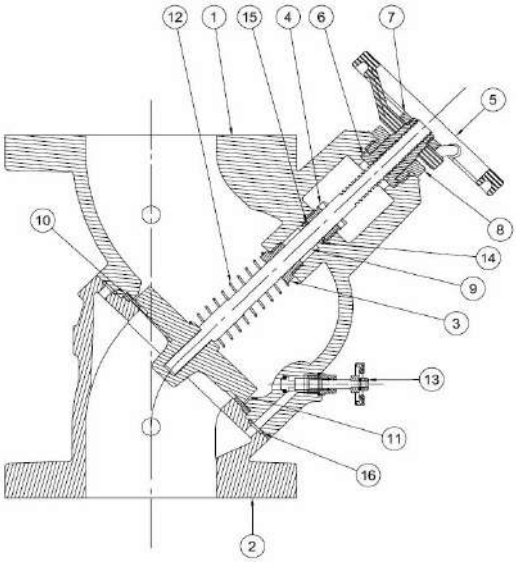
Enriching Lives

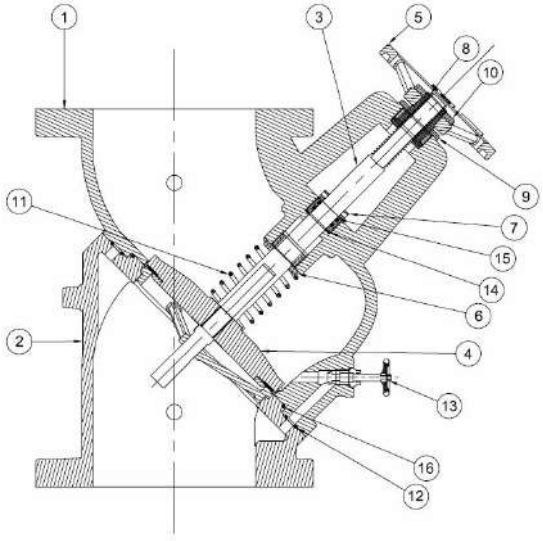
# INSTRUCTIONS ON INSTALLATION, OPERATION AND MAINTENANCE FOR KIRLOSKAR TRIPLE DUTY VALVES

**KIRLOSKAR BROTHERS LIMITED**
Established 1888
A Kirloskar Group Company

# INDEX

# KIRLOSKAR TRIPLE DUTY VALVES




| Size 2'' to 8'' | |
|---|---|
| **S. No.** | **Description** |
| 1 | Outlet body |
| 2 | Inlet body |
| 3 | Stem guide bush |
| 4 | Gland nut |
| 5 | Hand-wheel |
| 6 | Yoke sleeve |
| 7 | Lock nut |
| 8 | Yoke nut |
| 9 | Stem |
| 10 | Rubber seat |
| 11 | Disc |
| 12 | Spring |
| 13 | Bypass valve |
| 14 | Gland nut O-ring |
| 15 | PTFE seal |
| 16 | Mating flange seal O-ring |

| Size 10'' to 18'' | |
|---|---|
| **S. No.** | **Description** |
| 1 | Outlet body |
| 2 | Inlet body with spider |
| 3 | Stem |
| 4 | Disc |
| 5 | Hand-wheel |
| 6 | Stem guide bush |
| 7 | Gland nut |
| 8 | Yoke sleeve |
| 9 | Yoke nut |
| 10 | Lock nut |
| 11 | Spring |
| 12 | Mating flange seal O-ring |
| 13 | Bypass valve |
| 14 | PTFE seal |
| 15 | Gland nut O-ring |
| 16 | Mating flange face seal O-ring |

# 1. INTRODUCTION

Kirloskar Triple Duty Valves (TDV) are primarily designed for installation in pump discharge pipe where it functions as spring loaded non return check valve, flow control valve and shut off valve.
TDV eliminates the conventional accessories of the pumping system like isolation valve, check valve and control valve along with elbow pipe. The spring closes the disc gradually as line flow approaches to zero in order to prevent flow reversal and water hammer.
The flow through the valve can be adjusted from drip tight shutoff to full flow by throttling the valve.

# 2. INSPECTION ON RECEIPT, HANDLING, STORAGE & PRESERVATION

## 2.1 INSPECTION ON RECEIPT AND HANDLING

a. At the receipt of the product, ensure that there are no transit damages to the product received, especially on valve flanges, and hand wheel. Any damage if found should be reported to carrier and noted on freight bill.
b. Also ensure that Parts and Accessories are received as per ordered scope of supply.
c. While unloading the product, please use the provision of lifting made on the valve (e.g. Lifting Lugs, Lifting eye bolts).
d. Use the safe lifting devices (e.g. slings, hoists, hooks etc.) of adequate capacity.

**Caution:** Handle the product carefully – do not push, drag, drop from height. Support the valve properly during transportation to avoid toppling

If short or wrong supplies are observed, report the same immediately to the contact person mentioned in this manual.

## 2.2 STORAGE & PRESERVATION

If the valve has to be stored/stocked at site before installation,

a. Store it on vertical condition inlet flange resting on the floor in dry and clean atmosphere.
b. Store the products in well-covered sheds, protected from sun, rain and dust.
c. In the instance if the valve is required to be stored for long duration, ensure that rust preventive should be applied on the machined corrodible surfaces.
d. Both Inlet and Outlet side should be blind to avoid entry of any foreign particles. For longer storage duration, keep the valve disc in partial open condition.

In the instance if, spares supplied along with valve need to store for long duration, ensure that the shelf life of all elastomers is marked on each spare item. For shelf life of elastomer, refer below table-

| Sr. No | Component | Shelf Life |
|---|---|---|
| 01 | Rubber sheets | a) Shelf Life or Expiry date specified on product or<br>b) 08 Months from date of supply. |
| 02 | Rubber cords/Gaskets / Seals/ O Rings /U cup seal etc | a) Shelf Life or Expiry date specified on product or<br>b) 18 Months from date of supply. |

***Note**: All rubber, elastomer components shall be kept in covered area away from sunlight or rain at room temperature. It shall be kept protected from sharp metal corners to avoid any damage.*

## 3. INSTRUCTIONS FOR INSTALLATION

### 3.1 CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION

a. Before taking the TDV for pipe installation, make sure that it is cleaned from inside and outside and there are no foreign or metallic objects sticking on to its sealing elements. Also clean the valve interior passages to remove any foreign matter & rust preventive on machined surfaces.

b. Ensure that the entire rust preventive on the machined surface in the flow area is removed, before the valve is put in pipe-line.

c. Note the details on valve body and check valve pressure rating adequacy with respect to operating pressure. Also check direction of flow in the pipe-line and place the TDV accordingly.

| | Class 125 | Class 250 |
|---|---|---|
| Pressure | 150psi / 10.3 bar | 250psi / 17.2 bar |
| Temperature | 80ºC | 80ºC |

d. Valves should be installed in the pipeline, only after verifying the sealing ability of valve. This can be done by examination of the seat surfaces free from surface damages, scratch / dent marks as well as uniform mating of sealing surfaces. If abnormalities of this type are observed, contact Kirloskar Brothers Limited.

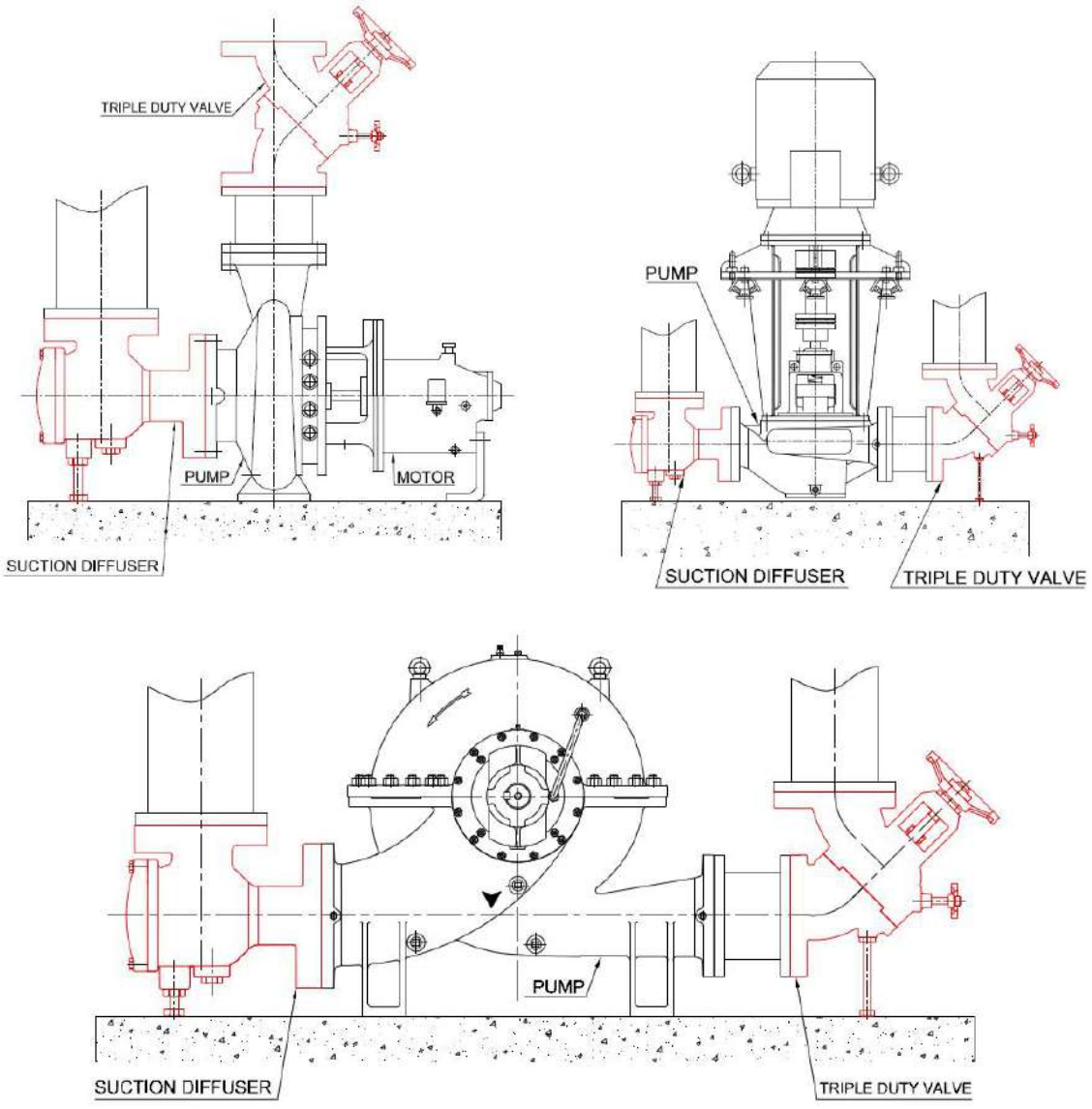
e. Operate the TDV manually from Full Close to Full Open and Full Open to Full Close. Ensure that there is no undue resistance / friction in the operation.

f. Before connecting valve & pipeline flanges, ensure that they do not have parallel, angular and radial gaps. While fitting the valve in pipeline, ensure that diagonally opposite bolts are simultaneously & uniformly tightened.

g. Maximum flow velocity in the pipe-line should not exceed 4 m/s.

h. The valves are mainly designed for handling clear water with maximum impurities of 5000 PPM.

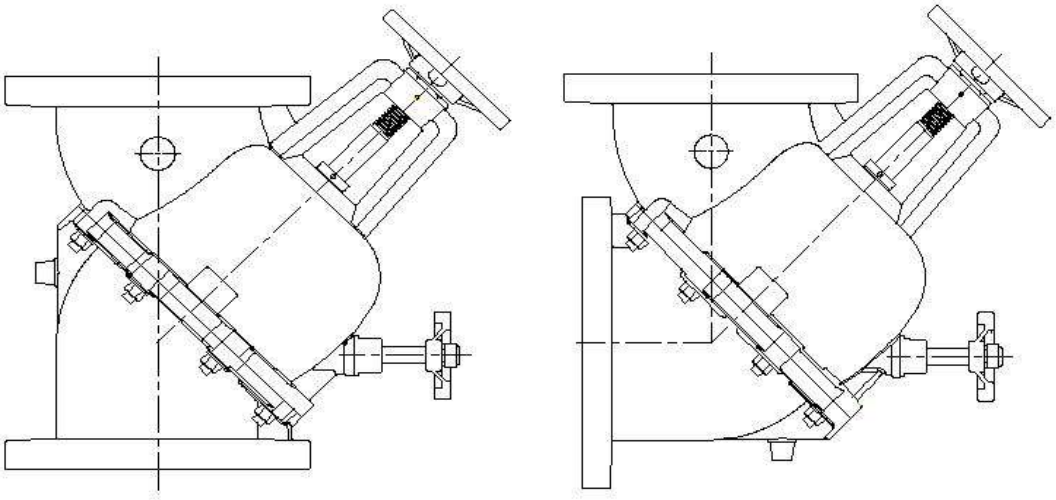
**Caution:** Ensure that the TDV is installed with the valve stem in upright position. Valve slam may occur if installed in any other position.




Installation for different types of pumps

## 3.2 CHECKS FOR THE PIPE-LINE BEFORE INSTALLATION

a. Clean the pipeline thoroughly so that it does not contain any solid matters which may damage the valve trims.
b. Avoid parallel, radial and angular mismatch between connecting flanges of valve and the pipeline.
c. Provide suitable concrete block for supporting the valves. It is advisable to install a support for the valve at bottom to prevent any sagging to be caused by weight of the valve along with weight of delivery pipes.
d. TDV has provision to reposition of the Inlet Body viz, with two types of mounting arrangement. I type (180º degree) can be used for straight delivery line. And L type (90º degree) can be used to replace elbow attachment.



I – Type mounting L-Type mounting

### 3.2.1 FIELD CONVERSION

a. Open the Valve for at least one complete turn.
b. Remove the body bolts from valve body.
c. Rotate one half of the valve body by 180º making sure the lower valve seat, 'O' ring, seat ring, spring, disc is in proper position. Inspect 'O' ring from any cuts or nicks and replace if necessary.
d. Ensure that pipeline flanges are parallel and are mating with the valve flange without leaving any parallel, angular or radial gap between the flanges. Do not over-tighten the flange bolts / nuts to make the flanges parallel forcefully. It may develop undue stresses in the valve flanges & body leading their deformation & malfunctioning.

# 4. COMMISSIONING

## 4.1 PRE-COMMISSIONING CHECKS

a. Ensure manually that the valve operates smoothly.
b. Flow Direction of the valve matches with that in the pipeline.
c. The entire pipe flange bolting is properly tightened.

### 4.2 COMMISSIONING

a. Keep the disc in fully closed condition by rotating hand wheel in clockwise direction. Open the Bypass valve across the valve.
b. Start the pump.
c. Allow the pump to work at shut off pressure.
d. Open the disc by rotating the hand wheel in anticlockwise direction.
e. Ensure that that there is no leakage through the flange gasket.
f. Close the Bypass valve.

Now the valve is commissioned for its Operation.

## 5. OPERATION

a. By-pass valve (if provided) – keep it open while every planned Start / Stop cycle of the Pump.
b. Once the TDV is closed, the By-pass valve may be kept closed till next operation of the valve.
c. Once TDV is opened, that Bypass valve may be kept closed till next operation of the valve.
d. TDV disc opens with the flow against spring force and self weight of the disc.
e. Throttling of the valve is done adjusting by stroke length of the spindle by rotating the hand wheel.
f. Under the shutoff condition of the pump, the disc will return to the closed position by virtue of spring forces and self weight of the disc.
g. To balance the pressure on both the TDV, it is recommended to open the By-pass valve and note differential pressure are at the minimum.

## 6. MAINTENANCE INSTRUCTIONS

Maintenance Check Points:

| Sr. | Parameter to Check | Method of Checking | Weekly | Monthly | During Overhaul |
|---|---|---|---|---|---|
| 01 | Leakage through valve seat | Visual | | • | |
| 02 | Noise / Vibrations while Opening or Closing the Valve | Feel | • | | |
| 03 | Condition of Door Face / Seat Ring faces – scratches, dent marks, intactness | Visual & feeler gauge | | | • |
| 04 | Condition of Stem | Visual | | | • |
| 05 | Leakage through Inlet / Outlet body mating flanges, Bypass valve, Gland Nut | Visual | • | | • |
| 06 | Smooth operation of the spindle and thread condition of spindle & Yoke sleeve. | Visual | | | • |

Kirloskar Triple duty valve requires very little maintenance if maintenance check point are attended during periodic inspection & during overhaul. However, valves could

malfunction in unusual conditions of usage, water contamination and may require maintenance as below:

## 7. TROUBLE SHOOTING OF KIRLOSKAR TRIPLE DUTY VALVE

| Sr. | Problem | Probable Reason | Action Required |
|---|---|---|---|
| 01 | Leakage through the valve seat | a. By-pass connection open<br>b. External object caught between seat ring & body face.<br>c. Worn out / Deformed or damaged seat ring / door face | a. Close By-pass valve<br>b. Try to flush away the external object by creating flow to flush it away. If it does not work, open flanged joint to reach the object and remove it manually **(*)**.<br>c. Replace the seat ring. |
| 02 | Leakage through side flanges | a. Inadequate tightening of flanged joint<br>b. Damaged gasket<br>c. Parallel / angular gap between valve and pipe flanges | a. Re-tighten the flanged joint<br>b. Replace gasket **(*)**<br>c. Remove parallel / angular gap between valve and pipe flanges **(*)** |
| 03 | Noise / vibrations while opening or closing valve | Inadequately supported / inadequately fixed piping / valve | Support / fix upstream / downstream piping & valve (with foundation bolts where applicable) |
| 04 | By pass valve seat leakage | Bypass valve seat damage. | Replace bypass seat. |
| 05 | By pass valve leakage | Check 'O' ring for any damage. | Replace 'O' ring. |
| 06 | Spindle leakage through Gland Nut. | a. Loosening of gland nut.<br>b. 'O' ring damage | a. Tighten gland nut.<br>b. Replace 'O' ring |

Note: (*) All this procedure requires emptying the upstream and downstream piping Removal of the valve from the pipe line.

**Caution:** All these procedures require emptying the upstream and downstream piping and removal of the valve from the pipeline.

## 8. RECOMMENDED SPARES FOR TRIPLE DUTY VALVE

We strongly recommend keeping the spares handy all the time to be able to eliminate delays in attending the operation troubles and scheduled replacements / overhauls.

Recommended spares for Triple duty valve are as follows

a. 'O' Ring for face sealing, stem sealing, Bypass valve stem sealing
b. Seat Ring
c. PTFE washer for Gland nut & by pass valve.

## 9. SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS FOR" KIRLOSKAR MAKE VALVE TO BE FOLLOWED BY USER, AT SITE


[These Safety Instructions are the integral part of the IOM Manual]

### PART – I: GENERAL INFORMATION & SAFETY REQUIREMENTS

The Products supplied by KBL have been designed with safety in mind. Where hazards can not be eliminated, the risk has been minimized by the use of guards and other design features. Some hazards can not be guarded against and the instructions below MUST BE COMPLIED WITH for safe operations. These instructions can not cover all circumstances; USER of the product is responsible for using safe-working practices at all times.

KBL product are designed for installation in designated area, which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points.

Access to the equipment should be kept restricted to the personnel responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with adequate tools for their respective tasks.

KBL requires that, all personnel that are responsible for installation, operation or maintenance of the equipment, have access to study the product instruction manual BEFORE any work is done and they will comply with all local and industry based safety instructions and regulations.

Personnel protection safety equipment must be worn where local rules apply.

Read the instruction manual before installation, operation and maintenance of the equipment.

Note that the limit of product application and permissible use of the product is according to the respective product design & testing standard and product pressure rating. Operation of the equipment beyond these limits will increase risk from hazards and may lead to premature and hazardous failure of the valve / accessories.

Clear and easy access to all controls etc. must be maintained at all times. Hazardous or flammable materials must not be stored near valves unless safe areas or racking and suitable containers have been provided.

IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF THE KBL PRODUCT COULD RESULT IN INJURY OR DEATH.

**PART – II: SAFETY INSTRUCTIONS WHLIE HANDLING, STORAGE AND USAGE**

For handling / lifting the valves, and other assembly components, use devices of adequate capacities certified by competent authorities. Use lifting provisions e.g. lifting eyebolts, lifting lugs, lifting holes etc. wherever provided on the valves and the components.
Before fitting the valve in pipeline, ensure that Pressure Rating of the valve is suitable for maximum working pressure / surge pressure that may arise in the pipeline.
User shall prevent any unauthorized person to mount, dismantle or remount, operate and repair the valves.
While using the device, ensure that approved technical rules and regulations e.g. trading regulations, regulations
for prevention of accidents, steam boiler regulations, regulations of gas mains under high pressure, regulations
for combustible fluids, local safety regulations etc. are followed.
During using the valve, ensure that approved technical rules & regulations e.g. trading regulations, regulations for prevention of accidents, local safety regulations etc. are followed.
During repairs / maintenance of the valve at site, the user shall take minimum following precautions:
Provide adequate working platform near the valve.
Make pipelines pressure less and harmless i.e. switch off the pumps, empty the pipelines, remove and switch-off all electric connections (of power pack unit).
If work is carried-out in vicinity of the valve, which leads to dusty atmosphere (e.g. concrete work, masonry, painting, sandblasting etc.) the valve / valve components must be covered effectively.

## 10. ORDERING INFORMATION

(To be sent to the Contact Person mentioned in this manual)
Details required to be furnished while ordering Spares

a. KBL Order Acceptance Number (O/A No. or Sale Order No.)
b. Product Description – Type, Size, Pressure Rating etc.
c. Product Serial No. (This is hard punch marked on Body Flange)
d. KBL SAP Product Code – This code is mentioned in the Invoice though which the product has been dispatched.
e. KBL Cross Sectional Assembly Drawing No. for the product (if provided)
f. Required Part Name & Part No. as shown in the Cross Sectional Assembly drawing / catalogue.
g. Material of construction of the required part, as that appears in the Cross Sectional Assembly drawing / catalogue.

## 11. WARRANTY CLAUSE

Kirloskar Brothers Limited (KBL) warrants that the valve manufactured and supplied by KBL to be free from defects in material, workmanship and construction, when used in accordance with installation and technical instructions provided, for a period of twelve months from the date of commissioning of the equipment or 18 months from the date of dispatch of valve from its factory, whichever is earlier.

THIS WARRANTY DOES NOT APPLY TO VALVES WHICH ARE MISUSED, OR ABUSED, OR DAMAGED FROM INSTALLATION, OR NOT USED IN ACCORDANCE WITH KBL'S INSTRUCTIONS. NORMAL WEAR OF VALVES IS NOT INCLUDED IN THIS WARRANTY.

Any parts or other accessories not manufactured by Kirloskar Brothers Limited but supplied through KBL shall carry the warranty of the original manufacturer.

KBL'S SOLE LIABILITY UNDER THIS WARRANTY SHALL BE LIMITED TO EITHER REPLACING OR REPAIRING WITHOUT CHARGE, AT ITS FACTORY OR ELSEWHERE AT ITS DISCRETION, ANY VALVE NOT MEETING THIS WARRANTY, OR AT KBL'S OPTION, REFUNDING THE PURCHASE PRICE. KIRLOSKAR BROTHERS LIMITED SHALL IN NO EVENT BE LIABLE FOR ANY OTHER DIRECT OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND UNDER THIS CONTRACT OR OTHERWISE.

Kirloskar Brothers Limited warranty does not cover and KBL makes no warranty with respect to any defects, failures, deficiencies, or errors which include but are not limited to: (a) Not timely reported to KBL; or (b) Due to misapplication, modification, disassembly or abnormal conditions or corrosive matters; or (c) Due to operation, either intentional or otherwise, in an improper manner; (d) damage during transit.

In case of delay of delivery due to lack of instructions from a customer or delay in accepting delivery by a customer, the period of 18 months shall be considered from the date of notification from Kirloskar Brothers Limited to customer that the valves are ready for dispatch.

The foregoing warranty constitutes KBL's sole liability.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

For Installation , Operation & Maintenance Manuals pl. refer following link :
www.kirloskarpumps.com ➔ DOWNLOAD CENTRE ➔ Product IOM Manual ➔ Product Category ➔ Valve

## 12. ENVIRONMENTAL ASPECT

Our products are designed and manufactured considering all environmental aspects to minimize impact on the environment. We ensure that the product supplied by us utilizes less energy during their life cycle and it does not emit any hazardous gas or cause any harm to any living being or to the environment. User of this product is recommended to follow the operating instructions and maintain the product in periodic manner, in order to ensure that it always functions with optimum energy efficiency.

## 13. PRODUCT RECYCLE PROGRAM

As a commitment towards a greener future, conservation of natural resources and reduction of carbon foot print, Kirloskar Brothers Limited offers to take back/replace its used products once it has reached the end-of-life and ensure that it is recycled/ disposed in an environment friendly manner with the following objective.

- To facilitate our customers for recycling / safe disposal of 'end-of-life' product in environment friendly through a recycle program.
- To minimize the impact caused by product disposal on society / environment.
- To reuse the recyclable components as secondary source of raw material.
- To ensure implementation of control mechanism over third part for recycle/safe disposal of the waste generated.
- To offer or replace customer's existing product with more efficient and environment friendly product.

End of life of Kirloskar Brothers Limited product shall be considered, when a customer has declared that the product has become redundant (the product has become obsolete/unfit for use/non-functional and cannot be refurbished in consultation with Kirloskar Brothers Limited personnel) Or the customer wishes to replace the existing product for a shift in technology/for replacement of product by latest/advanced technology of more energy efficient friendly product.

As the product reaches its End-of-Life, the customer shall communicate the same through the Kirloskar Brothers Limited mail ID, cusotmercare.recycle@kbl.co.in or approach the nearest Customer Support Service/Regional Offices/ Authorized Dealer/Authorized Service Dealers who in turn shall communicate the same to Zonal Customer Support Service representative.

## 14. INTIMATING PRODUCT / PERFORMANCE COMPLAINT

(Information to be sent to the Contact Person mentioned in this manual)
While communicating product complaint, furnish following information to help us to resolve the problem promptly.

a. KBL Order Acceptance Number (O/A No. or Sale Order No.)
b. Product Description – Type, Size, Pressure Rating etc.
c. Product Serial No. (This is hard punch marked on Body Flange)

d. KBL SAP Product Code – This code is mentioned in the Invoice though which the product has been dispatched.
e. KBL Cross Sectional Assembly Drawing No. for the product (if provided)
f. Exact nature of complaint

If the complaint is related to Short Supply, Wrong Supply, Transit Damage, it is necessary to communicate the Invoice Number which will help in tracking the cause of the problem.

In case if you need additional information or help, please contact:

Customer Support Cell
Kirloskar Brothers Limited
"Yamuna", Survey No.98/ 3 to 7,
Baner,
Pune- 411045
Toll free no: 1800-10-34443
e-mail: kirloskarvalves@kbl.co.in

Enriching Lives

# KIRLOSKAR BROTHERS LIMITED

A Kirloskar Group Company
Established 1888

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**OUR COMPANIES**

United Kingdom | U.S.A. | South Africa | India | The Netherlands