

GENERAL SPECIFICATION

CORROSION

GS EP COR 161

**Internal corrosion and erosion-corrosion monitoring:
Design and installation**

Rev.	Date	Purpose of the revision
09	11/2018	Addition of wake frequency verification and minor updates
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1. Scope

The present specification defines the minimal requirements applicable to:

- The selection and design of internal corrosion, erosion, sand and polymer ageing monitoring systems for onshore and offshore facilities,
- The installation and commissioning of such equipment.

The present specification does not apply to downhole equipment.

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 addendums, is the latest revision published at the effective date of this document.

Reference	Title
ASME PTC 19.3TW	Thermowells

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP COR 001	Corrosion control on production facilities: Design and construction
GS EP PLR 109	Design, fabrication and testing of submarine unbonded flexible pipes and risers

3. Definitions

Corrosion monitoring: Measurement of the degradation (metal loss) caused by the electrochemical reactions involved in corrosion phenomena.

Erosion monitoring: Measurement of the degradation (metal loss) due to the mechanical action of solids.

Polymer ageing monitoring: Determination of the potential breakdown or ageing of the polymer material under operating conditions.

Sand monitoring: Technique aiming at detecting and/or quantifying sand production.

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4. Abbreviations

ASD	Acoustic Sand Detector
CC	Corrosion Coupon
CRA	Corrosion Resistant Alloy
ER	Electrical Resistance (Probe)
FAT	Factory Acceptance Testing
HP	High Pressure
LPR	Linear Polarization Resistance (Probe)
NI	Non-Intrusive (permanent equipment)
NPS	Nominal Pipe Size
SP	Sample Point

5. Intrusive monitoring systems

5.1 Common design requirements (corrosion / erosion / polymer ageing)

Compatibility	When revamping or extending existing assets, the selected type of intrusive monitoring system shall be compatible with the already existing one (same retrieval tool, same type of loggers, same software). For new facilities, it should be selected to be compatible with the one used on adjacent assets.
Safety	Only Heavy Duty Covers shall be used on Total E&P premises. Threaded covers are forbidden for all new projects. For 2" size, hydraulic access fittings are mandatory for all new constructed facilities. Intrusive probes and coupons installed on lines subject to pigging shall be systematically flush-mounted. If purchasing new retrieval equipment for already existing mechanical access fittings, the retrieval system shall be of the non-telescopic type.
Pressure limits	Intrusive monitoring systems are not allowed above 350 bars. 1" systems are only allowed below 5 bars operating pressure

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Installation	• Fittings shall be located on pipework accessible from floor level or immediately adjacent to permanent walkways. • If the pipe (running above head) to be monitored is not accessible from the underneath floor, a removable trap in the grating shall be provided to allow access from the immediately above floor, with dimensions suitable for retrieval operations. • As a minimum, access fittings shall be positioned with a 2 m long x 1 m diameter cylindrical clearance from the access fitting, to allow easy access and safe operability of the retriever tool during the whole installation/removal operation (Appendix 2). • When several access fittings are installed at the same location, a minimum distance of 1 meter between each fitting shall be provided. The particular requirements for the monitoring device installation shall be reported on the P&IDs during the detailed engineering phase.
Commissioning / Maintenance	Access fittings shall be welded during construction of the equipment where they are to be installed, and the coupons / probes shall be put in place at commissioning stage or immediately after start-up. The verification of the free movement of the instrument inside the access fitting annulus shall be part of the access fitting FAT. During commissioning of the facilities, the Contractor shall mobilize the vendor or the specialist company in charge of the maintenance contract to ensure that all corrosion monitoring equipment is properly functioning: • Access fittings are correctly installed and all internal equipment is retrievable live. • Functional test of data download either to the control room or from the logger depending on the type of equipment selected (see Table 2). In addition, a maintenance Contract shall be setup within the subsidiary including maintenance services and coupons replacement for at least 2 years.