



Technical Installation & Operation Manual

KWT Flap Valve

Type KRK





Foreword:

All products are designed and constructed according to the specifications as written in the quotation and order confirmation.

Never use the product for any other means or applications than stated. This could result in premature failure of the product, flooding or risk the safety of personnel. Without any exception, the products are not designed to bear or carry any loads of the civil construction

KWT products will be virtually drop-tight at their working pressure if installation has been carried out correctly. Better sealing can be expected at applications with on seated pressure. The responsibility of drop-tight installation lies primarily with the installing contractor

Phrases in this manual which need special attention are marked as follow:

- ☞
 - Gives the user suggestions and tips to carry out instructions more easily.
 - Remarks, with additional information.
 - Informs user for possible problems.

- ☞
 - The user can cause serious injury to himself or others or can damage the product.



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I. Introduction

I.1 Product

General

The KRK is manufactured in HDPE and Stainless Steel 316. The flap and backplate are manufactured in HDPE, with stainless steel 316 hinge-pin, counterweight and attachments. Due to the specific gravity of the HDPE, KWT fit a stainless steel counterweight to ensure closure when back-pressure is present, however very low heads of water are required to open the flap, as the design is such that the counterweight balances the flap correctly.

The KRK incorporates an EPDM rubber lip seal, to provide the seal between the flap and frame, and also an EPDM sponge seal between the frame and wall is fitted to prevent leakage.

Purpose of usage & Principle of functioning

The KWT KRK Flapvalve is designed to discharge water from outfalls, and to operate under very low heads of water, to prevent backing-up of water in the pipe. The flapvalve prevents water flowing back up the pipe, by closing when the downstream water level rises.

Use the KRK only in gravity flow applications at ambient conditions –20 up to 40 degrees Celsius.

The KRK is well suited for applications involving Waste Water plants, sewage systems etc.

Sudden impact as result of waves, water hammer should be avoided at all times.

Installation & operation stipulations

Read this instruction guideline carefully before installing the KRK.

Make sure you have taken all necessary safety precautions into account before starting. All legal and local regulations have to be followed precisely.

Skilled and therefore qualified personnel only carry out installation of the KRK should be only. In case of any doubt, please contact the supplier immediately

I.2 Technical specifications

Materials of Construction	
Flap/Ribs	HDPE
Back plate	HDPE
Hinge Pin and Counterweight	Stainless Steel 316
Sealing (between Valve and back plate)	EPDM Seal compound
Sealing (between back plate ad the wall)	EPDM Sponge Seal

Table 1: Technical specifications



2. Safety

2.1 General

In this chapter all safety precautions of the KRK are discussed. It is most important that everybody who operates the KRK is familiar with the contents of this chapter.

2.2. Safety, Health and environmental Risks

The following risks should be regarded:

- Danger of trapping of fingers and hands when mounting or operating.
- Electrical dangers during mounting or maintenance.
- Falling during hoisting.

2.3 Safety precautions if applicable.

- Report all unsafe situations or defects to the responsible person on discovery
- Qualified personnel only may carry out Electrical and mechanical work
- Wear all necessary P.P.E.

3. Transport and storage

3.1 Transport:

The KRK is to be moved horizontally with flap facing up on a pallet of matching size.

The KRK can be lifted with "soft" suitable slings, using only the lifting points provided (flaps over 25kg only)

- ☞ All necessary lifting should be carried out by fully trained personnel
- ☞ Only lift the KRK by means of lifting slings and a lifting bar.

3.2 Storage

It is recommended to store the KRK horizontally and free of dust, dirt and moisture.

4. Installation & Erection

4.1 General

In this chapter it is discussed how the KRK should be taken into operation. The KRK is mounted to concrete or brick walls using chemical anchor attachments. In the paragraphs 4.3 and 4.5 the installation is explained step by step. In paragraph 4.6 the required actions prior to operation are described.

Warranty

It is the responsibility of the purchaser to inspect the supplied KWT products for possible defects and that all ordered items are present at arrival. Missing parts or defects should be reported to KWT immediately and the installation must not proceed until these are rectified. The warranty will be deemed void if:

- The items supplied are not installed in the manner set out in this manual
- The products are modified in any way without the prior approval of the supplier/manufacturer
- The items are damaged due to mis-use, vandalism or overload.

All claims for warranty are subject to a full inspection by the supplier/manufacturer. KWT/ACE maintain the right to refuse claims for warranty where the inspection proves the damage to be the fault of another party.

Safety Aspects:

The installing contractor is considered to be acquainted with the safety procedures as mentioned in chapter 2.

4.2 Preparation prior mounting

Check the mounting supplies

- 1) EPDM compound (15mm thick)
- 2) EPDM glue (in a small canister)
- 2) A white pencil
- 3) A drill can
- 4) Tube of copper grease
- 5) Chemical anchor capsules and accessories

☞ **On some large flapvalves, it may assist installation to remove the flap from the frame before commencing, by removing the necessary bolts.**

Check the concrete wall

- 1) Check the concrete wall before installing the KRK, to ensure the wall is smooth. For this application, it may be necessary to remove concrete from the bottom corners of the culvert, to ensure that the corners are square.
- 2) Correct any deviation. Any possible gravel pockets must be filled out and concrete remains must be removed.

Applying the EPDM compound to the back plate of the KRK

100-500mm diameter

For KRK Flapvalves in this size range, a pre-cut EPDM sealing gasket is supplied, which is self adhesive. The flapvalve is to be clean from grease, dirt and dust, and the gasket is to be fully aligned with the mounting holes.

600mm Diameter ±

- 1) Before placing the EPDM compound, ensure that the mounting face is clean and smooth.
- 2) Mark the holes with the white pencil, so you will be able to drill a hole in the compound, which now correspond with the existing holes in the frame

- 3) The compound is self adhesive on one side. Cut the compound oversized then remove the protection slip and fit the compound in the fgroove on the back of the frame.

- 4) The compound now should be cut to length and squared so that the corners connect properly.
- 5) Glue the corners precisely together by using the provided EPDM glue. When not glued properly it can lead to leakage between the sealing face and the concrete wall
- 6) Grease the drill can on the outside with the copper grease to prevent ripping of the compound.
- 7) Drill the previously marked holes in the EPDM

☞ **SAFETY WARNING** Make sure that contact with the EPDM glue to your skin and eyes is prevented. If this does occur, contact your doctor immediately

4.3 Mounting with chemical anchor bolts

When all points in 4.2 are addressed and the EPDM compound is applied then continue with following installation procedure:

- 1) With suitable lifting slings, lift the KRK up and adjust to ensure that the KRK is vertical and level.
- 2) Lower the KRK into the right position.
- 3) Check and adjust KRK into correct position, ensuring that the flapvalve invert is level with the invert of the pipe invert.
- 4) Mark the mounting holes for the upper corners onto the wall.
- 5) Remove the KRK and drill the holes to the required depth for the chemical anchors (see appendix B and supplied manufacturer's instructions)

☞ **Follow the instructions supplied by the manufacturer of the chemical anchors (see appendix B) ensure that the holes are drilled to the correct depth and that the holes are fully cleaned out and free of dust. The curing time should be considered precisely.**

☞ **ONLY USE THE MOUNTING ACCESSORIES SUPPLIED WITH THE KRK.**

- 6) Insert the chemical anchor capsules into the pre-drilled holes
- 7) Re-position the KRK to previous position, adjust as necessary.
- 8) With mounting accessories supplied and suitable electric drill, following chemical anchor instructions insert mounting bolts. (See appendix B)

The curing time should be considered precisely

- 9) After curing time has elapsed fasten hexagon nuts to mounting bolts apply copper grease on anchors and nuts, (use copper grease to prevent the nuts to get stuck on the anchor!) and tighten the nuts by hand. **NOTE: Do not allow the bolts to take the weight of the flap, they have only been installed to assist positioning of the flapvalve.**
- 10) Check KRK again for correct position.
- 11) Mark the remaining holes and remove the KRK.
- 12) Drill remaining holes as above (see appendix B)
- 13) Re-position the KRK and continue inserting mounting bolts (as appendix B)
- 14) When all mounting bolts, washers, spring washers and nuts are installed, tighten by hand
- 15) Once resin has fully cured, tighten bolts to manufacturer's recommended torque (see data supplied with anchors) compressing the seal evenly to ensure a good seal between the KRK and the wall
- 16) The KRK is not allowed to deform in any way.

4.4 Inspection prior to operation

- 1) Clean the KRK thoroughly after installation.
- 2) Check the proper functioning of the KRK by closing and opening the KRK

☞ **If in any doubt always contact the supplier.**



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5. Operation

5.1 General

The operation of the KRK is discussed in paragraph 5.2. In paragraph 5.3 possible failures, the causes and methods for solving.

Safety issues

The installing contractor is considered to be acquainted with the safety procedures as mentioned in chapter 2.

5.2.1. Specifications

The KWT KRK, type KRK is standard provided with:
HDPE Flap and a HDPE Back plate.
Single Stainless Steel 316 Hinge and counterweight

5.2.2. Opening and Closing

- 1) In normal conditions, the water from the pipe discharges through the flapvalve by lifting the flap. This is assisted due to the material properties.
- 2) As the water level downstream raises above the upstream level, the flap is closed by the pressure of the water, sealing off the pipe, preventing reverse flow up the pipe.

5.3 Failure

Failure	Possible cause	Suggestion
The KRK is leaking between back plate and wall.	Wall not flat	Wall need to flattened according NEN 6722 march 1998, article 8,6
	Sealing not glued correctly	Sealing has to be renewed and installed according the installation instructions
The KRK is leaking between Flap and Back plate.	Seal is damaged	Replace seal
	Application specifications are exceeded	Please contact supplier
	Dirt between seal and seal face area	Remove present obstacles
	Seal does not contact seal area. Check if the KRK has not been deformed due to a non-flat wall.	Adjust fixing bolts evenly to straighten frame

Table 2 Failures

6. Cleaning & maintenance:

6.1 General

The KRK is constructed in a way that a minimum of maintenance is required. Paragraph 6.2 describes the regulations involving regular maintenance.

6.2 Maintenance & Inspection

For a correct functioning of the KRK it is recommended to carry out a visual check of the flapvalve annually. The following parts require attention in particular and need to be cleaned if necessary

	Parts	Material
Sealing (dirt and wear)	Sealing	EPDM

Table 3 Product Parts

In an aggressive environment or in a situation where there is a large amount of silt or debris, it is strongly recommended to increase the inspection interval to suit the location of the flapvalve.

7. Disposal

7.1 General

Paragraph 7.2 describes the procedure that a KRK at the end of its life cycle can removed safely and on an environmental responsible way.

7.2 Removal

Dismantle the KRK as follows:

- 1) Ensure that the KRK is sufficiently supported before removing fixings
- 2) Remove all the mounting material from the KRK.

Ensure that suitable precautions are in place to prevent injury whilst the KRK is not held in place by the mounting attachments.

- 3) Remove the KRK from the wall.
- 4) Remove the fixing materials from the wall.
- 5) Dismantle the KRK and separate materials into suitable classifications.

Dispose of the different materials via recognised methods, and in an environmentally responsible way



Appendix A Drawings



Appendix B Instructions Chemical anchor bolts

Procedure for installing Chemical Anchor Attachments

Please note that chemical anchor attachments in two forms are used for installing various elements of the KKS tilting weir. The following procedure must be referred to for details of this:

Standard Chemical Anchors

Comprising of:

Stainless Steel Threaded Studding
Chemical Anchor Capsules
Drill Adaptor
Stainless Steel Nuts, Washers and Spring Washers

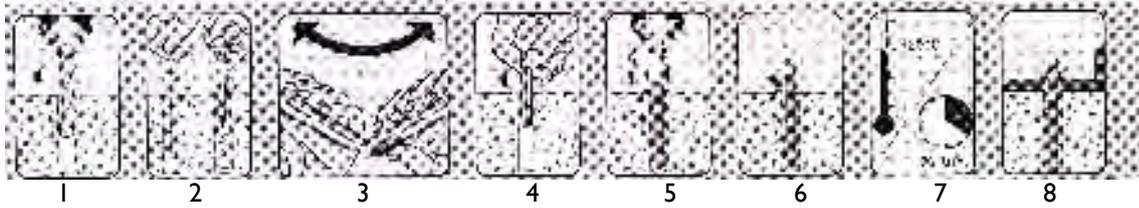
1. Drill Mounting hole in required position to the correct depth and diameter (please refer to details supplied with chemical anchors)
2. Blow out drilled hole using compressed air. (Warning, suitable eye protection to be worn)
3. Insert a chemical anchor capsule into each hole.
4. Attach a length of studding to the drill adaptor, then attach the adaptor to a rotary drill (NOTE: Do not use a hammer-action drill, as this will cause resin to escape from the hole)
5. Place the end of the threaded stud into the hole, then in one motion operate the drill at high speed, while pushing the stud through the anchor to the back of the hole. Once the back of the hole is reached, stop the drill to prevent resin escape.
6. Carefully remove the drill adaptor from the drill chuck, taking care not to move the stud.
7. Once the resin has sufficiently cured, remove the drill adaptor from the stud, however if the stud turns, leave the resin to cure further.
8. Replace the item to be mounted, then place a washer, a spring washer and a nut onto the stud and tighten by hand.
9. Once all required anchors have been installed and are fully cured, proceed to tighten the nuts evenly to the recommended torque. Where EPDM seal is used, this must be compressed evenly to ensure a good seal, however the frame must not be allowed to deform. For torque moment data, please refer to the anchor manufacturer's guidelines supplied with the anchors.

Special Countersunk Socket Anchors

Comprising of:

Threaded sockets with internal thread
Countersunk Bolts
Chemical Anchors
Special Drill Adaptor

1. Drill Mounting hole in required position to the correct depth and diameter for the threaded socket (please refer to details supplied with chemical anchors)
2. Blow out drilled hole using compressed air. (Warning, suitable eye protection to be worn)
3. Insert a chemical anchor capsule into each hole.
4. Attach the special drill adaptor to a threaded socket, then attach the adaptor to a rotary drill (NOTE: Do not use a hammer-action drill, as this will cause resin to escape from the hole)
5. Place the end of the threaded socket into the hole, then in one motion operate the drill at high speed, while pushing the socket through the anchor to the back of the hole. Once the back of the hole is reached, stop the drill to prevent resin escape.
6. Carefully remove the drill adaptor from the drill chuck, taking care not to move the socket.
7. Once the resin has sufficiently cured, remove the drill adaptor from the socket, however if the socket turns, leave the resin to cure further.
8. Replace the item to be mounted, then insert a countersunk bolt into the threaded socket.
9. Once all required anchors have been installed and are fully cured, proceed to tighten the bolts evenly to the recommended torque. Where EPDM seal is used, this must be compressed evenly to ensure a good seal, however the frame must not be allowed to deform. For torque moment data, please refer to the anchor manufacturer's guidelines supplied with the anchors.



Type	L mm	ϕ	ϕ mm	t mm	max. Nm
M10	85	M10	12	90	20
M12	95	M12	14	110	40
M16	95	M16	18	125	80

Table 1 requisite dimensions and turn moments

Temperature in °C	Mins.	Hours
Above 20	10	-
10-20	20	-
0-10	-	1
-5- 0	-	5

Table 2 Stated Curing Times



Appendix C High Density Polyethylene Properties

High Density Polyethylene (HDPE)

SIMONA
plastics

CEE- Safety Data Sheet according to 91/155 EWG	
Trade name: SIMONA PE-HWU-B / SIMONA PE-HWU / SIMONA PE-HD-pipe	
1. Indications to the manufacturer	SIMONAAG Tel: 06752 / 14-0 Teichweg 6 Fax: 06752 / 14-211 D-55606 Km
2. Composition / Indications to components	
Chemical characteristics	Polymer of ethylene
CAS-number	Not necessary
3. Possible dangers	Un-Known
4. First aid measures	
General comment	Medical aid is not necessary
5. Fire-fighting measures	
Suitable fire-fighting appliance	Water fog, foam, fire fighting powder, carbon dioxide
6. Measures in case of unintended Release	Not applicable
7. Handling and storage	
Handling	No special regulations must be observed
Storage	Unlimited good storage property
8. Limitation of exposition	
Personal protective equipment	Not necessary



Continue Appendix C

9. Physical and chemical characteristics.	
Phenotype:	
Form:	Semi- finished product
Colour:	Black
Smell:	Not distinguishable
Change of state	
Crystallite melting point	126-130 °C
Fire point	Not applicable
Inflammation temperature	Approx. 350 °C
Density	0.95 g/cm ³
10. Stability and reactivity	
Thermal decomposition	Above approx. 300 °C
Dangerous decomposition products	None
Besides carbon black also carbon dioxide and water as well as low molecular parts of PE will develop during the burning process. In case of incomplete burning also carbon monoxide may arise	
11. Toxic indications	
During several years of usage no effects being harmful for the health were observed	
12. Ecological indications	
No biodegradation, no solubility in water, no effects being harmful to the Environment must be expected.	
13. Waste-disposal indications	
Can be recycled or can be disposed of together with household rubbish (acc. To Local Regulations)	
Waste key for the unused product	57128
Waste name	Waste of polyolefin
14. Transport indications	
No dangerous product in respect to / according to transport regulations.	
15. Instructions.	
Marking according to GefStoff V/EG	No obligation for marking
Water danger class	Class 0 (self classification)
16. Further indications	
The indications are based on your to-days knowledge. They are meant to describe our Products in respect to safety requirements. They do not represent any guarantee of The described product in the sense of the legal guarantee regulations.	

Appendix D Characteristic values of Material

Simona

Technical information for HDPE

	Test method DIN	Dimension	SIMONA PE-HWU
Density, method C	53479	G/cm ³	0.950
Yield stress, Test piece 3	53455	N/ mm ²	22
Elongation at yield stress	53455	%	9
Elongation at tear	53455	%	300
Tensile-E-Module	53457	N/ mm ²	800
Impact strength (std. Small bar)	53453	KJ / mm ²	Without break
Impact strength when notched (U-notch)	53453	KJ / mm ²	12
Indentation hardness H 132 / 30	53456	N/ mm ²	40
Shore hardness D	53505	N/ mm ²	63
Crystalline melting range calorimetric	52328	°C	(126 –130)
Mean coefficient of thermal expansion	53752	k	1.8 .10
Heat conductivity	52612	W /mk	0.38
Behaviour in fire	4102		82
Dielectric strength. Method K 20 / 5D	53481	KV / mm	47
Volume resistance Annular electrode	53482	Ohm .com	>10
Surface resistance. Electrode A	53482	Ohm	10



Creep resistance Method KC	53480	V	600
Dielectric constant; At 300-1000 Hz. At 3 .10 Hz.	53483		2.3 2.3
Dielectric loss factor. At 300 Hz. At 1000 Hz. At 3.10 Hz.	53483		< 3.10 5.10 < 3.10
Physiological safety	BGA		JA

The data specified here are guide values and may vary depending on the processing method and the production of test pieces. Unless specified otherwise, these are average values taken from measurements on extruded sheets 4 mm thick. This information cannot be automatically transferred to finished components. The manufacturer or user must check the suitability of our materials for a specific application.