

# ***AQUATIC CONTROL ENGINEERING LTD***

**Installation, Operation and Maintenance Instructions**

**Product Type: KWT KRK Flapvalve**



Manufactured in the  
Netherlands by:



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# Installation, Operation and Maintenance Manual

## Foreword:

Aquatic Control Engineering Ltd are specialist suppliers and installers of Water Control Equipment, manufactured in the Netherlands by The KWT Group.

This document sets out the requirements and procedures for the installation, operation and maintenance, as set out in the manufacturer's guidelines.

This version of the document is for standard KRK flapvalves, between 100 mm and 1500 mm. If the product you have purchased is outside of this range, is not a standard product, please contact ACE for advice, as this document may not incorporate any special instructions that may be applicable.

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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# Installation, Operation and Maintenance Manual

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## 1. Introduction



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## 1.1 Product

### General

The KRK flapvalve 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 or MS Polymer seal between the frame and wall is fitted to prevent leakage.

### Purpose and function

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.

## 1.2 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 and the wall)	EPDM Sponge Seal
Maximum pressure (on seat)	5.0 MwC

Table 1: Technical specifications



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# Installation, Operation and Maintenance Manual

## 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.
  
- Falling during lifting

### 2.3 Safety precautions if applicable.

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

## 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 (where fitted-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 spreader beam if applicable.

### 3.2 Storage

It is recommended to store the KRK horizontally and free of dust, dirt and moisture, on stable, level ground



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## 4. Installation

### 4.1 General

In this chapter it is discussed how the KRK should be installed. 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 ACE/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.
- The equipment is fitted with alternative methods, fixings or seal without prior approval

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 or MS Polymer sealant
- 2) EPDM glue (in a small canister)
- 3) A white pencil
- 4) A seal-drill
- 5) Tube of copper grease
- 6) 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.



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**NOTE: THE MOUNTING SURFACE MUST BE WITHIN A TOLERANCE OF 2-3MM PER METRE. IF THIS IS NOT THE CASE, THE SEAL OPERATION MAY BE COMPROMISED.**

## ***Applying the seal to the back plate of the KRK***

### 100-500mm diameter

For KRK Flapvalves in this size range, MS Polymer sealant is provided, which is applied using a mastic gun to a pre-cut groove in the back plate. The flapvalve is to be clean from grease, dirt and dust, and a suitably size bead of sealant is to be applied to ensure contact with the mounting surface.

### 600mm Diameter +

- 1) Before placing the EPDM compound, ensure that the mounting face is clean and smooth.
- 2) The compound is self adhesive on one side. Cut the compound oversized then remove the protection slip and fit the compound in the groove on the back of the frame.
- 3) The compound should now be cut to length and squared so that the corners connect properly.
- 4) Glue the corners precisely together by using the provided EPDM glue (Loctite). When not glued properly it can lead to leakage between the sealing face and the concrete wall
- 5) Grease the seal drill on the outside with the copper grease to prevent ripping of the compound.
- 6) Mark the mounting hole positions on the seal, and using a battery drill and seal drill, 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***

- 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 with the chemical anchors (see appendix B for a typical procedure) 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 fully followed.**



**ONLY USE THE MOUNTING ACCESORIES 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)



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- 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 seizing on the bolt) and tighten the nuts by hand.

**NOTE: Do not allow the bolts to take the weight of the flap until cured, 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 (see 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

#### Safety issues

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

#### 5.2.1. Specifications

KWT KRK flapvalves are fitted as standard with:  
 HDPE Flap and a HDPE Back plate.  
 Single Stainless Steel 316 Hinge and counterweight  
 EPDM Lip seal  
 100-500mm- MS Polymer sealant  
 600mm+- Closed Cell EPDM sponge seal

#### 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 (2-3 mm. per meter)
	Seal not glued correctly	Sealant 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 in 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





# Installation, Operation and Maintenance Manual

## Appendix A Drawings



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## Appendix B Instructions Chemical anchor bolts

### Procedure for installing Chemical Anchor Attachments

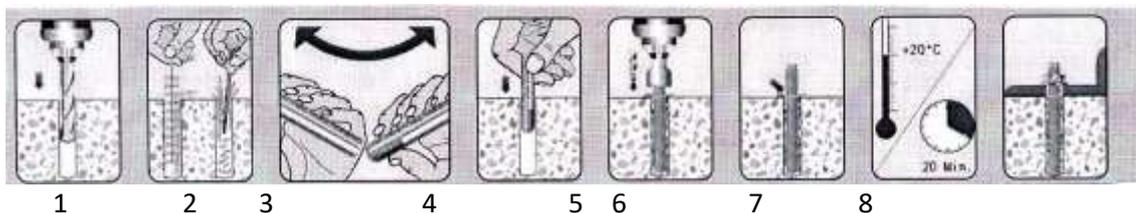
Please note that chemical anchor attachments are used for installing various elements of the KRK Flapvalve. A typical procedure for the installation of these is as follows, however please refer to the instructions with the delivered anchors, in case of supply variation.

### 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.





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Type	L mm	$\sigma$	$\sigma$ 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



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## Appendix C High Density Polyethylene Properties High Density Polyethylene (HDPE)- SIMONA

<b>CEE- Safety Data Sheet according to 91/155 EWG</b>	
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



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## 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<sup>3</sup>

### 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.





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## Appendix D Characteristic values of Material

### Simona

#### Technical information for HDPE

	Test method DIN	Dimension	SIMONA PE-HWU
Density, method C	53479	G/cm <sup>3</sup>	0.950
Yield stress, Test piece 3	53455	N/ mm <sup>2</sup>	22
Elongation at yield stress	53455	%	9
Elongation at tear	53455	%	300
ensile-E-Module	53457	N/ mm <sup>2</sup>	800
Impact strength ( std. Small bar)	53453	KJ / mm <sup>2</sup>	Without break
Impact strength when notched ( U-notch)	53453	KJ / mm <sup>2</sup>	12
Indentation hardness H 132 / 30	53456	N/ mm <sup>2</sup>	40
Shore hardness D	53505	N/ mm <sup>2</sup>	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.

**Date Reviewed:** 27/2/17

**Version No. 2.0**

*This document is no longer considered controlled once it has been printed or E-mailed*



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