INTER PLANT STTEEL STANDARD		
IPSS	**CODE OF PRACTICE FOR INSTALLATION AND MAINTENANCE OF INDUSTRIAL VALVES**	**IPSS:1-06-042-08**
	Corresponding IS does not exist	

0.1 **FOREWORD**

This Inter Plant Standard prepared by the Standards Committee on Pipes, Fittings, Valves and Piping Layout, IPSS 1:6 with the active participation of the representatives of all the steel plants and associated organization in the field was adopted in August 2008.

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment for existing or new installations by individual steel plants. It is not desirable to make deviations in technical requirements.

1. **SCOPE**

1.1 This standard covers general guidelines on Installation and Maintenance of Industrial Valves used in steel plants.

1.2 These guidelines are general in nature and user shall apply them only after careful study of the specific requirement and parameters of the system as well as prevalent maintenance practice. Accessories attached to valves are not covered in this standard.

2. HANDLING AND STORAGE OF VALVES

2.1 All valves are mechanism which are engineered with precision and therefore, require to be handled, stored, installed, operated and maintained with due care so that they will give constant trouble free services.

2.2 While transporting valves to site or from one place to another and during storage – care shall be taken to ensure that the valves are in shut condition and that in case of Non return valves the flaps or the discs, are firmly wedged on their seats in order to prevent their slamming during transportation.

2.3 Heavy valves shall be handled with the aid of proper lifting tackles or cranes and shall not be allowed to suffer heavy shocks.

2.4 While transporting valves to site and during storage it shall be ensured that all openings are suitably blocked or blanked to prevent entry of dirt and any other foreign matter.

2.5 The storage of valves shall be in a covered godown or warehouse in a dirt free non corrosive atmosphere.

2.6 Flanges of flanged valves shall be protected over entire contact face with suitable protectors securely attached to the valves.

2.7 Screwed and socket weld ends of valves shall have suitable protectors over them.

2.8 During storage the seats of Gate valves shall be protected with a film of lubricating oil to prevent galling.

2.9 All exposed surfaces of valves shall be painted with rust preventives or anti-rust solutions before storage.

2.10 Preservatives or grease shall be applied on the thread of the out side screw valves to prevent corrosion.

2.11 All bolts & nuts shall be painted with anti-rust compound before storage.

2.12 All valves shall be stored in an orderly fashion properly tagged and numbered for easy identification. The tag attached to valve shall indicate the size of valves, flange drilling/end connection standard, nominal and test pressure, date of testing, intended medium of flow.

3. INSTALLATION OF VALVES

3.1 Before installation – all valves shall be thoroughly checked and inspected for any defects or damages that may have occurred during transit and storage. Defective valves shall be attended prior to installation.

3.2 Before installation the valves shall be thoroughly cleaned free of all preservatives, dirt, scale etc.

3.3 The pipe line shall be thoroughly cleaned or flushed out of all traces of dirt, scale, rust, welding flashes and any other foreign matter.

3.4 When laying a pipe line, consisting of flanged pipes, each length or valve shall be bolted on and tightened in position before the next component is attached to avoid stresses generated for pulling heavy lengths of pipe into alignment.

3.5 For large diameter and heavy valves steps shall be taken to support the valve or the pipe line as close to the valve as possible to obviate undue stresses being set up.

3.6 Valves shall be installed in an easily accessible position so that they can be reached easily in case of an emergency.

3.7 Where By-Pass valves are fitted it shall be ensured that they open in the same direction as the main valve.

3.8 Valves shall always be installed in the pipe line as indicated by the arrow-head on the valve body parallel to the direction of flow with the axis (stem axis) vertical.

3.9 Sluice valves shall normally be installed with spindle vertical on horizontal pipes except on vertical pipes where spindle shall be horizontal.

3.10 The valve stems shall not be pointed towards walkways, roads etc for rising spindle valves.

3.11 It shall be ensured that while fixing valves in pipe lines below ground level that a clear space of about 200 mm is available between the top of the valve spindle and valve chamber ceiling. For rising spindle valves the space shall be ensured after fully opening the valve.

3.12 Before installing valves between counter flanges it shall be ensured that the counter flanges have a common centre line and that their contact faces are parallel.

3.13 The gaskets used between the contact faces of connecting flanges shall not obstruct the flow in any way.

3.14 Glands are to be checked for uniform tightness.

3.15 While connecting the flanges by screwed fasteners the nuts shall be tightened uniformly by tightening two diametrically opposite nuts at the same time. Torque wrenches are recommended to ensure uniformity in tightening.

3.16 While connecting screwed end valves, connecting threads shall be thoroughly cleaned, jointing compound applied on the pipe end only and the spanner for tightening applied to the end of valves nearest to the connection. Unnecessary extra tightening shall be avoided.

3.17 While welding valves directly onto the pipe line, care shall be taken to avoid weld metal damaging either the body or seat faces.

3.18 After completion of welding the pipe must be thoroughly cleaned of all scale and weld metal. Any loose foreign matter left in the pipe line may cause damage to the valve later.

3.19 All valves shall be installed in fully closed condition.

3.20 While installing the valve, operating access shall be considered properly. Frequently operated valves shall be installed in such a manner that the operating valve wheel is at waist height. Valves installed at a height upto 6 meters shall be chain operated or shall have extension stem for below ground level. Suitable platform shall be provided for overhead valves.

3.21 For installing butterfly valves, free room for rotating the disc inside the pipe shall be ensured.

3.22 For uni-directional valves, like non return valves, arrow marking showing the direction of flow shall be taken care while installing.

3.23 Valves shall not be dropped on the floor or hammered or otherwise abuse any valve. It is not practical to build valves strong enough to resist unusual mechanical abuses.

3.24 Install a suitable valve for the service. Unless a suitable valve is put into service, it can not be expected to give optimum service.

4. OPERATION OF VALVES

4.1 Before operating the valves for the first time the bolts on the connecting flanges and on the bonnet flange shall be checked and re-tightened if necessary. Resilient gaskets have a tendency to settle down during the initial period of services.

5. Valves shall be operated by hand wheels or other manual operating arrangements in the direction of the arrow marked on it. The general

arrangement is to open by anti-clockwise operation and to close by clockwise operation while facing the handwheels.

5.1 When valves are provided with by-pass, the by-pass valve shall be opened gradually before opening the main valve.

5.2 While operating the valves, the glands of the stuffing box of valves shall be checked and tightened if any leakage is observed.

5.3 Gate valves are generally not suitable for throttling and shall usually be fully open or fully closed. They shall not preferably be used in partly open condition.

6. MAINTENANCE OF VALVES

6.1 Valves maintenance begins with selection of a valve, because correct choice of type and materials will minimize the need for maintenance, valves, however, need regular inspection during operation and prompt attention when troubles arise.

6.2 Whenever the operating conditions of a system are altered, valves shall be checked to ensure that they are suitable for the new working conditions.

6.3 Gland packings shall not be allowed to leak. It shall be changed whenever tightening of glands do not stop the leakage.

6.4 When leakage is observed in a valve in shut condition it shall be opened a little to flush out any foreign matter that may have lodged between its seats. If it does not rectify the defect the valve shall be immediately taken out for reinforcing and or reseating. In no case undue force shall be exerted to force it shut as it may ruin the seat.

6.5 Removal of screwed bonnets, when necessary, shall be carefully done to avoid distortion of the components.

6.6 Valves that are not operated frequently and which may remain open, or closed (as per the process requirement), for long periods shall be operated, even partially, about once a month.

6.7 Inspection of valves shall be carried out thoroughly every six months.

6.8 Greasing of spindles and gearing and other working components as appropriate, shall be per done every six months. (In the case of a unit that has not been operated for a long time all moving parts shall lubricated before operation)

6.9 While replacing renewable parts or seat rings, a good rust solvent is recommended. Where it is necessary to saw or split a ring to remove it, damage to the body must be carefully avoided.

While inserting a screwed replacement, graphite compound on threads will facilitate operation. When inserting a shelter ring it must be made tight against the Shelter.

6.10 After a lengthy period of service, connecting bolts shall be checked for tightness. (This shall be done more often if vibration is experienced in the pipe line)

6.11 When it is necessary to keep a valve closed in cold weather, precaution shall be taken to prevent it from "Freezing-up"

6.12 It is recommended that all valves in the system shall be inspected during overhauling and every time the pipe line is put out of operation.

6.13 The valves shall be dismantled for such inspection and components thoroughly cleared and inspected to ensure (a) that there is no indication of corrosion or cavitation under the seats or any where else. (b) that there is no pitting or any indication of seizing noticed on the surfaces of moving components.

6.14 After every dismantling, the seating surfaces shall be ground or lapped with suitable grinding paste or lapping compound, if necessary.

6.15 All gaskets shall be changed and new gaskets used after each dismantling.

6.16 After reassembly, valves shall be tested for their proper functioning.

6.17 It shall be ensured that packing inside stuffing box is in good trim and impregnated with grease. Packing shall be checked / changed after every three months.

6.18 Threaded parts of the gland bolts or studs are to be lubricated o ensure freeness.

6.19 T-head of the valve shall have good fit on the square taper at the top of the spindle. It is dangerous to operate with a loosely fitted T-key as this may result in rounding-off of the square taper of the spindle

6.20 Partial opening of a valve against a high unbalance pressure in a pipe is highly dangerous. If it is absolutely necessary, it will be a safe practice to provide another valve on upstream side to enable isolation of the pipe section for repairing the operating valve when it becomes defective.

6.21 Where a valve has been fully opened, the back lash shall be taken out and the valve be slightly eased so that it will not stick.

6.22 Before dismantling a valve, shutdown of the service shall be ensured, if required under protocol.

6.23 Valves handling hazardous fluids, shall be flushed with neutral fluids, before asking the maintenance personnel to handle the inside parts, coming in direct contact with fluid.

6.24 Wherever bleeding screw is provided, it should be opened before dismantling.