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Introduction

A condition for the safe and troublefree use of the Vetter pipe and test sealing bags is a knowledge of and adherence to these operating and safety instructions. Pay attention to DIN 7716 if stored for longer periods of time. The local rules and regulations for accident prevention at the place of use should also be observed.

Explanation of symbols

The following words and symbols are used in these operating instructions to indicate risks:



This symbol indicates a **direct risk to the life and health of persons**.

A non-observance of these instructions *leads to serious detrimental effects on the health of persons*.



This symbol indicates a **possible pending risk to the life and health of persons**.

A non-observance of these instructions *can lead to serious detrimental effects on the health of persons*.

Correct use

Vetter pipe and test sealing bags may only be filled with compressed-air or water depending on their intended use. They may only be used

- to seal off corresponding pipes

- for pressure testing in pipes
- for the construction of a pipe bypass.

Any other use will be deemed to be contrary to their intended purpose.

Safety instructions

Independent modifications and conversions to the sealing bags, connections and filling equipment are forbidden since a safe operation of the bags can then no longer be guaranteed.

Use only Vetter original fittings! Only these have been tested in the works.

Check the fittings, necessary accessories and pipe and test sealing bags for a perfect and proper condition before and after every use.

Pay special attention to cracks, cuts, etc. in the sealing bags. These could lead to the bag bursting during use.

Never use damaged bags.

Wear the specified personal safety gear when using

sealing bags.

Use a separate working line to carry, pull or lower the bags into sewers.

Vetter pipe and test sealing bags may only be filled outside pipes to a max. pressure of 0.5 bar.

When using the bags, make sure that there are no concrete lugs, reinforcing steel, etc. on the inside of the pipes. These can damage the bags. The pipes must be free from sediments.

Vetter sealing and testing bags are made of a very elastic material. There are no mechanical limits to the maximum diameter.



If sealing bags are inflated beyond their maximum permissible diameter they may burst and cause injuries.

Vetter sealing and testing bags may only be used inside circular or egg-shaped (special design) pipes (open channels), and may only be inflated up to their maximum working

pressure.

Insert sealing bags into pipes up to their full length. The entire sealing surface of the bag must rest against the inside wall of the pipe.



If the bags are inserted into pipes a restraint must be fitted to stop them being suddenly forced out of the pipe.

Once the pipe and test sealing bags have been placed in position you must ensure that there is no-one in the pipe during the filling, testing and emptying procedure.

Before removing the restraint you must make sure that the pipe is completely empty. The bag can be forced out suddenly if not and people standing nearby may be injured.

Safety valve

All controllers are fitted with safety valves.



Warning

The pre-set pressures may not be altered.

If the lead seal on the top part of the valve is removed its safe function can no longer be guaranteed. The safety valve must be returned to the manufacturer.

If the maximum working pressure of 1.0, 1.5 or 2.5 bar is exceeded, the safety valve blows off. The max. tolerance for opening and closing of the safety valve should be $\pm 10\%$.

To empty the sealing bags, open the vent (2) on the head of the safety valve by turning in an anti-clockwise direction. Once the bag is deflated

- close the handwheel at the pressure reducer,
- briefly open the ball valve to empty the supply hose of the pressure reducer.

Troubleshooting

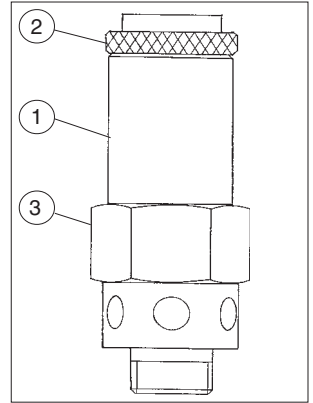
If a safety valve blows off too early on account of a foreign body which has entered the system, briefly open the vent (2) in an anti-clockwise direction and blow through the system.

If this does not remove the foreign body the complete top part of the valve must be unscrewed.

- Attach pipe wrench at position (1) and secure hexagon nut (3) with a spanner.
- After unscrewing the valve cone carefully remove this and then remove the foreign body from the sealing plate.
- Retighten the top part of the valve firmly and check that it functions perfectly.

Use a common defroster spray if iced up, e.g. on account of a high air humidity and low temperatures.

Please contact Manfred Vetter GmbH & Comp. in D-53909 Zülpich should you have any further questions.



Operating pipe and test sealing bags

The two systems 1.5 and 2.5 bar differ through different bag sizes and by the hose and coupling colours.

System	Hose colour	Coupling colour
1.5 bar	blue	blue
2.5 bar	grey	black

The coupling systems for 1.5 bar and 2.5 bar are different so that a 2.5 bar controller is not accidentally used with a 1.5 bar system, which could burst the bag since the pressure is too high.

The 1.5 bar coupling system does, however, fit in the 2.5 bar system, so that these bags can also be filled to a maximum of 1.5 bar. Remember that the elasticity of the “2.5 bar bag material” is lower at 1.5 bar.

**Operation with a Vetter foot pump with built-in safety valve
 1.5 bar/2.5 bar**

Connect the foot pump’s supply hose with nipple to the filling hose of the bag. Push nipple into the coupling of the filling hose (blue/grey) until it catches.

Fill the sealing bag with the foot pump. Keep an eye on the manometer and sealing bag. The manometer on the foot pump shows the pressure in the bag. If the maximum working pressure is exceeded the safety valve blows off. The sealing bag is emptied with the vent on the safety valve.



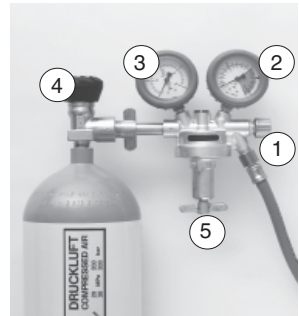
Operation with individual controllers, fitting construction 1.0 bar/1.5 bar/2.5 bar (e.g. when filling with the compressed-air cylinders 200/300 bar)

Connect the individual controller and sealing bag. Push nipple of hose into the coupling of the sealing bag until it catches.

Connect pressure reducer with T-screw to compressed-air cylinder. Close handwheel of pressure reducer (1). Open cylinder valve (4). The manometer (3) shows the pressure in the cylinder. Set the back pressure to approx. 3-4 bar with the control valve (5). (Keep an eye on the back pressure manometer (2)).

Connect pressure reducer’s supply hose to the controller. Push the plug-type nipple into the coupling until it catches. Open the handwheel on the pressure reducer.

Slowly open the individual controller’s ball valve to fill the sealing bag. Keep an eye on the manometer and sealing bag during filling. The manometer on the controller shows the pressure in the bag. If the maximum working pressure is exceeded the safety valve blows off. See the chapter on “Safety valve” for emptying the bag.



Operating with other compressed-air sources

Vetter adaptor sets are available for other compressed-air sources.

(1) Truck air brake systems



Warning
 Seal off control line with the dummy coupling (2).
 Secure truck with wheel

Vetter Pipe and Test Sealing Bags

blocks.

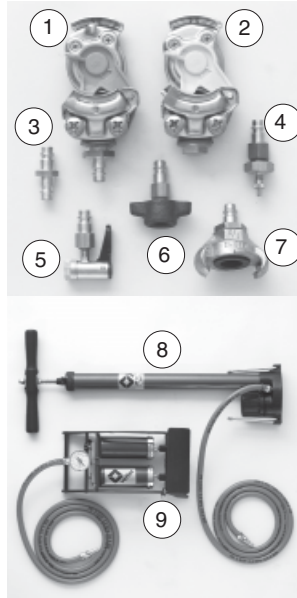
- (3) Compressed-air mains
- (4) Truck tyre valve . For inflation with a normal hand or foot pump.
- (5) Truck tyre valve connector . To take air from the spare tyre.
- (6) Truck tyre inflator. Tyre inflation connector must be protected by a safety valve.
- (7) Building site compressor.
- (8) Hand or
- (9) foot pump with manometer and 2 m/6.6 ft. air supply hose for direct connection to the controller.

Adapters and air pumps are available from the manufacturer.

If the maximum pressure of the compressed-air source is above 6 bar,

- use a pressure reducer,
- reduce pressure to approx. 3-4 bar.

A pilot pressure reducer up to 20 bar is also available.



Preparing for use

General

Select a suitable bag. The bag diameter must be smaller than the inside diameter of the pipe.

Push or place the bag with its entire length into the pipe.

Restraining the bag

The bag in the pipe must be restrained and only filled until it can still be moved in the pipe. Then pull the bag up to the restraint.



After positioning the pipe and test sealing bag you must ensure that there is no-one in the pipe during the filling, testing and emptying procedure.

The gap between the restraint and bag behind this should be filled with blunt materials, e.g. slats, (particularly with the bag types PDK 20/50, PDK 50/80 and RDK 50/120) so that the bag is restrained over as large an area as possible. The bag should be also be secured with a working line to prevent it from slipping back during emptying.

All pipelines must be timbered before filling.

Leave the pipeline and fill the bag from a safe position up to a maximum working pressure of 1.5 bar/2.5 bar.

At the end of work the bag should be emptied from outside the pipe via the controller and filling hose.

The dammed fluid must be allowed to drain away completely.

! DANGER

Before removing the restraint you must make sure that the pipe is completely empty. The bag can be forced out and injure persons standing nearby.

Once the water has drained away completely remove the restraint and then the bag.

Suggested restraints

The type of restraint necessary depends on the

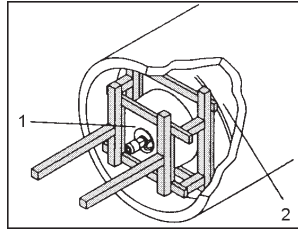
- structural conditions in the pipe
- the pipe itself and
- the expected counter-pressure.

The restraint is only shown schematically in the sketches to avoid misinterpretations.

Various possibilities for constructing a restraint during work in pipelines will be shown in the following:

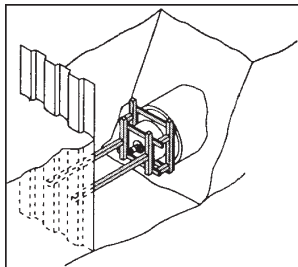
General restraint (schematic)

Example PDK 20/50

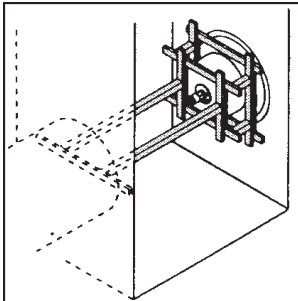


- 1 Centre of bag
- 2 Inflatable bag envelope

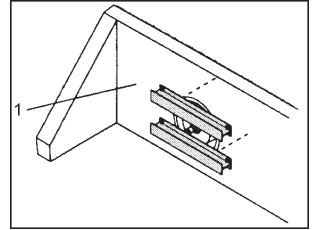
Suggested restraint for an excavation pit (schematic)



Suggested restraint for a manhole (schematic)



Suggested restraint for an pipe ending at an outside wall (schematic)



- 1 Outside wall with pipe opening

Vetter pipe and test sealing bags in use

Unlike the 1.5 bar system, 2.5 bar test sealing bags require no additional adapter since the base and top plates are connected by internal, continuous tubes.

If water pressure tests up to a max. of 1.0 bar in open channels are to be carried out or if ducts with higher pressures are to be blocked off (e.g. on account of a steep slope), Vetter pipe and test sealing bags with a permissible working pressure of 2.5 bar should be used.

Blocking a pipeline

(Fig. 1)

Vetter pipe sealing bags can be used in various pipe diameters. Select a sealing bag to match the pipe diameter to be sealed and connect to the filling device.

There should be no branches or house connections, etc. in the pipe to be sealed off.

Insert bag into the pipe and fill until it fits snugly in the pipe and against the restraint. Secure with a working line to stop it from slipping out during emptying.

Leave the pipeline and fill the bag from a safe position to the maximum permissible working pressure of 1.0/ 1.5/2.5 bar.

The maximum height of damming may not exceed 5/10 m head of water. If a pipeline has to be sealed off over a longer period of time the pressure in the pipe sealing bag must be checked regularly at the controller.

Drain pipeline



Before draining the pipeline make sure that there is no-one in the pipe.

Empty bag from a safe position until the dammed fluid can drain past the pipe sealing bag and restraint.

Only fully empty the bag after the fluid has drained completely.

Then remove the restraint and take the completely emptied bag out of the pipe.

Clean the pipe sealing bag and the filling device and

check for any damages.

Water pressure test in an open channel

(Figure 2)

Pay close attention to DIN 4033 / EN 1610 when testing water leaks in open channels.

Select the corresponding bag size for the pipe diameter and position and restraint so that it fits snugly in place.

Pay attention to the correct position of the emptying hose with float.

Connect the ball valve C (closed) and the test and measuring hose to vent the

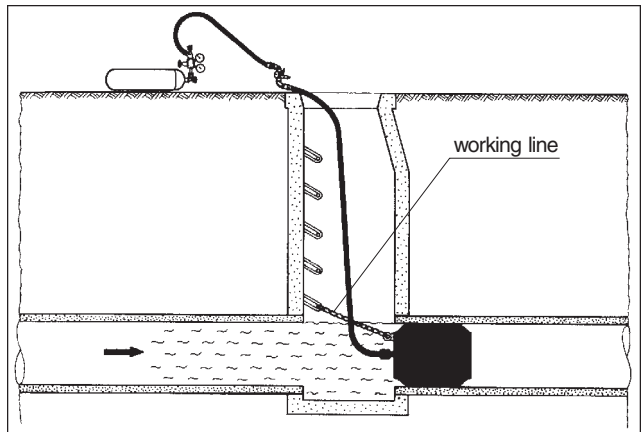


Figure 1 Sealing off a pipeline, diagrammatic view (the working line is only shown schematically)

pipeline to the higher test sealing bag. Place test and measuring hose in a vertical position.

Connect the water supply (1) and the test and measuring hose (2) to the ball valve C on the lower test sealing bag. The latter is used to measure the test pressure.

Slowly fill the pipeline with water from the lowest point in the line until it is sufficiently free of air. The pipeline to be tested should not be directly connected to a pressurised line. The test pressure measurement is to be carried out at the

lowest point in the pipeline.



Under no circumstances may there be persons in the pipe during the filling, testing and emptying procedure.

Pipelines can also be tested with compressed-air using Vetter pipe and test sealing bags. This procedure complies with EN Standard 1610, not DIN 4033.

On completion of the test first open the ball valve on the upper test sealing bag, then on the lower test

sealing bag, and allow the water to drain away.

When no more water escapes from the lower ball valve, empty the upper bag first.

A residual amount of water will escape when the lower bag is emptied.

Only then should the restraint be removed and the bags taken out of the pipeline.



Never remove the restraint from a pressurised pipeline. The bag can be forced out suddenly and injure persons standing in front of the pipe.

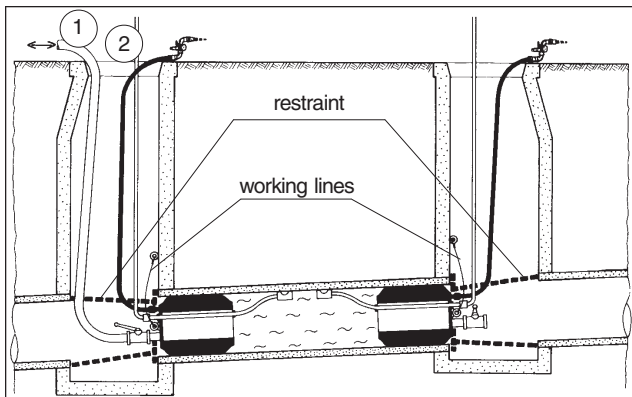


Figure 2 Water pressure test on an open channel pipeline, diagrammatic view (restraint and working lines shown schematically)

Construction of a provisional bypass (Fig. 3)

To construct a bypass, use the test sealing bag type PDK 10/20 or 20/50, Storz coupling A or B, with the respective bypass adapter. 2 Storz C connections and 1 Storz A connection are available for the bypass function of the PDK 50/80 and 50/120.

Place bypass bag (1) in the pipe above the building site. Restrain and inflate until it fits snugly. Secure the bag with a working line too. Connect the Storz coupling (A or B) to the suction pump on the surface via a suction hose. Make sure that the height of damming

of the dammed fluid does not exceed 5 m head of water.

Connect a hose to the delivery side of the pump and introduce into the pipeline behind the building site.

Prevent a backflow into the building site area by means of a further pipe sealing bag (3).



Warning

If persons can be endangered by a sudden influx of water, you must secure the building site by an additional pipe sealing bag (2).

Practical tips for shaft testing

If shafts are to be tested for water leaks, pipe and test sealing bags should be inserted on the incoming (against the direction of flow) and the outgoing (with the direction of flow) sides and must be axially connected to one another.

The straps are passed through the two tension slots or eyelets (in PDK) of the deflated bags.

Remember that the bags become shorter when filled, so that the retaining lines must be long enough.

Pressure test of a service line

DIN 4033 and EN 1610 are in principle to be observed during leak tests. Determine the length of the service line to the main channel (main duct) and mark this on the filling and thrust hose. The pipe sealing bag RDK 8/15 HA can also be exactly positioned from the main duct using a CCTV.

Insert the pipe sealing bag into the service line up to

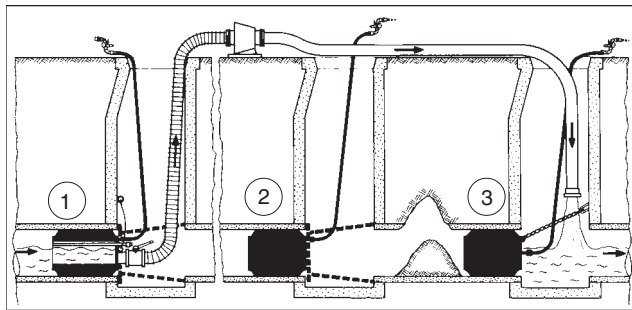


Figure 3 Construction of a temporary bypass, diagrammatic view (restraint and working lines shown schematically/simplified for reasons of space).

the determined length with the filling and thrust hose and fill up to the maximum permissible working pressure of 2.5 bar with the foot pump.

The test sealing bag PDK 10/15 HA is now inserted into the pipeline and similarly filled with the foot pump.

The filling and thrust hose is to be sealed at the leadthrough of the test sealing bag (PDK 10/15 HA) with a union piece.

Connect test and measuring hose.

Slowly fill the pipeline with water or compressed-air and build up the pressure.

At the end of the test make sure that the pipeline is depressurised before emptying the bag. The pipe sealing bag should be emptied first to let any remaining water drain away.

Once the test sealing bag has been emptied, release the union piece and remove the bags from the pipeline.

Using the Vetter universal gully sealing bag 2.5 bar

The bags can be used in gullies with drain pipes between 10 and 15 cm in diameter. A counter-pressure of 10 m head of water is possible.

In the case of pipelines with a diameter over 15 cm you should use Vetter pipe and test sealing bags.

Remove gratings, covers and dirt pans from the gully before starting work.

Connect the supply hose of the foot pump to the filling hose of the sealing bag. The hose couplings must catch at the nipples.

Screw the positioning rod together, holding the end with the peg downwards. Hang the bag on the peg of the positioning rod by the hole in the shackle.

Insert the gully sealing bag into the drain pipe in the bottom of the gully and fill with the foot pump to a max. of 2.5 bar.

Disconnect the filling hose from the supply hose of the foot pump. The coupling is

self-sealing and ensures that the bag remains pressurised. Secure the filling hose and bag with the working line.

The sealed gully fills up. A pump sump is created out of which the fluid can be pumped.

Vetter universal gully sealing bags 2.5 bar can also be filled with a filling device for pipe sealing bags 1.5 bar, though only up to 1.5 bar.

Use the attached plug-type nipple to empty the bag.

Clean the bag and accessories thoroughly of fluid residues after use.

Using the Vetter compact gully sealing bag



Vetter compact gully sealing bags may not be used,

- **if sharp-edged metal parts or concrete walls could damage the bags.**
- **if one has to reckon with a counter-pressure or vacuum.**

Vetter Pipe and Test Sealing Bags

Counterpressures can force the bag out of the pipe. In such cases you should use Vetter pipe sealing bags 1.5 bar/2.5 bar.

Vetter compact gully sealing bags are to be used solely to seal off round gullies and shafts with diameters between 30 and 50 cm. The max. height of damming is 0.5 m head of water. These diameters are usually found in the area around or below the dirt pan.

Vetter compact gully sealing bags may only be used in pipes which prevent an expansion of the diameter above 50 cm when the bag is filled to a max. of 0.3 bar.

First remove the gully cover, then any dirt pan which may be located below this.

Connect filling and safety fittings to the compressed-air cylinder.

Connect the quick-action coupling of the bag's filling hose to the nipple of the filling and safety fittings.

Lower the compact gully

sealing bag with filling hose into the gully by the holding line until the middle of the bag is in the circular area of the inlet; if necessary, slightly fill the bag first until it assumes a cylindrical shape.

Slowly open the compressed-air cylinder by turning the handwheel. Check the bag's working pressure at the manometer.

As soon as the bag fits into the circular area of the inlet and seals this (at a max. of 0.3 bar), close the compressed-air cylinder by turning the handwheel to the stop.

Place the cylinder with filling fittings outside the fluid area and possibly seal the next gully with a further bag.

After work, empty the bags and pull out of the gully by their holding lines.

Clean bags and accessories and check for any damages. Rub bag with talcum powder and roll up from bottom to top.

Close safety valve.

Check if there is any air left in the cylinder and re-fill if necessary. Connect re-filled cylinder to the filling and safety fittings.

Pack the fully connected compact gully sealing bag system (bag – filling hose – filling and safety fittings) – cylinder) into the transport case.

Shearing forces on the bag's sealing surface (kg) at a dammed height of water (m WS = meter of head of water)

Pipe Ø in cm	Area in cm ²	0.3 bar (3 m WS)	0.5 bar (5 m WS)	1.0 bar (10 m WS)
10	78.5	23.6	39.3	78.5
20	314.0	94.2	157.0	314.0
30	706.5	211.9	353.3	706.5
40	1,256.0	376.8	628.0	1,256.0
50	1,962.5	588.8	981.3	1,962.5
60	2,826.0	847.8	1,413.0	2,826.0
70	3,846.5	1,153.9	1,923.3	3,846.5
80	5,024.0	1,507.2	2,512.0	5,024.0
90	6,358.5	1,907.6	3,179.5	6,358.0
100	7,850.0	2,355.0	3,925.0	7,850.0
110	9,498.5	2,849.6	4,749.3	9,549.8
120	11,304.0	3,391.2	5,652.0	11,304.0
130	13,266.5	3,979.9	6,633.3	13,273.2
140	15,386.0	4,615.8	7,693.0	15,393.8

Vetter service line testing system HA 2.5 bar

Service lines between 10 and 15 cm in diameter can be sealed from the inspection chamber (cleaning opening) and checked for leaks in accordance with DIN 4033 with water, and with compressed-air according to the expected EN standard 1610, using the Vetter service line testing system (HA) 2.5 bar.

Scope of delivery (Fig. 4)

Vetter service line testing system (HA) consisting of:

- 1 x test sealing bag type PDK 10/15 HA with 2.5 bar system coupling and standard MS filling coupling including filling and thrust hose 15 m for RDK 8/15
- 1 x pipe sealing bag type RDK 8/15
- 1 x foot pump with safety valve, manometer and 2 m connecting hose
- 1 x test and measuring hose 9 mm, 6 m long
- 1 x adapter nipple/bayonet coupling (for water filling)
- 1 x shut-off valve with bayonet coupling

1 x transport case
60 x 40 x 13.5 cm



Figure 4 Vetter service line testing system (HA) 2.5 bar

Technical data Vetter service line testing system (HA) 2.5 bar

Type		RDK 8/15 HA SP 3/6	PDK 10/15 HA FT 4/6
Article no.		149 12 000	149 10 000
Pipe diameter Ø min. - max.	cm / in.	8 - 15 (3.2 - 6)	10 - 15 (3.9 - 5.9)
Max. working pressure	bar / psi	2.5 (36.25)	2.5 (36.25)
Test pressure	bar / psi	3.25 (47.4)	3.25 (47.4)
Test counterpressure	mWS/ psi	10 (14.5)	5 (7.25)
Length of cylinder	cm / in.	12 (4.7)	18.5 (7.2)
Overall length	cm / in.	13.5 (5.3)	20 (7.8)
Diameter Ø	cm / in.	8.0 (3.2)	9.8 (3.8)
Nominal content	l / cu. ft.	4 (0.14)	2.9 (0.1)
Air requirements	l / cu. ft.	14 (0.5)	10.1 (0.36)
Weight	kg / lbs.	0.5 (1)	1.2 (6)

**Vetter pipe and test sealing bag 1.0 bar
RDK 80/140, PDK 80/140**

On account of the larger volume, the permissible working pressure for these bags has been limited to 1.0 bar for safety reasons. They also have two bayonet couplings as filling connections for faster filling. The filling hoses are coupled to a twin controller, fitting construction 1.0 bar. The filling hoses remain connected to the twin controller during use. This serves to monitor the pressure.



Vetter pipe and test sealing bag set 1.0 bar RDK 80/140, PDK 80/140

Technical data for Vetter pipe and test sealing bag 1.0 bar RDK 80/140, PDK 80/140

Type		RDK 80/140 SP 32/54	PDK 80/140 FT 32/54
Article no.,		148 28 000	144 30 000
Pipe diameter Ø min. - max.	cm / in.	80-140(32 -54)	80-140(32 -54)
Max. working pressure	bar / psi	1.0 (14.5)	1.0 (14.5)
Test pressure	bar / psi	1.3 (19)	1.3 (19)
Test counterpressure	mWS/ psi	5 (7.25)	5 (7.25)
Length of cylinder	cm / in.	181 (71)	181 (71)
Overall length	cm / in.	186 (73)	193 (73)
Diameter Ø	cm / in.	78.5 (30.9)	78.5 (30.9)
Nominal content	l / cu. ft.	1250 (44)	1230 (43.5)
Air requirements	l / cu. ft.	2500 (88)	2460 (87)
Weight	kg / lbs.	41 (90.4)	69 (152)

Vetter Pipe and Test Sealing Bags

Technical data for Vetter pipe sealing bags 1.5 bar

Type		RDK 7/15 SP (3/5)	RDK 10/20 SP (4/8)	RDK 20/40 SP (8/16)	RDK 30/60 SP (12/24)	RDK 50/100 SP (20/39)
Article no.		148 27 000	148 10 000	148 11 000	148 12 000	148 14 000
- Test adapter						
- Bypass adapter						
Pipe diameter min.-max.	cm / in.	7 - 15 (3 - 5)	10 - 20 (4 - 8)	20 - 40 (8-16)	30 - 60 (12-24)	50-100 (20-39)
Max. working pressure	bar / psi	1.5 (21.75)	1.5 (21.75)	1.5 (21.75)	1.5 (21.75)	1.5 (21.75)
Test pressure	bar / psi	1.95 (28)	1.95 (28)	1.95 (28)	1.95 (28)	1.95 (28)
Test counterpressure	mWS/psi	5 (7.25)	5 (7.25)	5 (7.25)	5 (7.25)	5 (7.25)
Length of cylinder	cm / in.	30 (12)	51 (20)	51 (20)	73.5 (29)	111 (44)
Overall length	cm / in.	35 (14)	57 (22.5)	57 (22.5)	78 (31)	117 (44)
Diameter	cm / in.	6.8 (2.7)	9 (3.6)	19.5 (7.7)	29.5 (11.7)	45 (17.8)
Nominal content	l / cu. ft.	3.8 (0.13)	11.5 (0.4)	44.8 (1.58)	156 (5.51)	610 (21.6)
Air requirements	l / cu. ft.	9.5 (0.3)	28.8 (1.0)	112 (4.0)	315 (11)	1525 (54)
Weight	kg / lbs.	0.5 (1.1)	1.2 (2.6)	3.1 (6.8)	7 (15.4)	17 (37.5)

Technical data for Vetter pipe sealing bags 2.5 bar

Type		RDK 2.5/4 SP (1/1.5)	RDK 4/7 SP (1.5/3)	RDK 7/15 SP (3/5)	RDK 12.5/25 SP (5/10)	RDK 25/50 SP (10/20)
Article no.		144 02 000	144 03 000	144 04 000	144 05 000	144 07 000
Pipe diameter min.-max.	cm / in.	2.5 - 4(1-1.5)	4 - 7 (1.5-3)	7 - 15 (3-5)	12.5-25 (5-10)	25 - 50 (10-20)
Max. working pressure	bar / psi	2.5 (36.25)	2.5 (36.25)	2.5 (36.25)	2.5 (36.25)	2.5 (36.25)
Test pressure	bar / psi	3.25 (47.4)	3.25 (47.4)	3.25 (47.4)	3.25 (47.4)	3.25 (47.4)
Test counterpressure	mWS/psi	10 (14.5)	10 (14.5)	10 (14.5)	10 (14.5)	10 (14.5)
Length of cylinder	cm / in.	11.5 (4.6)	15.5 (6.1)	30 (11.8)	51 (20.1)	65 (25.6)
Overall length	cm / in.	17.7 (7)	21.5 (8.5)	35 (13.8)	57 (22.5)	71 (28)
Diameter	cm / in.	2.1 (0.8)	3.7 (1.5)	6.8 (2.7)	11.5 (4.6)	24.5 (9.7)
Nominal content	l / cu. ft.	0.2 (0.007)	0.7 (0.02)	4 (0.14)	20 (0.71)	95 (3.35)
Air requirements	l / cu. ft.	0.14 (0.005)	2.45 (0.2)	14 (0.5)	70 (2.4)	953.5 (33)
Weight	kg / lbs.	0.15 (0.33)	0.2 (0.44)	0.55 (1.2)	1.5 (3.3)	4.5 (9.9)

For maximum chemical resistance the sealing bags 1.5/2.5 bar are available with VITON coating or Material C and stainless steel connections. Details of resistances are listed in the table on page 47.

Technical data for Vetter test sealing bags 1.5 bar

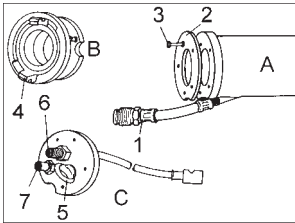
RDK 60/120 SP (23/47)	PDK 10/20 FT (4/8)	PDK 20/50 FT (8/20)	PDK 50/80 FT (20/32)	PDK 50/120 FT (20/47)
148 35 000	148 20 000	148 21 000	148 31 000	148 33 000
	145 03 000	143 03 000	included	included
	145 04 000*	143 04 000	included	included
60 - 120 (23 - 47)	10 - 20 (4 - 8)	20 - 50 (8 - 20)	50 - 80 (20 - 32)	50 - 120 (20 - 47)
1.5 (21.75)	1.5 (21.75)	1.5 (21.75)	1.5 (21.75)	1.5 (21.75)
1.95 (28)	1.95 (28)	1.95 (28)	1.95 (28)	1.95 (28)
5 (7.25)	5 (7.25)	5 (7.25)	5 (7.25)	5 (7.25)
130 (51)	48.5 (19)	55 (22)	56.5 (22.9)	90 (35)
136 (46)	55.5/60* (21.9/23.6*)	67/74.5* (26/29.3*)	62 (24.4)	94 (37)
58 (22.8)	9.7 (3.8)	19.5 (7.7)	45 (17.8)	45 (17.8)
820 (29)	9 (0.3)	63 (2.2)	124 (4.3)	568 (20)
2050 (72)	203 (7.2)	158 (5.6)	310 (10.9)	1420 (50)
25 (55)	2.8/2.7* (6.2/6*)	9/8.3* (19.8/18.3*)	30 (66.1)	42.5 (93.7)

Technical data for Vetter test sealing bags 2.5 bar

RDK 50/80 SP (20/33)	RDK 50/100 SP (20/39) (Kevlar)	PDK 12.5/25 FT (5/10)	PDK 25/50 FT (10/20)	PDK 50/80 FT (20/32)
144 09 000	144 15 000	144 25 000	144 27 000	144 29 000
50 - 80 (20-32)	50 - 100 (20-39)	12.5 - 25 (5-10)	25 - 50 (10-20)	50 - 80 (20-32)
2.5 (36.25)	2.5 (36.25)	2.5 (36.25)	2.5 (36.25)	2.5 (36.25)
3.25 (47.4)	3.25 (47.4)	3.25 (47.4)	3.25 (47.4)	3.25 (47.4)
10 (14.5)	10 (14.5)	10 (14.5)	10 (14.5)	10 (14.5)
111 (43.7)	111 (43.7)	51 (20)	65 (25.6)	111 (43.7)
117 (46)	117 (46)	58 (23)	74 (29)	118 (46)
45 (17.8)	45 (17.8)	11.5 (4.6)	24.5 (9.7)	45 (17.8)
446 (15.8)	610 (21)	18.5 (0.65)	93 (3.3)	436 (15.4)
1560 (55)	2135 (83)	64.8 (2.5)	326 (11.4)	1526 (53.4)
17 (37)	17 (37)	3.6 (8)	9.9 (22)	36 (79)

Vetter pipe and test sealing bag 1.5/2.5 bar

Test and bypass sealing bag type PDK 10/20



A Basic sealing bag PDK 10/20

- 1 Filling connection/bag
- 2 Seal
- 3 Screws

B Bypass adapter PDK 10/20

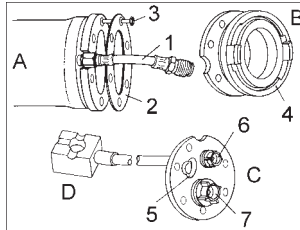
- 4 Storz coupling size B

C Test adapter PDK 10/20 including vent hose with float

- 5 Fastening eyelet for working line
- 6 Plug-type coupling to connect the test and measuring hose
- 7 Connection for water supply including turning valve

Use the test and measuring hose adapter to connect the test and measuring hose (connection to C 6)

Test and bypass sealing bag type PDK 20/50



A Basic sealing bag PDK 20/50

- 1 Filling connection/bag
- 2 Seal
- 3 Screws

B Bypass adapter PDK 20/50

- 4 Storz coupling size A

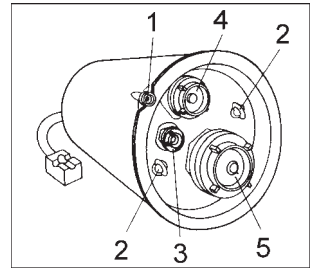
C Test adapter PDK 20/50

- 5 Fastening eyelet for working line
- 6 Storz coupling size D to connect the test and measuring hose, with dummy coupling
- 7 Storz coupling size C for water supply, with dummy coupling

D Vent hose with float

Use a ball valve size Storz C between the water supply and Storz coupling size C (C 7). With a pipe diameter over 200 mm you must use auxiliary restraint struts to enlarge the restrained area.

Test and bypass sealing bag type PDK 50/80; PDK 50/120



- 1 Filling connection/bag
- 2 Fastening eyelet for working line
- 3 Storz coupling size C to connect the test and measuring hose, with dummy coupling
- 4 Storz coupling size C for water supply, with dummy coupling
- 5 Storz coupling size A for bypass suction hose, with dummy coupling

Screw vent hose with float to socket piece on the rear of the Storz C connection from inside before using as a test sealing bag.

Vetter universal gully sealing bag 2.5 bar

Scope of delivery (Fig. 5)

Universal gully sealing bag set, article no. 146 70 000, consisting of:

- 4 x universal gully sealing bags 2,5 bar, type 10/15 with 2.5 m filling hose and 2.5 m holding line
- 1 x foot pump with safety valve and manometer
- 1 x positioning rod 1.5 m long, in 3 parts
- 1 x transport case 60 x 40 x 13.5 cm

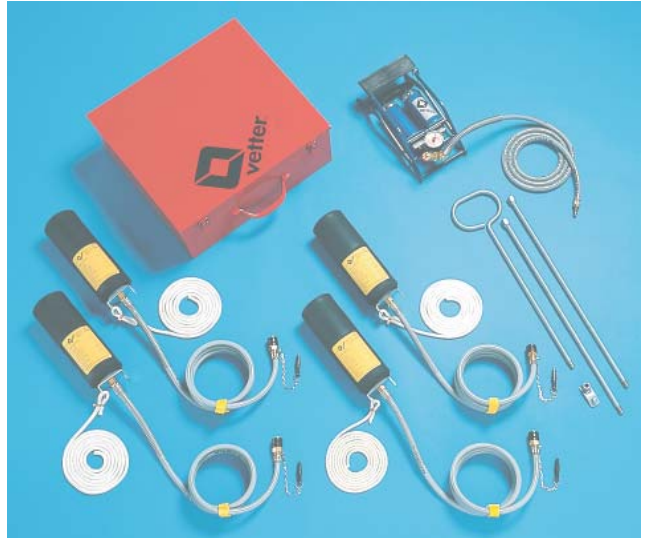


Figure 5 Universal gully sealing bag set

Technical data

Type		Universal gully sealing bag
Article no.		146 71 000
Gully outlet min.-max.	cm / in.	10 - 15 (4 - 6)
Working pressure	bar / psi	2.5 (36.25)
Max. test pressure	bar / psi	3.25 (47.4)
Test counterpressure	mWS / psi	10 (14.5)
Length of cylinder	cm / in.	26.5 (10)
Overall length	cm / in.	30 (12)
Diameter Ø	cm / in.	9 (3.5)
Nominal content	l / cu. ft.	3.7 (0.1)
Air requirements	l / cu. ft.	13 (0.5)
Weight, complete	kg / lbs.	12.1 (26.7)

Vetter compact gully sealing bag

Scope of delivery (Fig. 6)

A complete Vetter compact gully sealing bag set, consisting of:

- 1 x compact gully sealing bag, including 2 m filling hose and holding line for max. counterpressures of 0.5 m head of water (0.05 bar)
- 1 x filling and safety fittings with hand connection, pressure reducer fixed at 1 bar, manometer, safety valve 0.3 bar and nipple (for quick-action coupling)
- 1 x compressed-air cylinder 1 l/200 bar
- 1 x transport case, red (L x W x H) 60 x 40 x 13.5 cm



Figure 6 Compact gully sealing bag set

Technical data

Type		Compact gully sealing bag
Article no.		146 51 000
Gully diameter min.-max.	cm / in.	30 - 50 (1.8 - 19.6)
Working pressure	bar / psi	0.3 (4.35)
Test pressure	bar / psi	0.4 (5.8)
Test counterpressure	mWS / psi	0.5 (7.25)
Overall length	cm / in.	46 (18)
Diameter Ø	cm / in.	29.5 (11.6)
Nominal content	l / cu. ft.	85 (3)
Air requirements	l / cu. ft.	127 (4.5)
Weight, complete	kg / lbs.	9.7 (21.4)

Vetter pipe and test sealing bag 1.0 bar for egg-shaped pipelines

The Vetter pipe and test sealing bags are to be filled to a permissible working pressure of 1.0 bar and used only in egg-shaped (oval) pipelines. They are only suitable for one pipe dimension (fixed).

Please refer to the corresponding sections in these operating instructions for practical tips on their use.



Vetter pipe and test sealing bag set, 1.0 bar for egg-shaped pipelines

Technical data for Vetter pipe and test sealing bag 1.0 bar for egg-shaped pipelines

Type		EDK 60/90	EDK 70/105	EDK 90/135	EPK 60/90	EPK 70/105	EPK 90/135
Article no.		148 80 000	148 81 000	148 82 000	148 85 000	148 86 000	148 87 000
Pipe cross-section DIN	cm in.	60/90 23.6/35	70/105 27.5/42	90/135 35/53	60/90 23.6/35	70/105 27.5/42	90/135 35/53
Max. working pressure	bar/psi	1.0 (14.5)	1.0 (14.5)	1.0 (14.5)	1.0 (14.5)	1.0 (14.5)	1.0 (14.5)
Test pressure	bar/psi	1.3 (18.9)	1.3 (18.9)	1.3 (18.9)	1.3 (18.9)	1.3 (18.9)	1.3 (18.9)
Test counter-pressure	mWS psi	5 7.25	5 7.25	5 7.25	5 7.25	5 7.25	5 7.25
Length of cylinder	cm/in.	120 (47)	140 (55)	180 (71)	120 (47)	140 (55)	180 (71)
Overall length	cm/in.	145 (57)	165 (65)	220 (87)	151 (59)	172 (68)	220 (87)
Nominal content	l/cu.ft.	496 (17.5)	788 (27.8)	1323 (46.7)	490 (17.2)	779 (27.4)	1313 (46.3)
Air requirements	l/cu.ft.	992 (35)	1576 (56)	2646 (93)	980 (34.5)	1558 (55)	2626 (91)
Weight	kg/lbs.	23 (51)	28 (61)	44 (97)	43 (95)	51 (112)	67 (148)

Maintenance and care

Vetter pipe and test sealing bags and their accessories are to be checked

- after every use
- after longer periods of storage

for

- completeness
- perfect working order.

Visual and functional inspections are to be carried out on:

- **Hoses:**

Functional reliability of hose couplings

- **Sealing bags:**

Functional reliability of connection couplings

- **Controllers**

Functional reliability of safety valves, couplings and manometers

Clean the pipe and test sealing bags with lukewarm soapy water.

Then leave to dry at room temperature.

(Extract from DIN 7716)

Material resistance list

	Pipe-sealing bags (standard) Leak-sealing lances Vacuum leak-draining bags	Mini lifting bags (special) Leak-sealing bags Type W Leak-sealing bandages	Mini lifting bags (standard) Lifting bags 0.5/1.0 bar/7/14 psi. Pipe-sealing bags (special) Leak-sealing bags Type S Leak-sealing bandages Leak-draining bags Universal gully-sealing bags Gully-sealing bags	Viton* sealing bags
	Material A	Material B	Material C	Material Viton*
Abrasion resistance	excellent	good	excellent	good
Dielectric properties	excellent	low	good	good
Electrical isolation resistance	good to excellent	low	moderate to good	moderate to good
Resistance to <ul style="list-style-type: none"> • diluted acids • concentrated acids 	moderate to good moderate to good	good good	excellent good	excellent excellent
Resistance to solvents <ul style="list-style-type: none"> • aliphatic hydrocarbons • aromatic hydrocarbons • oxygenic solvents (ketones, etc.) • paint solvents 	low low moderate to good low	excellent good low moderate	moderate to good moderate moderate	excellent excellent low low to moderate
Resistance to <ul style="list-style-type: none"> • swelling in lubricant oils • mineral oils and fuels • animal/vegetable oils • ozone • sunlight • heat ageing (upper temp. for permanent use) • flames • high temperatures • cold 	low low low to moderate low to moderate low 85°C/185°F low good excellent	very good excellent very good moderate low 115°C/240°F low good moderate to good	good low good very good to excel. very good 95°C/200°F good very good good	excellent excellent excellent outstanding outstanding 85°C/185°F excellent outstanding good

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