



PMI (Positive Material Identification)

Approved by: Richard Alber

Procedure **PMI-test (Positive Material Identification) of finished goods**

Technique used XRF (X-ray fluorescence)

Equipment Oxford Instruments model: X-met 7500
Serial no.: 751164



Elemental range: **Mg** (Magnesium ,12) to **U** (Uranium, 92) - i.e. includes light elements.

Equipment calibration Before use the X-met 7500 is calibrated against relevant certified alloy master:

- SS316 (certified reg. no. 3063753)
- SMO254 (certified reg. no. 13X 31254)
- Super Duplex Cr25 (certified reg. no. 13X NSA8)
- Ni-Al-Bronze. (certified reg. no. 32X CA23)
- Titanium (certified reg. no. IARM 312A)

Qualification of PMI test personnel Personnel conducting PMI test has been trained and certified by the X-met 7500 equipment supplier with special focus on: safety, calibration and operation of the equipment, sample preparation, interpretation of test results. The PMI test personnel are introduced to API RP 578 *).

Testing methodology **Sample size and selection**
If not otherwise specified by the customer, PMI test is as standard conducted on 10% of the parts. If the parts are manufactured from more than one material batch/lot/heat/melt the aim is to assure that 10% of each involved batch is inspected.

*) API RP 578 = American Petroleum Institute, Recommended Practice 578: Material Identification Program For New and Existing Alloy Piping Systems.



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Marking

If requested and agreed with the customer – the PMI tested items can be marked, either by means of stamping or paint, in order to identify what items have been tested.

If traceability to the individual product is required, all products of an order – or the PMI tested products only, can be individually numbered/stamped – and the PMI test results can be referenced to each product ID-number.

Product preparation

It shall be assured that the metal surface to be PMI tested is clean – and free from any contamination (grease, oil, oxidation products, etc.) that could influence on the PMI result.

The location(s) to be tested shall be in agreement with the customer- and be documented in the test report (e.g. by photo or drawing).

PMI-test

The actual PMI-test can be performed in two ways:

- 1 (simple): **Match / No Match** to material standard (e.g. is it SS316 – or not).
- 2 (advanced): **Qualitative and quantitative analysis** where the material element content is identified and documented. This analysis can verify if the tested material is conforming to the EN 10204 3.1 results (chemical composition) for the material batch.

The type of PMI-test and level of documentation shall be agreed with the customer.

Testing time

The actual X-ray analyzing time can be varied depending on the level of accuracy required.

For simple **Match/No match** analysis a test time of 3 to 5 seconds will normally be sufficient.

For **Qualitative and quantitative** analysis a test time of 15 to 30 seconds is recommended.

The GW standard test time is 20 seconds – or to customer's specification.

The type of PMI-test and level of documentation shall be agreed with the customer.



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Test Result Assessment

If significant deviations (i.e. “no match”) to the specified alloy is observed on any tested item, a 100% inspection of the material batch involved is conducted. All non-conforming products are isolated and bonded, and the QA-Manager is consulted.

Documentation

The PMI documentation comprises of two documents per tested item / part number:

- 1: **GW PMI Test Report** - a test result summary report compiling the relevant order, product and inspection data. Document ID = DOK 06.32.01_1
- 2: **X-Met 7500 Report** – each PMI test conducted is documented by tamper proof reports / files generated by the X-met 7500 test equipment (direct data), showing the individual test results for each item tested.