

GENERAL SPECIFICATION

INSTRUMENTATION

GS EP INS 107

Design and installation of instrumentation links

09	11/2012	Revised as per marking
08	01/2012	Revised as per marking
07	01/2011	Revised as per marking
06	10/2009	Revised as per marking
00	10/2002	First issue
Rev.	Date	Purpose of the revision

Owning entity: DEV/TEC	Managing entity: DEV/TEC/INS
------------------------	------------------------------

General Specification		GS EP INS 107
Design and installation of instrumentation links		
Rev.: 09	Effective date: 11/2012	Page: 2 of 16

Contents

1. Scope	3
2. Reference documents.....	3
3. Links and cabinets descriptions.....	4
3.1 Electrical links	4
3.2 Pneumatic links.....	6
3.3 Hydraulic links.....	7
3.4 Optical fibre links.....	7
4. Segregation of electric and electronic signals	8
5. Instrument earthing.....	8
5.1 Earthing principle	8
5.2 Cabinets earthing.....	9
5.3 Cable earthing.....	10
6. Identification of instrument lines	11
6.1 General.....	11
6.2 Component identification principles.....	11
6.3 Line identification principles	11
6.4 Terminal strips identification principles.....	12
7. Instrument tubing class.....	12
7.1 General.....	12
7.2 Use of piping class.....	12
Appendix 1 Table of "Descriptive" field codes for identification.....	13
Appendix 2 Instrumentation line identification principles.....	14
Appendix 3 Instrument Tubing Classes.....	15

General Specification		GS EP INS 107
Design and installation of instrumentation links		
Rev.: 09	Effective date: 11/2012	Page: 3 of 16

1. Scope

This Specification defines the principles underlying the design and construction of instrument lines.

This specification applies to all onshore and offshore installations.

Submarine links and telecommunication links are not included in this specification.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
AISI	Data sheet 904L
AISI	Data sheet 316L
IEC 60079-07	Explosive atmospheres - Part 7: equipment protection by increased safety "e"
IEC 60079-14	Explosive atmospheres - Part 14: Electrical installations design, selection and erection
IEC 60331	Parts related to the Tests for electrical cables under fire conditions - Circuit integrity
IEC 60332	Parts related to the Tests on electric cables under fire conditions
IEC 60364	Parts related to the Low-voltage electrical installations and Electrical installations of buildings
IEC 60446	Basic and safety principles for man-machine interface, marking and identification - Identification of conductors by colours or alphanumeric
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 61000-5	Sections related to the Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines
ISO 4406-1999	Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles

General Specification		GS EP INS 107
Design and installation of instrumentation links		
Rev.: 09	Effective date: 11/2012	Page: 4 of 16

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP ELE 161	Electrical cables
GS EP ELE 311	Cable trays/ladders
GS EP INS 101	Instrumentation engineering, supply and construction general requirements
GS EP INS 104	Design of generation and distribution of instrument air or gas
GS EP INS 134	Design and supply of integrated control and safety system
GS EP INS 146	Design of generation and distribution of hydraulic energy
GS EP PVV 112	Piping materials classes
GS EP PVV 171	Steel piping fabrication
GS EP TEL 180	Engineering and installation of telecommunication network pre-cabling

3. Links and cabinets descriptions

3.1 Electrical links

The electrical equipment and installation to be installed in potentially explosive areas shall comply with [IEC 60079](#).

3.1.1 Cables

3.1.1.1 Specifications

All instrument cables shall comply with [GS EP ELE 161](#), with the exception of cable armour which shall be Tinned Copper Wire Braid (TCWB) or Galvanised Steel Wire Braid (GSWB).

Cable used in zone 1 or 2 of explosive areas shall be armoured. Outside the explosive area, the use of armoured cable will depend on the environment.

Individual and multiple pairs cables shall have individual shield for:

- Low level signals
- Frequency signals
- I.S. signals
- System network communication cable.

Individual and multiple pairs cables shall have overall shield for analogue input & output signals.

Cables used for digital outputs do not require any shield.

General Specification		GS EP INS 107
Design and installation of instrumentation links		
Rev.: 09	Effective date: 11/2012	Page: 5 of 16

Multiple pair cables for on/off input signals shall have individual and overall shields when sharing the same multiple pair cables as analogue input & output signals.

All cables shall be flame retardant as per [IEC 60332-3](#). When required as per [GS EP INS 101](#) they shall be fire resistant as per [IEC 60331](#).

A minimum of 20% spare capacity shall be provided in multicore cables.

All conductors shall be connected to a terminal at both ends.

Spare conductors within non IS cables shall be grounded at both points in compliance with EMC recommendations, whereas within IS cables spares conductors shall be grounded at cabinet side only as per [IEC 60079-14](#).

Long lengths (> 1000 m) may be set up using composite cables and shall be lightning protected.

Cables for digital links - coaxials, twisted pairs or optical fibres - shall be specified by the Vendor of the equipment to be connected.

Selection of conductors section of cables for instruments requiring high consumption (e.g. fire and gas detectors) shall be determined as per voltage drop calculations. Special consideration shall be paid to supply from UPS batteries.

3.1.1.2 Conductor colour-coding

Alternating current:

Blue and **green/yellow** are reserved: **blue** for neutral links and **green/yellow** for earthing links ([IEC 60446](#)).

Each phase conductor shall be colour-coded differently.

Direct current:

Green/yellow is reserved for earthing links ([IEC 60446](#)).

3.1.2 Junction boxes

It will preferably be of type Ex e ([IEC 60079-07](#)) and IP65 ([IEC 60529](#)) at the minimum.

The material used will preferably be reinforced polyester with stainless steel screw fastenings.

There shall not be more than one multicable per junction box.

Cable entries shall be through the bottom via glands.

Junction boxes shall be provided with plugs for spare cables.

Bleed valve shall be provided in order to drain the inside condensation.

Junction boxes shall be provided with terminals for all conductors including spare and screens.

All stranded conductors shall be crimped except in case of fast connection type.

3.1.3 Marshalling cabinets

Marshalling cabinets shall be used for cross-connection of I/O's between field image terminal blocks and digital system acquisition boards.