INTERPLANT STANDARD - STEEL INDUSTRY		
IPSS	**SPECIFICATION & GUIDE FOR INSTRUMENTATION AIR SYSTEM**	**IPSS: 2-07-095-14**
	No Corresponding IS	(New Standard)

0. Foreword:

0.1 Interplant standardization: Standardization activity in steel industry is being pursued under the aegis of Steel Authority of India Limited (SAIL). This Interplant Standard has been prepared by the Standards Committee on Instrumentation and Automation IPSS 2:7, with the active participation of representatives from the steel plants, other concerned organizations and established manufacturer in the field, and was adopted on April 2014.

0.2 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.

0.3 Objective of this standard is to give guidance& specification of instrumentation air system to help selection of equipment for the same for the purpose of operating pneumatic instruments systems and pneumatically actuated control valves at various locations in the steel plant.

0.4 In the formulation of this standard, reference has been derived from the following publications:

A. ISA: 57.3 (1975)
B. ANSI MC:11.1 (1975)
C. ISO - 8573
D. ISO - 12500

1. Scope:

This standard covers the details of requirement of instrumentation air system for pneumatic instruments to enable the users for proper selection of system equipment & its auxiliary components.

2. Dew Point (At Line Pressure)

2.1. Water vapor enters the system through the intake of the air compressor. On a typical summer day of 21 Degree C and 70% relative humidity, approximately 19.5 gallons (73.8 liters) of water enters a 100 scfm(170 nm3/hr) system in a 24 hour period. Compressed air systems serving the pneumatic equipment must maintain dry and moisture free conditions.

2.2. Outdoor installation as well as for indoor installations, the dew point at line pressure shall be at least 7-8 degree C below the minimum temperature to which any part of the instrument air system is exposed at any season of the year. In no case should dew point at line pressure exceed 2 degree C.

3. Dust Content / Solid Particles

3.1. Even a well maintained and routinely changed intake filter will allow solid particles to enter the air system. Therefore solid particulate must be removed from process air serving the control equipment. To achieve the recommended ISO 8573.1 Class 2 classification for solid particulate removal, a 1.0 micron particulate filter is recommended. The particulate filter will also enhance the service life of high performance coalescing filters by minimizing solid loading.

3.2. The maximum particle size in the air stream at the instrument shall be 3 micron and shall not be more than 1mg/Nm3. Concentration at what pressure and temperature is to be specified.

4. Oil Content: Liquid Oil and Oil Vapor

4.1. Compressed air “free from oil” is a requirement in instrumentation applications environment.

4.2. The maximum total oil or hydrocarbon content, exclusive of non-condensable shall be not more than 0.005 mg/Nm3. Concentration at what pressure and temperature is to be specified.

5. Contaminants: Compressed Air Contamination

5.1. Contaminants originate from three general sources.

i) Contaminants in the surrounding ambient are drawn into the air system through the intake of the air compressor. Ingested contaminants appear in the form of water vapor, hydrocarbon vapors, natural particles and airborne particulates.

ii) As result of the mechanical compression process, additional impurities may be introduced into the air system. Generated contaminants include compressor lubricant, wear particles and vaporized lubricant.

iii) A compressed air system will contain in-built contamination. Piping distribution and air storage tanks, more prevalent in older systems, will have contaminant in the form of rust, pipe scale, mineral deposits and bacteria.

5.2. The instrument air shall be free of all corrosive contaminants and hazardous gases, flammable or toxic which may be drawn into the instrument air system. If contamination exists in the compressor intake area, the air should be taken from an elevation or remote location free from contamination or proceed to remove such contamination. Any cross connection or process connection to the instrument air piping shall be isolated to preclude contamination of the air system. A regular periodic check should be made to ensure high quality instrument air.

6. Air Pressure for Instruments

6.1. The supply pressure shall be as per requirement from 4 to 7.5 Kg/cm2.

6.2. Standards for compressed air supply unit for pneumatic instruments and automatic devices are-

i). For ambient temperature -30 degree C to +50 degree C
ii) Dew Point (-40 degree C) at working pressure.

7. Requirement for Compressors

7.1. Lubricated compressors are typically less expensive to purchase and have a lower cost of ownership. A lubricated rotary screw air compressor will introduce 2 to 10 ppm/w of oil into the air system. A well maintained 250 scfm lubricated air compressor, with a conservative 4 parts per million carry-over, will add up to 4.8 gallons (18.2 liters) of oil into the air system over an 8000 hour operation. In lubricant free compressors, lubricant is only required for the bearings and timing gears, which is segregated from the compression chamber. This compressor technology presents no risk of lubricant migrating into the process air.

7.2. Compressor outlet pressure : 8 +/- 0.5 Kg/cm2

8. Selection of filters

8.1. Filters for Compressed Air : Oil Aerosols

The inlet concentrations, 10 mg/m3 and 40 mg/m3, were selected to provide a wide challenge variance. The challenge concentration selected shall appear in published technical data.

8.2. Filters for compressed air: Oil Vapors

It determines the adsorption capacity and pressure drop of hydrocarbon vapor removal filters. Adsorption filters, utilizing an activated carbon medium, possess the polarity to attract hydrocarbon vapors from an air stream onto a porous surface. The adsorption process will continue until the activated carbon media is fully consumed.

8.3. Filters for Compressed Air: Particulates

Filters shall be challenged by solid particulate in the range 0.01 to 5.0 µm, fine type filters, and particulate of 5.0 to 40 µm, for course type filters.

9. Quantity of air

9.1. Quantity of air shall be 30% more than calculated value.

10. Temperature of compressed air should be maximum 4 Degree C higher than ambient temperature.