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Guidance on Industry Standard for Analyser Houses to IEC TR 61831

GIS 31-011

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This is the first issue of Engineering Technical Practice (ETP) GIS 31-011. This Guidance on Industry Standard (GIS) is based on parts of heritage documents from the merged BP companies as follows:

Amoco (ACES)

A PC-PA-00-E	Process Control—Process Analysers—Engineering Specification
A PC-PA-00-G	Process Control—Process Analysers—Guide
A PC-PA-00-P	Process Control—Process Analysers—Supply Specification

ARCO (APCES)

Std 312-92	Analysers
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British Petroleum (RPSE)

RP 30-02	Instrumentation and Control, Selection and use of Measurement Instrumentation
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Table of Contents

	Page
Foreword	2
Introduction	5
2.6 Safety facilities	6
2.7 Manual isolation of electrical and process supplies	6
2.9 Alarm indication	6
3 Housings	6
3.3 Selection of housing	6
3.4 Area classification and toxic danger	7
3.5 Construction and mounting	7
3.6 Analyser housing ventilation requirements	8
3.7 Design for natural ventilation	8
3.8 Design for forced ventilation	8
3.9 Analyser housing safety monitors and alarms	9
4 Sampling systems	9
4.1 Introduction	9
4.4 Sample point location	9
4.6 By-pass systems	9
4.10 Construction	9
4.11 Effluent disposal	9
4.12 Calibration facilities	9
4.13 Automatic calibration/validation	9
5 Analyser communications	9
5.2 Signal transmission	9
5.3 Safety	9
5.4 Cables	9
5.5 Linearisation	9
5.6 Use of signal	9
6 Drawings and data	9
7 Inspection and testing	9
7.1 Factory acceptance testing (FAT)	9
7.2 Site acceptance testing (SAT)	9
8 System start-up and commissioning	9
9 Shipping and marking	9
10 Identification/Nameplates	9
11 Responsibility	9
11.1 Analyzer system supplier	9
11.2 Purchaser	9



L.1	Individual Analyser Data.....	9
L.2	Analyser House Details	9

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Introduction

- a. Guidance for analyser houses is based on IEC TR 61831, On-line analyser systems – Guide to design and installation, first edition July 1999.
- b. Guidance statements of this GIS are modifications to IEC TR 61831.
- c. Modifications to IEC TR 61831 are identified as Add, Modify to Read, or Delete.
- d. Section numbers in this GIS correspond to IEC TR 61831.
- e. Sections of IEC TR 61831 that are not revised remain applicable.



1 General**1.2 Reference Documents**Add

GIS 12-157, Guidance on Industry Standard for Optical Fibre Cable (IEC).

GIS 12-158, Guidance on Industry Standard for Optical Fiber Cable (ANSI).

GIS 30-851, Guidance on Industry Standard for Fire and Gas Detection.

GIS 31-012, Guidance on Industry Standard for Analyser Sample Systems.

GP 30-85, Guidance on Practice for Fire and Gas Detection.

2.3 Prevention of toxic hazardsAdd

Apparatus and enclosures containing toxic substances shall be clearly identified and handled in accordance with relevant national and local standards.

2.6 Safety facilitiesAdd

Oxygen deficiency monitoring and alarms shall be installed in analyser houses (see section 3.9).

Modify to Read**2.7 Manual isolation of electrical and process supplies**

Manual isolation devices should be fitted close to analysers and sample systems.

In the case of analyzer cabinets, shelters, or houses, isolation devices shall be located outside the housing.

Isolation devices shall be provided to isolate sample lines, gas lines, and electrical supplies to the individual analysers and associated equipment.

A separate isolation device shall be fitted for house ventilation fans.

2.9 Alarm indication

Alarm lamps shall be situated outside analyser houses and be visible from all entrance and access routes. Analyser house status lamps shall be provided for both alarm and normal conditions – indication of normal condition (e.g. green lamp) provides a fail safe configuration.

Visual alarm indications shall also be provided for inside the analyser house accompanied by a common audible alarm. In areas of high noise levels a high visibility strobe light shall be used.

3 Housings**3.3 Selection of housing****3.3.2 Analyser cabinet**Modify Third Paragraph to Read

Natural ventilation is normally used for cabinet ventilation when required. The advantage of a naturally ventilated method is that ventilation is permanent and independent of mechanical failure. However, natural ventilation will at best only maintain the surrounding hazardous area classification and all equipment shall be suitably certified accordingly. 3.3.4 Analyser house (AH)



Delete Last Sentence**3.4 Area classification and toxic danger****3.4.1 Electrical area classification**Modify First Paragraph to Read

The area within the AH shelter or cabinet shall be classified in accordance with IEC 60079-10 or NFPA 70 (NEC). Equipment and type of protection used shall be suitable for the area classification.

3.5 Construction and mounting**3.5.2 Analyser housing**Modify to Read

The following guidelines are applicable to all types of analyser housing:

Materials of construction shall be of fire-resisting material and be resistant to attack from oil and chemicals. Other environmental factors such as high humidity, frost, solar radiation, seismic activity, etc., should also be considered.

Construction shall minimise possibility of static charge build-up by careful specification of materials, especially when employing materials such as glass reinforced plastic (GRP) and use of earth bonding.

Construction shall minimise effects of corrosion. Suitable corrosion protection coatings should be applied where necessary and care should be taken to avoid local galvanic corrosion caused by use of dissimilar metals, e.g. stainless steel in direct contact with mild steel.

Penetrations shall be minimised and meet structural and safety requirements. Bulkhead panels (with appropriate bulkhead fittings) or transits (fire wall penetrations developed for the offshore industry – a schematic showing the principle is shown in annex J) can be used for both electrical and piping penetrations. Use of transits can provide a more compact arrangement if space is at a premium.

When used as a support for equipment the enclosure shall have sufficient rigidity to minimise vibration. Appropriate reinforcement may be required where equipment is wall mounted.

Where necessary, anti-vibration mountings and flexible pipe connections shall be used to isolate vibration-sensitive analysers from pipework or structural vibration.

Lighting or emergency lighting is to remain operational at all times and be suitable, as a minimum, for zone 1 hazardous areas for housings situated in hazardous areas or handling hazardous samples.

Heating and air conditioning shall be installed if extreme temperature and/or high-humidity conditions are expected. Heater surface temperature shall not exceed the temperature allowed by the area classification (IEC 60079-10) and the sheath shall be shielded against accidental contact by personnel.

Roofing materials and construction should be designed to minimise heat loss.

Where cavity walls are used care shall be taken to ensure flammable materials cannot build up within the cavity.

Where liquid samples are being analysed, suitable provision shall be made for removal of any spillages and/or cleaning materials. Suitable floor drains with the floor sloping to the drain shall be provided.



3.5.3 Analyser house (AH)

Modify to Read

Additionally, the following points pertain to an AH:

Construction is typically of brick, concrete, steel sheet or glass reinforced plastic/marine ply sandwich.

Outward-opening lockable doors shall be provided and be self-closing. All doors require the fitting of a "panic bar" so that they can be quickly opened from the inside even if locks are used. The doors should be positioned to permit easy escape in an emergency from anywhere inside the AH. A single door may suffice depending on the AH house size and escape route provisions outside the house. However, if this main door and escape routes can be impeded either internally or externally, then a second door or an emergency exit such as a kick-out panel shall be required as an alternative escape route remote from the main door.

The position and size of at least one door and the access to it shall also be arranged to permit removal of equipment housed.

Any windows are usually restricted to inspection windows in the AH doors and shall not be capable of being opened. Safety-type windows of a suitable material shall be provided in each door, unless specifically excluded by the user or safety authority.

There should be an unobstructed internal headroom of at least 2 m. Dead corners and trenches that may collect gas should be avoided. Equipment such as sample conditioning units, gas cylinders, calibration sample containers and laboratory sampling points shall be located outside the AH with appropriate weather protection.

3.6 Analyser housing ventilation requirements

3.6.4 Analyser cabinets and analyser houses

Modify to Read

c) Dilute any release of asphyxiants by the accidental rupture of any one sample or service line within the AH or cabinet to ensure oxygen levels do not fall below 19 % by volume at atmospheric pressure.

d) Assist in maintaining the temperature inside the housing such that the temperature is normally controlled at 20 °C +/-2 °C with a minimum of 15 °C and maximum of 30 °C.

3.7 Design for natural ventilation

3.7.1 Ventilation requirements

Modify to Read

The ventilation rates shall be designed to dilute and dissipate any dangerous release of gases and vapours within the AH or cabinet.

3.8 Design for forced ventilation

3.8.1 Ventilation requirements

Modify to Read

The ventilation rates shall be designed to dilute and dissipate any dangerous release within the housing.

The house shall be ventilated with air at an internal pressure and flow pattern designed to keep flammable or toxic gases, either lighter or heavier than air and dusts, out of the house. Air should enter and leave the house by entry and exit ports as discussed in 3.8.4. The minimum differential pressure under operating conditions should be 25 Pa (0,25 mbar). It is normal

