



VPC® Delta Ring

from DN 200 to DN 1000

The perfect level invert transition



VPC® Delta Ring

Get the optimal transition within the shortest time



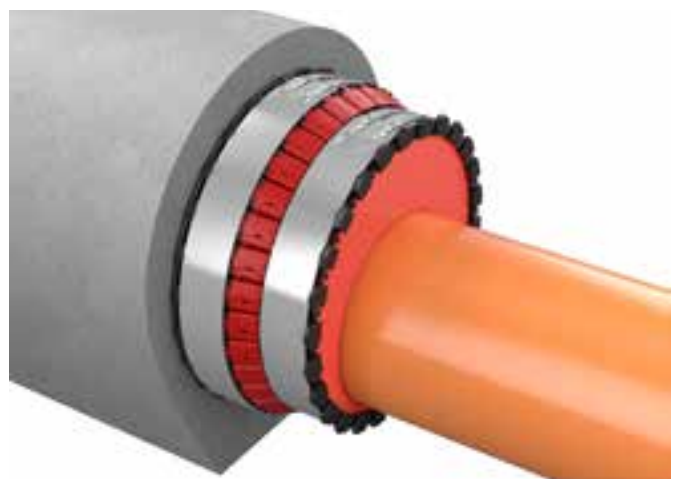
Background

Connecting pipes of various materials and nominal diameters is a routine task in the pipe trench: for example, if a hydraulically oversized main sewer needs to be reduced in size or an undersized main sewer needs to be enlarged. Commonly available reducer fittings are typically designed to reduce by only one nominal size. However, when extending or renewing a main sewer, it is often necessary to reduce by two or more nominal sizes. If the pipes with different nominal diameters are also made of different materials – for example concrete and plastic – technically sophisticated solutions are in short supply.

The solution

The VPC® Delta Ring provides a remedy. The VPC® Delta Ring can be used to connect wastewater pipes of various designs and different nominal widths with no offset, in conformity with the specifications of DIN EN 476 (*General requirements for components used in drains and sewers; German version EN 476*).

The way it works is very simple. The VPC® Delta Ring is precisely adapted to the larger of the two nominal diameters and is factory-fitted with a defined opening that corresponds to the outer diameter of the pipe with the smaller nominal diameter. Once the VPC® Delta ring has been connected to the VPC® Delta Pipe Coupling on the pipe with the larger nominal diameter, the pipe with the smaller nominal diameter is pushed into the VPC® Delta



Different nominal widths and materials are connected with no offset.

The VPC® Delta Ring – A new dimension in pipe connection technology



Advantages

- Level invert connection of the same or different nominal widths made of the same or different materials
- Reduction over several nominal widths possible
- Integrated stop ensures easy installation
- No loss of space due to installation
- No offset in the flow invert
- Short delivery times thanks to new manufacturing process

The VPC® Delta Ring also compensates for larger differences in nominal width in a very space-saving way!



Ring. The VPC® Delta Pipe Coupling is then tightened to the required torque. The VPC® Delta Ring is designed to ensure that both pipe inverts are connected to each other with virtually no offset. Possible pipe invert offsets meet the requirements of DIN EN 476 (*General requirements for components used in drains and sewers*), German version EN 476. According to this, the offset in the invert may be a maximum of six millimetres for a nominal width of DN 300.

The product

The VPC® Delta Ring is made of an extremely resistant elastomer and, depending on size and application, has an integrated static reinforcement. With a width of 70 mm, the VPC® Delta Ring provides a sufficient sealing surface. A rib attached to the outside of the VPC® Delta ring ensures a thrustproof connection within the VPC® Delta Pipe Coupling during installation. Once the VPC® Delta Ring is

positioned inside the VPC® Delta Pipe Coupling, it can be rotated 360° around its axis to precisely position the two pipe inverts requiring connection.

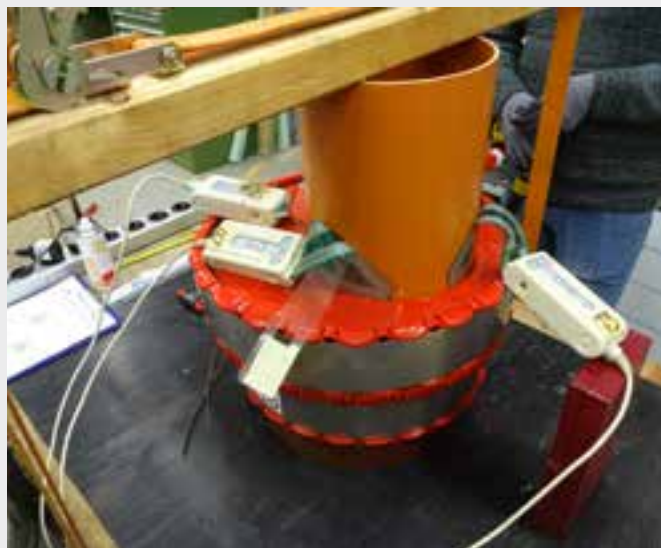
To seal the pipe with the smaller nominal diameter, the opening of the VPC® Delta Ring is provided with several sealing lips. These are pressed together by the contact pressure of the VPC® Delta Pipe Coupling and reliably seal the smaller nominal pipe diameter in the Delta Ring. There is also a stop ring on the inside of the opening in the VPC® Delta Ring. This is used to limit the insertion of the pipe with the smaller nominal diameter.

VPC® Delta Ring

Internally and externally tested quality



Internal leak test according to DIN 4060 in Funke's own test rig.



External study of the contact forces between the VPC® Delta Ring and the smaller connecting pipe subject to the tightening torque of the VPC® Delta Pipe Coupling using Tkscan pressure-sensitive sensors along the pipe circumference.

The same is true for the VPC® Delta Ring as for the entire Funke product range: the quality of the products is regularly checked in internal tests and by external test laboratories.

Internal test

The tightness of the VPC® Delta Ring is tested at the factory in accordance with DIN 4060 (*Joints of sewer and drain pipes with elastomeric seals – Requirements and testing on joints with elastomeric seals*).

Pressure	Duration	Shear load	Pipe
0,5 bar	15 min.	10-fold	DN 160
0,5 bar	15 min.	25-fold	DN 160
1 bar	1 min.	none	none

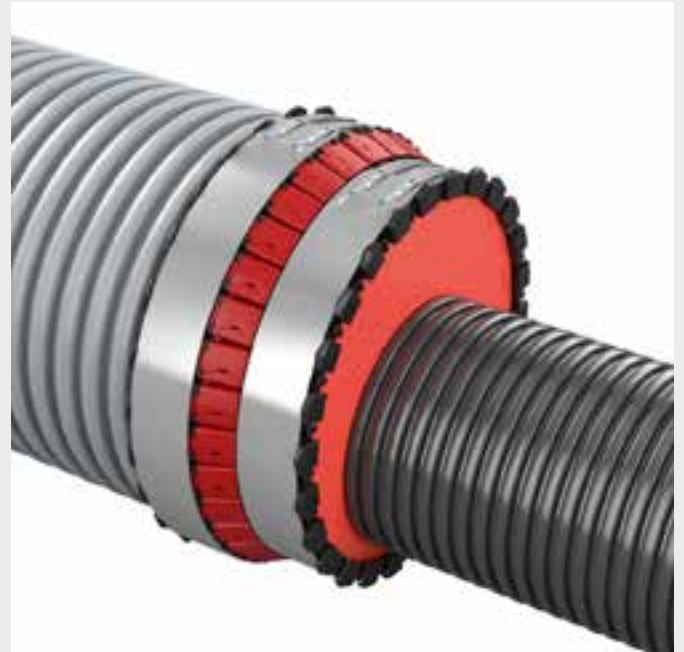
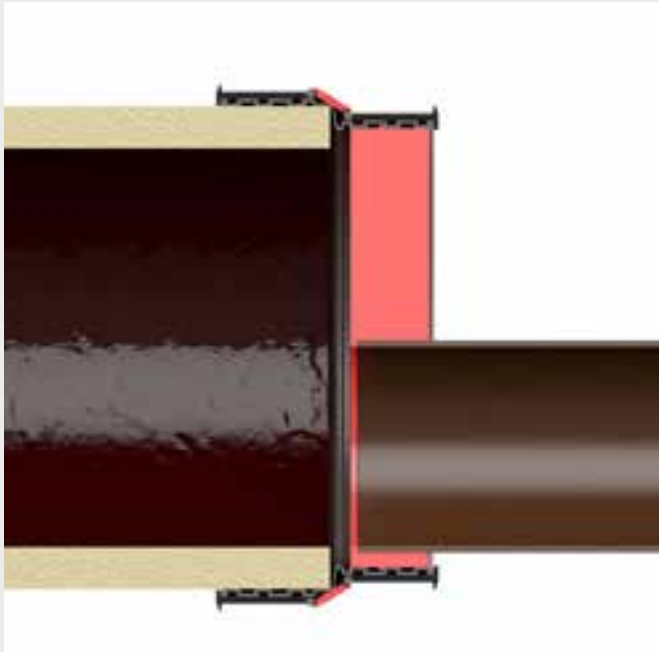
External test

At the IKT (German Institute for Underground Infrastructure), the surface pressure (contact forces) in the crown, at the side and in the invert between the VPC® Delta Ring and the smaller plastic pipe was studied. Using pressure mapping sensors, the force distribution between the VPC® Delta Ring and plastic pipe was determined on different Delta Ring sizes and plastic pipe sizes at different tightening torques on the tangential tensioner.



VPC® Delta Ring

Level invert requirements fully met



VPC® Delta Ring ensures level invert

DIN EN 476 specifies general requirements that must be taken into account in product standards for components such as pipes, fittings, inspection chambers and manholes with their respective connections, which are intended for wastewater pipes and sewers inside and outside buildings and are operated as gravity systems.

Pipe connections must, if provided, be level invert within the following calculated maximum limit dimensions:

- \leq DN/OD 315 or DN/ID 300: highest step 6 mm
- $>$ DN/OD 315 or DN/ID 300: highest step $0.02 \text{ mm} \times \text{DN}$, limited to 30 mm







Level invert transition



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The possible combinations

Large pipe			Type designation DELTA...	Small pipe										
DN	OD in mm	DN												
				1000	900	800	700	600	500	400	300	250	150 to 200	0 to 125
 Pipes with circular outer geometry	200	200 to 262	200 TYP A										✓	✓
	250	250 to 322	250 TYP A									✓	✓	✓
	300	315 to 382	300 TYP A								✓	✓	✓	✓
		395 to 465	300 TYP C								✓	✓	✓	✓
	400	395 to 465	400 TYP A							✓	✓	✓	✓	✓
		430 to 500	400 TYP B							✓	✓	✓	✓	✓
		495 to 565	400 TYP C							✓	✓	✓	✓	✓
	500	495 to 565	500 TYP A						✓	✓	✓	✓	✓	✓
		550 to 620	500 TYP B						✓	✓	✓	✓	✓	✓
		605 to 675	500 TYP C						✓	✓	✓	✓	✓	✓
	600	590 to 660	600 TYP A						✓	✓	✓	✓	✓	✓
		660 to 730	600 TYP B						✓	✓	✓	✓	✓	✓
		730 to 800	600 TYP C						✓	✓	✓	✓	✓	✓
	700	695 to 765	700 TYP A				✓	✓	✓	✓	✓	✓	✓	✓
		765 to 835	700 TYP B				✓	✓	✓	✓	✓	✓	✓	✓
		835 to 905	700 TYP C				✓	✓	✓	✓	✓	✓	✓	✓
	800	800 to 870	800 TYP A			✓	✓	✓	✓	✓	✓	✓	✓	✓
		870 to 940	800 TYP B			✓	✓	✓	✓	✓	✓	✓	✓	✓
		940 to 1010	800 TYP C			✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	890 to 960	900 TYP A		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		960 to 1030	900 TYP B		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		1090 to 1140	900 TYP C		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000	995 to 1065	1000 TYP A		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		1070 to 1120	1000 TYP B		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		1200 to 1250	1000 TYP C		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
 Pipes with base incl. flex cylinder	200	independent of OD	BIA 200										✓	✓
	250		BIA 250									✓	✓	✓
	300		BIA 300								✓	✓	✓	✓
	400		BIA 400						✓	✓	✓	✓	✓	✓
	500		BIA 500						✓	✓	✓	✓	✓	✓
	600		BIA 600					✓	✓	✓	✓	✓	✓	✓
	700		BIA 700				✓	✓	✓	✓	✓	✓	✓	✓
	800		BIA 800			✓	✓	✓	✓	✓	✓	✓	✓	✓
	900		BIA 900		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1000		BIA 1000		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
from 1100		on request												

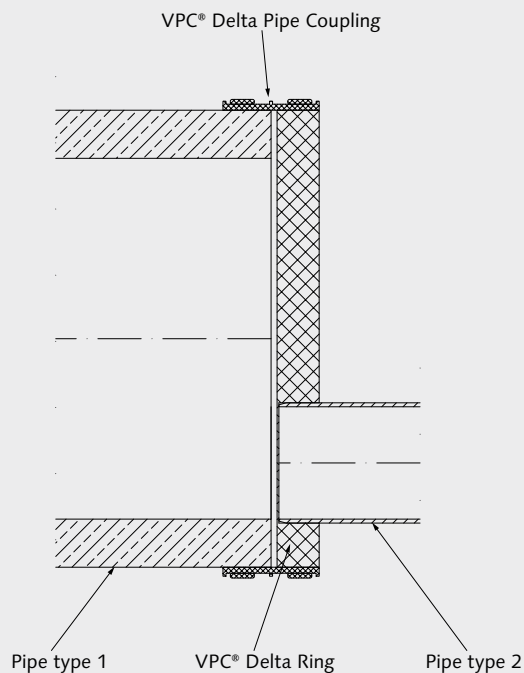
Torque wrench

Application area	Type designation Item no.	Force potential Nm
VPC 100 - 2800	VPDCS	5 - 30

Tangential tensioner

Application area	Type designation Item no.	Force potential Nm
VPC 300 - 995	VPCTS8	0 - 30

Technical information for professional installation



Professional installation

The VPC® Delta Ring is always supplied with a matching VPC® Delta Pipe Coupling. The fact that the Delta Ring is firmly fixed in the VPC® Delta Pipe Coupling makes installation much easier.

The VPC® Delta Pipe Coupling, together with the Delta Ring, is first pushed onto the spigot end of the larger of the two pipes requiring connection. In the next step, the VPC® Delta Pipe Coupling is tightened to the required torque. Depending on the size of the VPC® Delta Pipe Coupling, either the tangential tensioner or the hybrid tensioner is used (see the note on page 6 below).

The smaller of the two pipes requiring connection is then pushed into the opening of the Delta Ring up to the integrated stop and the VPC® Delta Pipe Coupling is also tightened on this side with the required torque.

Note: DIN EN 1610 (*Construction and testing of drains and sewers*) and the supplementary handout DWA-A 139 (*Construction and testing of drains and sewers*) must be observed when laying wastewater pipelines and sewers!

Example

A level invert connection is required!
Please specify any deviations separately!

	Pipe type 1:	Pipe type 2:
Material:	Concrete	PVC-U
Inner diameter:	500 mm	295 mm
Wall thickness:	85 mm	10 mm
Pipe circumference or outer diameter:	OD = 670 mm	DN/OD 315

Conditions for customisation

When ordering the VPC® Delta Ring, it is mandatory to fully complete a questionnaire!

The specification of the two types of pipe requiring connection (e.g. concrete and GRP) is just as important as the respective outer diameter and the inner diameter or wall thickness (see example above). If this information is not available when ordering, the VPC® Delta Ring cannot be produced!

VPC® Delta Ring

First applications passed with flying colours



Sewer renovation with nominal diameter change



Upgrading an existing DN 700 concrete pipe to DN 800 concrete pipe.



Professionally installed: The interior view illustrates the level invert.

The VPC® Delta Ring has already been successfully used in several projects to professionally connect sewer pipes made of the same or different materials and with the same or different nominal widths. For example, if a hydraulically oversized main sewer needs to be reduced in size or an undersized main sewer needs to be enlarged.

The construction partners unanimously gave a very positive assessment of the workmanship and structural properties, noting the relatively simple installation and the offset-free flow invert.



Connection of concrete pipe to HS® Pipe with different nominal widths



Reduction from a concrete pipe DN 1000 to a steel pipe DN 800

This document is a translation of the German brochure. All mentioned approvals and standards pertain to those in Germany. For details on the corresponding approvals and standards in your country, please contact us.

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