s.

## Fraunhofer test assembly

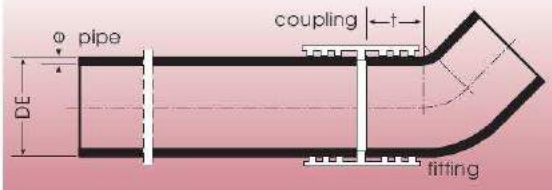



Standard noise protection (30 db(A) in rooms in need of noise protection, as per German regulations) should be no problem for correctly installed SML pipes. In order to observe elevated sound damping requirements (27 or even 24 db(A) as per German regulations) the whole building structure should be checked. However, cast iron sewage pipes are at present the sewage pipes best-suited for noise-damping.

# 01 SML DELIVERY PROGRAMME

# SML DELIVERY PROGRAMME






Construction dimensions:

Pipe diameter
Wall thicknesses
Insertion lengths (sealing zone)
Pipe weights
Surface

**SML-Pipes and Fittings (EN 877 and DIN 19 522)**

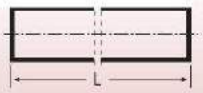
| nominal diameter | interior diameter | exterior diameter | | wall thickness pipes and fittings | | insertion lengths (sealing zone) | pipe weight empty | surface ca. m² |
|---|---|---|---|---|---|---|---|---|
| DN | $d_i$ approx. | DE | tolerance | nominal | minimum | t | ca.kg/m | per m |
| *40* | 42 | 48 | +2/-1 | 3,0 | 2,5 | 30 | 3,1 | 0,15 |
| *50* | 51 | 58 | | 3,5 | 3,0 | 30 | 4,3 | 0,18 |
| *70** | 71 | 78 | | 3,5 | 3,0 | 35 | 5,9 | 0,25 |
| *80*[1] | 75 | 83 | | 3,5 | 3,0 | 35 | 6,3 | 0,26 |
| *100* | 103 | 110 | | 3,5 | 3,0 | 40 | 8,4 | 0,35 |
| *125* | 127 | 135 | +2/-2 | 4,0 | 3,5 | 45 | 11,8 | 0,42 |
| *150* | 152 | 160 | | 4,0 | 3,5 | 50 | 14,1 | 0,50 |
| *200* | 200 | 210 | | 5,0 | 4,0 | 60 | 23,1 | 0,65 |
| *250* | 263 | 274 | +2,5/-2,5 | 5,5 | 4,5 | 70 | 33,3 | 0,85 |
| *300* | 314 | 326 | | 6,0 | 5,0 | 80 | 43,2 | 1,02 |
| *400* | 416 | 429 | +2/-3 | 6,3 | 5,0 | 80 | 60,0 | 1,35 |
| *500*** | | | | | | | | |
| *600*** | | | | | | | | |

* obsolete model, ** on request (see MLB programme)

All dimensions in mm

[1] The nominal diameter DN 80 with a minimum interior diameter of 75 mm corresponds to DN 80 as per EN 12056-2 as well as to DN 75 as per EN 877 (product standard)

Pipes




**SML-Pipe DIN 19522 – DN *40*x3000**

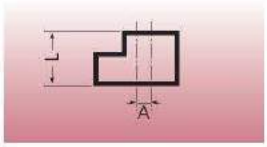
**L = 3000 mm**

| DN | kg | item no. |
|---|---|---|
| *40* | 10,5 | 660744 |
| *50* | 13,5 | 660004 |
| *70** | 18,3 | 660094 |
| *80* | 18,9 | 235145 |
| *100* | 26,5 | 660184 |
| *125* | 37,0 | 660274 |
| *150* | 43,5 | 660364 |
| *200* | 78,0 | 660454 |
| *250* | 113,0 | 660654 |
| *300* | 144,0 | 660664 |
| *400* | *187,7* | *660604* |
| *500*** | | |
| *600*** | | |

* obsolete model, ** on request (see MLB programme)

"Important notice: variable values in the item indications are printed in italics.
(example: **SML-pipe DIN 19522-DN *40*x3000**)"

Reducers (R)
(adapters)

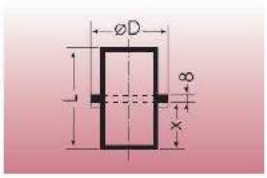



**SML-reducer DIN 19522 - *50 x 40* R**

| DN | A | L | kg | item no. |
|---|---|---|---|---|
| *50x40* | 10 | 65 | 0,5 | 662484 |
| *70x50** | 10 | 75 | 0,5 | 662504 |
| *80x50* | 12,5 | 80 | 0,7 | 235159 |
| *100x50* | 25 | 80 | 0,9 | 662514 |
| *100x70** | 16 | 85 | 0,9 | 662524 |
| *100x80* | 13,5 | 90 | 1,1 | 235161 |
| *125x50* | 38,5 | 85 | 1,4 | 662534 |
| *125x70** | 28,5 | 90 | 1,5 | 662544 |
| *125x80* | 26 | 95 | 1,7 | 235162 |
| *125x100* | 12,5 | 95 | 1,5 | 662554 |
| *150x50* | 51 | 95 | 2,0 | 662564 |
| *150x70** | 41 | 100 | 2,0 | 662574 |
| *150x80* | 37,5 | 100 | 2,3 | 235417 |
| *150x100* | 25 | 105 | 2,2 | 662584 |
| *150x125* | 12,5 | 110 | 2,2 | 662594 |
| *200x100* | 50 | 115 | 4,1 | 662604 |
| *200x125* | 37,5 | 120 | 4,1 | 662614 |
| *200x150* | 25 | 125 | 4,3 | 662624 |
| *250x150* | 57 | 140 | 6,8 | 662634 |
| *250x200* | 32 | 145 | 7,0 | 662644 |
| *300x150* | 83 | 150 | 10,7 | 662494 |
| *300x200* | 58 | 160 | 11,4 | 662714 |
| *300x250* | 26 | 170 | 12,4 | 662724 |
| *400x300*** | 51,5 | 180 | 15,0 | 662444 |

* obsolete model ** on request

Down pipe supports (FS)




**SML-down pipe support DIN 19522-*100* FS**

| DN | D | X | L | kg | item no. | |
|---|---|---|---|---|---|---|
| | | | | support **without** bearing ring | support **without** bearing ring | support **incl.** bearing ring |
| *50* | 87 | 96 | 200 | 1,3 | 661544 | 223825 |
| *70** | 106 | 96 | 200 | 1,6 | 661554 | 223830 |
| *80* | 114 | 96 | 200 | 1,8 | 235164 | 235343 |
| *100* | 145 | 96 | 200 | 2,3 | 661564 | 223834 |
| *125* | 170 | 96 | 200 | 3,0 | 661574 | 223839 |
| *150* | 195 | 96 | 200 | 4,0 | 661584 | 223841 |
| *200* | 245 | 96 | 200 | 6,0 | 661594 | 223843 |
| *250* | 340 | 146 | 300 | 19,5 | 100242 | 230053 |
| *300* | 390 | 146 | 300 | 25,5 | 100244 | 230054 |

Bearing ring


| DN | D2 | D1 | A | B | C | * | kg | item no. |
|---|---|---|---|---|---|---|---|---|
| *50* | 61 | 93 | 193 | 148 | 25 | 33 | 0,8 | 666314 |
| *70** | 81,5 | 114 | 214 | 166 | 26 | 33 | 1,0 | 666324 |
| *80* | 86,5 | 120 | 214 | 175 | 31 | 32 | 1,0 | 235344 |
| *100* | 115 | 147 | 250 | 202 | 28 | 33 | 1,3 | 666334 |
| *125* | 138 | 171 | 275 | 225,5 | 28 | 33 | 1,5 | 666344 |
| *150* | 163 | 199 | 301 | 253,5 | 30 | 33 | 2,0 | 666354 |
| *200* | 215 | 250 | 360 | 310,5 | 30 | 36 | 3,0 | 666374 |
| *250* | 280 | 344 | 442 | 392 | 34 | 40 | 5,6 | 227152 |
| *300* | 332 | 393 | 495 | 445 | 39 | 40 | 7,4 | 227153 |

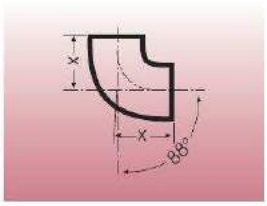
Bearing rings with rubber
for down pipe supports
(FS)

* obsolete model

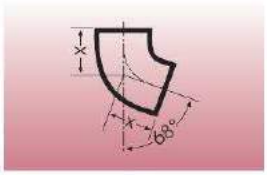
# SML DELIVERY PROGRAMME



Bend 88°

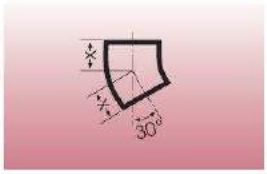



Bends 68°




Bends 45°


Bends 30°




Bends 15°


**SML-bend DIN 19522-*100-88***

| DN | X | kg | item no. |
|---|---|---|---|
| *40* | 70 | 0,5 | 661414 |
| *50* | 75 | 0,7 | 661054 |
| *70** | 90 | 1,1 | 661114 |
| *80* | 95 | 1,4 | 235150 |
| *100* | 110 | 2,1 | 661174 |
| *125* | 125 | 3,2 | 661234 |
| *150* | 145 | 4,9 | 661294 |
| *200* | 180 | 8,8 | 662784 |
| 250 | 225 | 13,8 | 233621 |
| 300 | 260 | 28,0 | 233622 |

| DN | X | kg | item no. |
|---|---|---|---|
| *50* | 65 | 0,7 | 661034 |
| *70** | 75 | 1,1 | 661094 |
| *80* | 80 | 1,2 | 235149 |
| *100* | 90 | 1,9 | 661154 |
| *125* | 105 | 2,9 | 661214 |
| *150* | 120 | 4,9 | 661274 |
| *200* | 145 | 7,7 | 661334 |

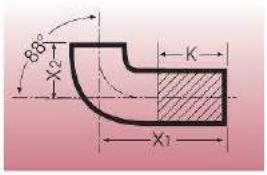
| DN | X | kg | item no. |
|---|---|---|---|
| *40* | 50 | 0,4 | 661404 |
| *50* | 50 | 0,5 | 661024 |
| *70** | 60 | 0,9 | 661084 |
| *80* | 60 | 1,0 | 235148 |
| *100* | 70 | 1,2 | 661144 |
| *125* | 80 | 2,3 | 661204 |
| *150* | 90 | 3,5 | 661264 |
| *200* | 110 | 6,5 | 661324 |
| *250* | 130 | 10,3 | 661374 |
| *300* | 155 | 17,3 | 661394 |
| *400*** | 257 | 36,0 | 661284 |

| DN | X | kg | item no. |
|---|---|---|---|
| *50* | 45 | 0,5 | 661014 |
| *70** | 50 | 0,7 | 661074 |
| *80* | 60 | 0,8 | 235147 |
| *100* | 60 | 1,3 | 661134 |
| *125* | 70 | 2,0 | 661194 |
| *150* | 80 | 3,0 | 661254 |
| *200* | 95 | 5,4 | 661314 |
| *250* | 110 | 9,7 | 661364 |
| *300* | 130 | 15,5 | 661384 |

| DN | X | kg | item no. |
|---|---|---|---|
| *50* | 40 | 0,4 | 661004 |
| *70** | 45 | 0,6 | 661064 |
| *80* | 50 | 0,7 | 235146 |
| *100* | 50 | 1,0 | 661124 |
| *125* | 60 | 1,7 | 661184 |
| *150* | 65 | 2,5 | 661244 |
| *200* | 80 | 4,6 | 661304 |

* obsolete model  ** on request

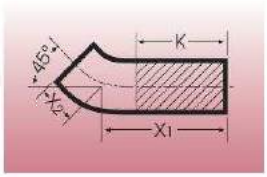
Bends 88° with 250 mm spigot (LB)




**SML-bend DIN 19522-100-88-LB**

| DN | X1 | X2 | K** | kg | item no. |
|---|---|---|---|---|---|
| *70** | 250 | 90 | 160 | 2,8 | 662064 |
| *80* | 250 | 95 | 155 | 2,6 | 236348 |
| *100* | 250 | 110 | 140 | 4,6 | 662084 |

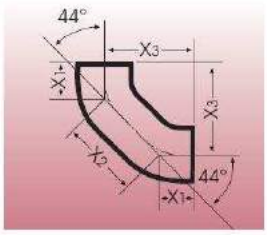
Bends 45° with 250 mm spigot (LB)




**SML-bend DIN 19522-100-45-LB**

| DN | X1 | X2 | K** | kg | item no. |
|---|---|---|---|---|---|
| *70** | 250 | 60 | 190 | 2,6 | 662054 |
| *80* | 250 | 60 | 190 | 2,5 | 236347 |
| *100* | 250 | 70 | 180 | 4,2 | 662074 |

Double bends 88° from 2 bends 44° (DB)




**SML-bend DIN 19522-*100*-88-DB**

| DN | X1 | X2 | X3 | kg | item no. |
|---|---|---|---|---|---|
| *50* | 50 | 100 | 121 | 1,2 | 661484 |
| *70** | 60 | 120 | 145 | 1,8 | 661494 |
| *80* | 60 | 120 | 145 | 2,0 | 235151 |
| *100* | 70 | 140 | 170 | 3,2 | 661504 |
| *125* | 80 | 160 | 195 | 4,6 | 661514 |
| *150* | 90 | 180 | 219 | 7,0 | 661524 |

* obsolete model, ** dimension for maximum cut-back

As per German DIN 1986, turns of base and collecting pipes may only be carried out with pre-manufactured bends. Each single bend may only have 45°.

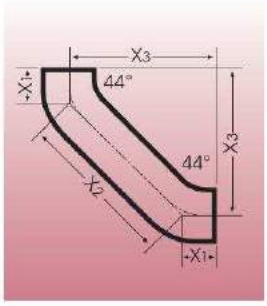
Normally, two bends 45° must be installed for this case. With the double bend, one coupling is no longer necessary and installation is simplified. Furthermore, this fitting offers the possibility of fixing a bracket in the middle.

The bend is also suitable for transition from a down pipe to a horizontal pipe and vice versa.

# SML DELIVERY PROGRAMME



Bends 88° (BB) with 250 mm steadying distance for adapting down pipes to draft pipes



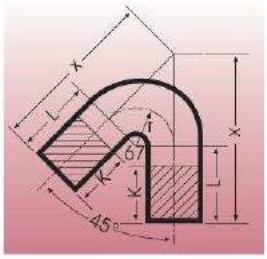

**SML-bend DIN 19522-*100*-88-BB**

| DN | X1 | X2 | X3 | kg | item no. |
|---|---|---|---|---|---|
| *70** | 60 | 301 | 273 | 3,2 | 662734 |
| *100* | 70 | 312 | 291 | 4,8 | 662744 |
| *125* | 80 | 322 | 308 | 6,8 | 662754 |
| *150* | 90 | 334 | 326 | 9,6 | 662764 |

German DIN 1986 says that for down pipes running through four to eight storeys or with a length of 10 to 22 m, special arrangements must be taken.

Supply and running bend of a draft pipe are to be resolved with a separator of 250 mm length.

Bends 135° for ventilation (bypass)

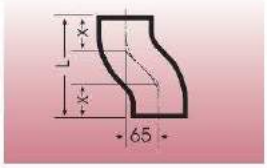



(see installation hint on page 22)

**SML-bend DIN 19522-100-135**

| DN | X | K** | L | kg | item no. |
|---|---|---|---|---|---|
| *100* | 312 | 100 | 150 | 5,0 | 662774 |

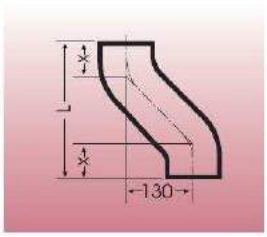
S-bends (SP)
offset (A) = 65 mm




**SML-S-bend DIN 19522-100-65 SP**

| DN | X | L | kg | item no. |
|---|---|---|---|---|
| *100* | 70 | 205 | 2,5 | 662864 |

S-bends (SP)
offset (A) = 130 mm

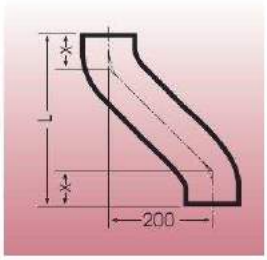



**SML-S-bend DIN 19522-100-130 SP**

| DN | X | L | kg | item no. |
|---|---|---|---|---|
| *100* | 70 | 270 | 3,5 | 662874 |

* obsolete model, ** dimension for maximum cut-back

S-bends (SP)
offset (A) = 200 mm

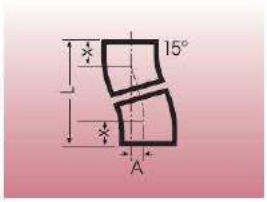



**SML-S-bend DIN 19522-100-200 SP**

| DN | X | L | kg | item no. |
|---|---|---|---|---|
| 100 | 70 | 340 | 4,5 | 662884 |

* obsolete model

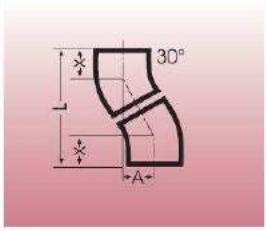
S-bends made of
2 bends 15°




**Fitting/Bend combinations**

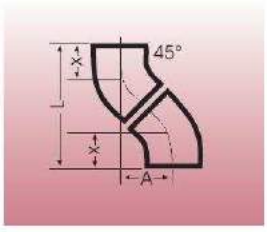
| DN | X | A | L |
|---|---|---|---|
| 50 | 40 | 27 | 162 |
| 70 | 45 | 25 | 182 |
| 80 | 50 | 26 | 197 |
| 100 | 50 | 27 | 201 |
| 125 | 60 | 32 | 241 |
| 150 | 65 | 35 | 260 |
| 200 | 80 | 43 | 319 |

S-bends made of
2 bends 30°




| DN | X | A | L |
|---|---|---|---|
| 50 | 45 | 48 | 172 |
| 70 | 50 | 53 | 191 |
| 80 | 60 | 60 | 224 |
| 100 | 60 | 63 | 228 |
| 125 | 70 | 73 | 266 |
| 150 | 80 | 83 | 303 |
| 200 | 95 | 98 | 359 |
| 250 | 110 | 113 | 415 |
| 300 | 130 | 133 | 489 |

S-bends made of
2 bends 45°

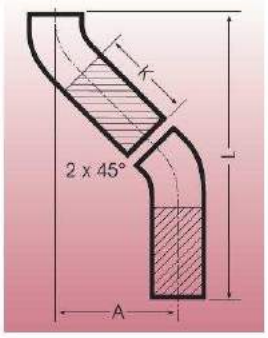



| DN | X | A | L |
|---|---|---|---|
| 50 | 50 | 74 | 174 |
| 70 | 60 | 88 | 208 |
| 80 | 60 | 85 | 205 |
| 100 | 70 | 103 | 243 |
| 125 | 80 | 117 | 277 |
| 150 | 90 | 131 | 311 |
| 200 | 110 | 159 | 379 |
| 250 | 130 | 187 | 447 |
| 300 | 155 | 223 | 533 |

# SML DELIVERY PROGRAMME



S-bends made of
2 bends 45° with
250 mm spigots



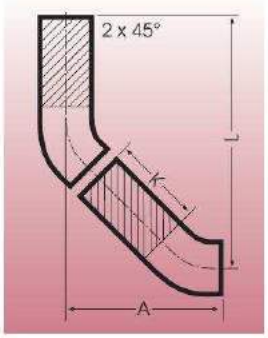

**Bend combinations**

| DN | A max. | A min. | L max. | L min. | K** |
|---|---|---|---|---|---|
| *70* | 223 | 88 | 533 | 398 | 190 |
| *80* | 223 | 88 | 533 | 398 | 190 |
| *100* | 230 | 103 | 550 | 423 | 180 |

** Dimension for maximum cut-back

Bends with 250 mm spigots can be reduced by the K-dimension at the most. This allows optimum adaptation of the pipes to the solidium. A reducing quotient of 1:1.5 can be used in site practice for 45° bends. This means: for a decrease of the distance dimensions A and L by 1 cm, the diagonally running longer spigot is to be shortened by 1.5 cm. In the above chart, 5 mm were added for the distance of the coupling. Because of the simple calculation method we dispense with the illustration of the three further combination possibilities of these bends (long spigots with long, short with short or one long spigot above).

Deviation made of
2 bends 45° with
250 mm spigots

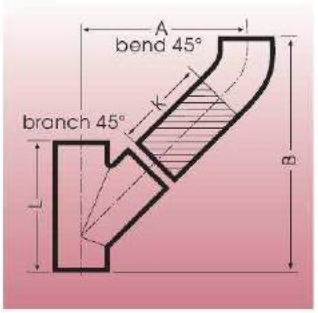



| DN | A max. | A min. | L max. | L min. | K** |
|---|---|---|---|---|---|
| *70* | 283 | 148 | 473 | 338 | 190 |
| *80* | 283 | 148 | 473 | 338 | 190 |
| *100* | 300 | 173 | 480 | 353 | 180 |

** Dimension for maximum cut-back

Due to cut-back possibilities, even the deviation made of 2 SML bends 45° with 250 mm spigots shown here allows good adaptation of the pipes to the solidium. Reducing quotient as in the previous example 1:1.5. This also is only one example out of 4 different combination possibilities. These combinations equal a hydraulically favourable and installation-friendly pipe direction with all deviations: vertical-horizontal, horizontal-vertical and horizontal-horizontal. The overall lengths "L" can also be lessened by cutting back the long supplying or draining spigots.

Combination examples
branch 45° - bend 45°



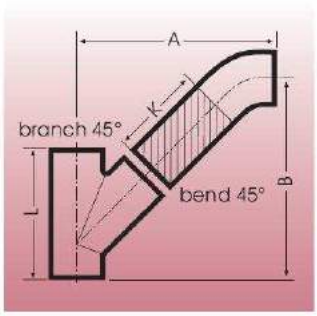

**Combinations of SML bends and branches (bend with 250 mm spigot)**

| branch 45° DN | bend 45° DN | A max. | A min. | B max. | B min. | L | K** |
|---|---|---|---|---|---|---|---|
| *70x70* | 70 | 283 | 149 | 398 | 264 | 200 | 190 |
| *80x80* | 80 | 293 | 159 | 418 | 284 | 225 | 190 |
| *100x70* | 70 | 301 | 166 | 406 | 271 | 215 | 190 |
| *100x80* | 80 | 304 | 170 | 419 | 285 | 230 | 190 |
| *100x100* | 100 | 315 | 187 | 455 | 327 | 260 | 180 |
| *125x70* | 70 | 311 | 177 | 411 | 277 | 225 | 190 |
| *125x80* | 80 | 322 | 187 | 422 | 287 | 240 | 190 |
| *125x100* | 100 | 329 | 202 | 459 | 332 | 270 | 180 |

** Dimension for maximum cut-back

The reducing quotient 1:1.5 in site praxis is also permitted here. When decreasing the distances A and B by 1 cm (both change at the same time), the bend must be cut back by 1.5 cm.

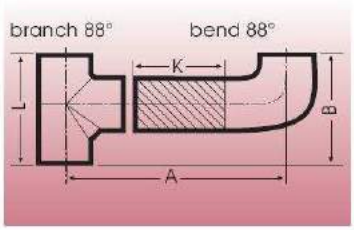
# 01 SML DELIVERY PROGRAMME




| branch 45° DN | bend 45° DN | A max. | A min. | B max. | B min. | L | K** |
|---|---|---|---|---|---|---|---|
| 70x70 | 70 | 343 | 209 | 338 | 204 | 200 | 190 |
| 80x80 | 80 | 353 | 219 | 358 | 224 | 225 | 190 |
| 100x70 | 70 | 361 | 226 | 346 | 212 | 215 | 190 |
| 100x80 | 80 | 364 | 230 | 359 | 225 | 230 | 190 |
| 100x100 | 100 | 385 | 257 | 385 | 257 | 260 | 180 |
| 125x70 | 70 | 371 | 237 | 351 | 217 | 225 | 190 |
| 125x80 | 80 | 382 | 247 | 362 | 227 | 240 | 190 |
| 125x100 | 100 | 399 | 272 | 389 | 262 | 270 | 180 |

** Dimension for maximum cut-back

Combination examples
branch 88° - bend 88°

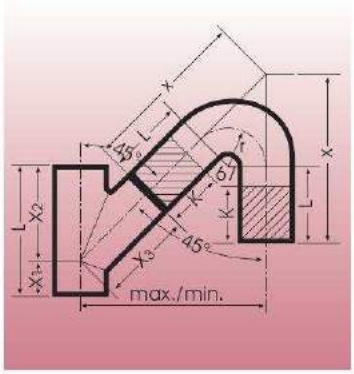



| branch 88° DN | bend 88° DN | A max. | A min. | B | L | K* |
|---|---|---|---|---|---|---|
| 70x70 | 70 | 350 | 190 | 187 | 180 | 160 |
| 80x80 | 80 | 350 | 195 | 197 | 180 | 155 |
| 100x70 | 70 | 365 | 205 | 192 | 190 | 160 |
| 100x80 | 80 | 365 | 210 | 207 | 190 | 155 |
| 100x100 | 100 | 370 | 230 | 225 | 220 | 140 |
| 125x70 | 70 | 380 | 220 | 197 | 200 | 160 |
| 125x80 | 80 | 380 | 225 | 213 | 205 | 155 |
| 125x100 | 100 | 385 | 245 | 235 | 235 | 140 |

** Dimension for maximum cut-back

In this case, the reducing quotient is 1:1. The distance A changes identically to the reduction of the bend.

Dimensional tolerances for distance B which theoretically result from the descent are unimportant for installation practice.



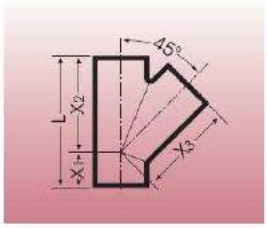

| Combinations of SML branches 45° and SML bends 135° for bypasses | | |
|---|---|---|
| DN | max. | min. |
| 100x100 | 370 | 300 |
| 125x100 | 380 | 310 |
| 150x100 | 395 | 325 |
| 200x100 | 410 | 340 |

As per German DIN 1986, special laying arrangements are necessary for waste water down pipes which run through more than 4 storeys if change of direction takes place due to the thus developing pressure ratio. This makes it necessary to use a bypass with 135°.

# SML DELIVERY PROGRAMME



branches 45°




Due to the appearance of the European standard for SML pipes and fittings 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.

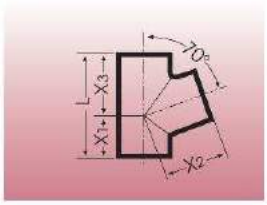
**SML-branch DIN 19522-70x50-45**

| DN | $X_1$ | $X_2$ | $X_3$ | L | kg | item no. |
|---|---|---|---|---|---|---|
| 40x40 | 45 | 115 | 115 | 160 | 1,0 | 664544 |
| 50x40 | 45 | 115 | 115 | 160 | 1,1 | 664554 |
| 50x50 | 50 (45) | 135 (115) | 135 (115) | 185 (160) | 1,4 (1,2) | 663004 |
| 70x50* | 40 | 150 (130) | 150 (130) | 190 (170) | 1,6 | 663034 |
| 80x50 | 50 | 140 | 140 | 190 | 1,8 | 235152 |
| 70x70* | 55 | 160 (145) | 160 (145) | 215 (200) | 2,3 (2,1) | 663064 |
| 80x80 | 65 | 160 | 160 | 225 | 2,4 | 235154 |
| 100x50 | 35 (30) | 165 (150) | 165 (150) | 200 (180) | 2,5 (2,3) | 663094 |
| 100x70* | 50 (45) | 185 (170) | 185 (170) | 235 (215) | 3,3 (3,0) | 663124 |
| 100x80 | 55 | 175 | 175 | 230 | 3,3 | 235156 |
| 100x100 | 70 | 205 (190) | 205 (190) | 275 (260) | 4,2 (3,8) | 663154 |
| 125x50 | 20 | 185 (170) | 185 (170) | 205 (190) | 3,4 (3,2) | 663184 |
| 125x70* | 40 | 200 (185) | 200 (185) | 240 (225) | 4,3 (4,0) | 663214 |
| 125x80 | 40 | 200 | 200 | 240 | 4,4 | 235342 |
| 125x100 | 60 | 220 (210) | 220 (210) | 280 (270) | 5,2 (5,0) | 663244 |
| 125x125 | 80 (75) | 240 (230) | 240 (230) | 320 (305) | 6,4 (6,1) | 663274 |
| 150x70* | 30 | 215 (205) | 215 (205) | 245 (235) | 5,6 (5,3) | 663334 |
| 150x80 | 30 | 215 | 215 | 245 | 5,9 | 235415 |
| 150x100 | 55 | 240 (225) | 240 (225) | 295 (280) | 6,8 (6,5) | 663364 |
| 150x125 | 70 | 255 (245) | 255 (245) | 325 (315) | 8,0 (7,7) | 663394 |
| 150x150 | 90 | 265 | 265 | 355 | 9,2 | 663424 |
| 200x70* | 15 | 240 (235) | 240 (235) | 255 (250) | 8,1 (8,0) | 663484 |
| 200x80 | 15 | 240 | 240 | 255 | 8,5 | 235416 |
| 200x100 | 40 | 265 (260) | 265 (260) | 305 (300) | 10,0 (9,8) | 663514 |
| 200x125 | 55 | 280 | 280 | 335 | 11,9 | 663544 |
| 200x150 | 75 | 300 | 300 | 375 | 13,3 | 663574 |
| 200x200 | 115 | 340 | 340 | 455 | 17,2 | 663604 |
| 250x100 | 15 | 310 (305) | 310 (305) | 325 (320) | 15,4 | 663634 |
| 250x125 | 35 | 335 (330) | 335 (330) | 370 (365) | 17,7 | 664504 |
| 250x150 | 55 | 350 | 350 | 405 | 20,2 | 664514 |
| 250x200 | 90 | 385 (380) | 385 (380) | 475 (470) | 25,1 (24,8) | 663644 |
| 250x250 | 130 | 430 | 430 | 560 | 31,5 | 663654 |
| 300x100 | 5 | 345 | 345 | 350 | 22,0 | 663664 |
| 300x125 | 15 | 360 | 360 | 375 | 23,9 | 664524 |
| 300x150 | 35 | 380 | 380 | 415 | 26,9 | 664534 |
| 300x200 | 70 | 415 | 440 | 485 | 34,0 | 664444 |
| 300x250 | 115 | 465 | 465 | 580 | 42,1 | 663674 |
| 300x300 | 155 | 505 | 505 | 660 | 50,1 | 663684 |
| 400x300** | 105 | 555 | 565 | 660 | 60,0 | 663694 |

* obsolete model

** on request

Branches 70°
(no longer listed in the new German standard version)

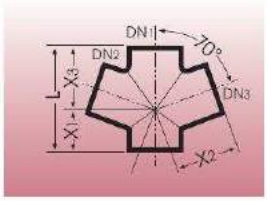



**SML-branch DIN 19522-*70x50-70***

| DN | $X_1$ | $X_2$ | $X_3$ | L | kg | item no. |
|---|---|---|---|---|---|---|
| *50x50* | 55 | 80 | 80 | 135 | 0,9 | 663014 |
| *70x50** | 55 | 90 | 90 | 145 | 1,2 | 663044 |
| *70x70** | 70 | 100 | 100 | 170 | 1,6 | 663074 |
| *100x50* | 55 | 110 | 100 | 155 | 1,9 | 663104 |
| *100x70** | 70 | 120 | 110 | 180 | 2,3 | 663134 |
| *100x100* | 85 | 130 | 130 | 215 | 3,0 | 663164 |
| *125x50* | 55 | 120 | 110 | 165 | 2,7 | 663194 |
| *125x70** | 70 | 130 | 120 | 190 | 3,2 | 663224 |
| *125x100* | 85 | 145 | 140 | 225 | 4,8 | 663254 |
| *125x125* | 100 | 155 | 155 | 255 | 4,8 | 663284 |
| *150x100* | 85 | 155 | 150 | 235 | 5,3 | 663374 |
| *150x125* | 100 | 170 | 165 | 265 | 6,2 | 663404 |
| *150x150* | 115 | 180 | 180 | 295 | 7,2 | 663434 |
| *200x100** | 85 | 185 | 170 | 255 | 8,6 | 663524 |
| *200x125** | 100 | 195 | 185 | 285 | 9,8 | 663554 |

* obsolete model

Double branches 70°
(no longer listed in the new German standard version)




**SML-double branch DIN 19522-*100x100x100-70* D**

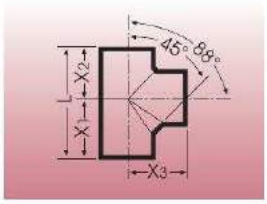
| DN | $X_1$ | $X_2$ | $X_3$ | L | kg | item no. |
|---|---|---|---|---|---|---|
| *100x100x100* | 85 | 130 | 130 | 215 | 3,5 | 663864 |
| *125x100x100* | 85 | 145 | 140 | 225 | 5,0 | 663954 |

Important note on 70° branches:
As per German DIN 1986, for connection of horizontal pipes up to DN 70 to down pipes, branches of 88° are to be used. This is to prevent underpressure in the connecting pipes. SML branches 88° with an access angle of 45° also allow to connect larger diameters from DN 100 up to the down pipe. This is space-saving and guarantees connecting pipes without negative pressure. Therefore 70° branches are no longer required and are no longer contained in German DIN 19522. As 70° branches are however still on demand, we sell a reduced range of 70° branches until further notice.

# SML DELIVERY PROGRAMME



Branches 88°
access angle 45°

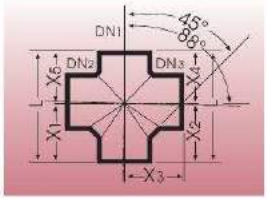



**SML-branch DIN 19522-*70x50*-88**

| DN | X1 | X2 | X3 | L | kg | item no. |
|---|---|---|---|---|---|---|
| *50x50* | 79 | 66 | 80 | 145 | 0,9 | 663024 |
| *70x50** | 83 | 72 | 90 | 155 | 1,4 | 663054 |
| *80x50* | 95 | 85 | 90 | 180 | 1,5 | 235153 |
| *70x70** | 97 | 83 | 95 | 180 | 1,7 | 663084 |
| *80x80* | 95 | 85 | 95 | 180 | 1,7 | 235155 |
| *100x50* | 94 | 76 | 105 | 170 | 2,1 | 663114 |
| *100x70** | 102 | 88 | 110 | 190 | 2,4 | 663144 |
| *100x80* | 105 | 85 | 110 | 190 | 2,6 | 235157 |
| *100x100* | 115 | 105 | 120 | 220 | 2,9 | 663174 |
| *125x50* | 98 | 82 | 120 | 180 | 3,0 | 663204 |
| *125x70** | 107 | 93 | 125 | 200 | 3,4 | 663234 |
| *125x80* | 110 | 94 | 125 | 205 | 3,4 | 235158 |
| *125x100* | 125 | 110 | 130 | 235 | 4,0 | 663264 |
| *125x125* | 137 | 123 | 135 | 260 | 4,6 | 663294 |
| *150x50* | 100 | 100 | 140 | 200 | 4,4 | 663324 |
| *150x100* | 130 | 115 | 145 | 245 | 5,5 | 663384 |
| *150x125* | 147 | 128 | 150 | 275 | 6,2 | 663414 |
| *150x150* | 158 | 142 | 155 | 300 | 6,9 | 663444 |

* obsolete model

Double branches 88°
access angle 45°

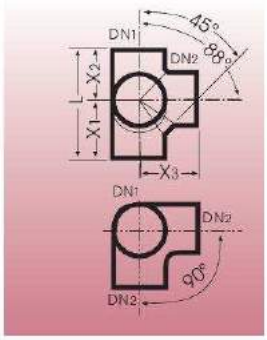



**SML-double branch DIN 19522-*150x100*-88 D**

| DN1 | DN2 | DN3 | X1 | X2 | X3 | X4 | X5 | L | kg | item no. |
|---|---|---|---|---|---|---|---|---|---|---|
| *100* | *50* | *50* | 100 (94) | 100 (94) | 105 | 80 (76) | 80 (76) | 180 (170) | 2,2 | 663814 |
| *100* | *70* | *70** | 102 | 102 | 110 | 88 | 88 | 190 | 2,7 | 663844 |
| *100* | *80* | *80* | 110 | 110 | 120 | 95 | 95 | 205 | 3,2 | 236353 |
| *100* | *100* | *100* | 120 (115) | 120 (115) | 120 (115) | 110 (105) | 110 (105) | 230 (220) | 3,2 | 663874 |
| *150* | *100* | *70** | 130 | 112 | 145 | 133 | 115 | 245 | 6,3 | 664184 |
| *150* | *100* | *100* | 130 | 130 | 145 | 115 | 115 | 245 | 7,1 | 664084 |

* obsolete model

Corner branches 88° (EA)
access angle 45°;
corner angle 90°

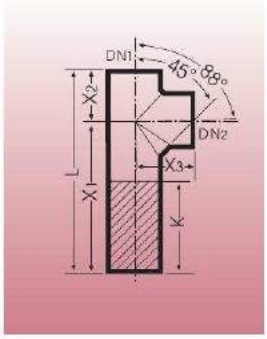



**SML-corner branch DIN 19522-*100x70*-88 EA**

| DN1 | | DN2 | X1 | X2 | X3 | L | kg | item no. |
|---|---|---|---|---|---|---|---|---|
| *80* | x | *80* | 105 | 90 | 105 | 195 | 2,2 | 235850 |
| *100* | x | *70** | 102 | 88 | 110 | 190 | 2,7 | 662044 |
| *100* | x | *80* | 110 | 95 | 120 | 205 | 2,9 | 236346 |
| *100* | x | *100* | 115 | 105 | 120 (115) | 220 | 3,4 | 662034 |
| *125* | x | *80* | 125 | 110 | 140 | 235 | 4,2 | 235846 |
| *125* | x | *100* | 125 | 110 | 130 | 235 | 5,0 | 662014 |
| *150* | x | *100* | 130 | 115 | 145 | 245 | 7,1 | 664434 |

* obsolete model

branches 88°(AL)
with long spigot
access angle 45°

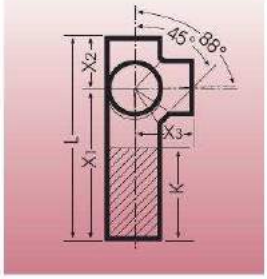



**SML-branch DIN 19522 - 100x100-88 AL**

| DN | X1 | X2 | X3 | L | K** | kg | item no. |
|---|---|---|---|---|---|---|---|
| *100x100* | 325 | 105 | 115 | 430 | 210 | 4,6 | 664454 |

** dimension for maximum cut-back
especially suited for ceiling break-throughs

Corner branches 88° (EAL)
with long spigot
access angle 45°;
corner angle 90°

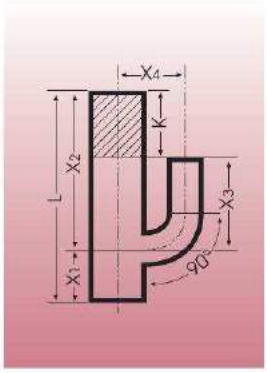



**SML-corner branch DIN 19522 - 100x100x100-88 EAL**

| DN | X1 | X2 | X3 | L | K** | kg | item no. |
|---|---|---|---|---|---|---|---|
| *100x100x100* | 325 | 105 | 115 | 430 | 210 | 5,2 | 664464 |

** dimension for maximum cut-back
especially suited for ceiling break-throughs

Parallel branches (P)




**SML-parallel branch DIN 19522-100x70 P**

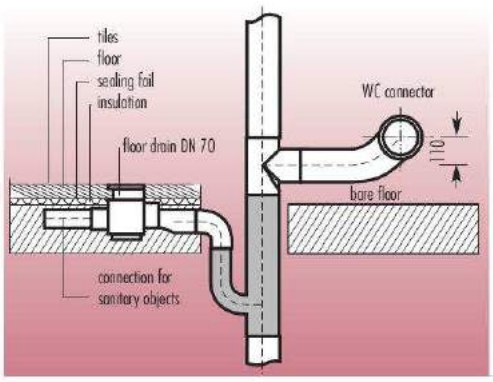
| DN | X1 | X2 | X3 | X4 | L | K** | kg | item no. |
|---|---|---|---|---|---|---|---|---|
| *100x70** | 100 | 300 | 175 | 125 | 400 | 125 | 6,5 | 664474 |

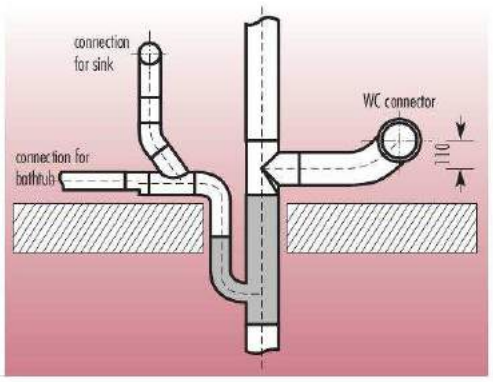
* obsolete model
** dimension for maximum cut-back

# SML DELIVERY PROGRAMME

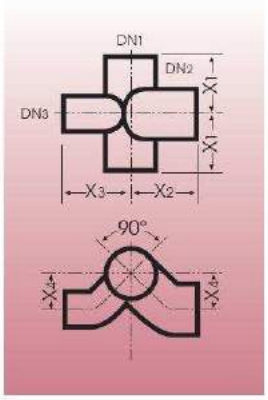


## Installation examples SML parallel branch




Combination branches (K)
access angle 45°



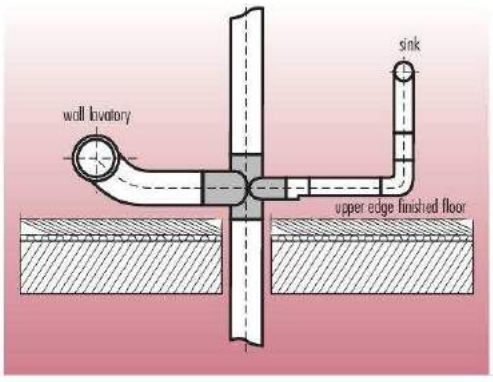

**SML-combination branch DIN 19522 - 100x100x*80*-90 K**

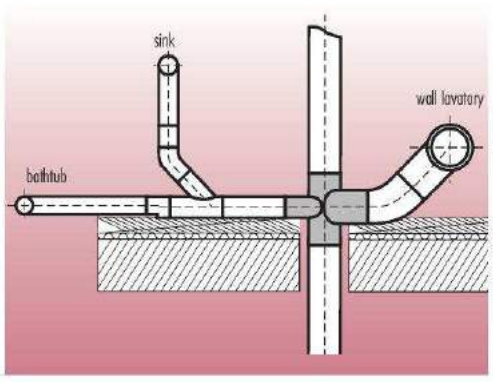
| DN | $X_1$ | $X_2$ | $X_3$ | $X_4$ | kg | item no. |
|---|---|---|---|---|---|---|
| *100x100x70** | 115 | 140 | 130 | 70 | 4,6 | 665834 |
| *100x100x80* | 115 | 140 | 135 | 70 | 4,7 | 235345 |
| *100x100x100* | 115 | 140 | 140 | 70 | 5,0 | 665924 |

* obsolete model

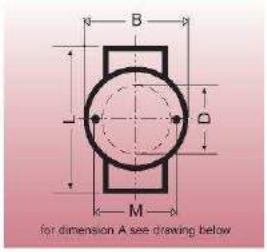
The easy-flow designed double branch for space-saving waste water supplies to down pipes in pipe shafts, behind faced brickwork or in sanitary blocks allows simultaneous connection to various sanitary objects. Because of the double-sided arrangement of the access angles at 45°, this branch can be installed laterally reversed by vertical turning of 180°.
**It allows the level connection of WC and, for example, bathtub.**

## Installation examples SML combination branch



Inspection pipes for down pipes, with round opening (RRrd)

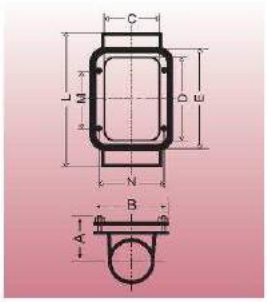



**SML-inspection pipe DIN 19522 - *100* RRrd**

| DN | A | B | D | L | kg | item no. |
|---|---|---|---|---|---|---|
| *50* | 59 | 105 | 53 | 190 | 2,3 | 669580 |
| *70** | 69 | 125 | 73 | 210 | 2,9 | 669583 |
| *80* | 74 | 135 | 78 | 220 | 3,1 | 235166 |
| *100* | 84 | 159 | 104 | 260 | 5,0 | 669586 |

* obsolete model
with toroidal sealing ring in EPDM as per DIN 4060

Inspection pipes for horizontal and down pipes, with rectangular opening (RRrk)

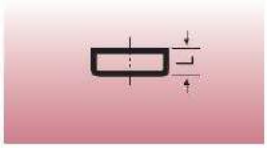



**SML-inspection pipe DIN 19522 - *100* RRrk**

| DN | A | B | C | D | E | L | M | N | kg | item no. |
|---|---|---|---|---|---|---|---|---|---|---|
| *100* | 83 | 160 | 100 | 200 | 230 | 340 (320) | 130 | 130 | 7,6 | 669624 |
| *125* | 101 | 190 | 125 | 225 | 255 | 370 (355) | 150 | 160 | 10,3 | 669627 |
| *150* | 112 | 215 | 150 | 250 | 280 | 395 | 170 | 180 | 14,5 | 669630 |
| *200* | 137 | 262 | 200 | 300 | 330 | 465 | 200 | 235 | 22,0 | 669633 |
| *250* | 170 | 330 | 259 | 350 | 426 (380) | 570 (540) | 230 | 300 | 36,5 | 669612 |
| *300* | 195 | 380 | 309 | 400 | 476 (430) | 640 (610) | 280 | 350 | 51,0 | 669615 |

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 (ED)

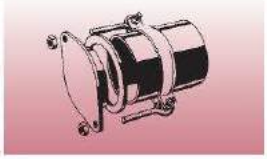



**SML-plug DIN 19522 – *100* ED**

| DN | L | kg | item no. |
|---|---|---|---|
| *50* | 30 | 0,2 | 665504 |
| *70** | 35 | 0,4 | 665514 |
| *80* | 35 | 0,5 | 235163 |
| *100* | 40 | 0,5 | 665524 |
| *125* | 45 | 1,1 | 665534 |
| *150* | 50 | 1,7 | 665544 |
| *200* | 60 | 3,1 | 665554 |
| *250* | 70 | 6,0 | 665564 |
| *300* | 80 | 9,5 | 665574 |

* obsolete model
further diameters on request.

Plugs with security collars



**SML-plug**

| DN | kg | item no. |
|---|---|---|
| *100* | 1,1 | 664804 |
| *125* | 1,5 | 664814 |
| *150* | 2,1 | 664824 |
| *200* | 3,3 | 664834 |

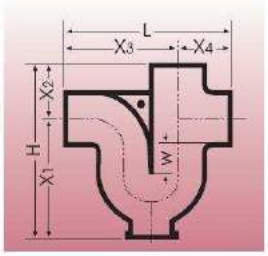
rubber seal in EPDM

| | | |
|---|---|---|
| *100* | 0,05 | 100700 |
| *125* | 0,07 | 100701 |
| *150* | 0,09 | 100702 |
| *200* | 0,11 | 100703 |

# SML DELIVERY PROGRAMME



Siphons (G)




**SML-siphon DIN 19522 - *100* - G**

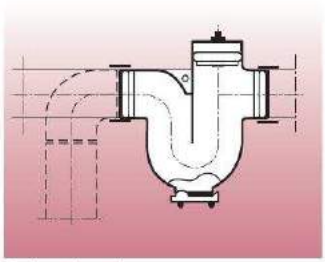
| DN | L | H | X1 | X2 | X3 | X4 | W | kg | item no. |
|---|---|---|---|---|---|---|---|---|---|
| *50* | 190 | 250 | 182 | 68 | 122 | 68 | 60 | 2,8 | 669562 |
| *70** | 265 | 293 | 200 | 93 | 172 | 93 | 60 | 5,0 | 669563 |
| *80* | 265 | 285 | 190 | 95 | 170 | 95 | 80 | 5,8 | 235165 |
| *100* | 325 | 392 | 282 | 110 | 215 | 110 | 100 | 8,5 | 669564 |
| *125* | 390 | 446 | 316 | 130 | 260 | 130 | 100 | 13,0 | 669565 |
| *150* | 470 | 493 | 348 | 145 | 325 | 145 | 100 | 19,5 | 669566 |
| *200* | 600 | 600 | 420 | 180 | 400 | 200 | 100 | 33,7 | 669567 |

* obsolete model

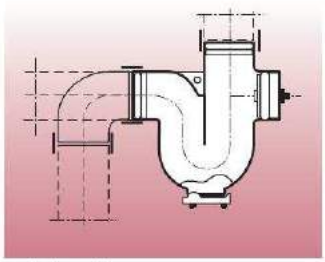
Cleaning trap for DN 50 to 150 below; for DN 200 above.

The supplying side of the SML siphons DN 50 to DN 200 may be connected either to the horizontal or the vertical pipe. Bends can guide the outlet into different directions. The supply opening not used is to be closed with a hermetic plug with press-sealing automatically supplied.

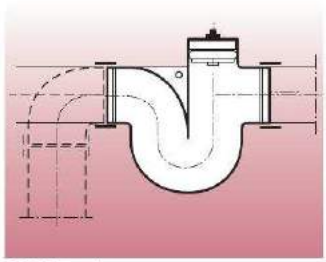
## Installation examples



horizontal supply

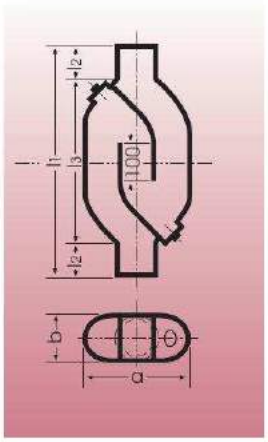


vertical supply



DN 200 version

Rain water pipe siphons (RGV)



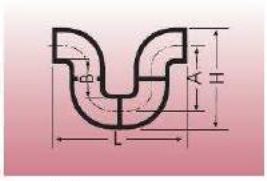

**SML-siphons DIN 19522 - *100* - RGV**

| DN | a | b | l2 | l3 | l1 | kg | item no. |
|---|---|---|---|---|---|---|---|
| *70** | 195 | 90 | 80 | 312 | 472 | 9,0 | 669557 |
| *80* | 195 | 90 | 70 | 333 | 472 | 9,6 | 236357 |
| *100* | 276 | 124 | 90 | 408 | 588 | 18,5 | 669558 |
| *125* | 344 | 144 | 100 | 487 | 687 | 28,5 | 669559 |
| *150* | 374 | 179 | 110 | 522 | 742 | 38,0 | 669560 |

* obsolete model

100 mm sealing height, vertical version with upper and lower cleaning hole for installation in rain water down pipes. Use of this odour trap is necessary when run-off areas (e.g. balcony or patio drainage) are connected to the rain water pipes which join mixed water pipes. Installation must be carried out in a frost-protected area - we advise above the cleaning hole before junction of the down pipe into the base pipe.

Odour trap as a combination of bends and fittings with a minimum sealing height of 100 mm

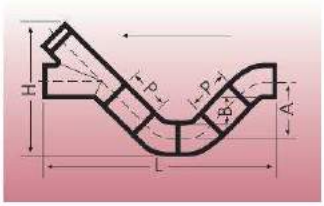



Example 1:
DN 70 to 150 with 4 bends 88°

**SML fittings and fitting combinations**

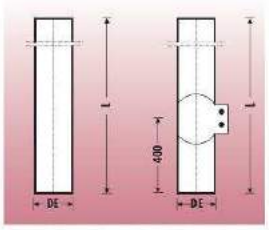
| DN | A | B | H | L |
|---|---|---|---|---|
| *70** | 185 | 115 | 263 | 375 |
| *80* | 190 | 108 | 272 | 393 |
| *100* | 225 | 125 | 335 | 457 |
| *125* | 255 | 130 | 390 | 518 |
| *150* | 295 | 145 | 455 | 600 |

Example 2: DN 200 to 300
with 1 branch 45°, 3 bends 45°,
1 hermetic plug, 2 pipe cuttings




| DN | A | B | H | L | P |
|---|---|---|---|---|---|
| *200* | 300 | 100 | 766 | 1280 | 195 |
| *250* | 350 | 100 | 941 | 1525 | 225 |
| *300* | 400 | 100 | 1096 | 1775 | 246 |

Rain water standpipes
without socket



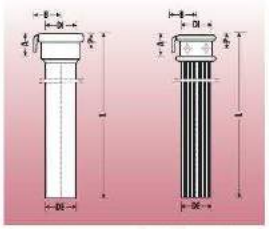

**SML-rain water standpipe**

| Type | DN | DE | L | kg | item no. |
|---|---|---|---|---|---|
| without inspection opening | 100 | 110 | 1000 | 8,8 | 660264 |
| with inspection opening | 100 | 110 | 1000 | 8,6 | 669646 |

For connection to pipes of other materials (zinc, copper etc) in dimension 80 - 100 mm.
Pipes inside with yellow epoxy coating, outside with a reddish brown primer coating.
Inspection opening: chromium steel collar
Fixing: with normal pipe clamps

**Attention:** For a durable good appearance we recommend to coat rainwater standpipes after installation. Suitable paints are alkyd or acrylic varnishes with corrosion protection additive.

Rain water standpipes
with socket



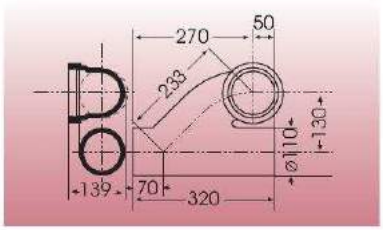

**SML-rain water standpipe**

| Type | DN | DE | DI* | L | B | A | P** | kg | item no. |
|---|---|---|---|---|---|---|---|---|---|
| round | 100 | 110 | 110 | 1000 | 85 | 81 | 45 | 9,4 | 662230 |
| antique | 100 | 110 | 110 | 1000 | 88 | 72 | 50 | 13,5 | 662240 |

* outer diameter of connecting pipe. Standpipes can be connected to rainwater downpipes made of zinc, copper or plastics.
** Insertion length. For easier insertion we recommend to cut the pipe ends in an angle.
Phosphated inside and outside, coating on a PVC basis in shade RAL 7032 (grey)
Sockets with inserted EPDM sealing. Fixing with the integrated socket hook and a fixing loop (not delivered), consisting e.g. of a U profile and a bolt. The minimum distance to the wall is 20mm, wider distances can be realised through further wedges.

**Attention:** For a durable good appearance we recommend to coat rainwater standpipes after installation. Suitable paints are alkyd or acrylic varnishes with corrosion protection additive.

WC branch DN 100 (R) (L) for modernisation of old buildings

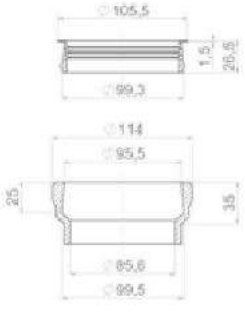



**SML-WC branch DIN 19522 - 100 - 90 R**

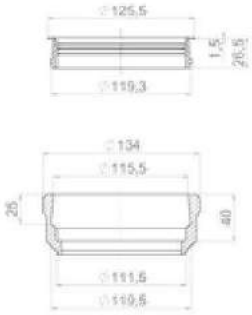
| DN | Version | plastic pipe connection DN | kg | item no. |
|---|---|---|---|---|
| 100 | left | 100 | 7,0 | 662164 |
| 100 | right | 100 | 7,0 | 662174 |

illustration: right version

## Dimensions of special sockets and rubber joints




WC socket for plastic pipe connection DN 90

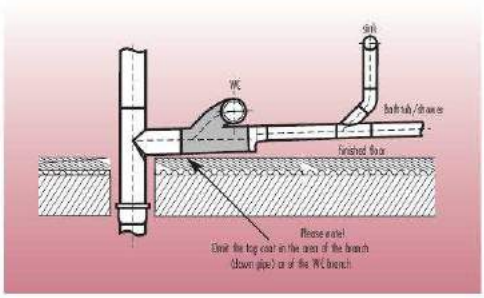



WC socket for plastic pipe connection DN 100

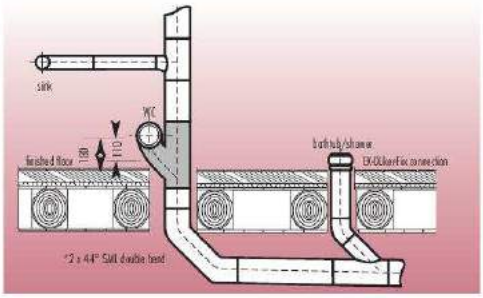
## Installation examples

**SML WC branch for modernisation of old buildings.** This special branch is meant for connecting a standing WC when laying SML pipe onto an already finished floor (e.g. when modernising an old building). With use of this WC branch, it is possible to lay the collective connecting pipe onto the existing floor. The **top coat in the area of the branch (down pipe) must be omitted.** The connection height of a standing WC with horizontal outlet is generally 180 mm from the middle of the WC outlet to the upper edge of the finished floor. A customary WC connecting piece (outer dimension 110 mm, in plastic) is necessary for the connection of the WC outlet to the SML connecting socket.

**Example 1:**
Installation of the branch into a collective connecting pipe for connection of a standing WC with horizontal outlet.




**Example 2:**
Installation of a branch into a down pipe for the connection of a standing WC with horizontal exit. **Only surface-cistern, close-coupled cistern or flushing valve possible.**

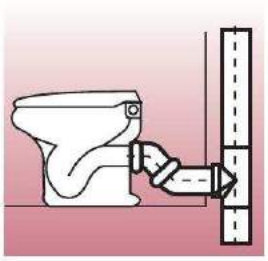



** Installation guideline for waste water down pipes as per German DIN 1986:*
*"Foot bends of 88° ± 2° are permitted for down pipes which do not run through more than three storeys or which are not longer than 10 m and which pass over to horizontal pipes."*
*However, we recommend using the 2 x 44° double bend for sound insulation reasons.*

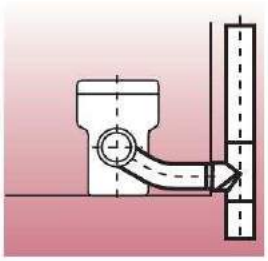
## Connection examples standing WC

1. Standing WC with hidden vertical outlet. Connection to a cast iron WC connection bend with a plastic WC connection piece.

2. Standing WC with horizontal outlet. Connection to a cast iron WC connection bend with a plastic WC connection bend 90°.



3. Standing WC with horizontal outlet. Wall connection to a cast iron WC branch 88° in a down pipe. The difference in height of 100 mm between the water level of the WC odour trap and the base of the connecting pipe necessary in this case is achieved by putting two plastic connecting pipes 45° into one another. The normal SML branch DN 100 88° with Düker-Fix connection can be used for wall connection instead of the WC branch.



4. Standing WC with horizontal exit. Wall connection on the side with the down pipe. The necessary difference in height in the connecting pipe is achieved by a cast iron WC bend which shows an offset of 110 mm. The WC with a straight plastic WC connection piece is connected to this bend.

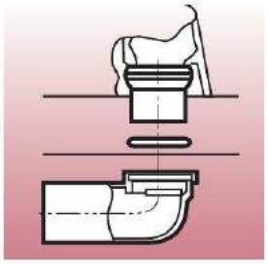
**Installation notes for WC connectors**

In general: When connecting WC connectors to down pipes we recommend SML branches 88° with 45° access angle which offer the best draining conditions.

**WC connectors should be inserted into the down pipes so that the difference in height between the water level of the WC siphon and the base of the connecting pipe at the junction into the down pipe is at least the DN (100 mm for DN 100). Please always note this rule when connecting lavatories with horizontal outlets to the wall.**

As per current state of the art, **standing WCs** are only supplied with vertical or horizontal outlet. Plastic WC connecting pieces Ø 110 mm with sealing lips or compression connections are used for joining the WC outlet to the cast iron (bend 22°, 45° and 90° as well as straight connecting pieces).

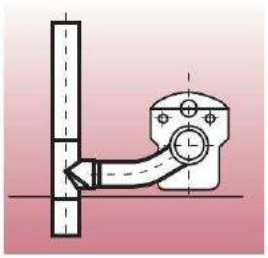
## Connection examples standing WC / wall WC



5. Connection detail: Plastic WC connection piece, cast iron WC connection bend with special socket and rubber seal.

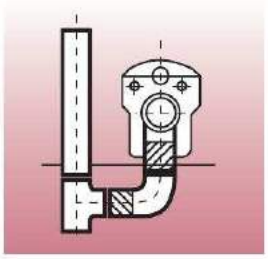
Wall WC connections are carried out by joining straight plastic WC connection pieces Ø 110 mm and sealing lips to cast iron WC connection pieces with special socket and sealing ring.

The connection may not be carried out directly to the down pipe, but only via bends or bend combinations which consider the difference in height of at least 100 mm.

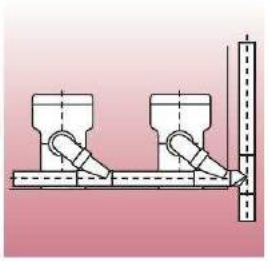


6. Wall WC connection with cast iron WC connection bend and plastic WC connection pieces.

The cast iron WC connection bends which show an offset of 110 mm and can be connected (almost) horizontally to a SML branch 88° guarantee an optimum of draining conditions. The simple WC connection bends should only be used when the given difference in height is reached due to the arrangement of the connecting pipe (refer to installation example no. 7). The simple WC double socket connector for the double-sided connection of wall WC is only intended for vertical arrangement since otherwise washing-ins from both sides would occur.

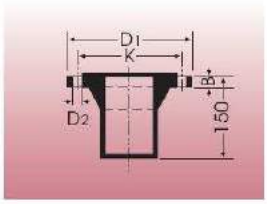


7. Wall WC connection with cast iron WC connection bend, a SML bend 88° with spigot and a plastic WC connection piece.



8. Standing WC with 4.5 or 6 l flush tank with plastic bend DN 90, EK-Düker-Fix coupling DN 80 and branch 45° DN 80. Both horizontal and down pipe are also in DN 80. **Attention:** this solution is not approved in all countries. If DN 80 cast iron pipes are not admissible for toilet drainage in your country, we recommend to connect the DN 90 plastic bend to a DN 100 cast iron branch via a transition coupling by Mücher (www.muecher.com).

Flange connecting pieces (FL)



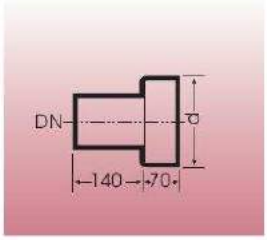

**SML-flange connecting piece DIN 19522 - *150* - FL**

| DN | D1 | D2 | B | K* | screws 8 pcs | kg | item no. |
|---|---|---|---|---|---|---|---|
| *100* | 220 | 18 | 24 | 180 | M16 | 5,8 | 665934 |
| *125* | 250 | 18 | 26 | 210 | M16 | 8,0 | 665944 |
| *150* | 285 | 22 | 26 | 240 | M20 | 9,8 | 665954 |
| *200* | 340 | 22 | 26 | 295 | M20 | 14,5 | 665964 |

Delivery without screws and seals

*8 holes, PN6/PN10 as per EN 1092-2

Cast iron connection pieces for stoneware (E)

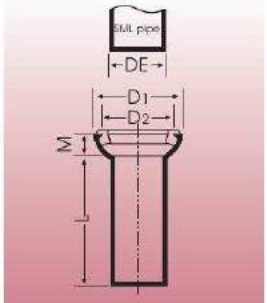



**SML-connecting piece DIN 19522 – *300* – E**

| DN | d | kg | item no. |
|---|---|---|---|
| *100* | 159 ± 2,0 | 4,9 | 664924 |
| *125* | 187 ± 3,5 | 6,7 | 664934 |
| *150* | 218 ± 3,5 | 9,7 | 664944 |
| *200* | 278 ± 3,5 | 13,3 | 664954 |

Connections for these: stoneware-A-ring or Tecotect-se-S seal

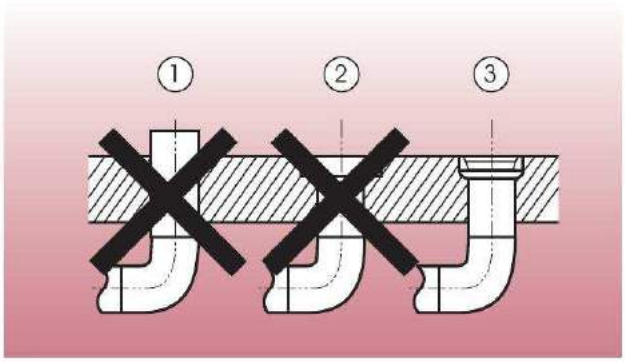
Connection pieces with short socket and inserted rubber profile seal




**SML-connection piece**

| DN | D1 | D2 | L | M | DE | kg | item no. |
|---|---|---|---|---|---|---|---|
| *100* | 144 | 125,5 | 250 | 40 | 110 | 3,3 | 662194 |
| *125* | 172 | 151,5 | 250 | 42,5 | 135 | 4,6 | 662204 |
| *150* | 201 | 178,5 | 250 | 45 | 160 | 6,1 | 662214 |

**SML connections at the bare ceiling**
SML pipe imbedded in concrete, where the continuation above the bare ceiling can only be carried out later.



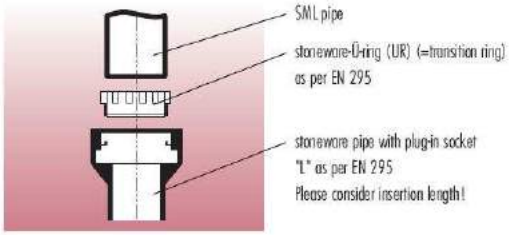

**Example no. 1:**
Pipe openings are easily tripped over, which can lead to injuries or damage.

**Example no. 2:**
the space is saved for the coupling. An enlargement is usually inevitable.

**Example no. 3:**
The socket connection piece is imbedded in concrete at the same level with the upper edge of the bare ceiling and protected by a sealing hood. The inserted sealing guarantees an easy and unproblematic later continuation.

## Connections of SML pipes to other soil pipes

SML pipe to stoneware pipe with push-in socket "L" as per EN 295 DN 100 to 200

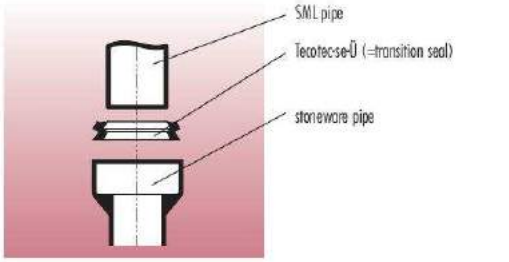



Stoneware transition ring "stoneware-Ü-Ring" EN 295 (UR) for connecting SML to stoneware with push-in socket "L" as per EN 295

| DN | item no. |
|---|---|
| *100* | 100295 |
| *125* | 100296 |
| *150* | 100297 |
| *200** | 100298 |

* not for socket K

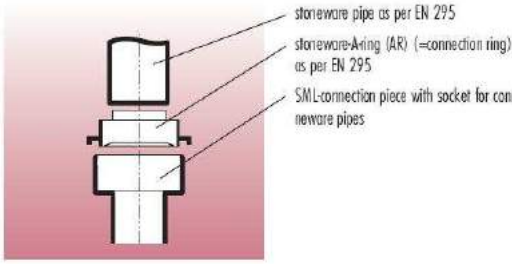
SML pipe to stoneware pipe (normal wall thickness) without pre-finished seal DN 100 to 300




Tecotect-se-Ü-seal for connecting SML to stoneware without pre-finished seal

| DN | item no. |
|---|---|
| *100* | 102573 |
| *125* | 102574 |
| *150* | 102575 |
| *200* | 102576 |

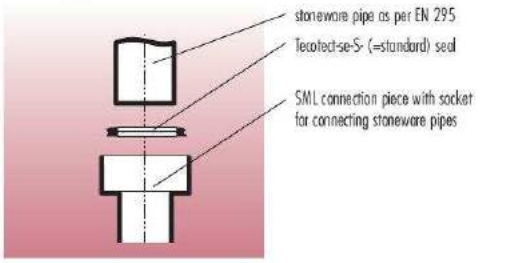
Stoneware pipe (normal wall thickness) to SML pipe DN 100 to 200




Stoneware-A-Ring EN 295 (AR) for SML connection piece stoneware to cast iron

| DN | item no. |
|---|---|
| *100* | 100312 |
| *125* | 100313 |
| *150* | 100314 |
| *200* | 100315 |

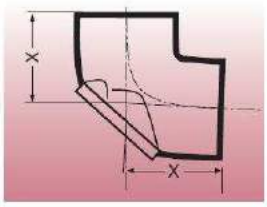
Stoneware pipe (normal wall thickness) to SML pipe DN 250 and 300




Tecotect-se-S-seal for stoneware SML connection piece to cast iron

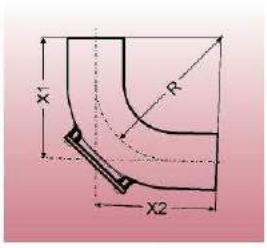
| DN | item no. |
|---|---|
| *100* | 102567 |
| *125* | 102568 |
| *150* | 102569 |
| *200* | 102570 |

For larger diameter seals, please contact company Mücher, www.muecher.com



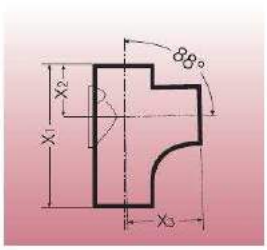

**SML short radius access bend - 88°**

| DN | X | kg | item no. |
|---|---|---|---|
| *100* | 110 | 3,3 | 100268 |
| *150* | 145 | 6,1 | 232741 |



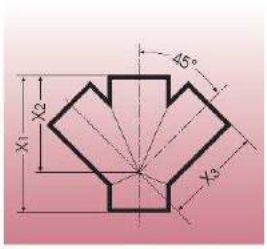

**SML long radius bend - 88° - with/without access**

| DN | X1 | X2 | R | kg with access | kg without access | item no. with access | item no. without access |
|---|---|---|---|---|---|---|---|
| *100* | 230 | 230 | 150 | 5,5 | 5,1 | 100262 | 235125 |
| *150* | 245 | 245 | 150 | - | 7,8 | - | 235126 |



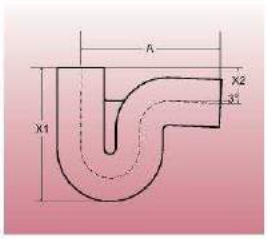

**SML swept entry access branch - 88°**

| DN | X1 | X2 | X3 | kg | item no. |
|---|---|---|---|---|---|
| *100x100* | 270 | 102 | 150 | 4,3 | 100269 |




**SML double branch - 45°**

| DN | X1 | X2 | X3 | kg | item no. |
|---|---|---|---|---|---|
| *100x100* | 260 | 190 | 190 | 4,0 | 100260 |
| *150x100* | 280 | 225 | 225 | 8,4 | 661444 |
| *125x100* | 280 | 220 | 220 | 6,5 | 237737 |

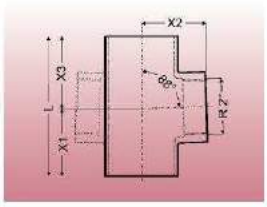



**SML plain trap**

| DN | A | X1 | X2 | kg | item no. |
|---|---|---|---|---|---|
| *100* | 310 | 300 | 80 | 8,0 | 100261 |

# SML DELIVERY PROGRAMME

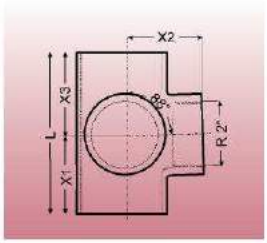





**SML boss pipe - single/double**

| DN | X1 | X2 | X3 | L | kg single | kg double | item no. single | item no. double |
|---|---|---|---|---|---|---|---|---|
| *100* | 77,5 | 80 | 77,5 | 155 | 2,1 | 2,2 | 100267 | 100266* |
| *150* | 87,7 | 104 | 87,5 | 175 | 3,8 | 3,8 | 232746 | 237738 |

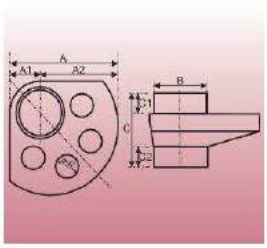
* upon request




**SML double boss pipe - with bosses at 90°**

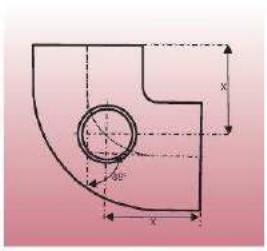
| DN | X1 | X2 | X3 | L | kg | item no. |
|---|---|---|---|---|---|---|
| *100* | 75 | 80 | 75 | 150 | 2,9 | 100318* |

* upon request



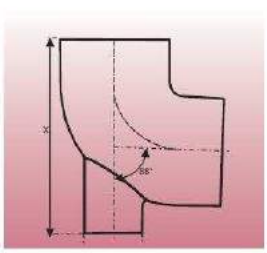

**SML manifold connector**

| DN | A | A1 | A2 | B | C | C1, C2 | kg | item no. |
|---|---|---|---|---|---|---|---|---|
| *100* | 233,7 | 65 | 168,7 | 110 | 145 | 40 | 1,8 | 214089 |




**SML bend 88° with vent**

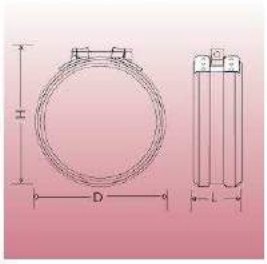
| DN | X | kg | item no. |
|---|---|---|---|
| *100x50* | 91 | 2,2 | 232445 |




**SML bend 88° with high heel**

| DN | X1 | A | kg | item no. |
|---|---|---|---|---|
| *100x50* | 195 | 58 | 2,4 | 235529 |

# 02 COUPLINGS DELIVERY PROGRAMME




OUR RECOM-MENDATION !

**Dükorapid® coupling**

| DN | D≈ | H≈ | L | item no. |
|---|---|---|---|---|
| | maximum dimensions after installation | | | |
| 40 | 60 | 72 | 41 | 659623 |
| 50 | 71 | 83 | 45 | 218592 |
| 70* | 91 | 103 | 45 | 218593 |
| 80 | 96 | 115 | 45 | 235494 |
| 100 | 123 | 135 | 45 | 214405 |
| 125 | 152 | 164 | 52 | 218594 |
| 150 | 177 | 189 | 52 | 218595 |
| 200 | 227 | 244 | 70 | 659556 |

all dimensions in mm

One screw coupling

German Approval no.: DN 50-150: ABP Nr. P-110002488-01/01
DN 40 and 200: ABP Nr. P-110002011

Material metal collar: W2, stabilised stainless steel, 1.4510/11 as per EN 10088

Material locking parts: lock 1.4301 or 1.4510/11
DN 50-150: screw and square nut steel with zinc lamellae coating, washer A2 as per DIN 125
DN 40 and 200: screw, washer and square nut galvanised, yellow-chromated

Material sealing: EPDM

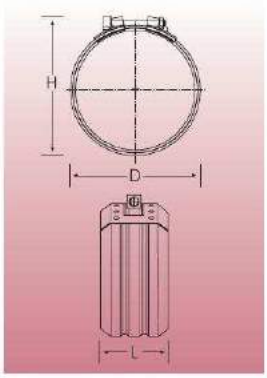
Axial restraint: up to 0.5 bar

Screw size: DN 40: M5; DN 50-150: M8; DN 200:M10

Torque: DN 50-150: 10-20 Nm
DN 40 and 200: until both locks come together

* obsolete model

Installation instructions see page 57




**MLetec® Rapid**

| DN | D≈ | H≈ | L≈ | item no. |
|---|---|---|---|---|
| 100 | 123 | 137 | 54 | 235487 |
| 125 | 150 | 164 | 63 | 235488 |
| 150 | 175 | 189 | 63 | 235489 |

≈ maximum dimensions after installation

One screw coupling with elevated axial restraint

German Approval no.: ABP Nr. 110002089

Material metal collar: W2, stabilised stainless steel, 1.4510/11 as per EN 10088

Material locking parts: lock austenitic steel 1.4301, screw, washer, square nut galvanised, yellow-chromated

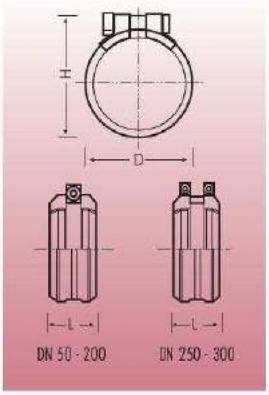
Material sealing: EPDM silicon-free. NBR on request for waste water containing oil, animal grease, solvents or petrol

Axial restraint: up to 1 bar

Screw size: M8 screw with 8.8 hexagon socket

Torque: 15-25 Nm

Installation instructions see page 57



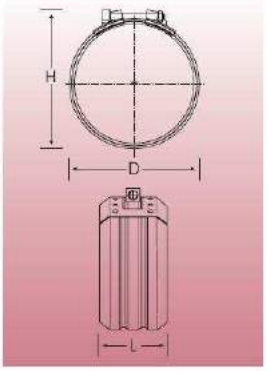

**OUR RECOM-MENDATION !**
for installation underground and outside of buildings

**Rapid Inox coupling**

| DN | D~ | H~ | L~ | item no. |
|---|---|---|---|---|
| | | maximum dimensions after installation ~ | | |
| 40 | 60 | 72 | 41 | 235493 |
| 50 | 70 | 80 | 39,5 | 234826 |
| 70* | 90 | 100 | 39,5 | 234827 |
| 80 | 95 | 105 | 39,5 | 235472 |
| 100 | 125 | 135 | 45,4 | 234828 |
| 125 | 147 | 162 | 54,5 | 234829 |
| 150 | 172 | 187 | 54,5 | 234830 |
| 200 | 227 | 244 | 70,0 | 234831 |
| 250 | 292 | 305 | 115 | 234832 |
| 300 | 344 | 358 | 115 | 234833 |

One screw coupling (DN 250 and 300: two screws) for soil installation without additional corrosion protection and for installation outside of buildings
Attention: particularly aggressive soils may call for an additional corrosion protection (e.g. shrinking hose)

| | |
|---|---|
| German Approval no.: | Ü DIN EN 877 |
| Material metal collar: | W5, austenitic stainless steel, 1.4571 as per EN 10088 |
| Material locking parts: | austenitic stainless steel 1.4571 as per EN 10088; screw, washer and square nut A4 |
| Material sealing: | EPDM. NBR on request for waste water containing oil, animal grease, solvents or petrol |
| Axial restraint: | DN 40 - 200: up to 0.5 bar; DN 250 - 300: up to 0.3 bar |
| Screw size: | hexagon socket screw; DN 40: M 5; DN 50 - 150: M 8; DN 200: M 10 |
| Torque: | until both fastening heads come together |
| Marking: | Marking W5 on the metal collar |
| * obsolete model | Installation instructions see page 57 |




**MLetec® Rapid Inox**

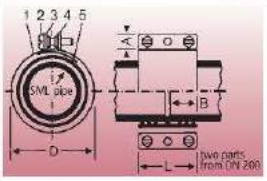
| DN | D~ | H~ | L~ | item no. |
|---|---|---|---|---|
| 100 | 123 | 137 | 54 | 235777 |
| 125 | 150 | 164 | 63 | 235778 |
| 150 | 175 | 189 | 63 | 235779 |

~ maximum dimensions after installation

One screw coupling for soil installation and for installation outside of buildings
Attention: particularly aggressive soils may call for an additional corrosion protection (e.g. shrinking hose)

| | |
|---|---|
| German Approval no.: | Ü DIN EN 877 |
| Material metal collar: | W5, austenitic stainless steel, 1.4571 as per EN 10088 |
| Material locking parts: | austenitic stainless steel 1.4571 as per EN 10088; screw, washer and square nut A4 |
| Material sealing: | EPDM silicon-free. NBR on request for waste water containing oil, animal grease, solvents or petrol |
| Axial restraint: | up to 1 bar |
| Screw size: | M8 screw with 8.8 hexagon socket |
| Torque: | 15-25 Nm |

Installation instructions see page 57




1 metal collar
2 slit hexagonal screws (DN 50 and 70 M6, DN 100 up to 300 M8)
3 guiding plate
4 threaded plate
5 sealing collar

**CV coupling**

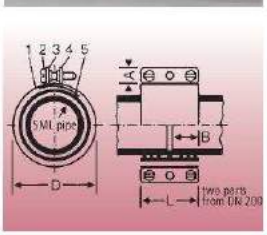
| DN | A | B | D~ | L | item no. |
|---|---|---|---|---|---|
| *50** | 14 | 22,5 | 65 | 48 | 659436 |
| *70** | 14 | 22,5 | 85 | 48 | 659437 |
| *80** | 14 | 22,5 | 88 | 48 | 235859 |
| *100** | 18 | 25,5 | 115 | 54 | 659438 |
| *125** | 18 | 31 | 140 | 65 | 659439 |
| *150** | 18 | 31 | 170 | 65 | 659440 |
| *200** | 18 | 37 | 220 | 78 | 659441 |
| *250** | 18 | 37 | 286 | 78 | 659442 |
| *300** | 18 | 37 | 338 | 78 | 659443 |

Double screw coupling. The metal collar is opened completely for installation, therefore the coupling is suitable for use in situations with reduced space.
**Attention:** not suitable for installation near ceiling and wall passthroughs with fire protection function (unless installed with Düker fire protection coupling).

| | |
|---|---|
| Material metal collar: | stabilised stainless steel, material no. 1.4510/11 as per EN 10088 |
| Material locking parts: | galvanised steel |
| Material sealing: | EPDM |
| Axial restraint: | - |
| Screw size: | slotted hexagonal screws; DN 50 - 80: M 6; DN 100 - 300: M 8 |
| Torque: | hand tight |

* obsolete model

Installation instructions see page 58




**CE coupling**

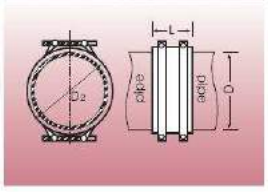
| DN | A | B | D~ | L | item no. |
|---|---|---|---|---|---|
| *50** | 14 | 22,5 | 65 | 48 | 100240 |
| *70** | 14 | 22,5 | 85 | 48 | 100236 |
| *100** | 18 | 25,5 | 115 | 54 | 100185 |
| *125** | 18 | 31 | 140 | 65 | 100237 |
| *150** | 18 | 31 | 170 | 65 | 100241 |
| *200** | 18 | 37 | 220 | 78 | 100186 |
| *250** | 18 | 37 | 286 | 78 | 100187 |
| *300** | 18 | 37 | 338 | 78 | 100188 |

Double screw coupling for soil installation (only with additional corrosion protection)

| | |
|---|---|
| German Approval no.: | Ü DIN EN 877 |
| Material metal collar: | W4, austenitic stainless steel, 1.4301 as per EN 10088 |
| Material locking parts: | austenitic stainless steel, 1.4301/1.4541 as per EN 10088 |
| Material sealing: | EPDM. NBR on request for waste water containing oil, animal grease, solvents or petrol |
| Axial restraint: | - |
| Screw size: | hexagonal screws (slit on DN 50-100); DN 50 - 70: M 6; DN 100 - 300: M 8 |
| Torque: | alternately, uniformly hand tight |
| Marks: | CE, W4 |

* obsolete model

Installation instructions see page 58

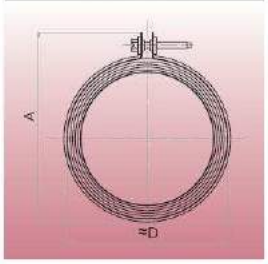


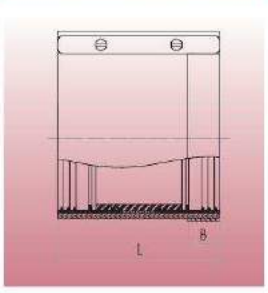

**Düker CE dual ring coupling**

| DN | D | $D_2$ | L | item no. |
|---|---|---|---|---|
| *400* | 431 | 445 | 110 | 100307 |

Double screw coupling for soil installation (only with additional corrosion protection) or for installation outside of buildings

| | |
|---|---|
| German Approval no.: | Ü DIN EN 877 |
| Material metal collar: | W4, austenitic stainless steel 1.4301 as per EN 10088 |
| Material locking parts: | austenitic stainless steel, 1.4301 as per EN 10088 |
| Material sealing: | EPDM |
| Axial restraint: | up to 0.5 bar |
| Screw size: | hexagonal screws M8 |
| Torque: | 35 - 40 Nm |




**Düker Fire protection coupling BSV 90**

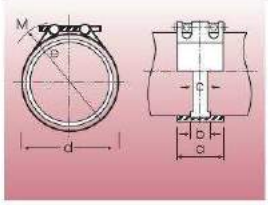
| DN | A | B | D≈ | L | item no. |
|---|---|---|---|---|---|
| *80** | 125 | 22,5 | 98 | 130 | 237693 |
| *100** | 152 | 25,5 | 127 | 135 | 237694 |
| *125** | 180 | 31 | 152 | 150 | 237695 |
| *150** | 202 | 31 | 177 | 150 | 237696 |

Two-screw coupling for installation in ceiling passthroughs with fire protection functions

| | |
|---|---|
| German Approval no.: | pending |
| Material metal collar: | stabilised stainless steel, 1.4510/11 as per EN 10088 |
| Material locking parts: | galvanised steel |
| Material sealing: | EPDM |
| Material plastic pipe insert: | PE-HD / PP |
| Material intumescence material: | expandable graphite on glass fibre fabric, intumescing at approx. 150°C |
| Axial restraint: | – |
| Screw size: | M8 |
| Torque: | hand tight |

Installation of the coupling similar to Rapid couplings (see page 57). Fasten the screws alternately and evenly. The upper third with the intumescence material strip must be placed in the ceiling; the lower two thirds must protrude below the ceiling (see page 12). Any pipes and fittings placed in a straight line below the Düker fire protection coupling must be made of cast iron.

* available after awarding of approval



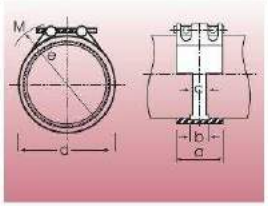

**Connect-F Inox coupling**

| DN | a | b | c | ~d | ~e | item no. |
|---|---|---|---|---|---|---|
| 100 | 98 | 40 | 25 | 130 | 150 | 234834 |
| 125 | 113 | 50 | 35 | 165 | 195 | 234835 |
| 150 | 113 | 50 | 35 | 185 | 215 | 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: | austenitic stainless steel, 1.4571 as per EN 10088 |
| Material locking parts: | bolts 1.4401, screws 1.4404 as per EN 10088 |
| Material sealing: | EPDM. NBR on request for waste water containing oil, animal grease, solvents or petrol |
| Axial restraint: | - |
| Screw size: | DN 100: M 8; DN 125 - 150: M 10; DN 200 - 600: M 12 |
| Torque: | as stated on the coupling |

Installation instructions see page 59

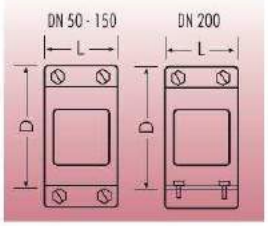



**Connect-G Inox coupling**

| DN | a | b | c | ~d | ~e | item no. |
|---|---|---|---|---|---|---|
| 50 | 78 | 29 | 17 | 85 | 105 | 234843 |
| 70* | 98 | 40 | 25 | 100 | 120 | 234844 |
| 80 | 98 | 40 | 25 | 105 | 125 | 235482 |
| 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: | casing austenitic stainless steel 1.4571, claw ring 1.4310 as per EN 10088 |
| Material locking parts: | bolts 1.4401, screws 1.4404 as per EN 10088 |
| Material sealing: | EPDM. NBR on request for waste water containing oil, animal grease, solvents or petrol |
| Axial restraint: | DN 50 - 400: up to 10 bar; DN 500: up to 6 bar; DN 600: up to 4 bar |
| Screw size: | DN 50: M 8; DN 70 - 100: M 10; DN 125 - 150: M 12; DN 200 - 600: M 16 |
| Torque: | as stated on the coupling |
| * obsolete model | Installation instructions see page 59 |




D = outer diameter of the closed grip collar

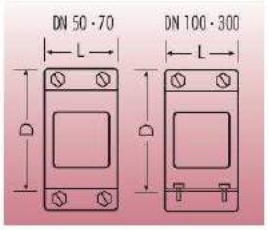
**OUR RECOM-MENDATION !**
for increased inside pressure

**Düker Kombi-grip collar EK**

| DN | D | L | item no. |
|---|---|---|---|
| 40** | 100 | 77 | 235473 |
| 50 | 124 | 72 | 235360 |
| 70* | 144 | 72 | 235361 |
| 80 | 149 | 72 | 235498 |
| 100 | 180 | 87 | 235280 |
| 125 | 210 | 98 | 235315 |
| 150 | 230 | 98 | 235316 |
| 200 | 275 | 111 | 235281 |

Security collar with axial restraint for all Rapid and CV/CE couplings

| | |
|---|---|
| German Approval no.: | ABP Nr. P-110002089 |
| Material metal collar: | galvanised steel |
| Material locking parts: | galvanised steel, yellow chromated 8 µ 8.8 |
| Material sealing: | - |
| Axial restraint: | DN 40-100: up to 10 bar; DN 125-150: up to 5 bar; DN 200: up to 3 bar |
| Screw size: | DN 40-70: round head screws with hexagon socket with washers M 8 x 30; DN 100-150: round head screws with hexagon socket with washers M 10 x 35;DN 200: hexagonal screw with washers and self-locking nut galvanised M 10 x 30 |
| Torque: | DN 40-70: 23-25 Nm; DN 80: 25-28 Nm; DN 100: 25-30 Nm; DN 125-150: 40-60 Nm; DN 200: 50-65 Nm |
| * obsolete model | Installation instructions see page 60 |
| ** DN 40 in planning | |

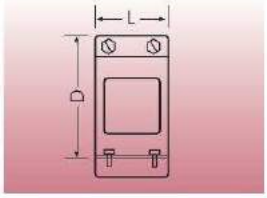



**CV grip collar**

| DN | A | D | L | item no. |
|---|---|---|---|---|
| 50* | 23 | 74 | 71 | 659485 |
| 70* | 23 | 94 | 71 | 659486 |
| 100* | 23 | 126 | 87 | 659487 |
| 125* | 23 | 151 | 98 | 659488 |
| 150* | 23 | 179 | 98 | 659489 |
| 200* | 23 | 229 | 111 | 659490 |

Security collar with axial restraint for CV/CE couplings

| | |
|---|---|
| German Approval no.: | ABP Nr. P-110002011 |
| Material metal collar: | galvanised steel with hardened claw insert |
| Material locking parts: | galvanised steel |
| Axial restraint: | up to 3 bar |
| Screw size: | DN 50 - 70: M 8; DN 100 - 200: M 10; DN 250 - 300: M 12 |
| Torque: | DN 50 - 70: 10-12 Nm; DN 100 - 150: 18-20 Nm; DN 200: 25-30 Nm, DN 250 - 300: 55-60 Nm |
| * obsolete model | Installation instructions see page 60 |



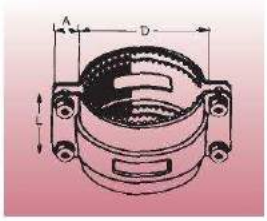

**Düker grip collar**

| DN | A | D | L | item no. |
|---|---|---|---|---|
| *250* | 30 | 305 | 125 | 216888 |
| *300* | 30 | 350 | 125 | 100304 |
| *400* | 30 | 460 | 160 | 100305 |

Security collar with axial restraint for CV/CE couplings

| | |
|---|---|
| Material metal collar: | galvanised steel |
| Material locking parts: | galvanised steel |
| Axial restraint: | up to 1 bar |
| Screw size: | hexagonal screw with washers and self-locking nut galvanised M 12 x 40 5.6 |
| Torque: | DN 250: 55-60 Nm; DN 300: 60-65 Nm; DN 400: 65-70 Nm |

Installation instructions see page 60

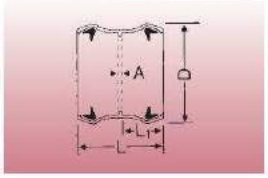



**Rekord grip collar**

| DN | A | D | L | item no. |
|---|---|---|---|---|
| *40** | 21 | 65 | 66 | 232413 |
| *50** | 23 | 75 | 69 | 659550 |
| *70** | 23 | 95 | 69 | 659551 |
| *100** | 25 | 135 | 87 | 659552 |
| *125** | 25 | 160 | 95 | 659553 |
| *150** | 25 | 185 | 95 | 659554 |
| *200** | 30 | 235 | 111 | 659555 |

Security collar with axial restraint for Rapid couplings

| | |
|---|---|
| German Approval no.: | ABP Nr. P-110002011 |
| Material metal collar: | galvanised steel with hardened claw insert |
| Material locking parts: | guiding plates and threaded plates and screws galvanised steel, yellow-chromated |
| Axial restraint: | DN 40 - 100: up to 10 bar; DN 125 - 150: up to 5 bar; DN 200: up to 3 bar |
| Screw size: | DN 40 - 70: M 8; DN 100-150: M 10; DN 200: M 12 |
| Torque: | DN 40 - 70: 12-15 Nm; DN 100: 25-30 Nm; DN 125-150: 30-35 Nm; DN 200: 60-65 Nm |
| * obsolete model | Installation instructions see page 60 |




**SVE coupling**

| DN | D | L | L1 | A | item no. |
|---|---|---|---|---|---|
| 50 | 77 | 60 | 29 | 2 | 659468 |
| 80 | 103,5 | 65,5 | 32 | 2 | 235483 |
| 100 | 134 | 82 | 39,5 | 3 | 659478 |
| 125 | 161 | 103 | 50 | 3 | 659479 |
| 150 | 186 | 103 | 50 | 3 | 659480 |
| 200 | 238 | 114 | 55,5 | 3 | 659481 |

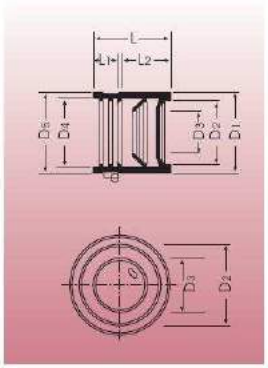
Plug connector for soil installation

| | |
|---|---|
| German Approval no.: | Z-42.5-273 |
| Material metal collar: | Polypropylene-CO |
| Material locking parts: | - |
| Material sealing: | sealing lips NR-SBR |
| Axial restraint: | - |
| Screw size: | - |
| Torque: | - |

Installaton instructions see page 61

**EK Düker Fix coupling**

| DN | D1 | D2 | D3 | D4 | D5 | L | L1 | L2 | Ø connection | item no. |
|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 72 | 56 | 30 | 57 | 67,5 | 63 | 19 | 40 | 40-56 | 100270 |
| 70* | 92 | 75 | 41 | 77 | 86,5 | 77 | 19 | 52,5 | 56-75 | 100271 |
| 80 | 108 | 75 | 41 | 81 | 91 | 83 | 20 | 52,5 | 56-75 | 236756 |
| 80** | 108 | 90 | 57 | 81 | 91 | 83 | 20 | 55 | 75-90 | 235346 |
| 100 | 128 | 110 | 78 | 108 | 118 | 95 | 21 | 65 | 104-110 | 100272 |
| 125 | 145 | 125 | 90 | 132 | 145 | 103 | 26 | 72 | 125 | 100273 |



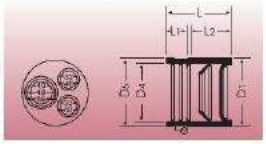

For connecting pipes of PE-HD-PP to cast iron sewage pipes

| | |
|---|---|
| German Approval no.: | Z-42.5-299 |
| Material: | EPDM |
| Material locking parts: | worm thread clamp stainless steel 1.4016, screw chromated steel Cq15. |
| Axial restraint: | - |
| Screw size: | cross-slit screw, width 7 |
| Torque: | ca. 2 Nm |
| Insertion lengths: | DN 50: 42 mm; DN 70: 55 mm; DN 80: 55-60 mm; DN 100: 65 mm; DN 125: 75 mm |
| * obsolete model | Installation instructions see page 62 |

** reducing DN 90 plastic pipe to DN 80 cast iron pipe is only admissible on a WC connection bend, but not in all countries.

# COUPLINGS DELIVERY PROGRAMME



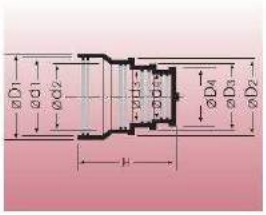



**Konfix Multi coupling**

| DN | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_5$ | L | $L_1$ | insertion | item no. |
|---|---|---|---|---|---|---|---|---|---|
| *100* | 134 | connections see illustration | | 108 | 116 | 90,5 | 35,5 | 40 | 100030 |

For connecting pipes of other materials to cast iron sewage pipes, up to three connecting pipes

German Approval no.: Z-42.5-240
Material: EPDM
Material locking parts: worm thread clamp stainless steel 1.4016, screw galvanised steel
Axial restraint: -
Screw size: worm thread screw SW7
Torque: 5.0 + 0.5 Nm
Installation instructions see page 62

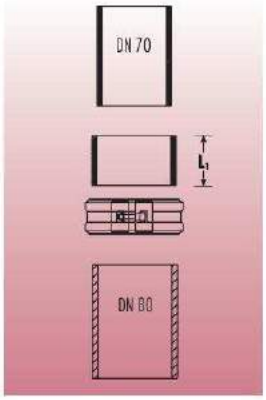



**Multiquick coupling**

| DN | $ØD_1$ | $ØD_2$ | $ØD_3$ | $ØD_4$ | $Ød_1$ | $Ød_2$ | $Ød_3$ | $Ød_4$ | H | item no. |
|---|---|---|---|---|---|---|---|---|---|---|
| *100x 70* | 117 | 111 | 101 | 81 | 108 | 104 | 93 | 74 | 107 | 234859 |

Transition coupling for socketless cast iron sewage pipes DN 100 or old cast iron socket pipes DN 100 with an exterior diameter of max. 115 mm to other materials with an exterior diameter of 72 - 110 mm.

German Approval no.: Z-42.5-240
Material: EPDM
Material locking parts: worm thread clamps stainless steel 1.406, screw galvanised steel
Axial restraint: -
Screw size: worm thread screw SW7
Torque: 5.0 + 0.5 Nm
Installation instructions see page 63



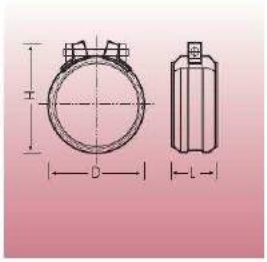

**Transition coupling**

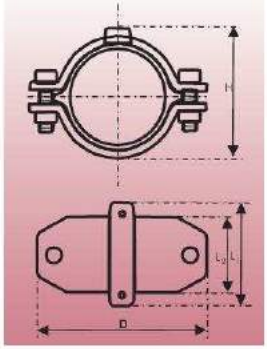
| DN | D≈ | H≈ | L | L1 | item no. |
|---|---|---|---|---|---|
| 80 | 96 | 115 | 45 | 30 | 235347 |

Transition coupling for socketless cast iron sewage pipes and fittings DN 70 and DN 80

| | |
|---|---|
| Material metal collar: | W2, stabilised stainless steel, 14510/11 as per EN 10088 |
| Material locking parts: | lock 1.4301, screw, washer, square nut galvanised, yellow-chromated |
| Material sealing: | EPDM |
| Axial restraint: | - |
| Screw size: | M-8-screw with 6 mm hexagon socket |
| Torque: | 10-20 Nm |

Installation instructions see page 64




**Ductile cast iron coupling**

| DN | H | D | L1 | L2 | kg | item no. |
|---|---|---|---|---|---|---|
| 50* | 79 | 111 | 50 | 68 | 0,6 | 235880 |
| 70* | 89 | 132 | 50 | 68 | 0,7 | 235881 |
| 100* | 134 | 168 | 60 | 78 | 1,1 | 235882 |
| 150* | 184 | 230 | 71 | 89 | 1,9 | 235883 |
| 200* | 231 | 278 | 82 | 100 | 3,5 | 235884 |

Ductile iron coupling with integrated electrical continuity screws

| | |
|---|---|
| Material metal collar: | ductile cast iron EN-GJS-400-15 (GGG 40) |
| Material locking parts: | nuts and bolts galvanised |
| Material sealing: | EPDM |
| Axial restraint: | - |
| Screw size: | cylinder screw M8 with hexagonal socket 8.8 |
| Torque: | ca. 20 Nm |

*upon request

Installation instructions see page 58

# COUPLINGS DELIVERY PROGRAMME



SML couplings - range of application for waste water, rain water, mixed water, ventilation ducts

| | DN | axial restraint up to ... bar | in the building | in concrete | in the soil | outside of buildings | flat roof drainage (siphonic system) | connection to plastic roof drain | connection to plastic pipes |
|---|---|---|---|---|---|---|---|---|---|
| 1. Dökorapid® coupling | 40 - 200* | 0,5 | | | | | | | |
| 2. MLetec® coupling | 100 - 150 | 1 | | | | | | | |
| 3. Rapid-Inox coupling CrNi steel | 50 - 200* / 250 - 300 | 0,5 / 0,3 | | | | | | | |
| 4. MLetec® Rapid Inox coupling | 100 - 150 | 1 | | | | | | | |
| 5. Düker CV coupling | 50 - 200 | – | | | | | | | |
| 6. CE coupling CrNi steel | 50 - 300 | – | | | * | | | | |
| 7. Düker CE dual ring coupling | 400 | – | | | * | | | | |
| 8. Connect-F Inox coupling | 100 - 600 | – | | | | | | | |
| 9. Connect-G Inox coupling | 50 - 400 / 500 / 600 | 10 / 6 / 4 | | | | | | | |
| 10. SVE coupling | 50 - 200 | – | | | | | | | |
| 11. EK Düker Fix coupling EPDM | 50 - 125 | – | | | | | | | |
| 12. Multiquick coupling | 50 - 100 | – | | | | | | | |
| 13. Kombi grip | 50 - 100 / 125 - 150 / 200 | 10 / 5 / 3 | | | * | | | | |
| 14. Rekord grip* for Rapid coupling | 40 - 100 / 125 - 150 / 200 | 10 / 5 / 3 | | | * | | | | |
| 15. CV grip* for CV and CD coupling | 50 - 200 / 250 - 300 | 3 / 1 | | | * | | | | |
| 16. Düker grip für CE dual ring coupling | 250 - 400 | 1 | | | * | | | | |

* DN 200: grip collars at changes of direction

* with corrosion protection, e.g. for wrapping

# 03 INSTALLATION INSTRUCTIONS

## Mounting and Installation instructions for Düker couplings

**Requirements as per EN 12056**
Waste water and ventilation pipelines are on principle sloping pipelines without interior pressure. However it is not impossible for pressure to develop in the pipelines under certain circumstances. Regarding pressure tightness, EN 12056 says generally:

**EN 12056-1, Jan. 01, pt. 5.4.2 water and gas tightness:**
Drainage systems shall be water and gas tight against the operational pressures. Pipework systems installed inside buildings shall not release vapours and foul air into the building.

**Furthermore EN 12056-5, pt. 6.3 fixing and supporting:** Pipelines with joints, which allow longitudinal movement, shall be fixed and/or supported in such a way as to ensure that during service the joint cannot become unintentionally disconnected. Reaction forces shall be considered.

**EN 877 – requirements on the product**
Today requirements as to the tightness of a system are fixed in the product standards. For Düker cast iron drainage pipe systems the relevant standard is EN 877. For pipelines up to DN 200 inside of buildings, the test requirement is water tightness up to 5 bar. However, this does not mean that all couplings can be used for pressures up to 5 bar. The reason is that the tests are carried out in a fixed test arrangement, without axial forces acting on the coupling.

For the application it is important to know up to what pressure the coupling is thrust-resistant (resistant to axial forces) or what measures can be taken to compensate for axial forces, e.g. fixings, grip collars, abutments etc.

The table on page 53 gives you the necessary data.

**Installation instructions and admissible pressure loads on Düker SML couplings**
Safe fixing or thrust-resistant couplings are particularly important for wastewater pipelines that can be subject to a higher interior pressure than 0.5 bar, e.g.

1. pipes in back water areas,
2. rain water pipes within buildings,
3. waste water pipes which run through more than one basement without further outlet,
4. pressure pipelines at waste water pumps.

Particularly on pipelines below the back water level there can be pressures during use, e.g. a backflow from the canal, which can make the pipe couplings slip. Therefore pipelines below the back water level must be treated as follows:

**Waste water up to 0.5 bar in the back water area**
- no additional measures on Düker Rapid couplings DN 100 to DN 150
- securing changes of direction on Düker Rapid couplings DN 200 with corresponding Düker grip collars

**Waste water above 0.5 bar in the back water area**
- all Düker couplings are to be secured with corresponding grip collars
- waste water pipelines connected to a mixed water sewer must also be secured with grip collars

**Gravity drainage rain water pipelines**

EN 12056-3, pt. 7.6.4 says: Internal rainwater pipes shall be able to withstand the head of water likely to occur in the event of a blockage.

Resistance to a possible obstruction of a rain water, collective or down pipe and therefore pressure loads corresponding to the height of the building is a new requirement. A backflow up to the upper building edge is still an exception. According to our experience it is sufficient to secure pipelines below the back water level with grip collars. Down pipes above the back water area normally do not need securing with grip collars. In vertical rain water pipes that are open above, the water column cannot exert axial forces as long as the pipes are secured against a possible sideways movement. However, changes of direction must be secured with grip collars.

Collection and connection pipelines below the roof need not be secured with grip collars.

If special information for high-risers should be required, please ask for our Technical Specifications waste water or rain water in highrisers.

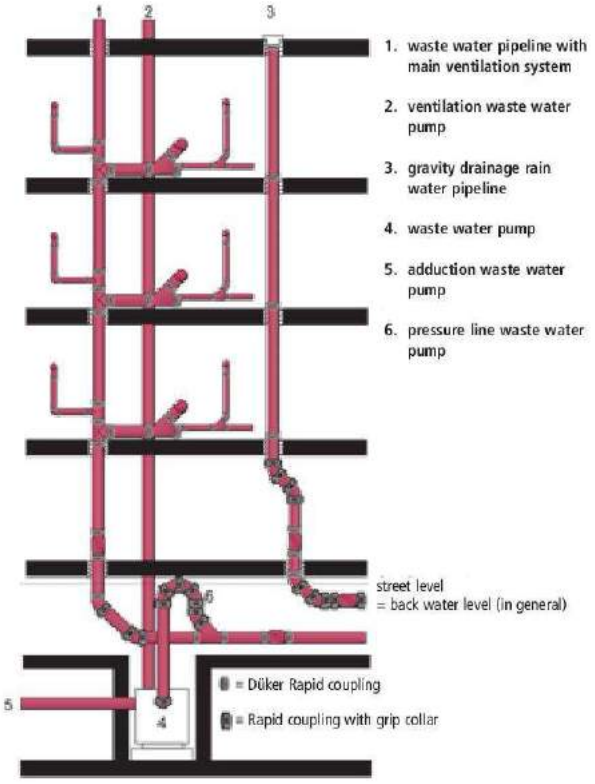
**Pressure pipelines at waste water pumps**

Pressure pipelines can be made of Düker cast iron drainage pipes and fittings with Rapid couplings and Kombi grip collars up to DN 100. As an alternative Connect-G couplings DN 50 – 400 can be used. The admissible pressure load is max. 10 bar in both cases. The reason for the assumption of 10 bar pressure load is that when the pump is switched off, there are often pressure peaks that can be much higher than the normal pump pressure.

In order to reduce these pressure peaks, it is recommendable to have floating backflow preventers with a counter weight available from suppliers of waste water pumps.

On principle it is necessary to have compensators in order to prevent the waste water pump's vibrations from being transmitted onto the pressure pipe. The fixings must be carried out in accordance with the Düker instructions. Pipe clamps should be mounted either direct to the wall or ceiling or in case of larger distances onto corresponding rails or supports. The clamps must be fixed with M16 rods.

The installation of pipelines must be in accordance with the Düker fixing and installation guidelines.




1. waste water pipeline with main ventilation system
2. ventilation waste water pump
3. gravity drainage rain water pipeline
4. waste water pump
5. adduction waste water pump
6. pressure line waste water pump

## Dükorapid® coupling / Rapid Inox coupling/MLetec® Rapid / MLetec® Rapid Inox

Dükorapid®
Rapid Inox

MLetec® Rapid
MLetec® Rapid Inox

Installation instructions

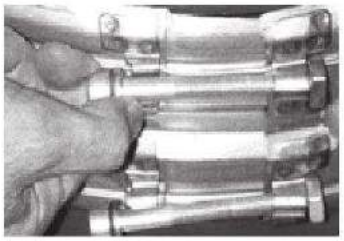
1. Slide the complete coupling up to the central ring of the seal onto the end of the pipe or fitting

2. Push the next pipe or fitting into the other end of the coupling.

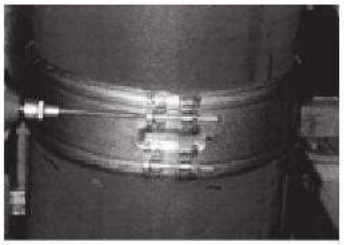
3. Tighten the hexagon socket screw with a screw wrench, ratchet or a customary powered screw driver.
Dükorapid® DN 50-150: 10 – 20 Nm
Dükorapid® DN 40 and 200, Rapid Inox: until both fastening heads come together
MLetec Rapid®: 15 – 25 Nm

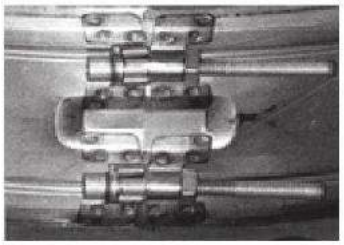
Rapid Inox DN 250-300

1. Install sealing collar as shown in 1-3 of the installation instruction CV/CE (see next page)



2. Insert screw heads with the attached washer rings into the fastening heads





3. Tighten the two hexagon socket screws with a screw wrench, ratchet or a powered impact screw driver alternately and evenly until the two fastening heads come together.

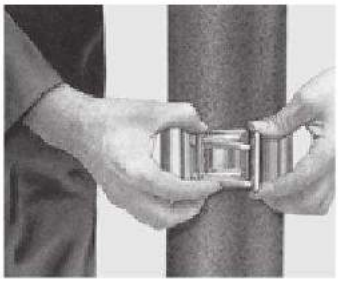
## CV coupling / CE coupling / Ductile iron coupling

### Installation Instructions

**1.** First of all, push the sealing collar onto the lower pipe end so that the inner sealing ring rests on top of the cut edge of the pipe.

**2.** Fold over the upper half of the sealing collar.

**3.** Place the next pipe or fitting even onto the inner ring and fold back the sealing collar.



**4.** **CV/CE coupling:** Wrap the metal sleeve around the sealing collar and alternately tighten both bolts so that they are even and handtight. The plates must push together parallel in order to avoid deformation.

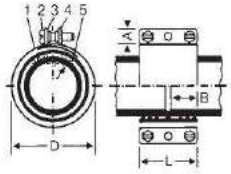
**4.** **Ductile iron coupling:** Place the metal halves around the sealing collar. Watch out that the electrical continuity screws are loosened and drawn back and that the notch in the top half fits over the corresponding rubber lip. Alternately tighten the bolts.

**5.** **Ductile iron coupling:** If necessary tighten the electrical continuity screws on both sides handtight.

### CV/CE coupling

Metal collar in stabilised chromium steel, material no 1.4510/11 as per EN 10088. Galvanised fastening parts. Sealing collar in EPDM.

Special version:
CE coupling. Metal collar and fastening parts in chromium nickel steel X-5 CrNi 18 9, material no. 1.4301 as per EN 10088.

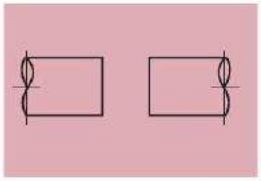



1 metal collar
2 slit hexagon screw
(DN 50-80 M6, DN 100-300 M8)
3 guiding plate
4 threaded plate
5 sealing collar

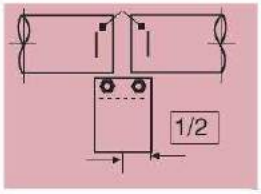
The coupling consists of two parts:
the elastic sealing collar in EPDM and a chromium steel metal collar.
This coupling is resistant to ageing, boiling water, corrosion, it is expansion-safe, and sound-absorbing. It allows installation in the smallest of areas – even where there is no more working with push-in couplings.

## Connect-F Inox/Connect-G Inox

Connect-F: not resistant to axial forces; pressure-resistant up to 10 bar if the axial forces are absorbed by anchorage.

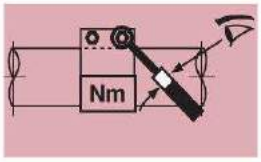


Remove any burrs and clean the pipe ends thoroughly in the sealing zones.




Mark half the coupling's width on both pipe ends.

Connect-G: resistant to axial forces up to 10 bar




Slide the coupling on one pipe and push the other pipe end into it. Align the coupling between the marks. Tighten the bolts loosely and alternately with a ratchet spanner or an Allen key. Connect-G may not be twisted after the teeth have engaged with the pipe. Tighten the bolts alternately with the torque wrench in accordance with the torque stated on the type plate (see coupling).

## Düker Kombi grip collar EK / CV grip collar / Düker grip collar / Rekord grip collar

Düker Kombi grip collar EK
Security collar with axial restraint for all Rapid, CV and CE couplings at more than 0.5 bar internal pressure

CV grip collar
Security collar with axial restraint for all CV and CE couplings at more than 0.5 bar internal pressure

Rekord grip collar
Security collar with axial restraint for Rapid couplings at more than 0.5 bar internal pressure

The axial force resistance necessary for SML pipes and fittings is obtained by the added protection of the coupling with a grip collar.
These security collars with axial restraint take up the reaction forces which may occur at an internal pressure load of up to 10 bar (see table) = 100 m water column. This means: the SML pipes and fittings which are connected with a coupling and additionally with a grip collar are protected against separation due to internal pressure without need of a special fastening to the solidium at the connections.
If pressures up to 0.5 bar are to be expected, it is sufficient to protect the coupling at changes of direction, e.g. with a grip collar, or to use Rapid couplings.

If pressures of more than 0.5 bar are to be expected, all Rapid, CV and CE couplings in the pressure-stressed areas are to be secured with grip collars unless the pipe components are otherwise secured axially force-locked.

### Installation instructions

1. The claw segments must evenly wrap around the pipe couplings. Therefore screw the segments together loosely at first and watch out that the claw inserts do not touch the metal collar of the coupling.

2. Then alternately crosswise tighten the screws or nuts, so that the fastening parts are drawn together parallel and with the same distances. Adhere to the torques stated in the table for each screw, even if the fastening parts already touch at inferior torques.

| item | DN | axial restraint up to ... bar | no. of segments | screws | screw dimension | torque Nm |
|---|---|---|---|---|---|---|
| Düker Kombi grip collar EK | 40-70 | 10 | 2 | round head screws with hexagon socket with washers* | M 8x30 | 23-25 |
| | 80 | 10 | 2 | | M 8x30 | 25-28 |
| | 100 | 10 | 2 | | M 10x35 | 35-40 |
| | 125-150 | 5 | 2 | | M 10x35 | 40-60 |
| | 200 | 3 | 3 | hexagonal screw with washers* and self-locking nut | M 10x30 | 50-65 |
| CV grip collar | 50-70 | 3 | 2 | hexagonal screws and nuts with washers* | M 8 | 10-12 |
| | 100-150 | 3 | 3 | | M 10 | 18-20 |
| | 200 | 3 | 3 | | M 10 | 25-30 |
| | 250-300 | 3 | 3 | | M 12 | 55-60 |
| Düker grip collar | 250 | 3 | 3 | hexagonal screw with washers* and self-locking nut | M 12 | 55-60 |
| | 300 | 3 | 3 | | M 12 | 60-65 |
| | 400 | 3 | 4 | | M 12 | 65-70 |
| Rekord grip collar | 40-70 | 10 | 2 | hexagon socket screws | M 8 | 12-15 |
| | 100 | 10 | 2 | | M 10 | 25-30 |
| | 125-150 | 5 | 2 | | M 10 | 30-35 |
| | 200 | 3 | 2 | | M 12 | 60-65 |

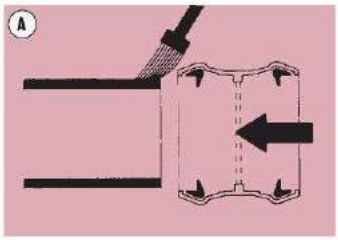
* important: do not forget to insert the washers under the screw heads and nuts!

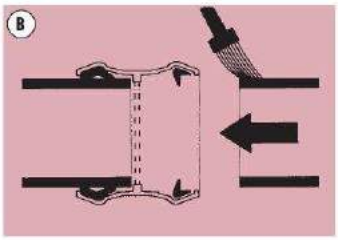
## SVE coupling

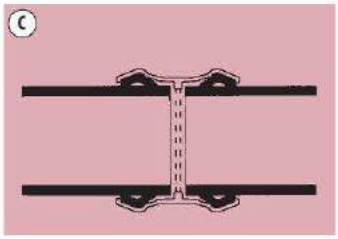
Push-in coupling for underground pipes. Double socket in brown-coloured polypropylene-CO with two sealing lips in NR-SBR.

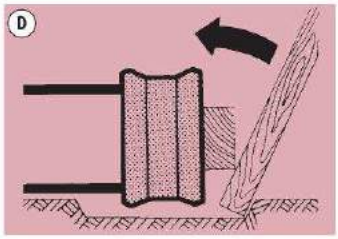
**Installation instruction**

1. Make sure that the sealing rings completely lie in the bead evenly
2. Clean pipes and fittings at the connection areas
3. Paint the ends of the pipes with a lubricant for elastomere seals (soap solution and dishwashing detergents but no oil or grease)
4. Place the push-in coupling onto the cut edge of the pipe and push on the pipe against the stop by jerks and jolts and gentle tilting.
5. Also paint the connecting pipe with a lubricant and push against the stop in the same way as described above.
6. A spade may be of help as a lever for installation in a pipe trench. A squared timber laid across the pipe outlet strengthens the transverse load in axial direction.
7. The fittings may be equipped with the necessary couplings before installation. This makes final installation easier and faster.



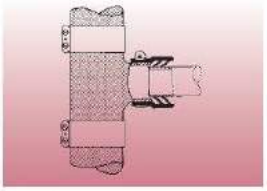




**Attention!**
Straight pipelines must be covered with soil in order to prevent lateral movement. At changes of direction and branches, concrete anchorage is required to withstand internal pressure (during pressure testing and normal operation).

**Beware to choose the correct cast iron pipe material for underground installation: a zinc-coated pipe system (TML, MLB or MLK), as EN 877 only allows pipes with adequate outside coating to be installed in the soil.**

## ED Düker Fix coupling / Konfix Multi coupling



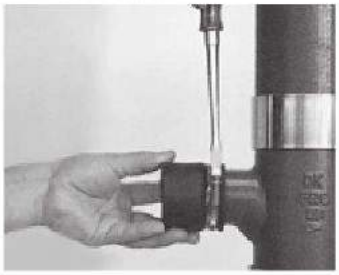
EK Düker Fix coupling in EPDM; worm thread clamp in chromium steel 1.4016; for connecting pipes in other materials to SML.

| SML pipe DN | connecting pipe outside Ø | insertion depth |
|---|---|---|
| 50 | 40–56 mm | 42 |
| 70 | 56–75 mm | 55 |
| 80 | 56–75 mm | 55 |
| 80 | 75–90 mm | 60 |
| 100 | 104–110 mm | 65 |
| 125 | 125 mm | 75 |

Konfix Multi coupling

With the EK Düker Fix coupling, pipes and drainage pieces of PP as per EN 1451-1 and DIN 19560-10 as well as PE-HD as per EN 1519-1 and DIN 19535-10 can be connected easily and safely to SML pipes DN 50 to DN 125. The connecting pipe is securely in place thanks to the double lip sealing and large insertion depths. Material: hot water resistant synthetic rubber EPDM. The EK Düker Fix couplings DN 100 and DN 125 are especially suited for connecting plastic roof drains.

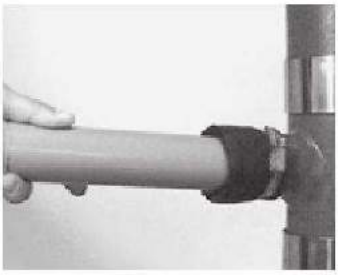
### Installation instructions



1. Push the EK Düker Fix coupling with opened clamp onto the SML pipe against the stop, then secure to the pipe with the clamp.

2. Grip the projecting rubber neck with a pair of tongs and carefully pull it out so that the opening is set free.

**(Konfix Multi coupling only:**
use a knife to cut into the grooved front, choosing the groove according to the exterior diameter of the connecting pipe, and without injuring the sealing lip underneath, and open)



3. Mark the connecting pipe at the depth of insertion, apply lubricant and insert into the coupling.

4. The plastic pipe used only illustrates the installation process. Any other material without special adapting pieces can be connected to the SML pipe system with the EK Düker Fix coupling. Attention: Please observe the table of acceptable outside diameters of pipes.

**Attention!**
The connecting pipe must be fixed in order to avoid slipping due to internal pressure.

## Multiquick coupling

**Connection possibilities**
Düker SML pipes and fittings DN 100 to inherently stable other materials with an exterior diameter of 72 up to 110 mm.

Düker SML pipes and fittings DN 100 to cast iron socket pipes DN 100 with an exterior diameter up to 115 mm. The coupling is delivered with two identical worm thread clamps, which are both adequate for the large diameter tolerance.

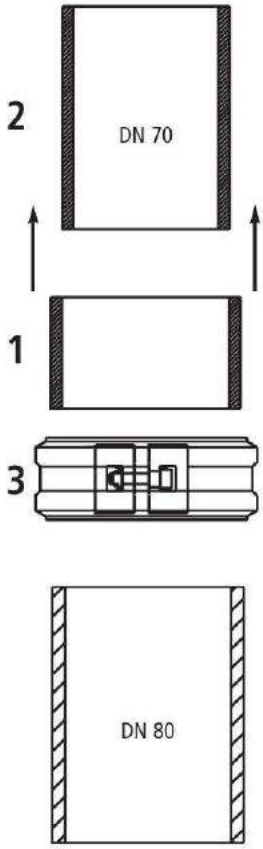
Push the open end of the Multiquick coupling over the cast iron pipe end and position the worm thread clamp in the groove intended for it.
Then tighten the worm thread clamp without displacing it. Use a knife to cut open the closed side or to cut the coupling back according to the outer diameter of the connecting pipe. Cut the coupling in front of the step to the required diameter.

Now slide the second worm thread clamp over the connecting pipe, push the pipe into the Multiquick coupling and tighten the worm thread clamp in the intended position.

Watch out for a flawless and clean sealing zone on the pipes or fittings. Paint lumps or mortar must be removed completely with sand paper. The worm thread clamps must be tightened exclusively by hand with a screw driver in order to avoid damages to the Multiquick coupling.

**Attention!**
The connecting pipe must be fixed in order to avoid slipping due to internal pressure.

## Transition coupling DN 70 – DN 80




1. Push the Dükorapid® coupling DN 80 onto the SML pipe or fitting DN 80

3. Push SML pipe DN 70 with the hose into the coupling DN 80

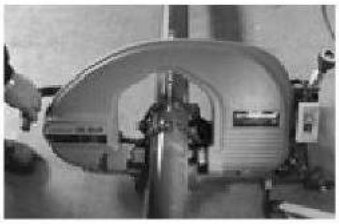
2. Push hose 74/79 onto the SML pipe or fitting DN 70

4. Tighten the screw on the Dükorapid® coupling (10 – 20 Nm)

## Cutting pipes

Düker hubless cast iron drainage pipes can be cut readily with the following tools:

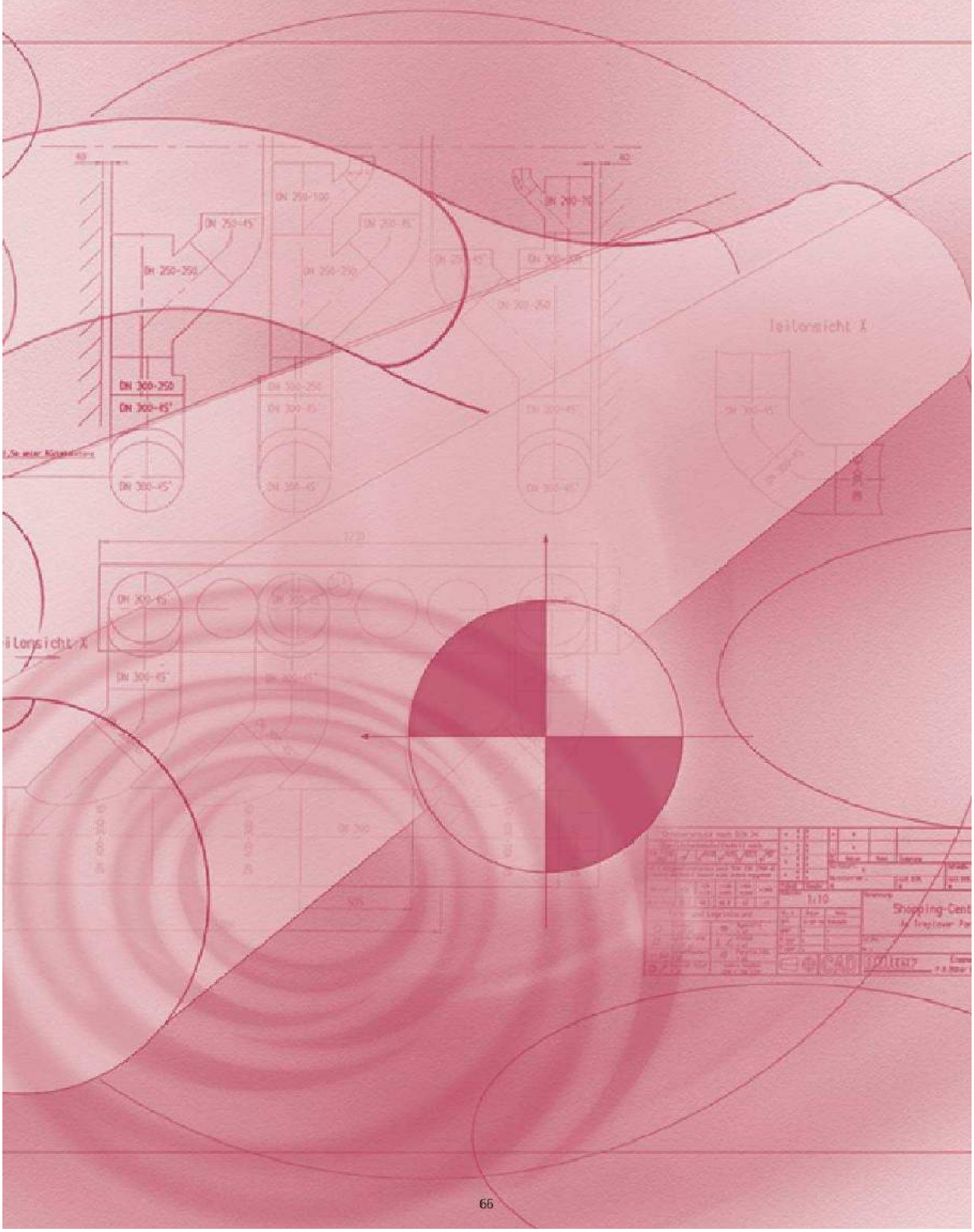
1. Belt saw
Portable belt saws cut pipes perfectly

2. Powered disc cutter
The best results with a powered disc cutter can be achieved with a disc appropriate for cast iron and a guidance as shown


3. Wheel cutter
For use without electricity


# 04 FIXINGS



## Imbedding cast iron pipes in concrete

On principle, cast iron drainage pipes can be imbedded in concrete. The cast iron expansion coefficient practically corresponds to that of concrete. As concrete passivates iron, no special protection against corrosion is necessary for SML pipelines as well as couplings. The standard single screw or twin screw couplings can be used. The pipes must be surrounded by 5 cm concrete all around. When imbedding the pipeline in concrete and during prior pressure testing of the pipeline, considerable forces may occur. In addition, when imbedding in base plates usually only little declivity is available and therefore the pipeline must be perfectly adjusted. The arising forces (which would be the weight including the water filling) should be taken in with brackets and transferred to the lower concrete, soil or the intended reinforcement. Use of threaded rods simplifies the arrangement of the usually short descent. The pipeline will tend to float to the surface when pouring in concrete. Therefore it must be secured with brackets. We recommend to fill the pipeline with water before imbedding it in concrete. If SML pipelines are imbedded in waterproof concrete bottoms, it is usually expected that the concrete must surround the pipe all around with 20 cm. If many fittings are strung together and therefore bracket fastening is not possible, then grip collars will have to be used.

**Imbedding SML main pipelines in the concrete bottom is recommended for:**

1. high groundwater level.
Advantage:
- leading pipes through waterproof floor plates is reduced.
- the pipeline itself is protected against any possibly aggressive groundwater.

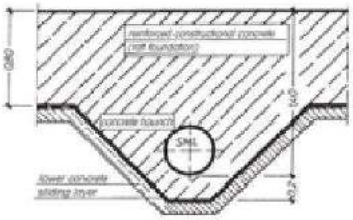
2. non-bearing ground.
Advantage:
- not having to carry out the necessary floor exchange or floor improvement and saving costly constructions for fastening of the pipelines below the floor plate.

If the thickness of the concrete slab is insufficient for installing the pipeline, the concrete slab must be reinforced at this point with a concrete haunch.

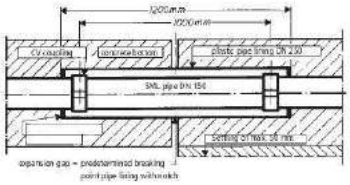
**Expansion gap**

In order to avoid any differences in settling, joints made up of pipe cuttings (0.5 - 1.0 m) are arranged at the expansion gaps. These pipe cuttings are placed movable with help of a pipe lining or a polystyrene casing.
According to EN 877, the permitted angling of SML couplings for the nominal widths is approximately:
up to DN 200 3 cm/m
DN 250 - 500 1.5 cm/m overall length.

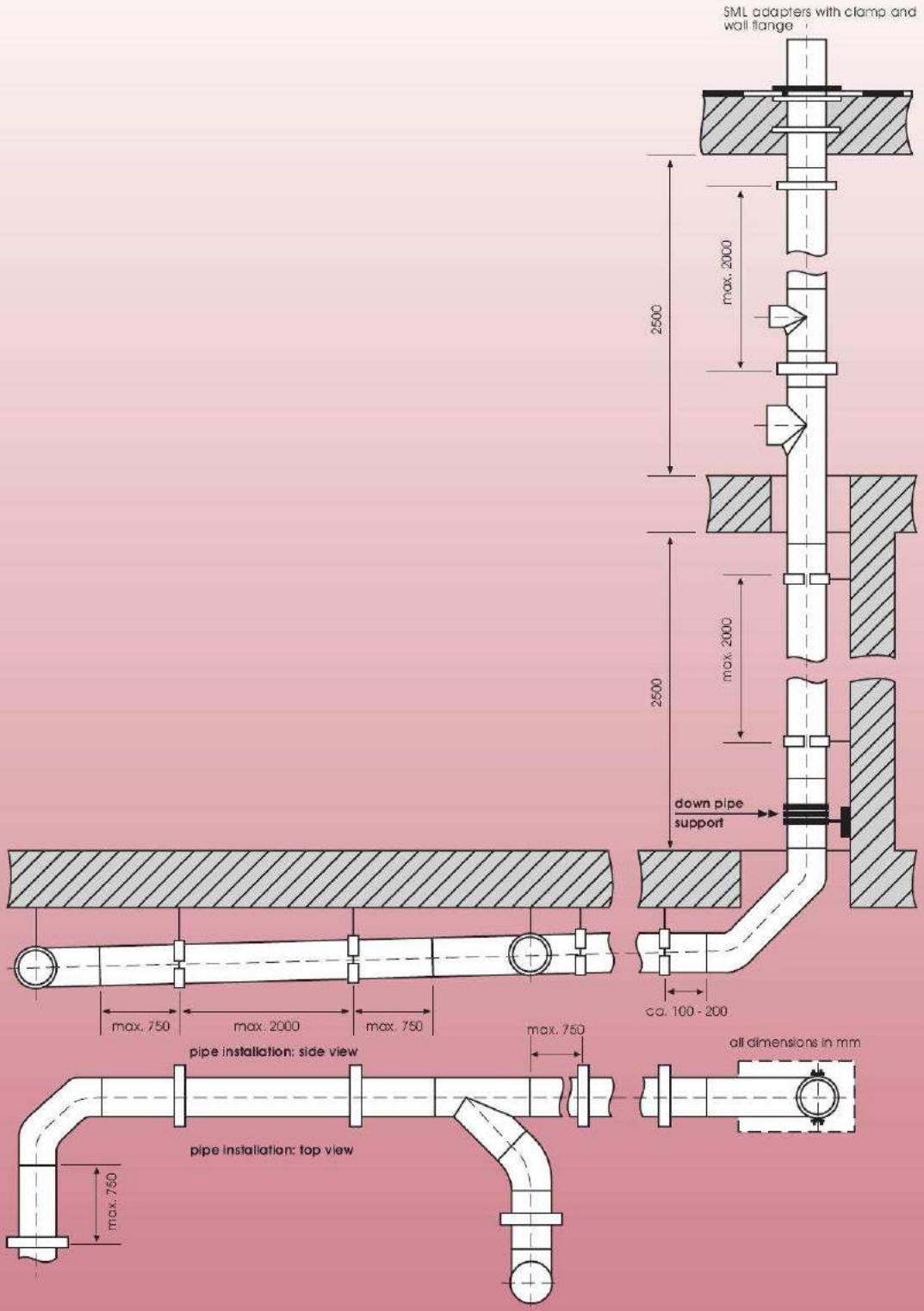
A predetermined breaking point (notched or cut through) is to be added to the pipe lining where the expansion gap is. Trickling of concrete into the cut-through pipe lining should be avoided by sealing with adhesive tape. It should also be sufficiently fastened in order to avoid slipping.



Haunch in a concrete slab



Expansion gap


SML adapters with clamp and wall flange
max. 2000
2500
max. 2000
2500
down pipe support
max. 750
max. 2000
max. 750
ca. 100 - 200
pipe installation: side view
max. 750
all dimensions in mm
pipe installation: top view
max. 750

## Fixing SML pipes

**General rules:**
The distances of the fixings should be even and should not exceed a length of 2 m. 2 to 3 m long pipes should be fixed twice - short pipes, according to the nominal width (or pipe weight) should be fixed once or twice. Fixing is to be carried out in regular distances **between** the couplings whereas the distance before and after each coupling should not be larger than 0.75 m.

**Horizontal pipes** must be securely fastened at all changes of direction and branches. Pipes which are pendant-fixed are to be secured against any type of movement in distances of 10 to 15 m with special fixed-point holding devices. This guarantees an excellent directional stability and avoids pushing out of the planned direction by other subassemblies.

**Down pipes** are also to be fastened at a maximum distance of 2 m. If a storey is 2.50 m high, then fastening is needed twice per storey, among that once directly at all branches eventually installed.

**Brackets** Use the customary pipe brackets with the corresponding fastening elements and supports. We recommend brackets with threaded connections M12 for SML pipes DN 50 to 150 - possibly M 8 for SML pipes up to DN 100. Rain water pipes and SML pipes under pressure should be fastened with brackets with threaded rods M 16. It might be useful to consult the manufacturer of pipe fixings.

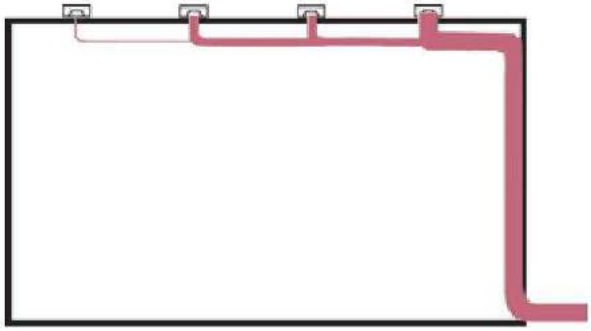
**SML down pipe supports** should be fastened as close to the wall as possible in order to avoid large bending moment to the brackets. Adequate supports with brackets should be used for larger wall distances.

Down pipe supports must carry the weight of the down pipe and should be fastened at the lowest possible point. They can carry as much vertical length as the wall can carry and the plugs can transmit to the wall. After this height, a further down pipe support is to be arranged.

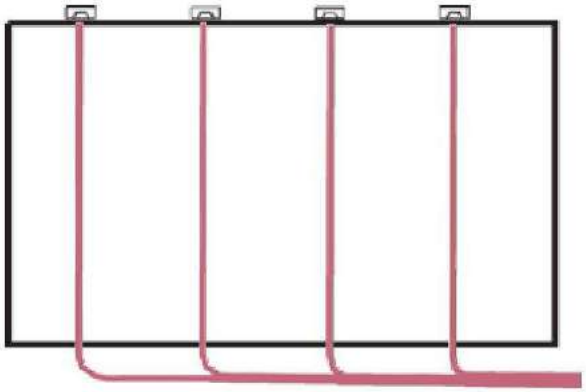
In general we recommend to install a down pipe support in down pipes of DN 100 or larger above the basement ceiling, and further down pipe supports in intervals of 5 storeys.

**SML pipes under pressure** Waste water pipes without thrust-resistant couplings must be secured against separation or slipping from the axis if internal pressure loads are to be expected. The demanded axial restraint can be obtained by thrust-resistant grip collars (see table on page 53).

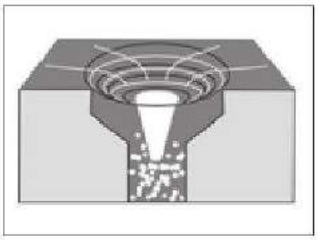
## Aquaperfect® Siphonic flat roof drainage



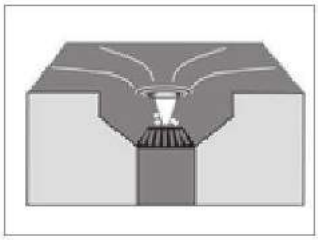
Aquaperfect® siphonic system



Gravity drainage



Normal roof drain



Drain for Aquaperfect® siphonic system with air sieve when the calculation rainfall is reached

AQUAPERFECT

**Differences to gravity drainage**
In a normal gravity roof drainage, the rain water is drained to the public sewage through partly filled pipelines. The filling level of these pipelines is generally at a maximum of 70% in order to ensure air circulation and pressure-free drainage.

In the Aquaperfect® siphonic system, starting at a certain rain water quantity (calculation rainfall quantity), the pipeline works without air and with negative pressure. The intake of air is avoided by an air sieve in the roof drain, which prevents the forming of a vortex (Coriolis force).

**Advantages and application**
The collection lines in the Aquaperfect® siphonic system are installed without slope and therefore save space below the roof construction. Nevertheless, the elevated flow velocities ensure a good self-cleaning effect. Smaller nominal widths, inferior material requirements and the avoidance of pipe trenches and base pipelines save cost and installation time.

Cast iron distinguishes itself by a low thermal expansion coefficient and does not add combustion loads to the building. Very important is the resistance to high negative pressure in the pipe, so it is not necessary to over-dimension the pipelines.

The Aquaperfect® siphonic system ought to be considered in the following cases:

- large roof areas, min. 150 m² per drain
- a difference in height of at least 4.2 m between the roof and the back water level
- limited installation space below the ceiling
- long collection pipelines

### Standards

The planning and execution of siphonic systems is based on:

- **EN 12056-3** (Layout and calculationn of roof drainage)
- **DIN 1986-100** (German supplement to EN 12056)
- **VDI 3806** (German regulation for siphonic roof drainage)
- **EN 1253** (roof drains)

### Functioning

The pressure height corresponds to the difference in height between the roof surface and the back water level (street level). Contrary to this force acts the pressure loss caused by pipe friction and the individual pressure resistance of the pipeline components. At the zero point, both forces cancel each other out, here the negative pressure converts to a positive pressure. After a relaxation length, the drainage has to transform into a gravity drainage at the back water level or in some cases above that level.

The strongest negative pressure is normally to be found at the so-called critical point, the turning of the horizontal collection pipe into the down pipe. The negative pressure may amount to a maximum of -900 mbar. The flow velocity in the negative pressure area should be at least 0.7 m/s, whereas it may not surpass 2.5 m/s in the relaxation area.

The drainage volume of the single roof drains ought to be practically identical within tight tolerances in order to avoid flow breaks, which would lead to delays in reaching the full flow.

The calculation rainfall quantity is to be defined based on local statistical values. For economical reasons and in order to ensure the self-cleansing effect, the full flow calculation is based on the highest rainfall quantity during five minutes which falls statistically within a period of two years (e.g. 300 l /(s·ha)).

The highest five-minutes rainfall quantity which is to be expected statistically within a period of 100 years – the so-called century rain (e.g. 600 l/(s·ha)) – cannot be drained through the siphonic pipeline system and might endanger the flat roof construction due to its weight. In case of flat roofs in light-weight construction, emergency drains must be installed for this contingency in any case. For other roof constructions this must be examined in each case. The drainage is done either by side drains over the facade, or with roof drains with height extensions which allow for the corresponding water level on the roof and dispose of a separate pipeline system. The water will be drained to surfaces near the building that can be flooded without danger.

### Calculation

The pressure ratio, flow velocities and drainage volumes must be calculated for each pipeline section and for each drain separately and then adjusted to the requirements. A calculation by hand is possible using among other things the Bernoulli equation. However, this calculating work is time-consuming, error-prone and troublesome: if the required values are not reached, the pipeline must be changed and the calculation must be repeated, if necessary several times.

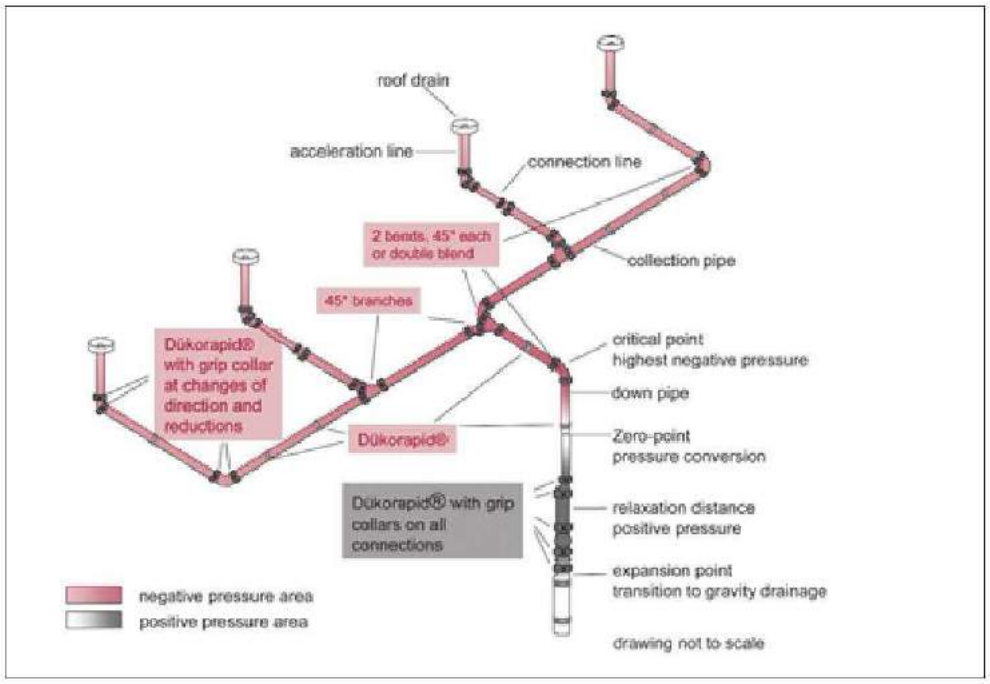
Larger building projects practically have to be planned with an appropriate computer software. The Aquaperfect® partners – Düker and Aco Passavant – offer you the service of planning and calculating siphonic systems for specific building projects. The specifier receives:

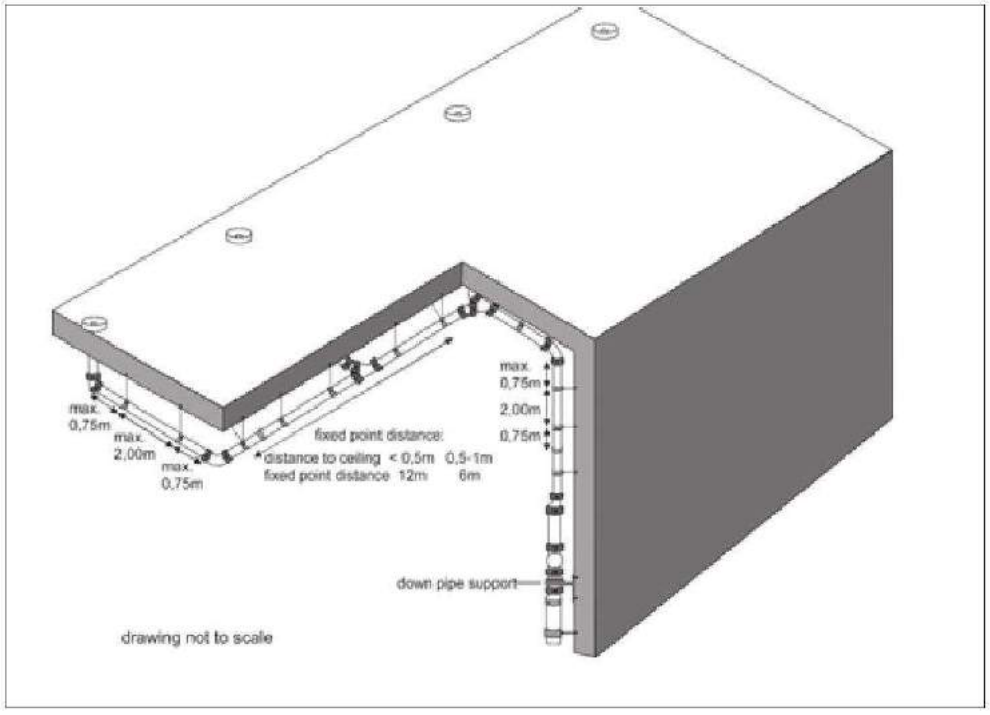
- pipeline section table and complete hydraulic calculation
- list of materials
- pipeline drawing
- specifying text

### Data required for the calculation

- horizontal sections
- sections
- detail of roof construction and insulation
- roof view with notation of the low-level points for drainage
- position of the back water level
- position of the connection points to the gravity system (base or collection pipes) and connection diameters
- Calculation rainfall quantity and roof material calculation value
- position of emergency drains
- effective drainage height, considering the admissible loads on the roof surface

In case of constructional modifications, the siphonic system must be re-calculated!


roof drain
acceleration line
connection line
2 bends, 45° each or double blend
collection pipe
45° branches
Dükorapid® with grip collar at changes of direction and reductions
critical point highest negative pressure
down pipe
Dükorapid®
Zero-point pressure conversion
Dükorapid® with grip collars on all connections
relaxation distance positive pressure
expansion point transition to gravity drainage
negative pressure area
positive pressure area
drawing not to scale


max. 0,75m
max. 2,00m
max. 0,75m
fixed point distance:
distance to ceiling < 0,5m 0,5-1m
fixed point distance 12m 6m
max. 0,75m
2,00m
0,75m
down pipe support
drawing not to scale

### General rules for planning

The following hints make planning easier:

- The pipeline nets ought to be symmetrical where possible
- The acceleration line ought to be at least 0.4 m
- The connection pipeline must be sufficiently long and be connected horizontally to the collection pipe
- The overall length of the longest flow distance (from the roof drain to the base pipeline) should be no more than ten times the height of the down pipe, but in any case no more than 100 m.
- The roof surface per down pipe should be no more than 5000 $m^2$.
- The distance between two drains should not surpass 20 m.
- Roof surfaces with a height difference of more than 1 m or with different roof material values should not be connected to the same down pipe.

### Rules for fixing and installing

The installation must follow EN 12056 part 1, paragraph 5.4.2, part 3, paragraph 7.6.2 as well as German DIN 1986 part 100, section 9.2.
On principle, the pipeline directions, diameters and lengths stated in the specifications must be observed, as otherwise the calculated pressures and volumes will not be reached.
The material type must be observed as other materials differ regarding pressure loss and reaction to negative pressure. A minimum of 6 m of the gravity drainage must also be installed in cast iron material.

The pipelines in the negative pressure area can be installed without slope.

### Fittings

At branchings, branches with 45° angles must be used, for turns bends with 45°, or double bends or bends with steadying distance. Only at the end of the acceleration line (below the roof drain), 88° bends are used.

### Couplings

On principle Rapid couplings should be used at all connections.
In the area of negative pressure, all turns, branchings, reductions and the complete acceleration line must be secured with grip collars.
In the area of positive pressure, all couplings must be secured with grip collars.
Where the gravity drainage starts, on a length of 6 m all changes of direction are to be secured with grip collars. In case of down pipes of more than 30 m height, the bends must be secured in any case.

### Fixings

The basic rules of page 68/69 are to be observed. Fixed-point devices are to be installed with an inbetween distance of no more than 12 m (distance to the ceiling < 0.5 m) or 6 m (distance to the ceiling 0.5 – 1 m).
The fixed points can be executed with threaded rods at an angle of at least 30° to the vertical fixing, or with consoles.

### Pipelines with risk of water condensation

Pipelines that can be subject to condensation or frost must be insulated accordingly. We recommend using the preinsulated compound pipe system VML.

### Start-off and maintenance

After installation the roof surface is to be cleaned thoroughly.
If considerable dirt accumulation on the roof surface is to be expected later on, it is recommendable to use gravel as a filter layer.
Unless the gravel is used on the whole roof, a gravel edge with a width of 0.5 m should be applied around the roof drain.
A maintenance contract covering the removal of dirt, plant growth and dead leaves and the check of the drain components is recommendable.

### Contact

For the calculation of Aquaperfect® siphonic systems and in case of technical questions please contact our hotline at +49 9353 791-280.

# FLOW CAPACITIES

**Filling level 50 % (h/d = 0,5)**

| SML | DN 70 $d_i$ = 71 | | DN 80 $d_i$ = 75 | | DN 100 $d_i$ = 103 | | DN 125 $d_i$ = 127 | | DN 150 $d_i$ = 152 | | DN 200 $d_i$ = 200 | | DN 250 $d_i$ = 263 | | DN 300 $d_i$ = 314 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v |
| cm/m | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s |
| 0,5 | 0,8 | 0,4 | 0,9 | 0,4 | 2,1 | 0,5 | 3,7 | 0,6 | 6,0 | 0,7 | 12,5 | 0,8 | 25,8 | 1,0 | 41,3 | 1,1 |
| 0,6 | 0,9 | 0,4 | 1,0 | 0,4 | 0,6 | 0,6 | 4,1 | 0,6 | 6,6 | 0,7 | 13,7 | 0,9 | 28,3 | 1,0 | 45,3 | 1,2 |
| 0,7 | 0,9 | 0,5 | 1,1 | 0,5 | 2,5 | 0,6 | 4,4 | 0,7 | 7,1 | 0,8 | 14,8 | 0,9 | 30,6 | 1,1 | 48,9 | 1,3 |
| 0,8 | 1,0 | 0,5 | 1,1 | 0,5 | 2,7 | 0,6 | 4,7 | 0,7 | 7,6 | 0,8 | 15,8 | 1,0 | 32,7 | 1,2 | 52,3 | 1,4 |
| 0,9 | 1,1 | 0,5 | 1,2 | 0,6 | 2,9 | 0,7 | 5,0 | 0,8 | 8,1 | 0,9 | 16,8 | 1,1 | 34,7 | 1,3 | 55,5 | 1,4 |
| 1,0 | 1,1 | 0,6 | 1,3 | 0,6 | 3,0 | 0,7 | 5,3 | 0,8 | 8,5 | 0,9 | 17,7 | 1,1 | 36,6 | 1,3 | 58,5 | 1,5 |
| 1,1 | 1,2 | 0,6 | 1,4 | 0,6 | 3,2 | 0,8 | 5,5 | 0,9 | 8,9 | 1,0 | 18,6 | 1,2 | 38,4 | 1,4 | 61,4 | 1,6 |
| 1,2 | 1,2 | 0,6 | 1,4 | 0,6 | 3,3 | 0,8 | 5,8 | 0,9 | 9,4 | 1,0 | 19,4 | 1,2 | 40,1 | 1,5 | 64,2 | 1,7 |
| 1,3 | 1,3 | 0,6 | 1,5 | 0,7 | 3,4 | 0,8 | 6,0 | 1,0 | 9,7 | 1,1 | 20,2 | 1,3 | 41,8 | 1,5 | 66,8 | 1,7 |
| 1,4 | 1,3 | 0,7 | 1,5 | 0,7 | 3,6 | 0,9 | 6,3 | 1,0 | 10,1 | 1,1 | 21,0 | 1,3 | 43,4 | 1,6 | 69,3 | 1,8 |
| 1,5 | 1,4 | 0,7 | 1,6 | 0,7 | 3,7 | 0,9 | 6,5 | 1,0 | 10,5 | 1,2 | 21,7 | 1,4 | 44,9 | 1,7 | 71,8 | 1,9 |
| 1,6 | 1,4 | 0,7 | 1,6 | 0,7 | 3,8 | 0,9 | 6,7 | 1,1 | 10,8 | 1,2 | 22,4 | 1,4 | 46,4 | 1,7 | 74,1 | 1,9 |
| 1,7 | 1,5 | 0,7 | 1,7 | 0,8 | 3,9 | 0,9 | 6,9 | 1,1 | 11,1 | 1,2 | 23,1 | 1,5 | 47,8 | 1,8 | 76,4 | 2,0 |
| 1,8 | 1,5 | 0,8 | 1,7 | 0,8 | 4,1 | 1,0 | 7,1 | 1,1 | 11,5 | 1,3 | 23,8 | 1,5 | 49,2 | 1,8 | 78,7 | 2,0 |
| 1,9 | 1,5 | 0,8 | 1,8 | 0,8 | 4,2 | 1,0 | 7,3 | 1,2 | 11,8 | 1,3 | 24,5 | 1,6 | 50,6 | 1,9 | 80,8 | 2,1 |
| 2,0 | 1,6 | 0,8 | 1,8 | 0,8 | 4,3 | 1,0 | 7,5 | 1,2 | 12,1 | 1,3 | 25,1 | 1,6 | 51,9 | 1,9 | 82,9 | 2,1 |
| 2,5 | 1,8 | 0,9 | 2,0 | 0,9 | 4,8 | 1,2 | 8,4 | 1,3 | 13,5 | 1,5 | 28,1 | 1,8 | 58,0 | 2,1 | 92,8 | 2,4 |
| 3,0 | 1,9 | 1,0 | 2,2 | 1,0 | 5,3 | 1,3 | 9,2 | 1,5 | 14,8 | 1,6 | 30,8 | 2,0 | 63,6 | 2,3 | 101,7 | 2,6 |

**Filling level 70% (h/d=0,7)**

| SML | DN 70 $d_i$ = 71 | | DN 80 $d_i$ = 75 | | DN 100 $d_i$ = 103 | | DN 125 $d_i$ = 127 | | DN 150 $d_i$ = 152 | | DN 200 $d_i$ = 200 | | DN 250 $d_i$ = 263 | | DN 300 $d_i$ = 314 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v |
| cm/m | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s |
| 0,5 | 1,3 | 0,4 | 1,5 | 0,5 | 3,6 | 0,6 | 6,2 | 0,7 | 10,1 | 0,7 | 20,8 | 0,9 | 43,1 | 1,1 | 68,9 | 1,2 |
| 0,6 | 1,4 | 0,5 | 1,7 | 0,5 | 3,9 | 0,6 | 6,8 | 0,7 | 11,0 | 0,8 | 22,9 | 1,0 | 47,2 | 1,2 | 75,5 | 1,3 |
| 0,7 | 1,6 | 0,5 | 1,8 | 0,5 | 4,2 | 0,7 | 7,4 | 0,8 | 11,9 | 0,9 | 24,7 | 1,1 | 51,1 | 1,3 | 81,6 | 1,4 |
| 0,8 | 1,7 | 0,6 | 1,9 | 0,6 | 4,5 | 0,7 | 7,9 | 0,8 | 12,7 | 0,9 | 26,4 | 1,1 | 54,6 | 1,3 | 87,3 | 1,5 |
| 0,9 | 1,8 | 0,6 | 2,1 | 0,6 | 4,8 | 0,8 | 8,4 | 0,9 | 13,5 | 1,0 | 28,1 | 1,2 | 58,0 | 1,4 | 92,6 | 1,6 |
| 1,0 | 1,9 | 0,6 | 2,2 | 0,7 | 5,1 | 0,8 | 8,8 | 0,9 | 14,3 | 1,1 | 29,6 | 1,3 | 61,1 | 1,5 | 97,6 | 1,7 |
| 1,1 | 2,0 | 0,7 | 2,3 | 0,7 | 5,3 | 0,9 | 9,3 | 1,0 | 15,0 | 1,1 | 31,0 | 1,3 | 64,1 | 1,6 | 102,4 | 1,8 |
| 1,2 | 2,0 | 0,7 | 2,4 | 0,7 | 5,5 | 0,9 | 9,7 | 1,0 | 15,6 | 1,2 | 32,4 | 1,4 | 67,0 | 1,6 | 107,0 | 1,8 |
| 1,3 | 2,1 | 0,7 | 2,5 | 0,7 | 5,8 | 0,9 | 10,1 | 1,1 | 16,3 | 1,2 | 33,8 | 1,4 | 69,7 | 1,7 | 111,4 | 1,9 |
| 1,4 | 2,2 | 0,7 | 2,6 | 0,8 | 6,0 | 1,0 | 10,5 | 1,1 | 16,9 | 1,2 | 35,0 | 1,5 | 72,4 | 1,8 | 115,6 | 2,0 |
| 1,5 | 2,3 | 0,8 | 2,7 | 0,8 | 6,2 | 1,0 | 10,9 | 1,1 | 17,5 | 1,3 | 36,3 | 1,5 | 74,9 | 1,8 | 119,7 | 2,1 |
| 1,6 | 2,4 | 0,8 | 2,7 | 0,8 | 6,4 | 1,0 | 11,2 | 1,2 | 18,1 | 1,3 | 37,5 | 1,6 | 77,4 | 1,9 | 123,7 | 2,1 |
| 1,7 | 2,4 | 0,8 | 2,8 | 0,9 | 6,6 | 1,1 | 11,6 | 1,2 | 18,6 | 1,4 | 38,6 | 1,6 | 79,8 | 2,0 | 127,5 | 2,2 |
| 1,8 | 2,5 | 0,8 | 2,9 | 0,9 | 6,8 | 1,1 | 11,9 | 1,3 | 19,2 | 1,4 | 39,8 | 1,7 | 82,1 | 2,0 | 131,2 | 2,3 |
| 1,9 | 2,6 | 0,9 | 3,0 | 0,9 | 7,0 | 1,1 | 12,2 | 1,3 | 19,7 | 1,5 | 40,9 | 1,7 | 84,4 | 2,1 | 134,8 | 2,3 |
| 2,0 | 2,7 | 0,9 | 3,1 | 0,9 | 7,2 | 1,2 | 12,5 | 1,3 | 20,2 | 1,5 | 41,9 | 1,8 | 86,6 | 2,1 | 138,3 | 2,4 |
| 2,5 | 3,0 | 1,0 | 3,4 | 1,0 | 8,0 | 1,3 | 14,0 | 1,5 | 22,6 | 1,7 | 46,9 | 2,0 | 96,9 | 2,4 | 154,7 | 2,7 |
| 3,0 | 3,3 | 1,1 | 3,8 | 1,1 | 8,8 | 1,4 | 15,4 | 1,6 | 24,8 | 1,8 | 51,4 | 2,2 | 106,1 | 2,6 | 169,6 | 2,9 |

**Filling level 100% (h/d=1,0)**

| SML | DN 70 $d_i$ = 71 | | DN 80 $d_i$ = 75 | | DN 100 $d_i$ = 103 | | DN 125 $d_i$ = 127 | | DN 150 $d_i$ = 152 | | DN 200 $d_i$ = 200 | | DN 250 $d_i$ = 263 | | DN 300 $d_i$ = 314 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v | Q | v |
| cm/m | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s | l/s | m/s |
| 0,5 | 1,6 | 0,4 | 1,8 | 0,4 | 4,2 | 0,5 | 7,4 | 0,6 | 12,0 | 0,7 | 24,9 | 0,8 | 51,6 | 1,0 | 82,6 | 1,1 |
| 0,6 | 1,7 | 0,4 | 2,0 | 0,4 | 4,7 | 0,6 | 8,2 | 0,6 | 13,2 | 0,7 | 27,4 | 0,9 | 56,6 | 1,0 | 90,5 | 1,2 |
| 0,7 | 1,9 | 0,5 | 2,1 | 0,5 | 5,0 | 0,6 | 8,8 | 0,7 | 14,2 | 0,8 | 29,6 | 0,9 | 61,2 | 1,1 | 97,8 | 1,3 |
| 0,8 | 2,0 | 0,5 | 2,3 | 0,5 | 5,4 | 0,6 | 9,4 | 0,7 | 15,2 | 0,8 | 31,6 | 1,0 | 65,4 | 1,2 | 104,6 | 1,4 |
| 0,9 | 2,1 | 0,5 | 2,4 | 0,6 | 5,7 | 0,7 | 10,0 | 0,8 | 16,2 | 0,9 | 33,6 | 1,1 | 69,4 | 1,3 | 111,0 | 1,4 |
| 1,0 | 2,2 | 0,6 | 2,6 | 0,6 | 6,0 | 0,7 | 10,6 | 0,8 | 17,1 | 0,9 | 35,4 | 1,1 | 73,2 | 1,3 | 117,1 | 1,5 |
| 1,1 | 2,3 | 0,6 | 2,7 | 0,6 | 6,3 | 0,8 | 11,1 | 0,9 | 17,9 | 1,0 | 37,1 | 1,2 | 76,8 | 1,4 | 122,8 | 1,6 |
| 1,2 | 2,4 | 0,6 | 2,8 | 0,6 | 6,6 | 0,8 | 11,6 | 0,9 | 18,7 | 1,0 | 38,8 | 1,2 | 80,3 | 1,5 | 128,3 | 1,7 |
| 1,3 | 2,5 | 0,6 | 2,9 | 0,7 | 6,9 | 0,8 | 12,1 | 1,0 | 19,5 | 1,1 | 40,4 | 1,3 | 83,6 | 1,5 | 133,6 | 1,7 |
| 1,4 | 2,6 | 0,7 | 3,1 | 0,7 | 7,2 | 0,9 | 12,5 | 1,0 | 20,2 | 1,1 | 41,9 | 1,3 | 86,7 | 1,6 | 138,7 | 1,8 |
| 1,5 | 2,7 | 0,7 | 3,2 | 0,7 | 7,4 | 0,9 | 13,0 | 1,0 | 20,9 | 1,2 | 43,4 | 1,4 | 89,8 | 1,7 | 143,6 | 1,9 |
| 1,6 | 2,8 | 0,7 | 3,3 | 0,7 | 7,7 | 0,9 | 13,4 | 1,1 | 21,6 | 1,2 | 44,9 | 1,4 | 92,8 | 1,7 | 148,3 | 1,9 |
| 1,7 | 2,9 | 0,7 | 3,4 | 0,8 | 7,9 | 0,9 | 13,8 | 1,1 | 22,3 | 1,2 | 46,3 | 1,5 | 95,6 | 1,8 | 152,9 | 2,0 |
| 1,8 | 3,0 | 0,8 | 3,5 | 0,8 | 8,1 | 1,0 | 14,2 | 1,1 | 22,9 | 1,3 | 47,6 | 1,5 | 98,4 | 1,8 | 157,3 | 2,0 |
| 1,9 | 3,1 | 0,8 | 3,6 | 0,8 | 8,3 | 1,0 | 14,6 | 1,2 | 23,6 | 1,3 | 48,9 | 1,6 | 101,1 | 1,9 | 161,7 | 2,1 |
| 2,0 | 3,2 | 0,8 | 3,7 | 0,8 | 8,6 | 1,0 | 15,0 | 1,2 | 24,2 | 1,3 | 50,2 | 1,6 | 103,8 | 1,9 | 165,9 | 2,1 |
| 2,5 | 3,5 | 0,9 | 4,1 | 0,9 | 9,6 | 1,2 | 16,8 | 1,3 | 27,1 | 1,5 | 56,2 | 1,8 | 116,1 | 2,1 | 185,6 | 2,4 |
| 3,0 | 3,9 | 1,0 | 4,5 | 1,0 | 10,5 | 1,3 | 18,4 | 1,5 | 29,7 | 1,6 | 61,6 | 2,0 | 127,2 | 2,3 | 203,3 | 2,6 |

# REFERENCES



| Selection of project references for Düker Cast Iron Drainage Pipe Systems | | |
|---|---|---|
| **Project Name** | **Town** | **Country** |
| Festspielhaus Theatre | St. Pölten | Austria |
| Millennium Tower | Vienna | Austria |
| Hilton Hotel | Sofia | Bulgaria |
| Four Seasons Hotel | Prague | Czech Republic |
| Hypo Vereins Bank | Prague | Czech Republic |
| Marriot Hotel | Prague | Czech Republic |
| Fisketorvet Center | Copenhague | Denmark |
| Opera House | Helsinki | Finland |
| Scandic Marski Hotel | Helsinki | Finland |
| BMW | Dingolfing | Germany |
| Multi function stadium | Duesseldorf | Germany |
| Commerzbank | Frankfurt | Germany |
| Dorint Hotel Riem Arcaden | Munich | Germany |
| Audi | Neckarsulm | Germany |
| Allianz HVU | Unterfoehring | Germany |
| Volkswagen Shed 55 | Wolfsburg | Germany |
| Spada Airport | Athens | Greece |
| Kowloon station | Hong Kong | Hong Kong |
| Sham Mong Road Housing Project | Hong Kong | Hong Kong |
| Shangri-La Hotel | Jakarta | Indonesia |
| King Hussein Centre | Amman | Jordan |
| Rijks Hospital | Amsterdam | Netherlands |
| Gardermoen Airport | Oslo | Norway |
| University | Tromsö | Norway |
| Galeria Domenikanska | Breslaw | Poland |
| Polski Telekom Building | Warsaw | Poland |
| Westin Hotel | Warsaw | Poland |
| Benfica Stadium of Light | Lisbon | Portugal |
| Ponte 25 de Abril | Lisbon | Portugal |
| World Trade Center | Shenzen | Republic China |
| Baltyskaja Hotel | St. Petersburg | Russia |
| German Center | Singapore | Singapore |
| Novena Square | Singapore | Singapore |
| El Corte Inglès | Linares | Spain |
| Växjo Hospital | Växjo | Sweden |
| Yuan's General Hospital | Kaohsiung | Taiwan |
| Taichung Tower | Taichung | Taiwan |
| Sheraton Voyager Hotel | Antalya | Turkey |
| Tower No. 1 Accommodation Block | Dubai | UAE |
| Birmingham Airport | Birmingham | UK |
| Children's Hospital | Bristol | UK |
| Millennium Stadium | Cardiff | UK |
| Houses of Parliament | London | UK |

Scandic Marski Hotel, Helsinki, Finland

Westin Hotel, Warsaw, Poland

Tower No. 1, Dubai, UAE

Commerzbank Frankfurt, Germany

Ponte 25 do Abril, Lisbon, Portugal

German centre, Singapore

Millennium Stadium, Cardiff, UK

Düker

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Simply click on the words!

Standards and approvals
Fire protection with Düker SML
Noise protection with Düker SML
Resistance and characteristics
Guarantee and certificates

## Product range, dimensions and weights:

pipes
reducers
down pipe supports
bends
S-bends
branches
inspection pipes
plugs
siphons
pipe with wall flange
adapter with clamp
and wall flange

rain water stand pipes
wash basin connectors
rubber connectors
WC connectors
connecting pieces
connectors to sewage pipes
special fittings
Dükorapid coupling
Rapid Inox coupling
CV coupling
CE coupling
CE dual ring coupling

Fire protection coupling
Connect-F/G-Inox coupling
Kombi grip collar
CV grip collar
Düker grip collar
Rekord grip collar
SVE coupling
EK Düker Fix coupling
Konfix Multi coupling
Multiquick coupling
transition coupling
ductile iron coupling

## Laying guidelines:

couplings – fields of application
guidelines in case of interior pressure
cutting of pipe ends
laying in concrete
guidelines on fixing
WC connection
Aquaperfect® siphonic system
flow capacities

## Installation instructions:

Rapid couplings
CV/CE couplings
Connect-G/F-Inox couplings
grip collars
SVE coupling
EK Düker Fix coupling
Konfix Multi coupling
Multiquick coupling
transition coupling

Specifying texts (Word format)