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GP 32-30

Inspection and Testing of Equipment in Service - Management Principles

**This Group Defined ETP has been approved by the GVP Safety
and Operations for implementation across the BP Group.**

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**



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Foreword

This issue of Engineering Technical Practice (ETP) GP 32-30 includes the following significant changes:

- a. Alignment with Group Standard for Integrity Management.
- b. Creation of PR 32 to describe the lifecycle structure of this ETP category.
- c. Clarification that this document covers management principles.
- d. Clarification of scope of equipment classes/types covered.
- e. Relocation of equipment specific requirements to relevant Group Practices (GPs).

These changes were so extensive that revisions have not been indicated in the margin as is normal practice.

Inspection and testing of equipment is a key component of IM.

Structure of the ETP category 32 documents and the inspection and testing activities in the lifecycle of equipment are described in ETP PR 32.

This GP describes inspection and testing management principles for the in service phase of the equipment lifecycle. Operations, maintenance, and inspection and testing personnel will typically have duties that meet the requirements of this GP.

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1. Scope

- a. This GP defines requirements for the organisation and management of inspection and testing programs for in service equipment used in BP Operations as defined in the GRP STD 01.
- b. Equipment types within the scope of this GP, whether permanently or temporarily installed, whether currently in operation or out of operation, whether above ground, below ground, subsea, or on a ship or floating offshore structures, include the following:
 1. Wells, flowlines, process and utility piping systems, transmission pipelines and risers, pressure vessels, steam boilers, fired heaters and flares, heat exchangers, valves, flexible hoses, rotating equipment casings, and associated pressure containing fittings and supports.
 2. Atmospheric and low pressure storage tanks.
 3. Mechanical protection devices, including relief valves, bursting discs, and vacuum breakers and overspeed devices.
 4. Lifting equipment.
 5. Stacks, towers, chimneys, and cooling towers.
 6. Onshore civil and mechanical structures, buildings, and facilities, including bunds.
Refer to GP 32-46 for full scope of civil and mechanical structures.
 7. Offshore fixed and floating structures, including vessel hulls and mooring systems.
 8. Gas cylinders (e.g., fire extinguishers, sample cylinders).
 9. Marine jetties, loading arms, and buoys.
 10. Offshore mooring systems.
 11. Instrument and control system devices, including instrument tubing and fittings.
 12. Electrical equipment.
 13. Emergency response equipment.
 14. Road, rail, and sea transportation equipment.
- c. This GP defines requirements in relation to the inspection and testing of in service equipment for:
 1. Organisational accountabilities.
 2. Responsibilities.
 3. Inspection and testing plans and procedures.
 4. Assessment of equipment integrity.
 5. Control of repairs/replacements/alterations.
 6. Reporting/data management.
 7. Performance management and assurance.

2. Normative references

The following referenced documents may, to the extent specified in subsequent clauses and normative annexes, be required for full compliance with this GP:



- For dated references, only the edition cited applies.
- For undated references, the latest edition of the referenced document (including any amendments) applies.

BP

GDP 44-00-01	Reporting HSSE and Operational Incidents.
GRP STD 01	Group Standard for Integrity Management.

3. Terms and definitions

For the purposes of this GP, the following terms and definitions apply:

Definitions are specific to this document and are not necessarily the same as those in codes, standards, and regulations.

Alterations

Physical changes or modification to equipment items.

The term “alterations” may have specific definitions in some national codes.

BP Operation

BP Strategic Performance Units, Business Units, projects, facilities, sites, and operations.

BP Operations leader

The leader who has overall accountability for the BP Operation which could be the Strategic Performance Unit Leader, Business Unit Leader (BUL), Works General Manager (WGM) or the Project Leader.

Competent

Describes an individual with knowledge and skills deemed acceptable by the EA/IA to perform a task. Appropriate knowledge and skill may be acquired through training, experience, qualifications, or some combination of these.

Deterioration

Any form of damage or degradation to equipment that could result in reduced integrity or loss of functionality or performance.

This damage may be detectable by inspection or may be revealed by testing.

Due date

Date by which an inspection or test activity shall be completed.

The due date is normally the last inspection or test date plus the determined interval between inspections or tests. If procedures permit the use of a tolerance or grace period, that period should be incorporated in the overall inspection or test interval.

Entity (BP entity or Operating entity)

Whilst these terms are not used in this GP they have a specific meaning in OMS. If this GP refers to BP Operation it should be interpreted as BP Entity or Operating Entity when working to OMS.

Equipment

Equipment item within the scope of this GP.



Fitness for service (FFS) evaluations

Quantitative engineering evaluations performed to demonstrate the structural integrity of an in service component containing a flaw or damage.

In service equipment

Equipment in the operational phase of its lifecycle, including equipment temporarily removed from operation with intent to be returned to operation (i.e., standby, mothballed, bypassed, laid up).

In service inspection and testing

Inspections and tests performed on in service equipment either while onstream or offstream.

Inspection and test plan

Plan detailing the scope, methods, and intervals between inspections/tests for in service equipment.

The plan may or may not exist in a single document. However, the contents of the plan should be readily accessible. Generic plans based on industry standards and practices may be used.

Inspection and testing personnel

Persons involved with in service inspection and testing activities, whether BP employees or third party contractors and permanent or temporary. This includes specialist support service providers and consultants.

Inspection authority (IA)

Individual with the delegated responsibility for in service inspection and testing of equipment.

Multiple IAs may need to be appointed for the different equipment types (e.g., pressure equipment, electrical, instrumentation) and/or different technical aspects (e.g., NDE, corrosion) in this GP.

The IA may or may not be the TA for the ETP Inspection and Testing category.

Inspection organisation

The department, team, or function that is collectively responsible for developing and executing the inspection and testing programs for in service equipment.

Inspection/test record

Compilation of design data, manufacturer data, inspection and test reports, and data, maintenance, and alteration history for an individual equipment item.

Inspection and test records may be in paper or electronic form.

Inspection and test report

Report of findings and/or recommendations resulting from an inspection or test activity.

This report may vary from a single entry in the computerised maintenance management system documenting the results of a test to a comprehensive written report for a major equipment inspection.

Nondestructive evaluation (NDE)

Testing and evaluation methods that do not damage or destroy the material or equipment being tested.

Nondestructive testing (NDT) is testing to detect defects in materials using techniques that do not damage or destroy the items being tested. Although the terms NDT and NDE are often used



synonymously, the word “evaluation” has become increasingly associated with those methods for which quantitative interpretation of the test results is possible.

Operating boundaries

Defined limits for the operation of plant and equipment (e.g., internal/external pressure, stream temperature, ambient temperature, stream chemistry and solids, stream velocities, structural weight loadings, wind/wave loadings, electrical parameters).

Operation within “safe design limits” is required by the GRP STD 01 element 04. Safe design limits are defined by applicable design codes and standards (e.g., pressure, temperature). However, certain parameters not specified in these codes and standards may also require definition and regular review to manage equipment integrity during the lifecycle (e.g., process stream chemistry limits). “Operating boundaries” represent the combination of the safe design limits, plus these additional parameter limits, if any.

Overdue

An inspection or test is overdue if it has not been completed and the equipment remains in operation or on standby beyond the inspection or test due date. For the purposes of this definition, equipment is out of operation if it has been made safe and cannot be put back immediately into operation without the inspection or test being performed.

For example, inspection and tests on a storage tank that has been made safe prior to the due date (e.g., decommissioned, positively isolated, drained down) to minimise the consequences of failure would not be considered overdue if the inspections are not completed by the due date.

Repair

A corrective action to restore equipment to a fit for service condition.

Some repairs may be classed as alterations or modifications by design codes.

Rerating/derating

Rerating is a formal change to the design parameters for equipment. Derating is a change to less onerous design parameters.

Risk

Risk is the product of likelihood and consequence of events.

Sample group

A group of items of equipment that have substantially the same design, geometry, and construction and are subject to similar conditions of service such that they have similar potential of deterioration.

Schedule date

Date on which the inspection or test activity is scheduled to commence. The schedule date will always be at some time before the due date and allow sufficient time to complete the activity on or before the due date.

Technical authority (TA)

Engineers with specific discipline expertise appointed by the EA. Their primary role is to act as technical integrity advisors within their designated engineering discipline or activity by ensuring the safe and consistent application of BP Group ETPs, regulatory codes and standards, and good engineering practices.



4. Symbols and abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

EA	Engineering authority.
FFS	Fitness for service.
HSSE	Health, safety, security, and environment.
IA	Inspection authority.
IM	Integrity management.
IACS	International Association of Certification Societies.
MCA	Maritime and Coastguard Agency.
MOC	Management of change.
NDE	Nondestructive evaluation.
NDT	Nondestructive testing.
OEM	Original equipment manufacturer.
OMS	Operating Management System.
P&ID	Piping and instrumentation diagram.
RCFA	Root cause failure analysis.
TA	Technical authority.
TAR	Turnaround.

5. Objectives of inspection and testing

- a. Objectives of in service inspection and testing are to:
 1. Protect the safety and health of persons at the workplace and of the public.
 2. Limit potential damage to property.
 3. Protect the environment through the control or reduction of risk associated with equipment failures.
 4. Confirm that equipment remains safe to operate within defined operating boundaries.
 5. Assist in the achievement of business objectives for reliability and availability.
 6. Verify that inspection and testing requirements for maintenance, repairs, and alterations are correctly specified and executed in accordance with site technical practices to maintain or restore equipment integrity.
 7. Assess remaining safe life of equipment.
 8. Identify equipment anomalies and provide early warning of repairs, replacements, or alterations that may be required.

