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JULY 2004 EDITION



PRACTICAL INSTALLATION MANUAL RYLBRUN 32GREY / 32BLACK / 2"GREY

Flexible rising main system for the installation of submersible pumps

July 2004 edition



NEW RYLBRUN SYSTEM



Flexible layflat rising main
for the practical installation
of submersible pumps.



001



■ FOREWORD

RYLBRUN is a high quality and resistant, flexible and self-supporting* layflat rising main ideal for installing submersible pumps. Installation time and manpower costs are greatly reduced using **RYLBRUN**.

Lightweight, flexible and compact, **RYLBRUN** is simple to use, transport and store.

RYLBRUN is superior to more conventional systems. The reliability and stability of its components assures it will not corrode.

* No supplementary fastening elements required.

MAIN ADVANTAGES OF USING RYLBRUN:

- Installation and retrieval made quick and simple.
- Easy to transport and store.
- Installation cost savings.
- Non-corrosive.
- Easier to install and retrieve from irregular casings.
- Long life installation.
- Perfect for confined space or hard to reach installations.
- Continuous lengths up to 600 metres.

Conversion table

Units	Conversion
1 Meters (m)	= 3.28 Feet (Ft)
1 Meters (m)	= 1.0936 Yards (yd)
1 Millimeters (mm)	= 0.0011 Feet (Ft)
1 Cubic Meters (m3)	= 1.31 Cubic Yard (Cu in)
1 Square Centimeters (cm2)	= 0.155 Squard Inch (Sq in)
1 Liter (l)	= 0.001 Cubic Meters (m3)

■ RYLBRUN 32Grey, 32Black AND 2”Grey FLEXIBLE RISER SPECIFICATIONS

Flexible riser specifically designed for the installation of submersible pumps in 4”

Characteristics	Rylbrun 32 Grey	Rylbrun 32 Black	Rylbrun 2” Grey
Diameter	32 mm	32 mm	51 mm
Wall thickness (approx)	2.0 mm	2.2 mm	2.4 mm
Weight/m (approx)	240 gr.	270 gr.	490 gr.
Internal layer	Polyurethane (non-toxic)	Polyurethane (non-toxic)	Polyurethane (non-toxic)
Middle layer	Textile reinforcement (high tenacity)	Textile reinforcement (high tenacity)	Textile reinforcement (high tenacity)
Outer layer	Polyurethane (atoxic and high abrasion resistant)	Polyurethane (atoxic and high abrasion resistant)	Polyurethane (atoxic and high abrasion resistant)

Performance	Rylbrun 32 Grey	Rylbrun 32 Black	Rylbrun 2”Grey
Burst pressure	45 Kg./cm2	80 Kg./cm2	50 Kg./cm2
Tensile strength	1200 Kg	3450 Kg.	2500 Kg.
Max* installation depth	100 m*	200 m*	100 m*
Max service load (continuous use)	350 Kg.	700 Kg.	500 Kg.
Max service load (occasional use)	500 Kg.	1000 Kg.	600 Kg.
Max pressure (continuous use)	10 Kg./cm2	20 Kg./cm2	10 Kg./cm2
Service temperature	50°C	50°C	50°C
Admissible Ph range	4-9	4-9	4-9
200, 500 & 600 coils	Yes	Yes	Yes
Stretch under working conditions (%)	+/- 1	+/- 1	+/- 1
Well purification/treatment	Ask manufacturer	Ask manufacturer	Ask manufacturer

* When maximum working pressure / load are not exceeded.

NOTE: 200, 500 & 600 coils are presented in wooden reels.

■ MAINTENANCE:

Rylbrun requires no specific maintenance due to its corrosive-resistant elements. However, take care of the following when repairing or maintaining the pump:

- Check the state of the electrical cables' anchoring points.
- Check that all elements are securely fastened in.

■ RETRIEVAL:

The retrieval process uses the same procedure as the installation. If the installation has included a discharge mechanism, this could be used and the weight would be lower. Even with the riser full of water, retrieval is still a simple process and would only prove difficult when doing it manually. In any case, the best retrieval process is established by calculating the total load.

■ STORAGE:

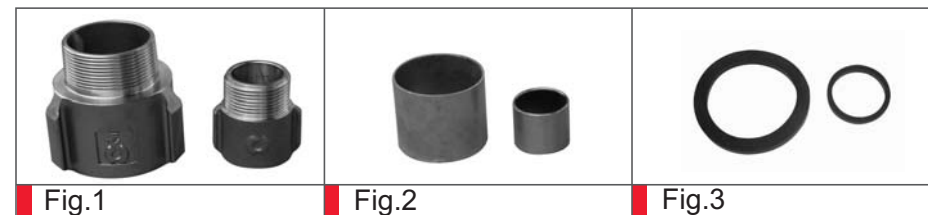
Storage temperature is -10° C +50°C. Keep in a cool place and away from direct sunlight.

volume			speed	load p. to nominal d.	load p. to working p.
l/min	l/s	m ³ /h	m/s	m.c.a./1m	m.c.a./1m
50	0.83	3	0.39	0.004043	0.003066
100	1.67	6	0.78	0.013644	0.010336
250	4.17	15	1.96	0.069502	0.052584
500	8.33	30	3.92	0.241223	0.182350
750	12.50	45	5.89	0.501735	0.379111
1000	16.67	60	7.58	0.845135	0.638396

RYLBRUN 32Grey, 32Black AND 2"Grey ACCESSORIES DESCRIPTION

A) RYLBRUN 32 and 2" expansion joints

- 1.- **S/S coupling** AISI 316 with 1^{1/4}" GAS thread (32Grey, 32Black) and 2"GAS (2"Grey) . (Fig.1)
- 2.- **Heat-treated S/S** ferrule for internal swageing. (Fig.2)
- 3.- **Synthetic rubber** flat seal. (Fig.3)



B) Rylbrun 32 and 2" union couplings

Union coupling in between S/S couplings AISI 316
Couple with - 1^{1/4}" GAS thread, female-female.

Union coupling in between S/S couplings AISI 316
Couple with - 2" GAS thread, female-female.



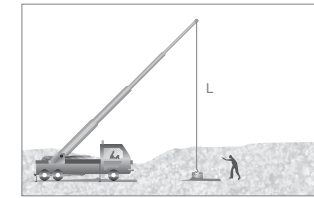
C) Installation using a crane and clamps

This installation method is not common for RYLBRUN 32Black, 32Grey and 2"Grey since the weight is not excessive and there is no need to use a crane.

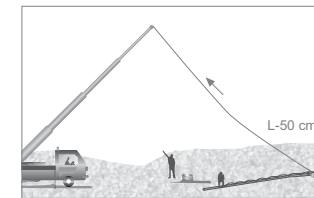
Nevertheless, this method will be described below should it be necessary to be put into practice when space is very limited.

1.- Install electrical cable/s as specified on page 10.

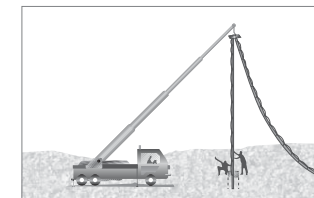
2.- Calculate the maximum height that the crane elevates vertically from the casing. (Refer to drawing, L length).



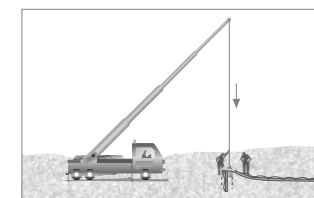
3.- Place the clamp at a distance from the pump, smaller than that calculated in step 2, in 50cm + the length of the pump. Take into account the following:



- a) Place the clamp in such a way that it clamps the riser exclusively. That is, one segment of the clamp will be placed between the electrical cable and the riser, and the other on the opposite side of the riser.
- b) Firmly tighten bolts to ensure that the riser is perfectly clamped.
- c) Lean the clamp on the parapet of the casing ensuring the electrical cable does not end up between the clamp and the casing.



4.- Couple the crane's hook onto the ring of the clamp and hoist it (riser must be fastened onto the clamp) up to the highest part of the crane.



5.- Lower the clamp using the crane until it is placed above the wellhead and disconnect the hook from the ring of the clamp.

F) **Reducer** - S/S adaptor AISI 316 between joint and pump*
 * Upon request

G) **Water discharge system**

Since weight of water makes extraction difficult, a device is used to discharge the water column from the riser. This will be the case where installations use a pump with retention valve. The system will easily and completely discharge the water column down to water level at rest. There are 3 parts to the system: weight, fuse and drain plug.



H) **Dismountable roller** - To 32mm and up to 6" riser installations.



■ **TERMINALS TO RISER FITTING PROCEDURE**

Elements used to fit-up the riser include:

- Expansion ring machine.
- Couplings.
- Flat seals.
- Expansion rings.

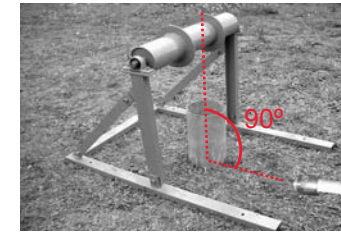


1.- Place flat seals into the rounded slot found inside the coupling.



B) **Installation using a vehicle and a roller**

- 1.- Calculate the total weight to evaluate the effort the vehicle will make.
- 2.- Install electrical cables.
- 3.- Flatten the riser in a straight line and look for the direction that has the greatest length.
- 4.- Place the roller over the wellhead and watch out for the following three conditions:



Place the roller on a right angle to the direction of the laid out hose.



Roller must be aligned with the casing.



Roller must be completely stable.

5.- Place the installation clamps, over what will be the upper end, at 20cm from the coupling and tie the tension sling (2m steel 10mm) to the clamp ring and tie the other end to the vehicle.



6.- Introduce the pump into the well manually above the roller and carefully drive the vehicle towards the well. Always make sure that the cables end up on the upper face of the casing.



7.- Drive the vehicle until the clamps pass above the roller and are leaning over the wellhead, loosening the tension sling.



■ PRECAUTIONS PRIOR TO INSTALLATION

A) The well.

Well DEPTH. Once the height at which the pump is to be placed has been established, a 5 metre security margin must be observed in case it is later decided for the pump to be placed near the bottom. This margin is to preserve the pump from mud and sludge (**Refer to drawing, Y distance**).

Well VERTICALITY. The structure of *RYLBRUN 32Grey*, *32Black* and *2"Grey* easily adapts them to wells that are deviated, twisted or easy to introduce. Please note an overly deviated well could cause points of friction for electrical cables. In those cases, verticality can be obtained with the use of a centring device.

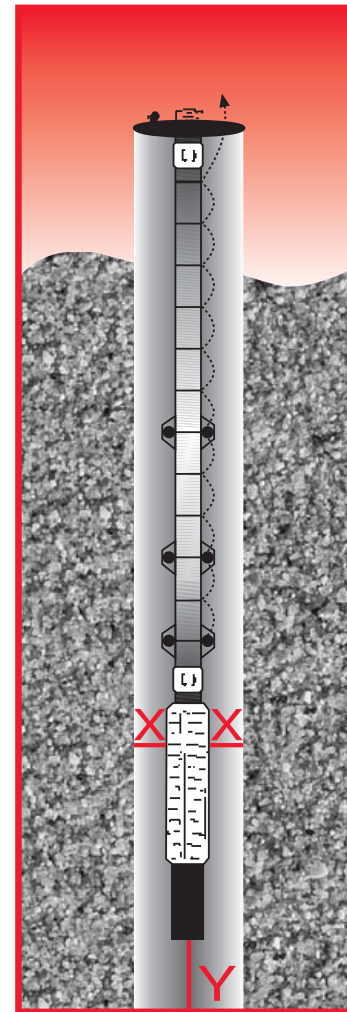
The diameter of the casing at its tightest point (if any) must observe a minimum diameter to ensure a comfortable introduction and retrieval of the pump. To this end, please take into account that the coupling-electrical cable's set-up, or the pump's maximum diameter must be 20mm smaller (per side) than the casing's inside diameter. (**Refer to drawing, X distance**).

	RYLBRUN 32	RYLBRUN 2"
Minimum diameter of the casing	120 mm	160 mm

There may be cases where the pump's curve, working at a minimum flow, will reach a height that exceeds the maximum permitted service pressure. In such a case, a safety valve must be placed at the wellhead calibrated to the maximum permitted pressure with the relief valve able to evacuate enough flow to diminish the pressure.

	32 Grey	32 Black	2" Grey
Max. pressure continuous flow Kg/cm ²	10	20	10

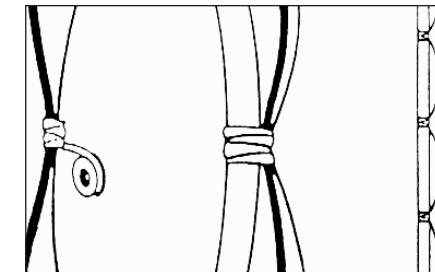
This security measure will avoid excessive pressure caused by the shutting off of the delivery valve while the pump is working.



Y ≤ 5 mt / X ≥ 20 mm

2- Self-curing rubber strap (scotch type).

- Firstly strap the cable or joined cables by making three turns covering a length of 40mm over the cable/s.
- Then proceed to strap the cables-riser set-up, in the same area as the previous operation, making sure the strap's tightness does not alter the flat shape of the riser.
- Repeat this procedure every 1,500mm throughout the entire length of the riser. The strapping should have at least three turns and the same width as before, 40mm.
- The cable/s should be parallel to the riser throughout its length.



Important: Use the self-curing rubber strap anchoring system for Rylbrun riser installation depths not greater than 80 metres.

Warning: Although RYLBRUN does not stretch, we recommend placing approximately 3% more electrical cable.

Maximum pressure and working load limits must be below certain values. These maximum permitted values are well below the maximum resistance of the riser, this enables us to guarantee full performance since the riser is operating well within its' capabilities.

Characteristics	32 Grey	32 Black	2" Grey
Max. pressure under continuous operating conditions (Kg./cm ²)	10	20	10
Burst pressure (Kg./cm ²)	45	80	50
Maximum working load under operating conditions (Kg.)	350	700	500
Burst traction pressure (Kg)	1200	3450	2500

3- Flow.

	32 Grey	32 Black	2" Grey
Maximum recommended flow in m ³ /h	6	7	20

Water speed must not exceed 2.5 m/s at any time.

4- Load loss.

There are 4 factors that contribute to a lesser load loss than conventional risers:

- Smooth polyurethane interior lining.
- Flexibility ensures no calcareous build-up in the interior of the riser that could cause roughness and sectional flow loss.
- Being a continuous riser, Rylbrun can be installed without the use of unions that could potentially increase load loss.
- Under service pressure, the nominal diameter dilates considerably thus reducing load loss.

■ RETRIEVAL KNOW-HOW PRIOR TO INSTALLATION

It would be wise to be familiar with the retrieval method of the riser prior to installing it, in case there is a pump revision, a repair needs to take place, or if the riser needs to be replaced, etc.

The riser will be under different conditions once it is operational compared to when it is just installed.

The riser will be full of water due to the pump's non-return valve action. Therefore, the combined weight of the system will be far greater than when initially installed.

As mentioned above, weight gain is not a problem for RYLBRUN 32Grey and 32Black due to their small section. However, the manual installation method is not always possible on retrieval. In this case, both risers may be installed with the water column discharge system. Alternatively, vehicle and roller or crane and clamp systems may be used.

In the case of 2"Grey, the water discharge system can be used. Furthermore, if the installation depth is limited to 100 metres, the water column will not represent a great obstacle either.

If this is not the case or if the terrain makes this difficult, a 2mm piercing in the non-return valve retarder can be made to cause the discharge from the riser when the pump is stopped. Proceed to retrieve the riser once the water column has been discharged.

■ ELECTRICAL CABLE INSTALLATION FOR RYLBRUN 32Grey, 32Black and 2”Grey

The installation of electrical cable/s can take place with the riser spread prior to introduction or while it is being installed.

During anchorage, Rylbrun is flat but will become cylindrical when the pump is turned on. Cable anchorage must use firm yet elastic elements.

There are 2 ways to set up the electrical cable:



- 1- Rubber strap with incorporated stainless steel buckle. 160mm long for RYLBRUN 32Grey and 32Black. 240mm for 2”Grey:



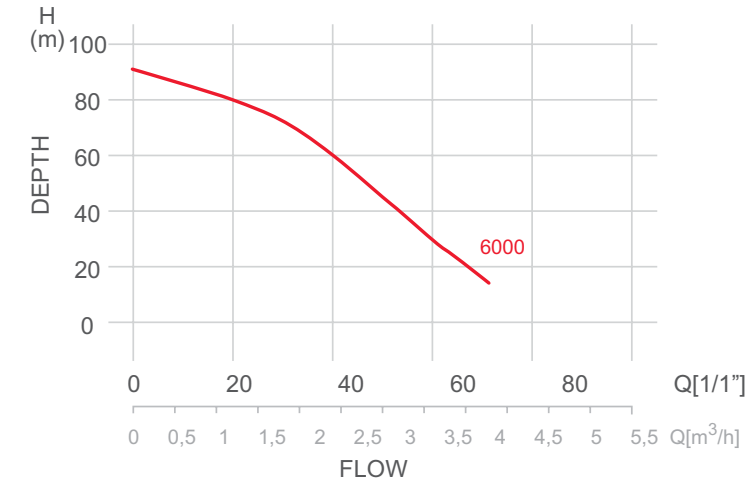
Anchor the electrical cable approximately every 1,500mm with rubber strap and stainless steel buckle.

Leave a bit of slack after anchoring each electrical cable.

The electrical cable and strap must make a complete loop, then surround the riser using the same strap, fastening it to the incorporated buckle.



B) Working conditions.



There are 4 important parameters to control and calculate prior to installation:

- 1.- Pressure to be exerted to the riser
- 2.- Maximum working load
- 3.- Flow
- 4.- Load loss

1- Pressure: The maximum pressure to be exerted to RYLBRUN riser is indicated in the area adjacent to the exit of the pump.

2- Installation load: The weight that will be placed on the upper section of the riser, coupling and suspending elements.

The suspending load is not to exceed the maximum permitted working load.

To calculate the load we take the following table data into account.

Riser weight	RW
Electrical cables & freatic level detector weight	ECW
Column of water weight	CW
Pump weight	PW
Pressure caused by force	Riser section x pressure at wellhead

$$RW+ECW+CW+PW+(SXP2) = \text{Working load.}$$

RYLBRUN 32Grey, 32Black and 2”Grey INSTALLATION

We can now proceed to install the Rylbrun system.

Firstly, connect the coupling to the pump.

RYLBRUN 32Grey and 32Black couplings are directly coupled into almost every 4” pump available in the market.

RYLBRUN 2”Grey is coupled with a 2” GAS thread. In both cases, should the coupling not connect properly, a stainless steel reducer must be used. (Refer to price list or ask Tipsa for technical advice).



There are various installation methods that can be used to the availability of materials and space in the casing, and the characteristics of the installation.

A) Manual Installation

This type of installation is recommended when dealing with shallow installations where the total weight is reduced.

1.- Calculate the total weight (riser, cables and pump) to evaluate the effort to be made.

2.- Install the head works onto the upper end. The head works will be threaded onto the end of the coupling.



3.- Install the electrical cables as previously instructed.

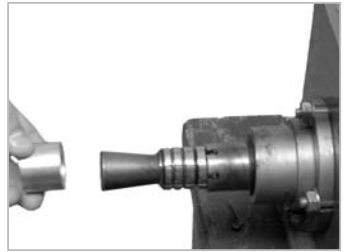


4.- Introduce the pump into the casing, lowering it via the riser. Ensure that the pump does not touch the edge of the casing.

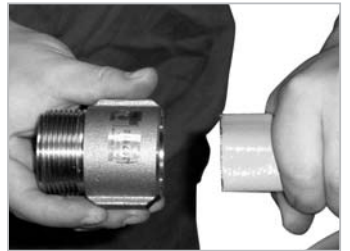


5.- Once the entire riser has been lowered, place the head works over the wellhead keeping it as centred as possible.

2.- Ferrule goes into the expansion clamp, open it slightly to prevent it from moving.



3.- Cut one end of the riser (straight cut) and push all the way into the coupling.



4.- Place the riser-terminal set-up into the expansion clamp onto the ferrule making sure the riser does not move from its position inside the terminal.



5.- Turn lever to tighten the ferrule until resistance is observed. Repeat this procedure, turning the coupling 45°.



6.- Visually inspect the correct positioning of the ferrule against the flat seal. Last of all, use finger to feel the inside of the ferrule to double check it is correctly positioned and to check the marks left on the ferrule following the expansion process.





8.- Screw the head works onto the coupling and replace the tension sling, remove it from the clamp and hook to the head works' hooks.



9.- Slowly reverse the vehicle until the clamp rises from the casing and the riser is taut.



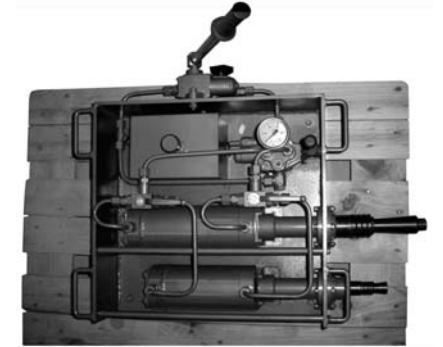
10.-Remove the clamp and drive the vehicle until the head works is placed above the wellhead keeping it as centred as possible.



11.- Remove the sling and roller. Proceed with electrical connections, connecting the valve, etc.

C) Coupling machine

Simple tool used to quickly and efficiently fit RYLBRUN to couplings via the expansion of the internal ferrule.



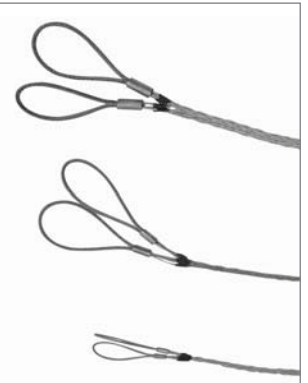
D) Riser covers

For 210 mm O.D. casings.
For RYLBRUN 32 with 1^{1/4}" internal thread on both sides (up and down).
For RYLBRUN 2" with 2" internal thread on both sides (up and down).

E) Cable grips

High tensile strength is achieved via a double grommet open mesh and steel wire used to fasten the pump's electrical cable supply to the parapet. Cable grip size will depend on the electrical cable's outside diameter.

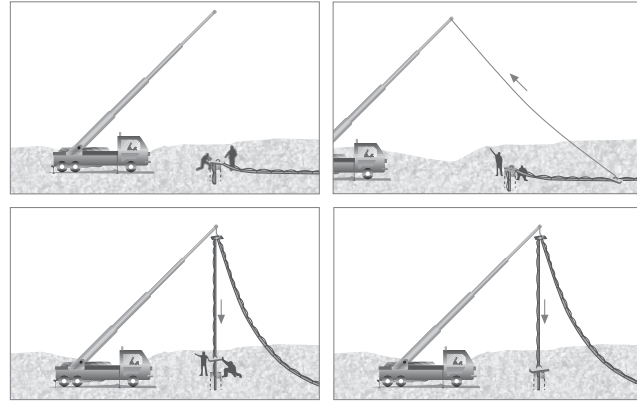
Electrical cable outer diameter		Length sleeve (mm)	Maximum load (Kg)
Minimum (mm)	Maximum (mm)		
10	15	250	150
16	24	600	750
25	32	800	800
33	40	1200	1500
41	50	1500	2500
51	65	1500	2500
66	80	1900	2500
81	100	2000	3000



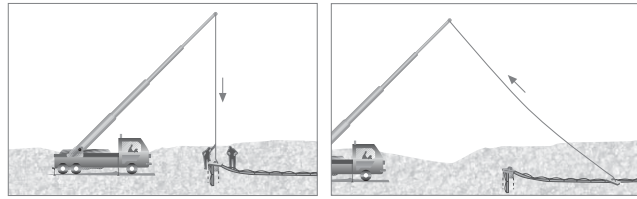
IMPORTANT:

For 32mm flexible riser installations greater than 150 metres.

6.- Place the second clamp 50cm (L) from the first clamp located at the wellhead and with the crane hoist the second clamp to the maximum height.

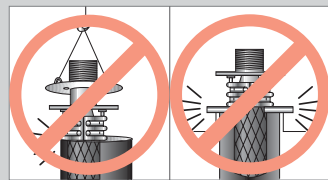
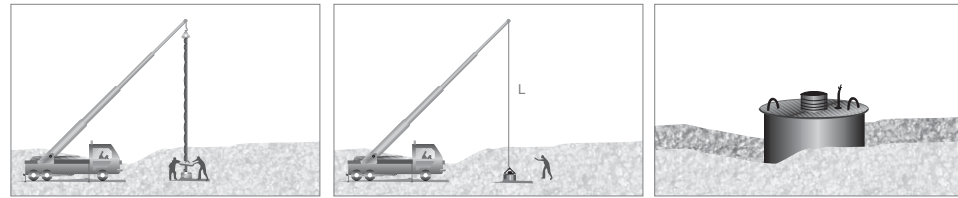


7.-Remove the lower clamp, which will be suspended and lower the upper clamp down to the wellhead.



8.- Connect the crane's hook to the head works and lift with crane to the maximum height.

9.- Remove the clamp and lower the head works until it rests on the wellhead. Remove the crane's hook and the installation will be complete.



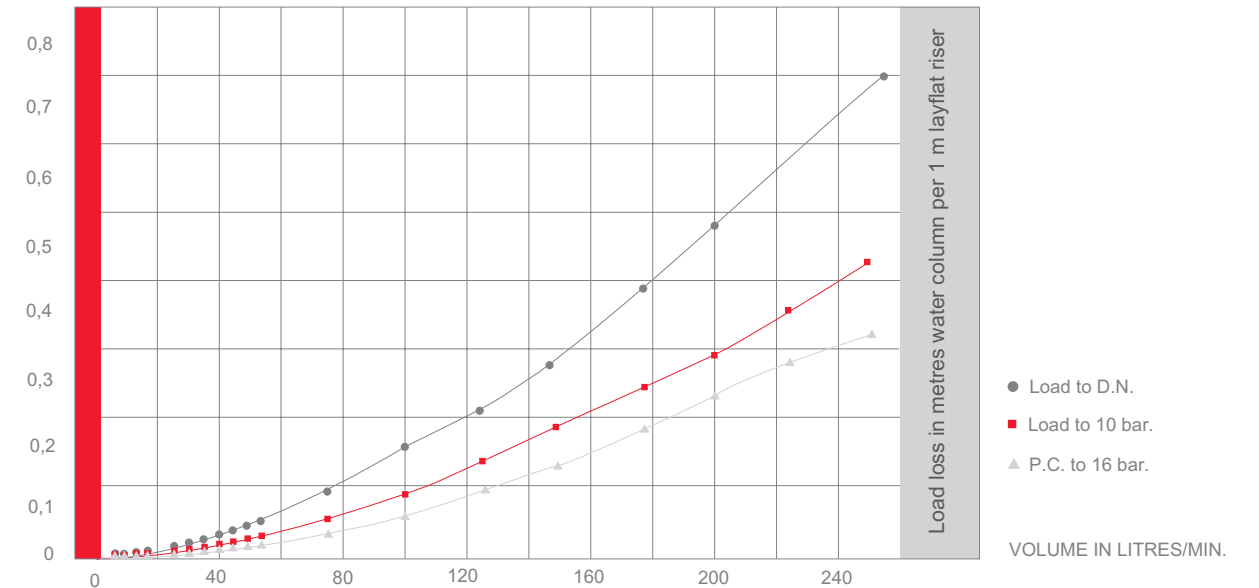
Warning: Do not, under any circumstance, bump the couplings or lean against the well parapet.

LOAD LOSS of flexible layflat riser in metres water column

Rylbrun 32 mm / 16 BAR service pressure / Nom.Dia=32mm Dia.a.p.s.=35,8mm

volume			speed	load p. to nominal d.	load p. to working p.
l/min	l/s	m ³ /h	m/s	m.c.a./1m	m.c.a./1m
5	0.08	0.3	0.10	0.000778	0.000458
10	0.17	0.6	0.21	0.002500	0.001467
15	0.25	0.9	0.31	0.005000	0.002929
20	0.33	1.2	0.41	0.008210	0.004804
25	0.42	1.5	0.52	0.012086	0.007067
30	0.50	1.8	0.62	0.016599	0.009698
35	0.58	2.1	0.73	0.021725	0.012686
40	0.67	2.4	0.83	0.027445	0.016019
45	0.75	2.7	0.93	0.033744	0.019688
50	0.83	3.0	1.04	0.040609	0.023684
75	1.25	4.5	1.55	0.083057	0.048380
100	1.67	6.0	2.07	0.138363	0.080527
125	2.08	7.5	2.59	0.205851	0.119731
150	2.50	9.0	3.11	0.285038	0.165710
175	2.92	10.5	3.63	0.375550	0.218244
200	3.33	12.0	4.14	0.477085	0.277157
225	3.75	13.5	4.66	0.589392	0.342303
250	4.17	15.0	5.18	0.712256	0.413556

• Max. recommended speed: 2,5 m/s • Max. recommended flow: 7,5 m³/h





WARRANTY CERTIFICATE:

Ribó, the manufacturer of “Rylbrun” flexible riser, certifies that:

- Rylbrun is made from the best quality raw materials and subjected to a thorough quality control.
- Each stage of production is thoroughly supervised.
- Upon completion of the production process, each element of the Rylbrun system is tested.

*Rylbrun has a **5-YEAR** warranty as per the terms described in the warranty card.*

Steps to ensure the validity of this warranty:

- Follow this installation manual comprehensively.
- Request and send the warranty card in each case.

RYLBRUN 32Grey, 32Black and 2”Grey specifications.....01

- Characteristics.....01
- Performance.....01

Load loss.....02

Accessories description.....03

- Rylbrun 32Grey, 32Black accessories.....03
- Rylbrun 2”Grey accessories.....03

Fitting procedure: couplings to rising main.....05

Precautions prior to installation.....07

- The well.....07
- Working conditions.....08

Retrieval know-how prior to installation.....10

Electrical cable installation.....11

RYLBRUN 32Grey, 32Black and 2”Grey installation.....13

- Manual installation.....13
- Installation using a vehicle and a roller.....14
- Installation using a crane and clamps.....16

Maintenance.....18

Retrieval.....18

Storage.....18

Warranty certificate.....19