

# **BORELINE**

**the flexible rising main**

## **INSTRUCTIONS FOR USE & TECHNICAL INFORMATION**

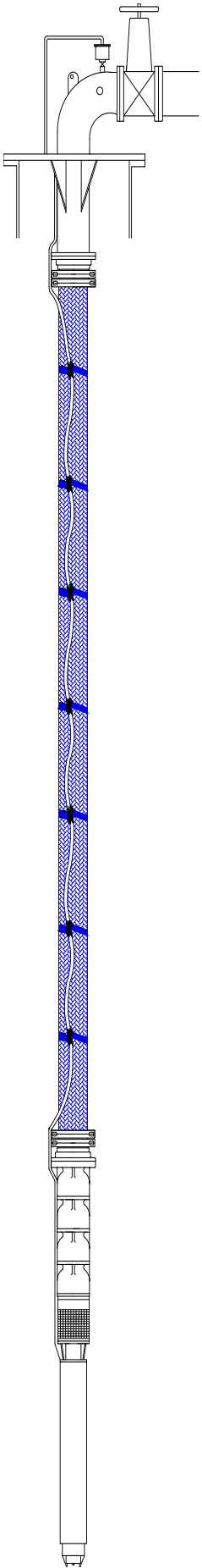
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### **NOTE**

**This document forms an integral part of the Boreline product and it is, therefore, a legal requirement for the Water Company to adhere to its provisions whenever installing Boreline to handle water intended for human consumption in the United Kingdom.**



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**CONTENTS**

	Page
BORELINE SPECIFICATIONS	3
BORELINE STORAGE AND HANDLING	4
BORELINE COMMISSIONING	4
BORELINE DISPOSAL	4
BORELINE SAFETY	4
BORELINE HAZARDS	4
BORELINE INSTALLATION PROCEDURE	4
PRIOR TO INSTALLATION	5
FITTING THE COUPLING AND RISER TO THE PUMP	5
FITTING THE POWER CABLE	6
INSTALLATION OF THE PUMP	8
CABLE STRAP CLOVE HITCH KNOT	9
WRAS APPROVAL	10

## SPECIFICATIONS

### The Riser

The Flexible Riser is constructed from high tenacity polyester yarns, which are circular woven and then totally encapsulated to form an integrated cover and lining of a high performance polyurethane elastomer, which is approved for use with potable water. A special rib is incorporated in the cover to facilitate the attachment of securing straps for the electric cable.

### Riser Specifications

The riser has a minimum theoretical short length burst pressure and tensile strength as shown on the table below. Average extension is no more than 3% and maximum diameter swell 15%. The material is capable of operating in water from pH 4 to pH 9 and temperatures up to 60°C. The manufacturer provides a warranty of 10 years against materials and manufacturing defects.

### Couplings

Boreline is supplied with fully re-usable 316 grade Stainless Steel couplings each comprising a body and two outer fastening clamps. The coupling body incorporates a BSP male threaded connection for attachment to the pump / headplate & two ribs over which the hose fits and the clamps are tightened – the two fastening clamps being split into three equal parts. ( Other coupling materials may be available on request.)

### Break-Off Plug / Drainer System ( 2" and above )

In order to minimise its weight, the riser should be empty when lifting the pump for inspection. This is often done by drilling the pump's non-return valve so that the water drains back at a controlled rate. Unfortunately, this can seriously reduce the life of the pump and motor as they will suffer the repeated stresses of starting against zero head every time they are used.

The Break-Off System has been developed to avoid this : the non-return valve is retained intact and a hollow stainless steel drainer plug is fitted across the lower Boreline coupling. This is then broken off at a weak point, when necessary, with a special 'torpedo' lowered down the hose.

### Boreline Data

Nominal Hose Dia.	1½"	2"	2½"	3"	4"	5"	6"	8"
Inside diameter	40mm	50mm	65mm	76mm	102mm	127mm	152mm	200mm
Burst pressure	65bar	65bar	60bar	60bar	58bar	58bar	58bar	45bar
Operating pressure	30bar	30bar	225bar	25bar	25bar	22bar	22bar	12bar
Tensile strength	3,000kg	4,000kg	6,000kg	7,000kg	12,000kg	16,000kg	20,000kg	18,000kg
Max working load	1,000kg	1,300kg	2,000kg	2,300kg	4,000kg	5,000kg	6,600kg	7,300kg
Weight of Boreline	0.50kg/m	0.55kg/m	0.85kg/m	0.95kg/m	1.40kg/m	1.70kg/m	2.50kg/m	3.7kg/m
Minimum well dia.	102mm	102mm	152mm	152mm	203mm	255mm	305mm	406mm
Coupling torque	10Nm	12Nm	20Nm	30Nm	30Nm	40Nm	45Nm	45Nm
Max. coupling dia.	80mm	95mm	109mm	140mm	165mm	200mm	230 m	350mm
Coupling weight	1.4kg	2.8kg	5.0kg	6.0kg	8.3kg	13.0kg	16.7kg	42.0kg
Weight of water	1.45kg/m	2.25kg/m	3.32kg/m	5.10kg/m	9.05kg/m	14.15kg/m	20.35kg/m	31kg/m
Area / Volume Ratio	100m <sup>2</sup> /m <sup>3</sup>	80m <sup>2</sup> /m <sup>3</sup>	62m <sup>2</sup> /m <sup>3</sup>	53m <sup>2</sup> /m <sup>3</sup>	39m <sup>2</sup> /m <sup>3</sup>	31m <sup>2</sup> /m <sup>3</sup>	26m <sup>2</sup> /m <sup>3</sup>	20m <sup>2</sup> /m <sup>3</sup>

**Minimum well diameter makes no allowance for any cables or dip tubes.**

**Due to continual Research & Development the above specifications are subject to change without notification.**

## STORAGE AND HANDLING

Boreline is available in continuous lengths of up to 300m ( 8" Boreline : maximum 120m ) – it is normally supplied cut to required length and wound on a drum convenient for dispense. Any odd or unused lengths should be coiled loosely and covered for protection – for prolonged storage Boreline should be kept out of direct sunlight.

## COMMISSIONING

Once installed in the borehole the pump must be started and the water run to waste for 24hours before connecting to the potable water take-off. This will ensure that any possible external contamination is flushed out from the Boreline together with any 'plastic taste' or other traces of soluble chemicals emanating from the manufacture or storage of the product.

## DISPOSAL

Boreline will normally be supplied cut to exact length to suit the borehole but occasionally a site adjustment may be necessary and a length of hose found surplus to requirements. This should be disposed of properly in accordance with local / national industrial waste disposal regulations.

## SAFETY

Boreline is light in comparison to steel rising main and, therefore, generally presents a lesser hazard to personnel when handling. ( The weight of the 8" coupling should, though, be noted. )

Because Boreline is supplied in continuous lengths care must be taken to ensure that it is either laid out neatly on site or coiled on a drum ( if space is limited ) whenever it is being installed and, in particular, when it is being retrieved. ( It should always be born in mind that a careless operative could drop the pump down the well – and the hose would follow it at great speed.) **An untidy workplace is a dangerous workplace.**

Installation instructions must be followed. Boreline must be installed by competent personnel. Care must be taken to ensure that the correct tools are available for the installation.

## HAZARDS

Boreline presents no chemical or biological hazards in normal usage, nor during installation or retrieval. ( Care should be taken, though, to keep the Boreline – and all other equipment – clean to avoid introducing external contaminants into potable water wells.)

If Boreline is involved in a **fire**, during storage or transportation, toxic & irritating gasses may be produced – **if inhaled, medical advice should be obtained immediately**. Molten material can cause severe burns – no attempt should be made to remove any such contamination from the skin but it **should be flushed with copious amounts of cold water and medical assistance sought without delay**.

## BORELINE INSTALLATION PROCEDURE

### Equipment and Plant Required

1. Submersible Pump & Motor
2. Wellhead assembly ( This must be designed & installed so that the pump hangs centrally within the borehole.)
3. The required length of Boreline – supplied coiled on itself or on a drum : take great care not to damage the hose if cutting off strapping etc. with a knife.
4. Electrical power cable – at least equal to the length of Boreline plus 5% minimum and surface requirement.
5. Two Boreline Couplings consisting of a coupling body and two outer rings. The latter each comprise three equal segments connected to each other by Allen screws.
6. Break-Off Plug fitted to lower coupling if required.
7. Sufficient Boreline Cable Straps to attach the power cable to the Boreline along the entire length of the riser. A cable strap is needed for each metre of riser.
8. Short length of spiral Cable Protector ( with electrical cable ties to secure it ) or heat shrink sleeving to guard the cable where it passes over the coupling.
9. Two Boreline Installation Clamps of appropriate size
10. Torque wrench with Allen keys
11. Lifting clamp spanners
12. Stanley Knife

**PRIOR TO INSTALLATION**

Inspect the pump, riser & cable and remove any loose dirt & debris, washing as required with clean water. The pump and riser should also be checked during the installation process to ensure no contamination enters the borehole. The pump and hose can be cleaned with a 5% chlorous solution during installation.

The Boreline can be installed using a crane or a gantry with electric chain hoist. Whichever is used, the lifting tackle should be positioned directly above the borehole high enough to allow the pump and clamp to be raised clear of the borehole.

Position the pump next to the borehole with the pump discharge facing away from the borehole towards the power cable drum and the reel of Boreline. Mount the Boreline and power cable on cable drum supports to allow the power cable and Boreline to be reeled off as required.

All equipment for use in boreholes must be kept clear of sources of bacterial contamination so the Boreline and cable should be laid on a strip of new polythene sheeting.

Nominal Hose Dia.	1½"	2"	2½"	3"	4"	5"	6"	8"
Minimum well dia.	102mm	102mm	152mm	152mm	203mm	255mm	305mm	406mm

**FITTING THE COUPLINGS AND RISER TO THE PUMP**

Identify the lower Boreline coupling and ensure the Break-Off Plug is screwed in securely (Fig.1) – then screw the coupling into the pump discharge port. (Fig.2) ( If a Break-Off Plug is **NOT** being installed, screw either Boreline coupling into the check valve after drilling a 6mm hole in the non-return valve to allow the water to drain back at a controlled rate – pump and motor life can be reduced by this as they will suffer the stresses of starting against zero head every time they are used – a vacuum relief valve should also be fitted at the wellhead. )



Fig.1

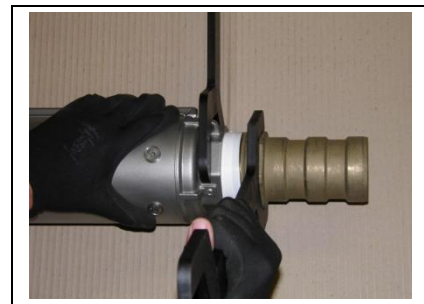


Fig. 2

Ensure that the ends of the riser are square – trimming with a sharp knife if necessary. (Fig.3)

Push the Boreline riser over the coupling body making sure the riser end is in contact with the shoulder at the threaded end of the coupling. (Fig.4) **Do not use any kind of lubricant.**



Fig.3



Fig.4

Fit the first three-segment ring over the rib closest to the threaded end of the coupling body – there is no need to strip the cable rib from the hose beforehand. (Fig.5) Tighten all three screws evenly, ensuring the gaps between the segments are even and there is approximately a 2mm gap – **do not** be tempted to close the gap. Finally torque the bolts up to the correct setting. In the absence of a proper torque wrench hand tightening with long series Allen keys is recommended.

Nominal Hose Dia.	1½"	2"	2½"	3"	4"	5"	6"	8"
Coupling torque	10Nm	12Nm	20Nm	30Nm	30Nm	40Nm	45Nm	45Nm

Fit the second ring over the other rib positioning the gaps half way between the gaps of the first ring and tighten as above. (Fig.6)



Fig.5

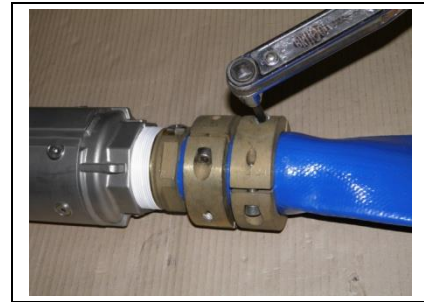


Fig.6

**FITTING THE POWER CABLE**

Note the cable is to be secured on the opposite side of the hose to the rib so at this point rotate the pump so that the cable guard is on the floor. The Boreline riser should be laid on the ground with the rib facing up. (Fig.7)

Push a Boreline cable strap through the cable rib openings every metre along the exposed length of the riser. Turn the riser over as you proceed to the next opening so that by the time all the cable straps have been inserted the rib of the riser is facing down. ( Normally, most of the cable straps will be **blue** and five **red** 'marker' straps will be included : these should be used closest to the pump to indicate its proximity when it is being lifted from the borehole.) (Fig.8)



Fig.7



Fig.8

Roll the power cable out next to the riser – allowing 5% slack in the cable.

Fit a protective sleeve to act as a guard over the cable where it will pass over the coupling and secure with electrical cable ties. Alternatively fit heat shrink sleeving over the area of the power cable where it passes over the Boreline coupling. (Fig.9)

Connect the power cable to the pump motor. ( This work should only be carried out by a qualified electrician.) (Fig.10)



Fig.9



Fig.10

Starting from the end nearest the pump and allowing a little slack, lift the power cable onto the centre of the riser. Bring the first cable strap **around** the power cable, and secure using a **Clove Hitch Knot ( See page 9 )**. Pull tight ensuring the power cable is hard against the Boreline riser. Buckle the strap. The power cable will be on the opposite side of the Boreline to the support rib. (Fig.11 -14)



Fig.11



Fig.12

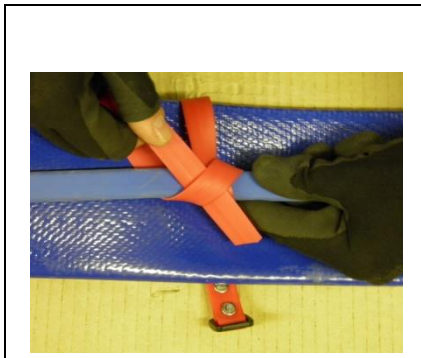


Fig.13



Fig.14

Repeat the procedure for fastening each subsequent cable strap – starting with the ‘marker’ straps – until the ‘top’ end of the hose is reached. ( **Remember to snake the power cable along the entire length of the riser allowing approximately 5% slack.** (Fig.15)

Calculate the maximum height that the crane or hoist can achieve above the wellhead. Clamp the Boreline riser only ( **avoiding the power cable** ) using a Boreline clamp at approximately a half metre less than the crane maximum height from the bottom coupling. (Fig.16)



Fig.15



Fig.16

## INSTALLING THE PUMP

Connect the Boreline coupling to the pump discharge or check-valve / non-return valve and / or Break-Off Plug assembly and then the Boreline riser to the coupling. ( **Do not** attach the second Boreline coupling and headworks to the hose at this stage.)

Unroll the Boreline riser along the ground. Lay the power cable next to the riser along the length.

Connect the power cable to the pump motor. ( This should only be carried out by a qualified electrician.) Use the Boreline cable straps to tie the power cable to the riser every metre. ( Remember to snake the power cable along the length allowing approximately 5% slack.) See 'Fitting the Power Cable' above.

Before installation inspect the pump, riser & cable and remove any loose mud & debris, washing as required with clean water. The pump and riser should also be checked during the installation process to ensure no contamination enters the borehole.

Some water suppliers may require the assembly to be disinfected during the installation operation – the appropriate procedures should be followed where this is specified. The maximum chlorine concentration should not exceed 5% to avoid damage to the hose.

Calculate the maximum height that the crane hook can achieve above the wellhead. Clamp the Boreline riser only ( **avoiding the power or other cables** ) using a Boreline clamp at approximately one metre less than the crane maximum height from the base of the pump.

Connect the clamp to the crane or hoist and lift the Boreline to the maximum height, guiding the pump as it is moved into the vertical position over the borehole. If a cooling shroud is to be used on the pump it can be installed in the vertical position headroom permitting. (Fig.17)

Lower the pump down the borehole until the Boreline clamp rests on the wellhead. (Fig.18)



Fig.17

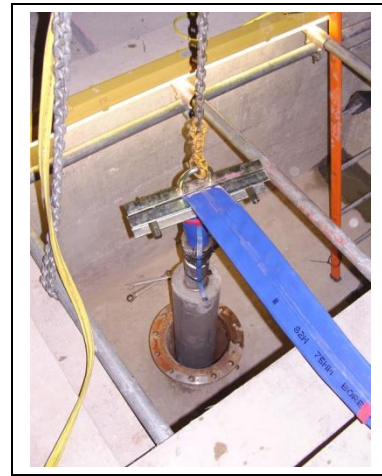


Fig.18

Secure the second clamp to the Boreline riser ( again, avoiding the cables ) at maximum lifting height less half a metre, raise this clamp to take up the slack and check that the load is secure prior to releasing the first clamp off the well head. Once the top clamp has taken all the weight remove the lower clamp and lower the pump / Boreline / cable assembly until the top clamp rests on the well head. Repeat this operation to continue lowering the pump down the borehole.

When ready to make the last lift, place the wellhead gasket over the remaining Boreline and attach the second Boreline coupling to the headworks then the free end of the riser to the coupling. Feed the remaining cable through the wellhead plate and secure the loose ends neatly.

Raise the headworks with the crane until the weight of the whole assembly is taken, remove the final clamp and lower the assembly onto its base. Attachment of discharge pipework & final wiring up (by a qualified electrician) will complete the installation.

### CABLE STRAP CLOVE HITCH KNOT

1



Pass the running end of the strap in front of the power cable & around it.

2



Then bring the running end forward over its own standing part. Pass the running end once more around the power cable and bring the running end in between the strap and the power cable.

3



Tighten the clove hitch by pulling on the running end.

4



Push the loops closer together.

Approval Number: 1604502  
Test Report: MA5607/S



5<sup>th</sup> April 2016

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**WATER REGULATIONS ADVISORY SCHEME LTD. (WRAS)**  
**MATERIAL APPROVAL**

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS6920-1:2000 and/or 2014 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

**HOSES & TUBING**

**5140**

'Boreline'. Blue coloured, extruded, polyether-polyurethane hose with polyester fabric reinforcement. For use with water up to 23°C.

**APPROVAL NUMBER: 1604502**  
**APPROVAL HOLDER: PROQUIP DIRECT LTD**

The Scheme reserves the right to review approval.  
Approval 1604502 is valid between April 2016 and April 2021

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: [www.wras.co.uk/directory](http://www.wras.co.uk/directory)

Yours faithfully

A handwritten signature in black ink, appearing to read 'Jason Furnival', written in a cursive style.

Jason Furnival  
Approvals & Enquiries Manager  
Water Regulations Advisory Scheme