

Instruction Manual for Piston Valves

Contents.....

1. Product Overview
2. Installation & Commissioning Instructions
3. Operations
4. Maintenance and Troubleshooting
5. Bill of Material
6. Storage

1. Product Overview:-

THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself by the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves, based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of asbestos, a high quality elastomer and graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.



Features:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Saves Energy, environment friendly.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.

2. Installation and Commissioning Instructions:

UNI Klinger Piston Valves

Uni Klinger piston valves can be installed in any position in the system.

The preferred flow direction indicated by an arrow on the body should be observed.

NOTE: Before installation protective caps must be removed from both side of valves body.

Klinger piston valves have a very high strength; the usual attention must be directed to the axially precise and parallel position of the connections on the system end.

Flush the piping before putting the valve in operation.

Perform the welding on valve in an assembled condition (valve closed).

Uniklinger recommends checking the temperature development in the area of the valve ring seats for piston valves with socket weld ends.

NOTE: If the line and valve are subsequently insulated, the insulation should only extend up to the head flange on the body side so that access to the bonnet hexagon nuts is not impeded.

Since the valve body can remain in site for repairs and maintenance work, the valve insulation does not need to be removable.

Uniklinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by incorrect installation and failure to observe the commissioning regulation.

3. OPERATIONS

Operating Instruction For UKL Piston valves

- Uniklinger piston valve must be closed clockwise and opened anticlockwise.
- When closing the valve the hand wheel should be turned until it adjoins on the bonnet. Unlike globe valves, piston valves do not require increased final torque. Due to the design of piston valves, a seal may be achieved before the closed position is reached. To protect the valve rings, piston valves should be kept in closed condition when it is not in operation.
- Klinger piston valves can also be used to regulate and to throttle, the above does not apply when opening the valve or setting it to the open position for regulating or throttle purposes.
- Through flow characteristics for valve in throttle positions are available from Uniklinger on request.
- If a valve starts leaking check the tightening torques of the bonnet/Gland fastenings nuts referring to the table and tighten if necessary. For this the valves needs to be in CLOSE position, unless it is a valve with a KXGT valve ring. In this case it can be adjusted in OPEN position.
- Klinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by failure to observe the operating instructions.

Hazardous Operating Errors and Possible Sources of Danger

Where the process fluid is incompressible, the operating of piston valves can cause pressure changes in tightly sealed parts of the system. This should be taken into account especially during the planning stage and can be avoided by selecting suitable installation position.

Piston valves provide a particular good seal. During temperature changes, process fluid captured between two piston valves can cause considerable change in pressure, which may exceed the pressure category of the valve. In such cases, appropriate volume compensation (expansion tank) is necessary.

Always ensure that the correct tightening torque specified on pg. 5 must applied to the bonnet hexagon nuts.

Do not loosen the nuts while the valves are under pressure.

The valves must not be subjected to pressure shocks in excess of one a half times their rated pressure.

When the stem thread has worn out that its stability seems endangered, release the pressure on the valve and carry out the necessary maintenance. Whatever the application, always consult the operating limit diagram (pressure-temperature refer catalogue) and also consider the stability of the materials for various process fluids.

4. Maintenance and Troubleshooting:

Maintenance and Repair Instruction for Uniklinger Piston Valves

Klinger piston valves are easy to repair using simple assembly and dismantling tools. The valve does not have to be removed but the line system must be depressurized and emptied.

We recommended the following procedure for dismantling:

1. Depressurized and empty the system .
2. Open the valve fully.
2. Unscrew the bonnet fastening nuts.
3. Turn the hand wheel clockwise (Closing direction) (bonnet rise out of body) .
4. Turn bonnet slightly until the flange rests against the stud bolt face and turn hand wheel anti-clockwise(opening direction) until piston is completely free of valve sealing ring.
5. Remove bonnet together with hand wheel, and stem and piston.
6. Remove upper valve ring and lantern bush using lantern bush extractor.
NOTE: In case of 65-200 NB valve additional valve ring must be removed before removing Upper ring using extractor hook.
7. Remove bottom valve ring with ring extractor hook.
8. Clean the valve body bore and valve ring seat, if necessary with fine sandpaper.

We recommended the following procedure for reassembly:

- Mount bottom valve ring using mounting tool/Wooden mandrill.
- Insert the cleaned lantern bush.
- Assemble upper valve ring using mounting tool/wooden mandrill.
NOTE-In case of 65-200 NB valves additional ring must be installed before inserting bonnet

- **Attention:** Particular care should be taken to ensure that the rings are inserted correctly positioned into bore of the valve body using the mounting tool.
Replace lantern bush ensuring that no teeth are on the valve outlet side.
Do not use lubricant or grease.
Whenever valve ring is replaced, always check at the same time that the piston /stem/bonnet assembly functioning properly.

While doing so, check to see whether:

- The outer cylinder surface of the piston is smooth and unmarked.
- The stem head moves freely in the piston horse-shoe slot.
- The trapezoid thread of the stem is not unduly worn.
- There is no excessive play between stem and threaded bush.
- If none of the above components needs replacing, lubricant the trapezoid thread and the neck of the bonnet with a suitable lubricant, before reassembling the valve. Uni Klinger recommends Molykote lubricant or equivalent.

If the bonnet is provided with a threaded bush proceed as follows:

- Tap the tension pin out of the bonnet (Inwards).
- Clamp the bonnet in the vice, unscrew the threaded bush using spindle and hand wheel
- Screw the new threaded bush in to the bonnet and pin them together.
- When renewing actuating parts, we recommend putting in a new spindle and threaded bush at the same time.
- Mount the spindle in the piston after thoroughly lubricating the spindle head with a suitable lubricant.
- Mount the spindle into the bonnet and install the hand wheel. Lubricant the bonnet neck and the spindle with a suitable lubricant.

Bonnet Stuffing Box Maintenance (for valve size 65-200 NB)

Bonnet stuffing box consist of 3 Graphite rings, a split bush that hold spindle and bonnet together. When the leakages from gland are observed. Close the hand wheel fully and make sure that the valve is closed. Tighten the Gland bolts evenly. This compresses the KXGT sealing rings against the bonnet body. This process can be repeated whenever valve leaks till the Gland touches and seats on the bonnet. When Gland is resting on bonnet, this is the indication that valve sealing rings are worn out and needs to be replaced. Attend to the isolation valves as soon as leakage starts for getting long life of resilient rings. Prolonged internal leakage can cause scratches/wear on the metallic Piston or resilient valve sealing rings. Damaged components will have to be replaced, if leakage continues.

Replacement of Gland KXGT Rings (for valve size 65-200 NB)

- Remove the bonnet assembly (Bonnet along with spindle, Handwheel) out of valve body.
- Unscrew the Gland nuts (2 Nos),
- Unscrew the Split Bush using spindle and Hand wheel. When the split bush is removed Spindle and Piston get separated. Take out the piston with care from downwards side and remove the Gland plate.

Now remove the stuffing box sealing rings using ring extractor.
Clean the stuffing box.
Insert the new Gland sealing KXGT rings using wooden mandrill.
Put the Gland plate, and insert the piston.
Screw the split bush so that spindle and piston are connected.
Tighten the gland nuts with eye bolts.

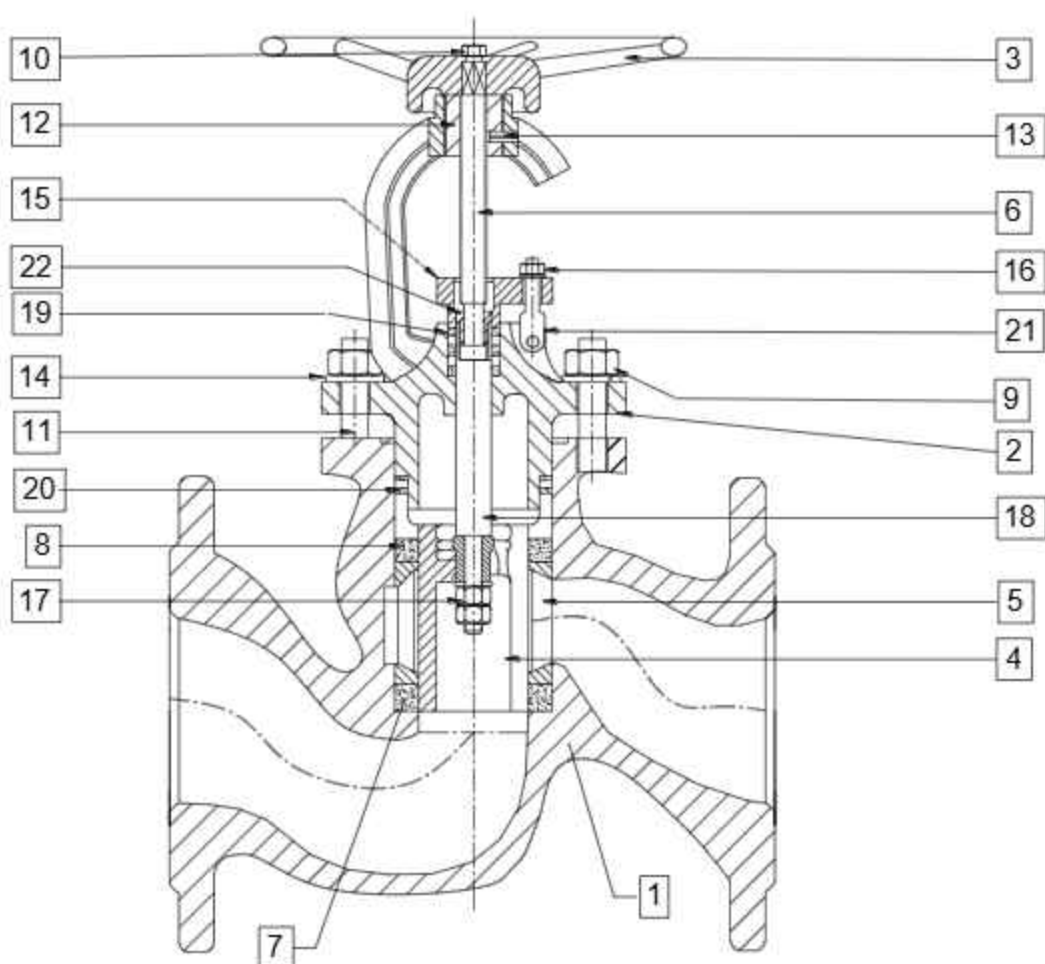
Assembling body and bonnet unit.

- Screw spindle with piston into bonnet.
- Insert the bonnet in valve body, and screw bonnet nuts to attach bonnet to body.
- Now close valve completely and open it again (when it opens, the bonnet with draws into the valve body).
- Now tighten the bonnet nuts fully.
- Close the valve completely(turn hand wheel clockwise).
- Tighten bonnet hexagon nuts with torque wrench in diagonal order to specified torque.

5.BILL OF MATERIAL (KVN 15-50 NB):-

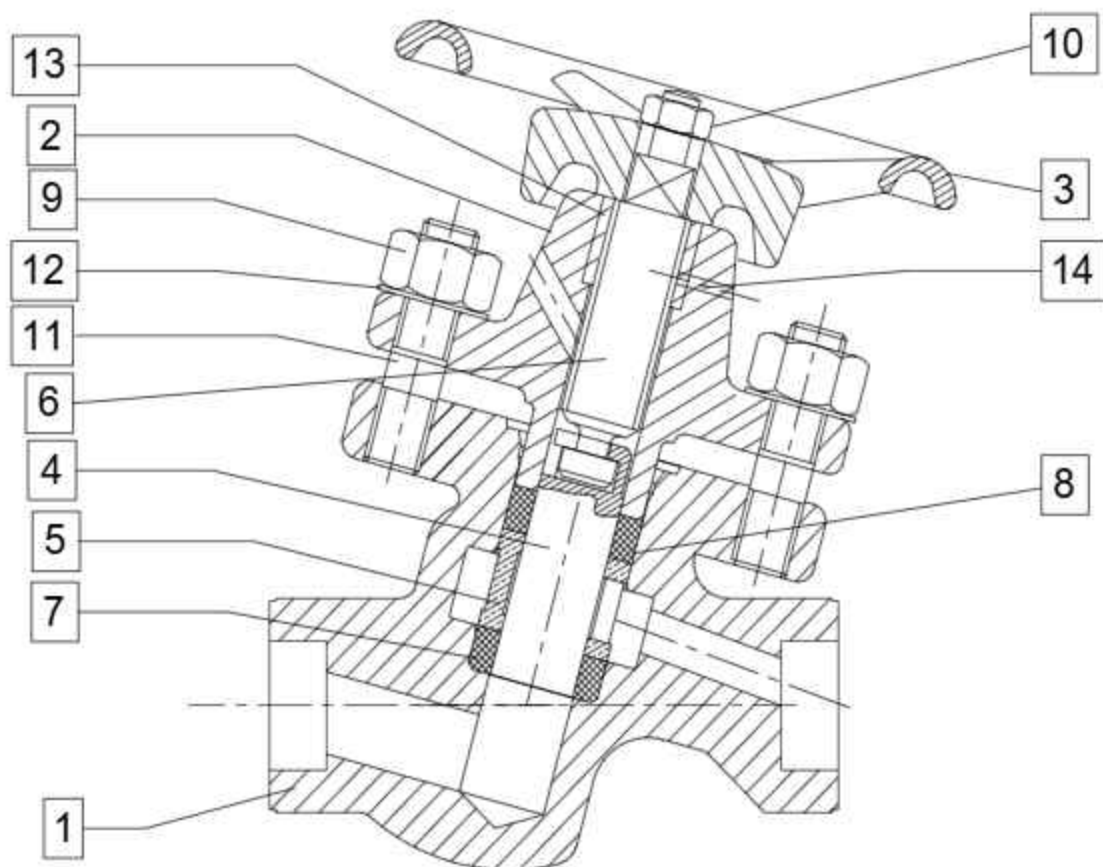
No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	Cast Equi. To AISI 430
5	Lantern Bush	Stainless Steel	ASTM A 276 TP 410
6	Spindle	Stainless Steel	ASTM A 276 TP 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Hand wheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7
12	Belleville Washer	Spring Steel	50 Cr V4
13	Threaded Bush	Cast Iron	GG 20 / FG 200
14	Tension Pin	Spring Steel	50 Cr V4

BILL OF MATERIAL (KVN 65-200 NB):-



No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	ASTM A 351 Gr. CF8
5	Lantern Bush	Stainless Steel	ASTM A 743 Gr. CA15
6	Spindle	Stainless Steel	ASTM A 276 Tp 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Handwheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7

No	PART NAME	MATERIAL	MATERIAL CODE
12	Threaded Bush	Cast Iron	GG 20 / FG 200
13	Tension Pin	Spring Steel	50 Cr V4
14	Belleville Washer	Spring Steel	50 Cr V4
15	Gland	Cast Steel	ASTM A 216 Gr WCB
16	Gland Nut	Carbon Steel	ASTM A 194 Gr 2H
17	Lock Nut	Stainless Steel	AISI 316
18	Piston Shaft	Stainless Steel	AISI 304
19	Stuffing Box Ring	Klinger Standard	KXGT
20	Additional Valve Ring	Klinger Standard	KXGT
21	Eye Bolt	Stainless Steel	EN 8
22	Split Bush	Brass / S.S.	---

BILL OF MATERIAL (USN 15/20/25/40 NB):-

No.	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Forged Steel	ASTM A105
2	Bonnet	Forged Steel	ASTM A105
3	Hand Wheel	Fabricated / C.I.	M.S. / C.I.
4	Piston	Stainless Steel	Cast Equivalent Of AISI 430
5	Lantern Bush	Stainless Steel	ASTM A276 TP410
6	Spindle	Stainless Steel	ASTM A276-TP410
7	Lower Valve Ring	Klinger Std.	KXGT
8	Upper Valve Ring	Klinger Std.	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr.2H
10	Hand Wheel Nut	Carbon Steel	ASTM A 194 Gr.2H
11	Stud	Alloy Steel	ASTM B 193 Gr. B7
12	Bel. Washer	Spring Steel	50 Cr V4
13*	Threaded Bush	Cast Iron	GG20 / FG200
14*	Tension Pin	Spring Steel	50 Cr V4

RECOMMENDED TIGHTENING TORQUE FOR PISTON VALVE-

Body Bonnet Nut			
NB	Stud bolt		Tightening Nm
	Dimension	piece	KX-GT
10/15	M10 x 30	2	9
20	M10 x 30	3	9
25	M10 x 30	4	10
32	M12 x 35	4	16
40	M12 x 35	4	23
50	M12 x 35	4	29

Tightening Torque(Nm)		
NB	Body Bonnet Nut	Gland Nut
65	51	13
80	42	13
100	34	22
125	76	22
150	68	22
200	126	22

6. STORAGE:-

Storage Instruction for Klinger Piston valves and their spare parts.

- Valves and spare parts for valves may only be stored in dry storage rooms. completely assemble valves are to be stored in the as received condition (valves set to close position, connection plugged). Spare parts for valves are to be handle with care, and should be kept in the original packing furnished by the factory if possible during all storage.
- If cover or shrink films are used, the appropriate measure must be taken to ensure that the atmosphere inside the cover stays free of condensate water.
- The appropriate protective measures are recommended in dusty rooms.
- To avoid confusion, all parts stored must label as on the delivery note and stored in the correct place.
- Temperature in the storeroom must not exceed the limit values of 20 and +50 and rapid changes in temperature (causing condensation and perspiration should be avoided).
- Handling regulations and operating instruction are supplied with and should always be stored with the products to ensure that important information and documents are appropriate passed on.
- Corresponding documents are available for the identification of Klinger components
- Damage owing to improper storage will release Klinger from any obligations as may be derived the warranty, guarantee and product liability.



Cast / Forged Steel Piston Valves, Bellow Seal Valves, High Pressure valves (Gate/Globe), Strainers – "Y" Type, Flash Vessel, Steam Traps (Thermodynamic, Thermostatic, Ball Float Traps, Inverted Bucket), Pressure Reducing Station, Condensate Recovery Products, Level Gauges (Reflex, Transparent, Bicolor), Sight Glass, Hot Water Generation System, Safety and Relief Valves.
FSD Products : Compressed Asbestos / Non Asbestos Fiber Sheet / Cut Gaskets, Spiral Wound Gaskets.

In view of technical progress design and dimensions are subjected to change without notice.



UNI KLINGER LIMITED

A joint venture of the Metelwala group of companies and KLINGER AG, Switzerland.

Central Sales Office & Pune Branch : SCF, 8th Fl., Kothlior Est. (Mumbai-Pune Highway, Kadakli, Pune-411 003. Tel.: +91-20-4102 3000 Fax: (020) 4102 3001
e-mail: sales@ukl.com, salespune@ukl.com, Website: www.ukl.com

Factory : C-37, M.I.D.C., Ahmednagar - 414 111, Maharashtra, Tel.: 0241 - 2777223 / 2777612 Fax: 0241 - 2777224 E-mail: fctworks@ukl.com

Branch Offices:

Baroda : 102, 1st Floor, Otel Towers-II R.C. Dutt Road, Baroda-360 006, Tel.: 91-0266-2312343 / 2340660, Fax: 91-0266-2341412 E-mail: salesbar@ukl.com
Chennai : East Coast Centre, 8th Floor, 683, Mount road, Teyyanampet, Chennai - 600 015, Tel.: 91 - 44 - 24345707, Fax: 91 - 44 - 24343950, E-mail: saleschen@ukl.com
Kolkata : 9, Chitraloot, 8th Floor, 230-A, A.J.C Bose road, Kolkata-700 020, Tel.: 91-33-22872610, Fax: 91-33-22875494, E-mail: salescal@ukl.com
Mumbai : 22, 2nd Fl, Shree Arcade CHS, Alameda road, Thane-400 602, Tel.: 91-22-26421140 / 91-22-26440461, Fax: 91-22-26440463, E-mail: salesmum@ukl.com
Delhi : 321, Ansal Chamber-II, 8, Bhikaji Cama Place, New Delhi-110 065, Tel.: 91-11-41665707 / 91-11-26193547, Fax: 91-11-41665705, E-mail: salesdel@ukl.com

Instruction Manual for Piston Valves

Contents.....

1. Product Overview
2. Installation & Commissioning Instructions
3. Operations
4. Maintenance and Troubleshooting
5. Bill of Material
6. Storage

1. Product Overview:-

THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself by the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves, based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of asbestos, a high quality elastomer and graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.



Features:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Saves Energy, environment friendly.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.

2. Installation and Commissioning Instructions:

UNI Klinger Piston Valves

Uni Klinger piston valves can be installed in any position in the system.

The preferred flow direction indicated by an arrow on the body should be observed.

NOTE: Before installation protective caps must be removed from both side of valves body.

Klinger piston valves have a very high strength; the usual attention must be directed to the axially precise and parallel position of the connections on the system end.

Flush the piping before putting the valve in operation.

Perform the welding on valve in an assembled condition (valve closed).

Uniklinger recommends checking the temperature development in the area of the valve ring seats for piston valves with socket weld ends.

NOTE: If the line and valve are subsequently insulated, the insulation should only extend up to the head flange on the body side so that access to the bonnet hexagon nuts is not impeded.

Since the valve body can remain in site for repairs and maintenance work, the valve insulation does not need to be removable.

Uniklinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by incorrect installation and failure to observe the commissioning regulation.

3. OPERATIONS

Operating Instruction For UKL Piston valves

- Uniklinger piston valve must be closed clockwise and opened anticlockwise.
- When closing the valve the hand wheel should be turned until it adjoins on the bonnet. Unlike globe valves, piston valves do not require increased final torque. Due to the design of piston valves, a seal may be achieved before the closed position is reached. To protect the valve rings, piston valves should be kept in closed condition when it is not in operation.
- Klinger piston valves can also be used to regulate and to throttle, the above does not apply when opening the valve or setting it to the open position for regulating or throttle purposes.
- Through flow characteristics for valve in throttle positions are available from Uniklinger on request.
- If a valve starts leaking check the tightening torques of the bonnet/Gland fastenings nuts referring to the table and tighten if necessary. For this the valves needs to be in CLOSE position, unless it is a valve with a KXGT valve ring. In this case it can be adjusted in OPEN position.
- Klinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by failure to observe the operating instructions.

Hazardous Operating Errors and Possible Sources of Danger

Where the process fluid is incompressible, the operating of piston valves can cause pressure changes in tightly sealed parts of the system. This should be taken into account especially during the planning stage and can be avoided by selecting suitable installation position.

Piston valves provide a particular good seal. During temperature changes, process fluid captured between two piston valves can cause considerable change in pressure, which may exceed the pressure category of the valve. In such cases, appropriate volume compensation (expansion tank) is necessary.

Always ensure that the correct tightening torque specified on pg. 5 must applied to the bonnet hexagon nuts.

Do not loosen the nuts while the valves are under pressure.

The valves must not be subjected to pressure shocks in excess of one a half times their rated pressure.

When the stem thread has worn out that its stability seems endangered, release the pressure on the valve and carry out the necessary maintenance. Whatever the application, always consult the operating limit diagram (pressure-temperature refer catalogue) and also consider the stability of the materials for various process fluids.

4. Maintenance and Troubleshooting:

Maintenance and Repair Instruction for Uniklinger Piston Valves

Klinger piston valves are easy to repair using simple assembly and dismantling tools. The valve does not have to be removed but the line system must be depressurized and emptied.

We recommended the following procedure for dismantling:

1. Depressurized and empty the system .
2. Open the valve fully.
2. Unscrew the bonnet fastening nuts.
3. Turn the hand wheel clockwise (Closing direction) (bonnet rise out of body) .
4. Turn bonnet slightly until the flange rests against the stud bolt face and turn hand wheel anti-clockwise(opening direction) until piston is completely free of valve sealing ring.
5. Remove bonnet together with hand wheel, and stem and piston.
6. Remove upper valve ring and lantern bush using lantern bush extractor.
NOTE: In case of 65-200 NB valve additional valve ring must be removed before removing Upper ring using extractor hook.
7. Remove bottom valve ring with ring extractor hook.
8. Clean the valve body bore and valve ring seat, if necessary with fine sandpaper.

We recommended the following procedure for reassembly:

- Mount bottom valve ring using mounting tool/Wooden mandrill.
- Insert the cleaned lantern bush.
- Assemble upper valve ring using mounting tool/wooden mandrill.
NOTE-In case of 65-200 NB valves additional ring must be installed before inserting bonnet

- **Attention:** Particular care should be taken to ensure that the rings are inserted correctly positioned into bore of the valve body using the mounting tool.
Replace lantern bush ensuring that no teeth are on the valve outlet side.
Do not use lubricant or grease.
Whenever valve ring is replaced, always check at the same time that the piston /stem/bonnet assembly functioning properly.

While doing so, check to see whether:

- The outer cylinder surface of the piston is smooth and unmarked.
- The stem head moves freely in the piston horse-shoe slot.
- The trapezoid thread of the stem is not unduly worn.
- There is no excessive play between stem and threaded bush.
- If none of the above components needs replacing, lubricant the trapezoid thread and the neck of the bonnet with a suitable lubricant, before reassembling the valve. Uni Klinger recommends Molykote lubricant or equivalent.

If the bonnet is provided with a threaded bush proceed as follows:

- Tap the tension pin out of the bonnet (Inwards).
- Clamp the bonnet in the vice, unscrew the threaded bush using spindle and hand wheel
- Screw the new threaded bush in to the bonnet and pin them together.
- When renewing actuating parts, we recommend putting in a new spindle and threaded bush at the same time.
- Mount the spindle in the piston after thoroughly lubricating the spindle head with a suitable lubricant.
- Mount the spindle into the bonnet and install the hand wheel. Lubricant the bonnet neck and the spindle with a suitable lubricant.

Bonnet Stuffing Box Maintenance (for valve size 65-200 NB)

Bonnet stuffing box consist of 3 Graphite rings, a split bush that hold spindle and bonnet together. When the leakages from gland are observed. Close the hand wheel fully and make sure that the valve is closed. Tighten the Gland bolts evenly. This compresses the KXGT sealing rings against the bonnet body. This process can be repeated whenever valve leaks till the Gland touches and seats on the bonnet. When Gland is resting on bonnet, this is the indication that valve sealing rings are worn out and needs to be replaced. Attend to the isolation valves as soon as leakage starts for getting long life of resilient rings. Prolonged internal leakage can cause scratches/wear on the metallic Piston or resilient valve sealing rings. Damaged components will have to be replaced, if leakage continues.

Replacement of Gland KXGT Rings (for valve size 65-200 NB)

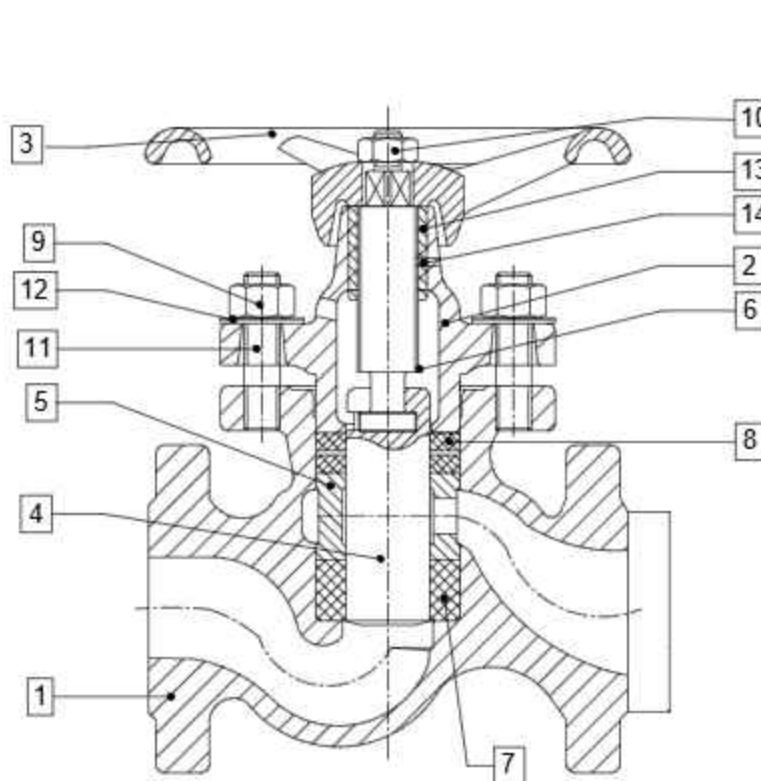
- Remove the bonnet assembly (Bonnet along with spindle, Handwheel) out of valve body.
- Unscrew the Gland nuts (2 Nos),
- Unscrew the Split Bush using spindle and Hand wheel. When the split bush is removed Spindle and Piston get separated. Take out the piston with care from downwards side and remove the Gland plate.

Now remove the stuffing box sealing rings using ring extractor.
Clean the stuffing box.
Insert the new Gland sealing KXGT rings using wooden mandrill.
Put the Gland plate, and insert the piston.
Screw the split bush so that spindle and piston are connected.
Tighten the gland nuts with eye bolts.

Assembling body and bonnet unit.

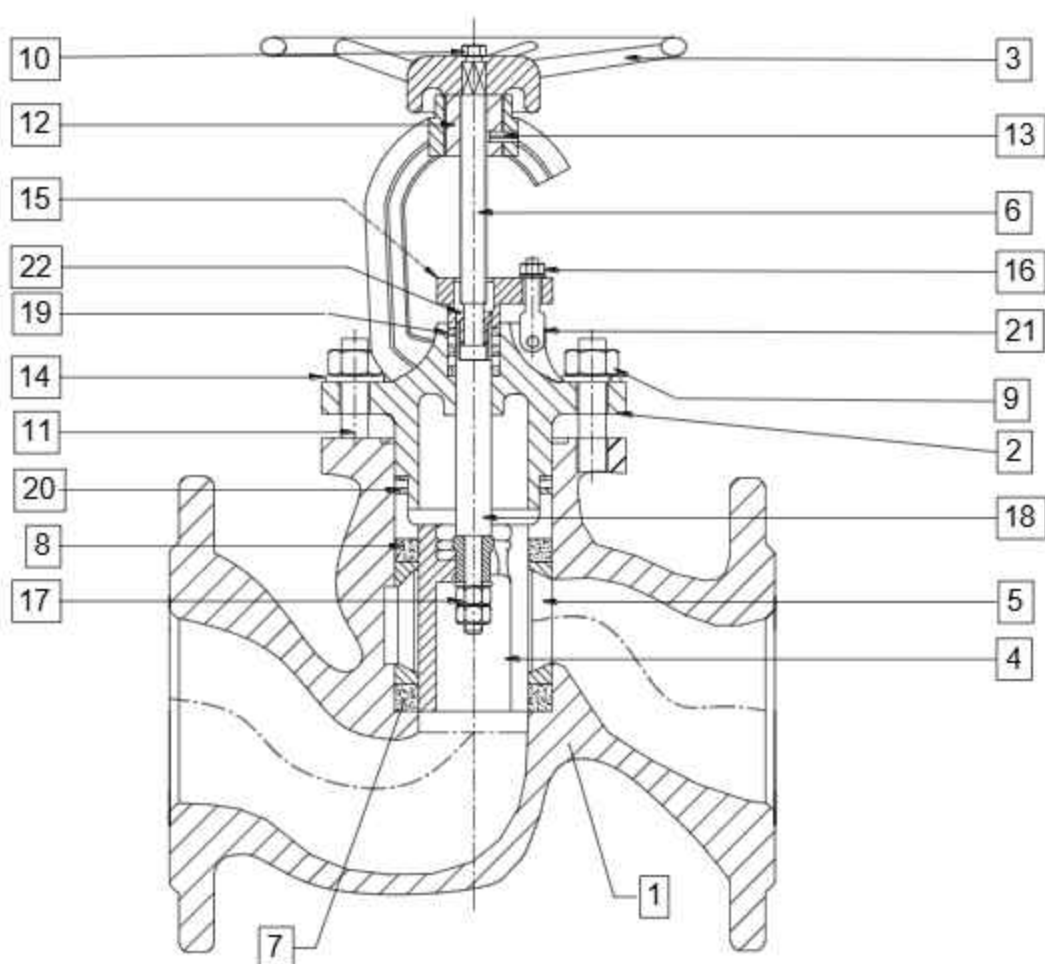
- Screw spindle with piston into bonnet.
- Insert the bonnet in valve body, and screw bonnet nuts to attach bonnet to body.
- Now close valve completely and open it again (when it opens, the bonnet with draws into the valve body).
- Now tighten the bonnet nuts fully.
- Close the valve completely(turn hand wheel clockwise).
- Tighten bonnet hexagon nuts with torque wrench in diagonal order to specified torque.

5.BILL OF MATERIAL (KVN 15-50 NB):-



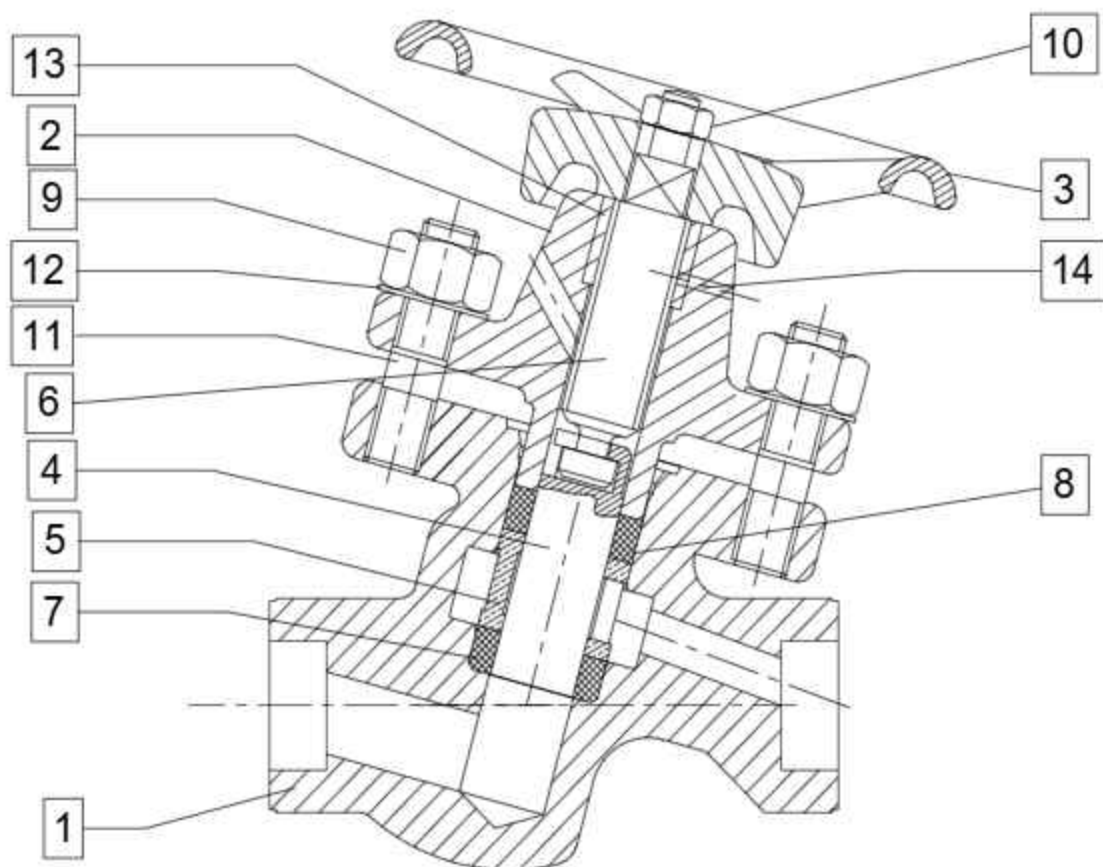
No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	Cast Equi. To AISI 430
5	Lantern Bush	Stainless Steel	ASTM A 276 TP 410
6	Spindle	Stainless Steel	ASTM A 276 TP 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Hand wheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7
12	Belleville Washer	Spring Steel	50 Cr V4
13	Threaded Bush	Cast Iron	GG 20 / FG 200
14	Tension Pin	Spring Steel	50 Cr V4

BILL OF MATERIAL (KVN 65-200 NB):-



No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	ASTM A 351 Gr. CF8
5	Lantern Bush	Stainless Steel	ASTM A 743 Gr. CA15
6	Spindle	Stainless Steel	ASTM A 276 Tp 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Handwheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7

No	PART NAME	MATERIAL	MATERIAL CODE
12	Threaded Bush	Cast Iron	GG 20 / FG 200
13	Tension Pin	Spring Steel	50 Cr V4
14	Belleville Washer	Spring Steel	50 Cr V4
15	Gland	Cast Steel	ASTM A 216 Gr WCB
16	Gland Nut	Carbon Steel	ASTM A 194 Gr 2H
17	Lock Nut	Stainless Steel	AISI 316
18	Piston Shaft	Stainless Steel	AISI 304
19	Stuffing Box Ring	Klinger Standard	KXGT
20	Additional Valve Ring	Klinger Standard	KXGT
21	Eye Bolt	Stainless Steel	EN 8
22	Split Bush	Brass / S.S.	---

BILL OF MATERIAL (USN 15/20/25/40 NB):-

No.	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Forged Steel	ASTM A105
2	Bonnet	Forged Steel	ASTM A105
3	Hand Wheel	Fabricated / C.I.	M.S. / C.I.
4	Piston	Stainless Steel	Cast Equivalent Of AISI 430
5	Lantern Bush	Stainless Steel	ASTM A276 TP410
6	Spindle	Stainless Steel	ASTM A276-TP410
7	Lower Valve Ring	Klinger Std.	KXGT
8	Upper Valve Ring	Klinger Std.	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr.2H
10	Hand Wheel Nut	Carbon Steel	ASTM A 194 Gr.2H
11	Stud	Alloy Steel	ASTM B 193 Gr. B7
12	Bel. Washer	Spring Steel	50 Cr V4
13*	Threaded Bush	Cast Iron	GG20 / FG200
14*	Tension Pin	Spring Steel	50 Cr V4

RECOMMENDED TIGHTENING TORQUE FOR PISTON VALVE-

Body Bonnet Nut			
NB	Stud bolt		Tightening Nm
	Dimension	piece	KX-GT
10/15	M10 x 30	2	9
20	M10 x 30	3	9
25	M10 x 30	4	10
32	M12 x 35	4	16
40	M12 x 35	4	23
50	M12 x 35	4	29

Tightening Torque(Nm)		
NB	Body Bonnet Nut	Gland Nut
65	51	13
80	42	13
100	34	22
125	76	22
150	68	22
200	126	22

6. STORAGE:-

Storage Instruction for Klinger Piston valves and their spare parts.

- Valves and spare parts for valves may only be stored in dry storage rooms. completely assemble valves are to be stored in the as received condition (valves set to close position, connection plugged). Spare parts for valves are to be handle with care, and should be kept in the original packing furnished by the factory if possible during all storage.
- If cover or shrink films are used, the appropriate measure must be taken to ensure that the atmosphere inside the cover stays free of condensate water.
- The appropriate protective measures are recommended in dusty rooms.
- To avoid confusion, all parts stored must label as on the delivery note and stored in the correct place.
- Temperature in the storeroom must not exceed the limit values of 20 and +50 and rapid changes in temperature (causing condensation and perspiration should be avoided).
- Handling regulations and operating instruction are supplied with and should always be stored with the products to ensure that important information and documents are appropriate passed on.
- Corresponding documents are available for the identification of Klinger components
- Damage owing to improper storage will release Klinger from any obligations as may be derived the warranty, guarantee and product liability.

Other Products:

Cast / Forged Steel Piston Valves, Bellow Seal Valves, High Pressure valves (Gate/Globe), Strainers – "Y" Type, Flash Vessel, Steam Traps (Thermodynamic, Thermostatic, Ball Float Traps, Inverted Bucket), Pressure Reducing Station, Condensate Recovery Products, Level Gauges (Reflex, Transparent, Bicolor), Sight Glass, Hot Water Generation System, Safety and Relief Valves.

FSD Products : Compressed Asbestos / Non Asbestos Fiber Sheet / Cut Gaskets, Spiral Wound Gaskets.

In view of technical progress design and dimensions are subjected to change without notice.



UNI KLINGER LIMITED

A joint venture of the Metelwala group of companies and KLINGER AG, Switzerland.

Central Sales Office & Pune Branch: SCF, 8th Fl., Kothlior Est. (Mumbai-Pune Highway, Kadeli, Pune-411 003. Tel.: +91-20-4102 3000 Fax: (020) 4102 3001
e-mail: sales@ukl.com, salespune@ukl.com, Website: www.ukl.com

Factory: C-37, M.I.D.C., Ahmednagar - 414 111, Maharashtra, Tel.: 0241 - 2777223 / 2777612 Fax: 0241 - 2777224 E-mail: fctworks@ukl.com

Branch Offices:

Baroda : 102, 1st Floor, Otel Towers-II R.C. Dutt Road, Baroda-390 006, Tel.: 91-0266-2312343 / 2340660, Fax: 91-0266-2341412 E-mail: salesbar@ukl.com
Chennai : East Coast Centre, 8th Floor, 683, Mount road, Teyyanampet, Chennai - 600 015, Tel.: 91 - 44 - 24345707, Fax: 91 - 44 - 24343950, E-mail: saleschen@ukl.com
Kolkata : 9, Chitraloot, 8th Floor, 230-A, A.J.C Bose road, Kolkata-700 020, Tel.: 91-33-22872610, Fax: 91-33-22875494, E-mail: salescal@ukl.com
Mumbai : 22, 2nd Fl, Shree Arcade CHS, Alameda road, Thane-400 602, Tel.: 91-22-26421140 / 91-22-26440461, Fax: 91-22-26440463, E-mail: salesmum@ukl.com
Delhi : 321, Ansal Chamber-II, 8, Bhikaji Cama Place, New Delhi-110 065, Tel.: 91-11-41665707 / 91-11-26193547, Fax: 91-11-41665705, E-mail: salesdel@ukl.com

Instruction Manual for Piston Valves

Contents.....

1. Product Overview
2. Installation & Commissioning Instructions
3. Operations
4. Maintenance and Troubleshooting
5. Bill of Material
6. Storage

1. Product Overview:-

THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself by the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves, based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of asbestos, a high quality elastomer and graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.



Features:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Saves Energy, environment friendly.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.

2. Installation and Commissioning Instructions:

UNI Klinger Piston Valves

Uni Klinger piston valves can be installed in any position in the system.

The preferred flow direction indicated by an arrow on the body should be observed.

NOTE: Before installation protective caps must be removed from both side of valves body.

Klinger piston valves have a very high strength; the usual attention must be directed to the axially precise and parallel position of the connections on the system end.

Flush the piping before putting the valve in operation.

Perform the welding on valve in an assembled condition (valve closed).

Uniklinger recommends checking the temperature development in the area of the valve ring seats for piston valves with socket weld ends.

NOTE: If the line and valve are subsequently insulated, the insulation should only extend up to the head flange on the body side so that access to the bonnet hexagon nuts is not impeded.

Since the valve body can remain in site for repairs and maintenance work, the valve insulation does not need to be removable.

Uniklinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by incorrect installation and failure to observe the commissioning regulation.

3. OPERATIONS

Operating Instruction For UKL Piston valves

- Uniklinger piston valve must be closed clockwise and opened anticlockwise.
- When closing the valve the hand wheel should be turned until it adjoins on the bonnet. Unlike globe valves, piston valves do not require increased final torque. Due to the design of piston valves, a seal may be achieved before the closed position is reached. To protect the valve rings, piston valves should be kept in closed condition when it is not in operation.
- Klinger piston valves can also be used to regulate and to throttle, the above does not apply when opening the valve or setting it to the open position for regulating or throttle purposes.
- Through flow characteristics for valve in throttle positions are available from Uniklinger on request.
- If a valve starts leaking check the tightening torques of the bonnet/Gland fastenings nuts referring to the table and tighten if necessary. For this the valves needs to be in CLOSE position, unless it is a valve with a KXGT valve ring. In this case it can be adjusted in OPEN position.
- Klinger accepts no liability relating to guarantees, warranties and product liability legislation for damage caused by failure to observe the operating instructions.

Hazardous Operating Errors and Possible Sources of Danger

Where the process fluid is incompressible, the operating of piston valves can cause pressure changes in tightly sealed parts of the system. This should be taken into account especially during the planning stage and can be avoided by selecting suitable installation position.

Piston valves provide a particular good seal. During temperature changes, process fluid captured between two piston valves can cause considerable change in pressure, which may exceed the pressure category of the valve. In such cases, appropriate volume compensation (expansion tank) is necessary.

Always ensure that the correct tightening torque specified on pg. 5 must applied to the bonnet hexagon nuts.

Do not loosen the nuts while the valves are under pressure.

The valves must not be subjected to pressure shocks in excess of one a half times their rated pressure.

When the stem thread has worn out that its stability seems endangered, release the pressure on the valve and carry out the necessary maintenance. Whatever the application, always consult the operating limit diagram (pressure-temperature refer catalogue) and also consider the stability of the materials for various process fluids.

4. Maintenance and Troubleshooting:

Maintenance and Repair Instruction for Uniklinger Piston Valves

Klinger piston valves are easy to repair using simple assembly and dismantling tools. The valve does not have to be removed but the line system must be depressurized and emptied.

We recommended the following procedure for dismantling:

1. Depressurized and empty the system .
2. Open the valve fully.
2. Unscrew the bonnet fastening nuts.
3. Turn the hand wheel clockwise (Closing direction) (bonnet rise out of body) .
4. Turn bonnet slightly until the flange rests against the stud bolt face and turn hand wheel anti-clockwise(opening direction) until piston is completely free of valve sealing ring.
5. Remove bonnet together with hand wheel, and stem and piston.
6. Remove upper valve ring and lantern bush using lantern bush extractor.
NOTE: In case of 65-200 NB valve additional valve ring must be removed before removing Upper ring using extractor hook.
7. Remove bottom valve ring with ring extractor hook.
8. Clean the valve body bore and valve ring seat, if necessary with fine sandpaper.

We recommended the following procedure for reassembly:

- Mount bottom valve ring using mounting tool/Wooden mandrill.
- Insert the cleaned lantern bush.
- Assemble upper valve ring using mounting tool/wooden mandrill.
NOTE-In case of 65-200 NB valves additional ring must be installed before inserting bonnet

- **Attention:** Particular care should be taken to ensure that the rings are inserted correctly positioned into bore of the valve body using the mounting tool.
Replace lantern bush ensuring that no teeth are on the valve outlet side.
Do not use lubricant or grease.
Whenever valve ring is replaced, always check at the same time that the piston /stem/bonnet assembly functioning properly.

While doing so, check to see whether:

- The outer cylinder surface of the piston is smooth and unmarked.
- The stem head moves freely in the piston horse-shoe slot.
- The trapezoid thread of the stem is not unduly worn.
- There is no excessive play between stem and threaded bush.
- If none of the above components needs replacing, lubricant the trapezoid thread and the neck of the bonnet with a suitable lubricant, before reassembling the valve. Uni Klinger recommends Molykote lubricant or equivalent.

If the bonnet is provided with a threaded bush proceed as follows:

- Tap the tension pin out of the bonnet (Inwards).
- Clamp the bonnet in the vice, unscrew the threaded bush using spindle and hand wheel
- Screw the new threaded bush in to the bonnet and pin them together.
- When renewing actuating parts, we recommend putting in a new spindle and threaded bush at the same time.
- Mount the spindle in the piston after thoroughly lubricating the spindle head with a suitable lubricant.
- Mount the spindle into the bonnet and install the hand wheel. Lubricant the bonnet neck and the spindle with a suitable lubricant.

Bonnet Stuffing Box Maintenance (for valve size 65-200 NB)

Bonnet stuffing box consist of 3 Graphite rings, a split bush that hold spindle and bonnet together. When the leakages from gland are observed. Close the hand wheel fully and make sure that the valve is closed. Tighten the Gland bolts evenly. This compresses the KXGT sealing rings against the bonnet body. This process can be repeated whenever valve leaks till the Gland touches and seats on the bonnet. When Gland is resting on bonnet, this is the indication that valve sealing rings are worn out and needs to be replaced. Attend to the isolation valves as soon as leakage starts for getting long life of resilient rings. Prolonged internal leakage can cause scratches/wear on the metallic Piston or resilient valve sealing rings. Damaged components will have to be replaced, if leakage continues.

Replacement of Gland KXGT Rings (for valve size 65-200 NB)

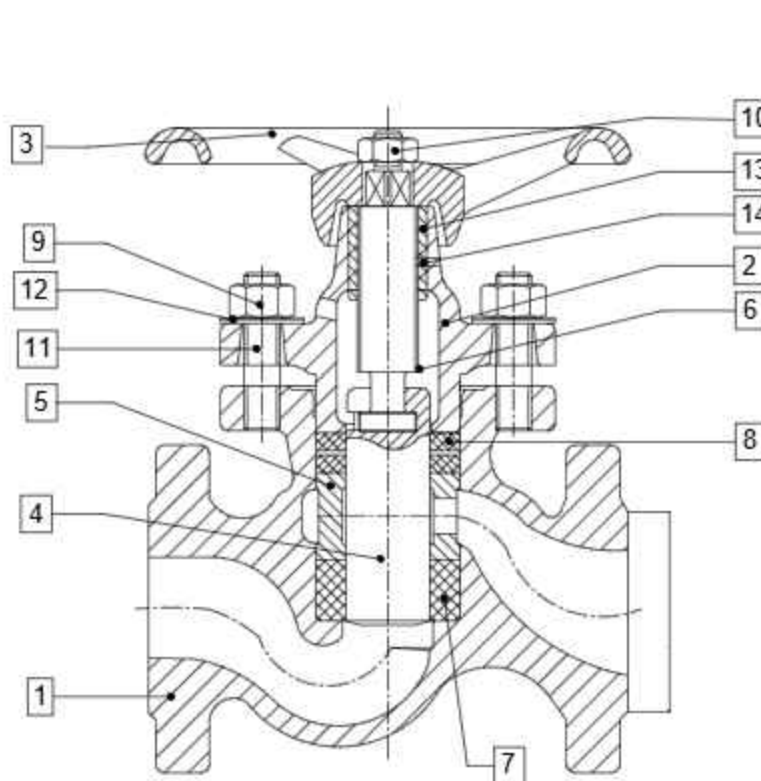
- Remove the bonnet assembly (Bonnet along with spindle, Handwheel) out of valve body.
- Unscrew the Gland nuts (2 Nos),
- Unscrew the Split Bush using spindle and Hand wheel. When the split bush is removed Spindle and Piston get separated. Take out the piston with care from downwards side and remove the Gland plate.

Now remove the stuffing box sealing rings using ring extractor.
Clean the stuffing box.
Insert the new Gland sealing KXGT rings using wooden mandrill.
Put the Gland plate, and insert the piston.
Screw the split bush so that spindle and piston are connected.
Tighten the gland nuts with eye bolts.

Assembling body and bonnet unit.

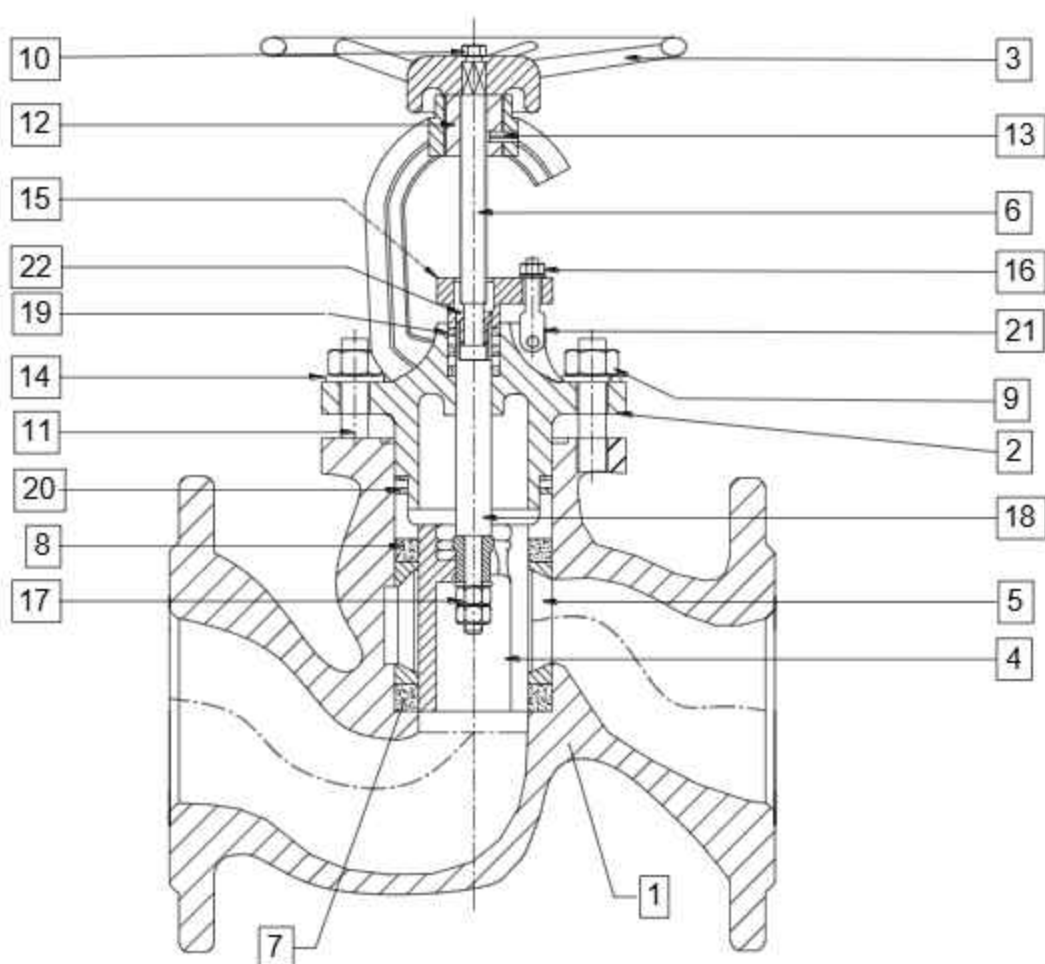
- Screw spindle with piston into bonnet.
- Insert the bonnet in valve body, and screw bonnet nuts to attach bonnet to body.
- Now close valve completely and open it again (when it opens, the bonnet with draws into the valve body).
- Now tighten the bonnet nuts fully.
- Close the valve completely(turn hand wheel clockwise).
- Tighten bonnet hexagon nuts with torque wrench in diagonal order to specified torque.

5.BILL OF MATERIAL (KVN 15-50 NB):-



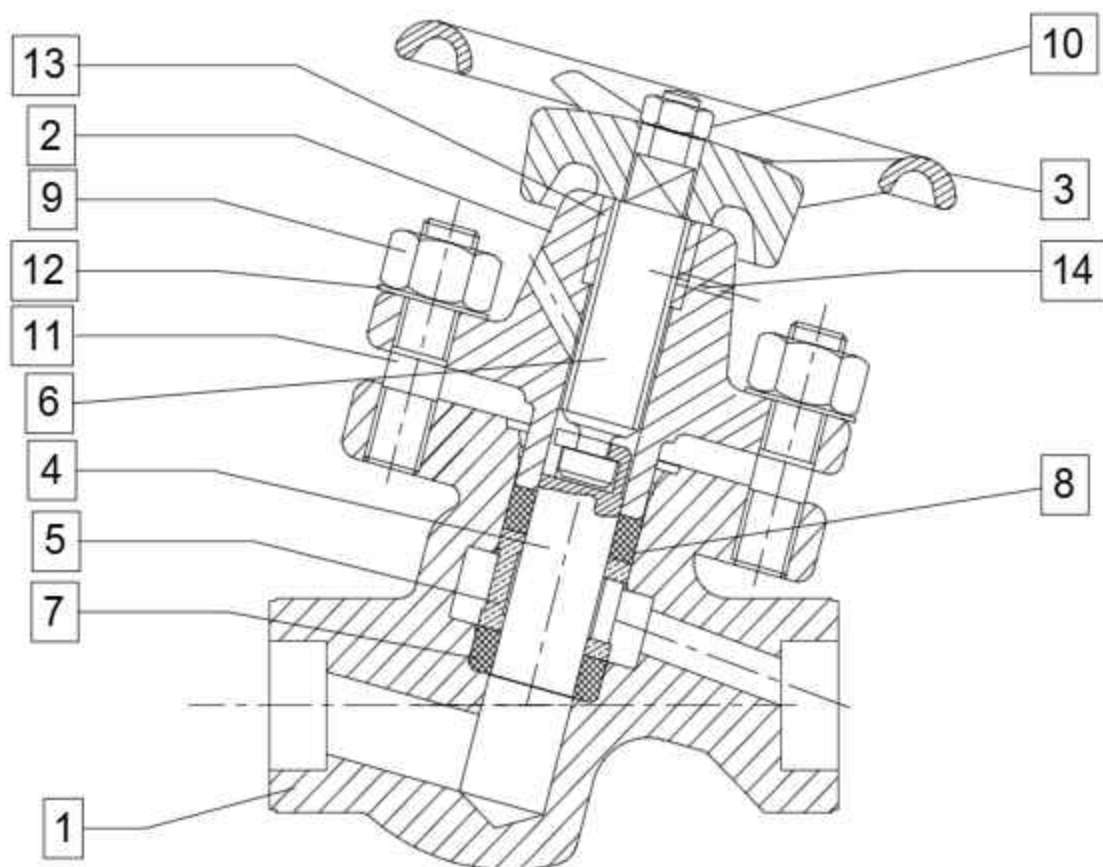
No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	Cast Equi. To AISI 430
5	Lantern Bush	Stainless Steel	ASTM A 276 TP 410
6	Spindle	Stainless Steel	ASTM A 276 TP 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Hand wheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7
12	Belleville Washer	Spring Steel	50 Cr V4
13	Threaded Bush	Cast Iron	GG 20 / FG 200
14	Tension Pin	Spring Steel	50 Cr V4

BILL OF MATERIAL (KVN 65-200 NB):-



No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4	Piston	Stainless Steel	ASTM A 351 Gr. CF8
5	Lantern Bush	Stainless Steel	ASTM A 743 Gr. CA15
6	Spindle	Stainless Steel	ASTM A 276 Tp 410
7	Lower Valve Ring	Klinger Standard	KXGT
8	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Handwheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7

No	PART NAME	MATERIAL	MATERIAL CODE
12	Threaded Bush	Cast Iron	GG 20 / FG 200
13	Tension Pin	Spring Steel	50 Cr V4
14	Belleville Washer	Spring Steel	50 Cr V4
15	Gland	Cast Steel	ASTM A 216 Gr WCB
16	Gland Nut	Carbon Steel	ASTM A 194 Gr 2H
17	Lock Nut	Stainless Steel	AISI 316
18	Piston Shaft	Stainless Steel	AISI 304
19	Stuffing Box Ring	Klinger Standard	KXGT
20	Additional Valve Ring	Klinger Standard	KXGT
21	Eye Bolt	Stainless Steel	EN 8
22	Split Bush	Brass / S.S.	---

BILL OF MATERIAL (USN 15/20/25/40 NB):-

No.	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Forged Steel	ASTM A105
2	Bonnet	Forged Steel	ASTM A105
3	Hand Wheel	Fabricated / C.I.	M.S. / C.I.
4	Piston	Stainless Steel	Cast Equivalent Of AISI 430
5	Lantern Bush	Stainless Steel	ASTM A276 TP410
6	Spindle	Stainless Steel	ASTM A276-TP410
7	Lower Valve Ring	Klinger Std.	KXGT
8	Upper Valve Ring	Klinger Std.	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr.2H
10	Hand Wheel Nut	Carbon Steel	ASTM A 194 Gr.2H
11	Stud	Alloy Steel	ASTM B 193 Gr. B7
12	Bel. Washer	Spring Steel	50 Cr V4
13*	Threaded Bush	Cast Iron	GG20 / FG200
14*	Tension Pin	Spring Steel	50 Cr V4

RECOMMENDED TIGHTENING TORQUE FOR PISTON VALVE-

Body Bonnet Nut			
NB	Stud bolt		Tightening Nm
	Dimension	piece	KX-GT
10/15	M10 x 30	2	9
20	M10 x 30	3	9
25	M10 x 30	4	10
32	M12 x 35	4	16
40	M12 x 35	4	23
50	M12 x 35	4	29

Tightening Torque(Nm)		
NB	Body Bonnet Nut	Gland Nut
65	51	13
80	42	13
100	34	22
125	76	22
150	68	22
200	126	22

6. STORAGE:-

Storage Instruction for Klinger Piston valves and their spare parts.

- Valves and spare parts for valves may only be stored in dry storage rooms. completely assemble valves are to be stored in the as received condition (valves set to close position, connection plugged). Spare parts for valves are to be handle with care, and should be kept in the original packing furnished by the factory if possible during all storage.
- If cover or shrink films are used, the appropriate measure must be taken to ensure that the atmosphere inside the cover stays free of condensate water.
- The appropriate protective measures are recommended in dusty rooms.
- To avoid confusion, all parts stored must label as on the delivery note and stored in the correct place.
- Temperature in the storeroom must not exceed the limit values of 20 and +50 and rapid changes in temperature (causing condensation and perspiration should be avoided).
- Handling regulations and operating instruction are supplied with and should always be stored with the products to ensure that important information and documents are appropriate passed on.
- Corresponding documents are available for the identification of Klinger components
- Damage owing to improper storage will release Klinger from any obligations as may be derived the warranty, guarantee and product liability.

Other Products:

Cast / Forged Steel Piston Valves, Bellow Seal Valves, High Pressure valves (Gate/Globe), Strainers – "Y" Type, Flash Vessel, Steam Traps (Thermodynamic, Thermostatic, Ball Float Traps, Inverted Bucket), Pressure Reducing Station, Condensate Recovery Products, Level Gauges (Reflex, Transparent, Bicolor), Sight Glass, Hot Water Generation System, Safety and Relief Valves.

FSD Products : Compressed Asbestos / Non Asbestos Fiber Sheet / Cut Gaskets, Spiral Wound Gaskets.

In view of technical progress design and dimensions are subjected to change without notice.



UNI KLINGER LIMITED

A joint venture of the Metelwala group of companies and KLINGER AG, Switzerland.

Central Sales Office & Pune Branch: SCF, 8th Fl., Kothinor Est. (Mumbai-Pune Highway, Kadek, Pune-411 003. Tel.: +91-20-4102 3000 Fax: (020) 4102 3001
e-mail: sales@ukl.com, salespune@ukl.com, Website: www.ukl.com

Factory: C-37, M.I.D.C., Ahmednagar - 414 111, Maharashtra, Tel.: 0241 - 2777223 / 2777612 Fax: 0241 - 2777224 E-mail: fctworks@ukl.com

Branch Offices:

Baroda : 102, 1st Floor, Otel Towers-II R.C. Dutt Road, Baroda-390 006, Tel.: 91-0266-2312343 / 2340660, Fax: 91-0266-2341412 E-mail: salesbar@ukl.com
Chennai : East Coast Centre, 8th Floor, 683, Mount road, Teyyanampet, Chennai - 600 015, Tel.: 91 - 44 - 24345707, Fax: 91 - 44 - 24343950, E-mail: saleschen@ukl.com
Kolkata : 9, Chitraloot, 8th Floor, 230-A, A.J.C Bose road, Kolkata-700 020, Tel.: 91-33-22872610, Fax: 91-33-22875494, E-mail: salescal@ukl.com
Mumbai : 22, 2nd Flr, Shree Arcade CHS, Alameda road, Thane-400 602, Tel.: 91-22-26421140 / 91-22-26440461, Fax: 91-22-26440463, E-mail: salesmum@ukl.com
Delhi : 321, Ansal Chamber-II, 8, Bhikaji Cama Place, New Delhi-110 065, Tel.: 91-11-41665707 / 91-11-26193547, Fax: 91-11-41665705, E-mail: salesdel@ukl.com



THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself to the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves; based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of graphite and tanged stainless steel between each layer of graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.

FEATURES:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.
- Spherical joint of piston and spindle requires very low torque leading to smooth opening and closing operation (Patent applied *)

END CONNECTIONS:-

Socket weld #800 Rating
Screwed BSPT/ NPT
Flanged to ANSI #150/ #300

MATERIAL OF CONSTRUCTION:-

ASTMA105
ASTMA182 Gr.F316

AVAILABLE SIZES:-

15,20,25, and 40 NB Pr Rating #800
½", ¾", 1", and 1½" Pr Rating #800

KVSN 50 as per PN40 Rating
KVSN 2" as per PN40 Rating



ON REQUEST:-

IBR/Non-IBR
MOC : Cast Stainless / Alloy Steel
Valve with extended spindle.
Valve with Heating Jacket
Pneumatic / Electrical Actuator

APPLICATIONS:-

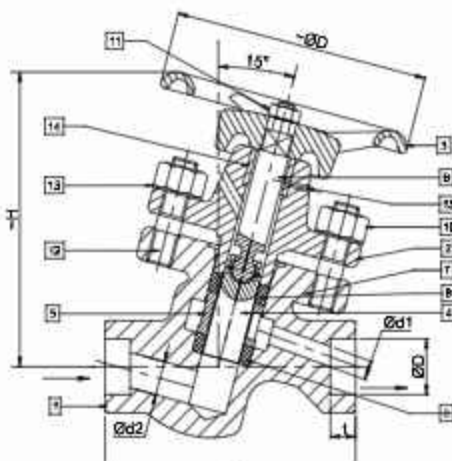
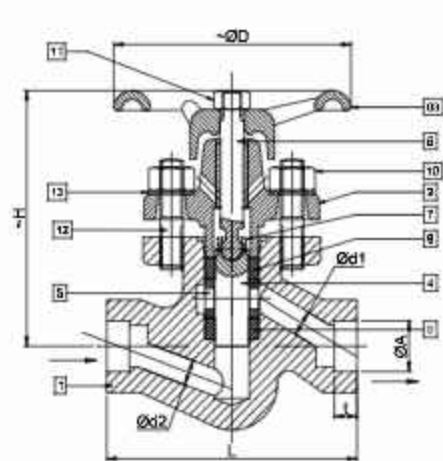
- Steam
- Thermic fluids
- Acids
- Gases
- Vacuum
- Other critical media.

INSTALLATION:-

Preferred direction is as per arrow; however this valve is a Bi Directional Valve. This valve can be installed in any position without any adverse effect on performance, seal ability or flow.

Due to soft sealing principle it is advisable to install a strainer upstream of the valve to avoid damage to the rings caused by weld slag, metal and other solid impurities.

Forged Piston Valve USN 15-40



BILL OF MATERIAL

No.	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Forged Steel	ASTM A105
2	Bonnet	Forged Steel	ASTM A105
3#	Hand Wheel	Fabricated/C.I.	M.S. / C.I.
4#	Piston	Stainless Steel	Cast Equivalent of AISI 430
5#	Lantern Bush	Stainless Steel	ASTM A276 TP410
6*	Spindle	Stainless Steel	ASTM A276-TP410
7*\$	Collar	Stainless Steel	AISI 430
8#	Lower Valve Ring	Klinger Std.	KXGT
9#	Upper Valve Ring	Klinger Std.	KXGT
10	Bonnet Nut	Carbon Steel	ASTM A 194 Gr.2H
11	Hand Wheel Nut	Carbon Steel	ASTM A 194 Gr.2H
12	Stud	Alloy Steel	ASTM B 193 Gr. B7
13	Bel. Washer	Spring Steel	50 Cr V4
14\$	Threaded Bush	Cast Iron	GG20 / FG200
15\$	Tension Pin	Spring Steel	50 Cr V4

- Available as Spares

\$ - Not applicable for 15NB and 20NB (1/2" & 3/4")

* Spherical joint arrangement for Piston and Spindle (Patent Applied)

DIMENSION (mm / inches)

Size		Class	L		H		ØA CI / MS		ØD		t		Ød1		Ød2	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
15	1/2"	800	110.00	4.33	110.00	4.33	100 / 106	3.94 / 4.17	21.80	0.86	10.00	0.39	11.00	0.43	11.00	0.43
20	3/4"	800	110.00	4.33	110.00	4.33	100 / 106	3.94 / 4.17	27.20	1.07	13.00	0.51	11.00	0.43	11.00	0.43
25	1"	800	135.00	5.31	155.00	5.31	140 / 146	5.51 / 5.75	33.90	1.33	13.00	0.51	19.00	0.75	17.00	0.67
40	1 1/2"	800	185.00	7.28	215.00	7.28	180 / 200	7.08 / 7.87	48.80	1.92	13.00	0.51	36.50	1.44	24.00	0.94

DIMENSION (mm / inches)

Size		Length (L)		Height (H)		ØA		ØD		b		Øg		No of holes		ØI		ØK	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in			mm	in	mm	in
Overall Dimensions for #150																			
15 NB	1/2"	212	8.35	118	4.65	100	3.94	90	3.54	9.6	0.38	35	1.38	4		16	0.63	60.3	2.37
20 NB	3/4"	232	9.13	134	5.28	120	4.72	100	3.94	11.2	0.44	42.9	1.69	4		16	0.63	69.9	2.75
25 NB	1"	251	9.88	155	6.10	140	5.51	110	4.33	12.7	0.50	50.8	2.00	4		16	0.63	79.4	3.13
40 NB	1 1/2"	311	12.24	215	8.46	180	7.09	125	4.92	15.9	0.63	73	2.87	4		16	0.63	98.4	3.87
Overall Dimensions for #300																			
15 NB	1/2"	226	8.90	118	4.65	100	3.94	95	3.74	16	0.63	45	1.77	4		14	0.55	65	2.56
20 NB	3/4"	252	9.92	134	5.28	120	4.72	105	4.13	18	0.71	58	2.28	4		14	0.55	75	2.95
25 NB	1"	269	10.59	155	6.10	140	5.51	115	4.53	18	0.71	68	2.68	4		14	0.55	85	3.35
40 NB	1 1/2"	327	12.87	215	8.46	180	7.09	150	5.91	18	0.71	88	3.46	4		14	0.55	110	4.33

Rating	Pmax		Temp		T max		Press.(bar.g)	
	bar.g	Psi.g	°C	°F	°C	°F	bar.g	Psi.g
#150	13.8	196.30	200	392	425	797	5.5	78.24
#300	43.8	623.04	200	392	425	797	28.5	405.41
SW# 800	138.9	1975.82	Amb.	Amb.	425	797	76.7	1100.28
BSP	12.25	174.25	260	—	—	500	—	—
BSPT/NPT	31.6	449.50	425	—	—	797	—	—

Special Instructions:- 1) Flush pipelines, 2) Open/Close the valve using hand wheel only, 3) Hot Tighten, 4) Lubricate spindle, 5) Use original Klinger rings only.

HOW TO ORDER

KLINGER PISTON VALVE USN 25, Steam, IBR, FLANGED TO #150 Please mention the media, its design and working pressure/temperature

In view of technical progress designs and dimensions are subject to change without notice.

UNI KLINGER LIMITED

A joint venture of the Neterwala group of companies and KLINGER AG, Switzerland.

e-mail : sales@uniklinger.com, Website : www.uniklinger.com



THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself to the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves, based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of graphite and tanged stainless steel between each layer of graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.

FEATURES:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.
- Spherical joint of piston and spindle requires very low torque leading to smooth opening and closing operation (Patent applied*)

END CONNECTIONS:-

Flanged #150/#300/ DIN PN40

MATERIAL OF CONSTRUCTION:-

ASTMA216 Gr. WCB

ASTMA351 Gr.CF8M

AVAILABLE SIZES:-

15,20,25,32,40 and 50 NB

[32 NB available in DIN Overall length only]

1/2", 3/4", 1", 1 1/4", 1 1/2" and 2"

[1 1/4" available in DIN Overall length only]



ON REQUEST:-

IBR/Non-IBR

MOC : Cast Stainless / Alloy Steel

Valve with extended spindle.

Valve with Heating Jacket

Pneumatic / Electrical Actuator

APPLICATIONS:-

- Steam
- Thermic fluids
- Acids
- Gases
- Vacuum
- Other critical media.

INSTALLATION:-

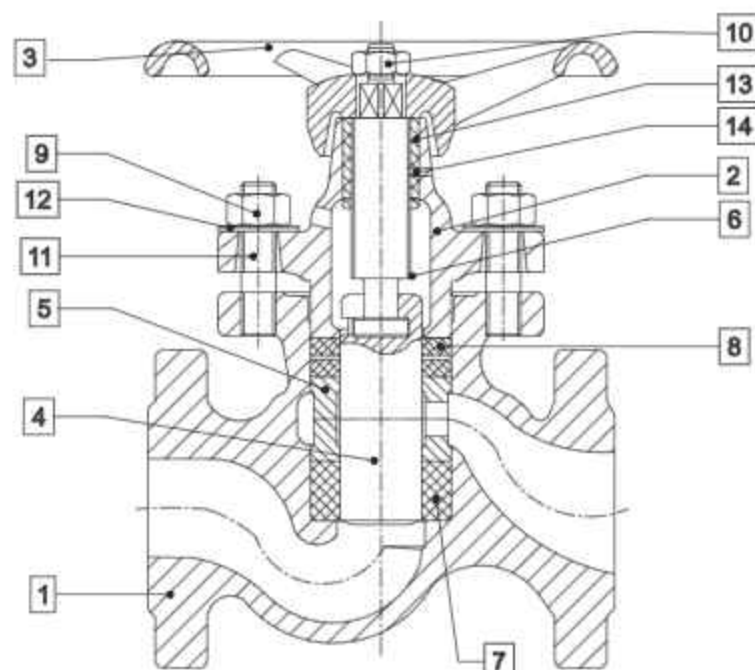
Preferred direction is as per arrow, however this valve is a Bi Directional Valve. This valve can be installed in any position without any adverse effect on performance, seal ability or flow.

Due to soft sealing principle it is advisable to install a strainer upstream of the valve to avoid damage to the rings caused by weld slag, metal and other solid impurities.

LIMITING CONDITIONS :

Rating	Pressure				Temperature			
	Kg/cm2		PSI		°C		°F	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
#150	5.61	14.08	79.8	200.3	200	425	392	797
#300	29.07	44.68	413.5	635.6	200	425	392	797
PN40	22.85	38.66	325.0	549.9	200	425	392	797

Piston Valve



BILL OF MATERIAL

No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3#	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4*#	Piston	Stainless Steel	Cast Equi. To AISI 430
5#	Lantern Bush	Stainless Steel	ASTM A 276 TP 410
6*	Spindle	Stainless Steel	ASTM A 276 TP 410
7*\$	Collar	Stainless Steel	AISI 430
8#	Lower Valve Ring	UKL Standard	KXGT
9#	Upper Valve Ring	UKL Standard	KXGT
10	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Hand wheel Nut	Carbon Steel	ASTM A 194 Gr 2H
12	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7
13	Belleville Washer	Spring Steel	50 Cr V4
14	Threaded Bush	Cast Iron	GG 20 / FG 200
15	Tension Pin	Spring Steel	50 Cr V4

- Available as Spares

\$ - Not applicable for 15NB (1/2") and 20NB (3/4")

* Spherical joint arrangement for Piston and Spindle (Patent Applied)

DIMENSIONS:

Rating	ØD N		L		H		ØA		ØD		b		Øg		I		ØK		No. of Holes		ØI		Weight (lb)	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
#150	15	1/2"	108	4.3	105	4.1	100	3.9	90	3.5	9.6	0.3	35	1.4	2	0.078	60.3	2.4	4	0.2	16	0.6	2.35	5.3
	20	3/4"	117	4.6	120	4.7	120	4.7	100	3.9	11	0.4	43	1.7	2	0.078	69.9	2.8	4	0.2	16	0.6	3.70	8.3
	25	1"	127	5.0	138	5.4	140	5.5	110	4.3	13	0.5	51	2.0	2	0.078	79.4	3.1	4	0.2	16	0.6	5.41	12.1
	32	1 1/4"	140	5.5	154	6.1	160	6.3	115	4.5	13	0.5	64	2.5	2	0.078	88.9	3.5	4	0.2	16	0.6	6.3	14.1
	40	1 1/2"	165	6.5	186	7.3	180	7.1	125	4.9	16	0.6	73	2.9	2	0.078	98.4	3.9	4	0.2	16	0.6	10.53	23.6
	50	2"	203	8.0	211	8.3	180	7.1	150	5.9	18	0.7	92	3.6	2	0.078	121	4.8	4	0.2	19.1	0.8	13.70	30.7
#300	15	1/2"	152	6.0	105	4.1	100	3.9	95	3.7	13	0.5	35	1.4	2	0.078	66.7	2.6	4	0.2	16	0.6	3.41	7.6
	20	3/4"	178	7.0	120	4.7	120	4.7	115	4.5	13	0.5	43	1.7	2	0.078	82.6	3.3	4	0.2	19.1	0.8	7.44	16.7
	25	1"	203	8.0	138	5.4	140	5.5	125	4.9	16	0.6	51	2.0	2	0.078	88.9	3.5	4	0.2	19.1	0.8	7.50	16.8
	32	1 1/4"	216	8.5	154	6.1	160	6.3	135	5.3	18	0.7	64	2.5	2	0.078	98.4	3.9	4	0.2	19.1	0.8	6.5	14.6
	40	1 1/2"	229	9.0	186	7.3	180	7.1	155	6.1	18	0.7	73	2.9	2	0.078	114	4.5	4	0.2	22.2	0.9	14.50	32.5
	50	2"	267	10.5	211	8.3	200	7.9	165	6.5	21	0.8	92	3.6	2	0.078	127	5.0	8	0.3	19.1	0.8	19.80	44.4
PN40	15	1/2"	130	5.1	105	4.1	100	3.9	95	3.7	16	0.6	45	1.8	2	0.078	65	2.6	4	0.2	14	0.6	3.2	7.2
	20	3/4"	150	5.9	120	4.7	120	4.7	105	4.1	18	0.7	58	2.3	2	0.078	75	3.0	4	0.2	14	0.6	7.0	15.7
	25	1"	160	6.3	138	5.4	140	5.5	115	4.5	18	0.7	68	2.7	2	0.078	85	3.3	4	0.2	14	0.6	7.0	15.7
	32	1 1/4"	180	7.1	154	6.1	160	6.3	140	5.5	18	0.7	78	3.1	2	0.078	100	3.9	4	0.2	18	0.7	6.3	14.1
	40	1 1/2"	200	7.9	186	7.3	180	7.1	150	5.9	18	0.7	88	3.5	3	0.12	110	4.3	4	0.2	18	0.7	13.9	31.1
	50	2"	230	9.1	211	8.3	200	7.9	165	6.5	20	0.8	102	4.0	3	0.12	125	4.9	4	0.2	18	0.7	19.0	42.6

In view of technical progress designs and dimensions are subject to change without notice.

UNI KLINGER LIMITED

A joint venture of the Neterwala group of companies and KLINGER AG, Switzerland.

e-mail : salescso@uniklinger.com, Website : www.uniklinger.com

UKL PISTON VALVE:-

THE PISTON VALVE principle is a KLINGER idea. One of many ideas which has achieved world-wide recognition. Continuously modified and matched to modern requirement, the piston Valve has provided itself by the millions throughout the world. Today we can say with pride that our group is worlds largest manufacturer of valves, based on this design principle. KLINGER Piston valve performance is backed by central R & D of KLINGER at Switzerland.

The shut off assembly comprises of a stainless steel piston, two resilient valve rings and a ferrous metal lantern bush. The sealing consists of the cylindrical surface of the piston and the corresponding inner surface area of the sealing rings. This provides a very large sealing compared with globe valves with conventional design- one of the reasons for the Piston valve's excellent seal.

The valve Rings are the heart of the piston valve. They are made from KXGT, a material specially developed and exclusively used for the manufacture of valve ring. KXGT consists essentially of asbestos, a high quality elastomer and graphite. KLINGER valve rings are not merely surface graphited; the graphite content extends throughout the ring. For this reason its outstanding self lubricating properties are retained throughout the rings entire service life. KLINGER valve rings are resilient, accurately dimensioned and in consequence of their good recovery characteristics have excellent form retention and long service life. KLINGER valve rings are resistant to water, steam, oils, solvents and wide range of other media. KLINGER valve rings can be used for more than 230 listed fluid media.

FEATURES:-

- Seatless and Gland less valve.
- Economic, easy to service.
- No erosion of sealing surface.
- Saves Energy, environment friendly.
- Maintenance free.
- Compensation for thermal expansion with use of Belleville washer.
- Leak-tight across ports and to atmosphere.

MATERIAL OF CONSTRUCTION:-

ASTM A216 Gr. WCB

ASTM A351 Gr.CF8M (On Request)

AVAILABLE SIZES:-

65,80,100,125,150,200 NB

2½", 3", 4", 5", 6", 8"

[65NB and 125 NB NB available in DIN Overall length only]

[2½" and 5" available in DIN Overall length only]



ON REQUEST:-

IBR/Non-IBR

MOC : Cast Stainless / Alloy Steel

Valve with extended spindle.

Valve with Heating Jacket

Pneumatic / Electrical Actuator

APPLICATIONS:

- Steam,
- Thermic fluids,
- Acids,
- Gases,
- Vacuum and other critical media.

INSTALLATION:-

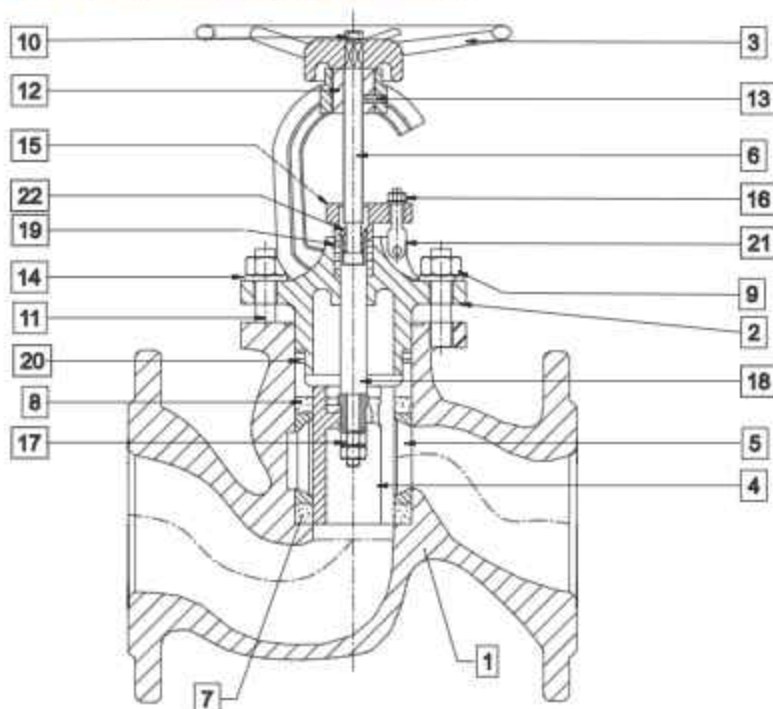
Preferred direction is as per arrow, however this valve is a Bi Directional Valve. This valve can be installed in any position without any adverse effect on performance, seal ability or flow.

Due to soft sealing principle it is advisable to install a strainer upstream of the valve to avoid damage to the rings caused by weld slag, metal and other solid impurities.

LIMITING CONDITIONS :

Rating	Pmax		Temp ^o C		T max		Press.	
	Kg/cm2	PSI	°C	°F	°C	°F	Kg/cm2	PSI
#150	14.08	200	200	392	425	797	5.61	79.8
#300	44.68	635.6	200	392	425	797	29.07	413.5
PN40	38.66	550	200	392	425	797	22.85	325

BILL OF MATERIAL (KVN 65-200 NB)



BILL OF MATERIAL

No	PART NAME	MATERIAL	MATERIAL CODE
1	Body	Cast Steel	ASTM A 216 Gr WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr WCB
3#	Hand Wheel	C.I. / M.I.	GG 20 / FG 200 / M.I.
4#	Piston	Stainless Steel	ASTM A 351 Gr. CF8
5#	Lantern Bush	Stainless Steel	ASTM A 743 Gr. CA15
6#	Spindle	Stainless Steel	ASTM A 276 Tp 410
7#	Lower Valve Ring	Klinger Standard	KXGT
8#	Upper Valve Ring	Klinger Standard	KXGT
9	Bonnet Nut	Carbon Steel	ASTM A 194 Gr 2H
10	Handwheel Nut	Carbon Steel	ASTM A 194 Gr 2H
11	Stud Bolt	Alloy Steel	ASTM A 193 Gr B7
12	Threaded Bush	Cast Iron	GG 20 / FG 200
13	Tension Pin	Spring Steel	50 Cr V4
14	Belleville Washer	Spring Steel	50 Cr V4
15	Gland	Cast Steel	ASTM A 216 Gr WCB
16	Gland Nut	Carbon Steel	ASTM A 194 Gr 2H
17	Lock Nut	Stainless Steel	AISI 316
18	Piston Shaft	Stainless Steel	AISI 304
19#	Stuffing Box Ring	Klinger Standard	KXGT
20#	Additional Valve Ring	Klinger Standard	KXGT
21	Eye Bolt	Stainless Steel	EN 8
22	Split Bush	Brass / S.S.	-----

Available as Spares

DIMENSIONS:

Rating	ØD N		L		H		ØA		ØD		b		Øg		f		No. of Holes	ØI		ØK		Weight (kg)	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	mm	in	mm	in
#150	65	2 1/2"	108	8.5	306	12.0	250	9.8	180	7.1	20.7	0.8	104.8	4.1	2	0.1	4	19.05	0.8	139.7	5.5	24	53.8
	80	3"	117	9.5	327	12.9	250	9.8	190	7.5	22.3	0.9	127	5.0	2	0.1	4	19.05	0.8	152.4	6.0	33	73.9
	100	4"	127	11.5	374	14.7	280	11.0	230	9.1	22.3	0.9	157.2	6.2	2	0.1	8	19.05	0.8	190.5	7.5	48.7	109.1
	125	5"	140	14.0	447	17.6	360	14.2	255	10.0	22.3	0.9	185.7	7.3	2	0.1	8	22.22	0.9	215.9	8.5	80	179.2
	150	6"	165	16.0	477	18.8	360	14.2	280	11.0	22.3	0.9	215.9	8.5	2	0.1	8	22.22	0.9	241.3	9.5	100	224.0
	200	8"	203	19.5	561	22.1	400	15.7	345	13.6	27	1.1	269.9	10.6	2	0.1	8	22.22	0.9	298.5	11.8	174	389.8
#300	65	2 1/2"	292.1	11.5	306	12.0	250	9.8	190	7.5	23.9	0.9	104.8	4.1	2	0.1	8	22.22	0.9	149.2	5.9	30	67.2
	80	3"	317.5	12.5	327	12.9	250	9.8	210	8.3	27	1.1	127	5.0	2	0.1	8	22.22	0.9	168.3	6.6	41.5	93.0
	100	4"	355.6	14.0	374	14.7	280	11.0	255	10.0	30.2	1.2	157.2	6.2	2	0.1	8	22.22	0.9	200	7.9	61.5	137.8
	125	5"	400	15.8	447	17.6	360	14.2	280	11.0	33.4	1.3	185.7	7.3	2	0.1	8	22.22	0.9	235	9.3	95	212.8
	150	6"	444.5	17.5	477	18.8	360	14.2	320	12.6	35	1.4	215.9	8.5	2	0.1	12	22.22	0.9	269.9	10.6	127.3	285.2
	200	8"	558.8	22.0	561	22.1	400	15.7	380	15.0	39.7	1.6	269.9	10.6	2	0.1	12	25.40	1.0	330.2	13.0	220	492.8
PN40	65	2 1/2"	290	11.4	306	12.0	250	9.8	185	7.3	22	0.9	122	4.8	3	0.1	8	18	0.7	145	5.7	29	65.0
	80	3"	310	12.2	327	12.9	250	9.8	200	7.9	24	0.9	138	5.4	3	0.1	8	18	0.7	160	6.3	40	89.6
	100	4"	350	13.8	374	14.7	280	11.0	235	9.3	24	0.9	162	6.4	3	0.1	8	22	0.9	190	7.5	60	134.4
	125	5"	400	15.7	447	17.6	360	14.2	270	10.6	26	1.0	188	7.4	3	0.1	8	26	1.0	220	8.7	94	210.6
	150	6"	480	18.9	477	18.8	360	14.2	300	11.8	25	1.0	218	8.6	3	0.1	8	26	1.0	250	9.8	125	280.0
	200	8"	600	23.6	561	22.1	400	15.7	375	14.8	34	1.3	285	11.2	3	0.1	12	30	1.2	320	12.6	210	470.4

In view of technical progress designs and dimensions are subject to change without notice.

UNI KLINGER LIMITED

A joint venture of the Neterwala group of companies and KLINGER AG, Switzerland.

e-mail : salescso@uniklinger.com, Website : www.uniklinger.com