INTER PLANT STANDARD - STEEL INDUSTRY		
IPSS	**FORMAT FOR STANDARD MAINTENANCE PRACTICES FOR PNEUMATIC CONTROL VALVES**	**IPSS:2-07-097-14**
	INDIAN STANDARD DOES NOT EXIST	*(New Standard)*

1. FOREWORD

1.1. Interplant standardization activity in steel industry is being pursued under the aegis of Steel Authority of India Ltd (SAIL). This Interplant Standard was prepared by the Standards Committee on Computerization and Automation, IPSS 2:7 with the active participation of the representatives of steel plants, established manufacturers in this field & reputed consulting organizations; and was adopted on April, 2014.

1.2. Interplant Standards on design parameters primarily aim at achieving rationalization and unification of parts and assemblies of process and auxiliary equipment used in steel plants and these are intended to provide guidance to the steel plant engineers, consultants and manufacturers in their design activities.

2. SCOPE

2.1. This Interplant standard provides and a Format for Standard Maintenance practices for pneumatic control valves

3. DESCRIPTION OF VALVE

3.1. Control valves are valves used to control conditions such as flow, pressure, temperature, and liquid level by fully or partially opening or closing in response to signals received from controllers that compare a "set point" to a "process variable" whose value is provided by sensors that monitor changes in such conditions.

3.2. The opening or closing of control valves is usually done automatically by electrical, hydraulic or pneumatic actuators. Positioners are used to control the opening or closing of the actuator based on electric or pneumatic signals. These control signals, traditionally based on 3-15psi (0.2-1.0bar), more common now are 4-20mA signals for industry, 0-10V for HVAC systems, and the introduction of "Smart" systems, HART, Fieldbus Foundation, and Profibus being the more common protocols.

3.3. A control valve consists of three main parts in which each part exist in several types and designs:

i) Valve's actuator

ii) Valve's positioner

iii) Valve's body

4. INSPECTION GUIDELINES

4.1. Following are the Inspection guidelines and the Technical guidelines for checking of pneumatic control and shut down basis are given in Annexure-A and Annexure-B respectively.

i) Running Inspection (Fortnightly)

ii) Periodical Inspection/Maintenance (Shutdown Basis)

iii) Inspection Format

5. INSPECTION CHECKLIST

5.1. The following inspection checklist format shall be the used on Fortnight basis :

SL NO	AREA	CHECKPOINTS	REMARKS IF ANY
1	Air Pressure for I/P	Kg/cm2	
2	Air Pressure for positioner	Kg/cm2	
3	Leakage of Instrument Air line	Y/N	
4	Looseness of Linkages	Y/N	
5	Leakage of Gland	Y/N	
6	Leakage of Valve Flanges	Y/N	
7	Movement of the Control Valve- Smooth	Y/N	

5.2. Inspection Checklist : The following inspection checklist format shall be the used on Shutdown basis:

CALIBRATION SHEET FOR CONTROL VALVE			
TAG NO			
DESCRIPTION OF THE VALVE			
DATE			
SL NO	% INPUT	% POSITION FEEDBACK	REMARKS
		VALVE STEM MOVEMENT	
1	0		Forward
2	20		
3	40		
4	60		
5	80		
6	100		
7	80		Reverse
8	60		
9	40		
10	20		
11	0		

ANNEXURE-A

a. TECHNICAL GUIDELINES FOR CHECKING OF PNEUMATIC CONTROL VALVE

SL NO	Check Point Details	Frequency	How To Check	Criteria	Action (If out of Criteria)
1	Instrument Air Line and Its Quality	Fortnightly	Visually check for presence of moisture and required Pressure	No moisture to be present	• Instrument Manifold of the supply air by draining the drain valve. • Check the source of pneumatic air • Check for the functioning of drier.
2	Air Filter Regulator and Gauges	Fortnightly	Visually check for the proper Pressure required	Indication of the pressure gauge.	• In the gauge by increase/decrease the pressure as per requirement.
3	Positioner and its Protection	Fortnightly	Visually check for Positioner condition and its fittings and its Gauges	No loose linkages of the positioner and pressure required in the gauge.	• Arrest Leakages of the instrument air. • Set right positioner fittings and its gauges.
4	Leakage of Diaphragm/ Power Cylinder	Fortnightly	Physically check for leakages	There should not be any leakage	• Arrest the leakage by sending the same to the Instrumentation Lab.
5	Leakage from Valve Flanges	Fortnightly	There should not be any leakages	Physically check for leakages	• Make action plan for arresting the same by isolating the process with SOP
6	Leakage from the Valve Gland	Fortnightly	Visually check for leakage from the gland	No leakage should be there	• If yes check for any increase in temperature of the actuator, positioner. Make plan to arrest the

					same on shutdown day.
7	Condition of the Linkages	Fortnightly	There should not be any misfit of the linkage.	No looseness to be observed.	• The link has to be properly tightened with proper tools and tackles.

* Only for Monitoring Purpose. To be used as Check List.

ANNEXURE-B

b. TECHNICAL GUIDELINES FOR CHECKING OF PNEUMATIC CONTROL VALVE ON SHUTDOWN BASIS

Sl NO	Area	Check Point Details	How To Check	Criteria	Action (If out of Criteria)`
1	Instrument Air Line	Quality of Air	Visually check for presence of moisture	No moisture to be present	• Instrument Manifold of the supply air by draining the drain valve. • Check the source of pneumatic air • Check for the functioning of drier.
		Line Leakages	Visually check for any pneumatic leakages	No leakages	• From the Instrument Manifold to the Valve positioner and I/P

		I/P Converter and its Protection	Visually check for I/P Convertor condition and its fittings	I/P Convertor to have protection against dust and moisture	• Check whether the cable glanding is proper to avoid any water ingress. Check the condition of the fittings. • Check for canopy for the I/P
2	Air Filter Regulator	Condition of AFR and Its Gauges	Visually check for presence of moisture and dust	No dust or moisture to be present	• Whether the filter is clean by isolating the same on a shutdown day and cleaning of the filter. • Check for the condition of the increase/ decrease knob and drain plug.
3	Positioner	Protection	Visually check for Positioner condition and its fittings and its Gauges	Positioner condition and its fittings and its Gauges	• Check for any leakage of the instrument air in the positioner fittings and its gauges. • Check whether the cable glanding is proper to avoid any

					water ingress. Check the condition of the fittings. • Check for the linkages of the positioner and valve stem.
4	Diaphragm Actuator/ Power Cylinder	Condition of Mounting Bolts Leakage of the Diaphragm/ Power Cylinder Protection from Water Ingress	Visually check whether it is loose or not Physically check for leakages Visually check for water protection is there or not	The nut and bolt to be firm without any loosenes s. There should not be any leakage If installed outside there should be canopy.	•Make action plan for tightening the same by isolating the process with SOP •Arrest the leakage by sending the same to the Instrumentatio n Lab. •Install proper sheeting of the Control valve and bellow for the power cylinder shaft
5	Valve Body Flanges	Condition of Nuts and Bolts Leakage from the Flanges	Visually check for Loosenes s of the nuts and bolts There should not be any leakages	No loosenes s should be there Physicall y check for leakages	•Make action plan for tightening the same by isolating the process with SOP •Make action plan for arresting the same by isolating the process with

					SOP
6	Valve Gland	Condition of the Valve Movement	Visually check for movement of the valve stem	No jerk should be there	• Check for gland packing and lubrication if required as per OEM recommendation. • If yes check for any increase in temperature of the actuator,positioner. Make plan to arrest the same on shutdown day.
		Leakage from the Gland	Visually check for leakage from the gland	No leakage should be there	
7	Linkages	Condition of Link Rods	Visually check that there should not be any looseness	No loosenes s to be there	• The link has to be properly tightened with suitable tools and tackles • Set right without any slip as it shall lead to hysteresis
		Condition of Key Way	Check for any slip between the actuator and the valve	No slip should be there	
8	Complete Valve	Calibrating of the Valve	Check for the movement of the valve by using Current source,	Complet e moveme nt of the valve	• Calibrate the valve as per requirement and by adjusting the positioner, I/P and /or by OEM guideline.

9	Checking of the valve accessories	End Limit Switches	Check for the contact wrt the valve travel	Both the open and close limit switches should be enabled during operation	• Adjust the limit switches as per requirement with proper SOP in proper for line isolation. • Check for the air pressure for the positioner and I/P
		Volume Boosters	Close the supply to the VB and check for the movement of the valve	It should be slow	• Check and repair/ replace the VB.
		Air Lock Relays	Close the pneumatic supply	The valve should stop in the stay put condition	• Check for any leakages in the pneumatic line • Check for the functionality of the ALR
		Volume Tank with NRV	Close the pneumatic supply to the Volume tank	Manually close and see that there is one cycle of operation of the valve travel.	• The Pressure of the Volume tanks should hold when Pneumatic supply is put off. • Check for the NRV for its healthiness.

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