Base Load Power Hub (BLPH)

FUGITIVE EMISSION PROCEDURE

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Revision / Change Log

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1 GENERAL

This procedure contains technical specification for fugitive emissions production acceptance test of control valves in accordance with ISO 15848-2.

2 APPLICABILITY

This procedure applies to control valve series that has been successfully type tested in accordance with ISO 15848-1.

3 SCOPE

This document provides instructions to perform fugitive emissions *production acceptance test* of control valves.
The leak rate measurement is outside the scope of this procedure.

4 REFERENCE STANDARDS

This procedure refers to the following standards:

- ISO 15848: Industrial valves — Measurement, test and qualification procedures for fugitive emissions:
  - Part 1: Classification system and qualification procedures for type testing of valves
  - Part 2: Production acceptance test of valves
- ASME V: Nondestructive examination
- UNI EN 837-1: 1998 Pressure gauges.
- ASME PTC 25: Pressure relief device – Performance test code.
- AST PI0003: Calibration of pressure measuring instruments.
- AST PI0013: Instruments control procedure.
- AST LT001: Leakage inspection - Gas tracer technique

5 DEFINITIONS

5.1 Production acceptance test

Test carried out on production valves to verify conformance with the requirements of ISO 15848-2.

6 SAFETY REQUIREMENTS

The personnel participating to the test shall have read, shall be aware of and shall have understood the content of this document before starting the tests.
Company safety regulations shall be adhered to during the tests. Extreme caution shall be exercised during pressure testing, as well as during lifting operations.
Before pressurizing, verify that the component is rigidly fixed and/or however stable in its position.
Gradually pressurize the component until the test pressure is reached.
If repairs are needed, take the component back to the atmospheric pressure.
Access to the test area shall be forbidden if there is the possibility of danger of stagnant Helium gas.
At the end of every test, ensure that there is no trapped pressure anywhere in the test equipment and in the test devices/tools.

7 GENERAL REQUIREMENTS

It is the test personnel's responsibility to carry out testing in accordance with these instructions, to record all observations and test data and to sign and date all observations and charts as required, at the time of observation or testing.
Personnel performing fugitive emissions testing and issuing the certificate shall be qualified Level II in accordance with ISO 9712.
It is Quality Department's responsibility to verify that this procedure is fully and accurately executed.
Quality Department will verify that the observations, signatures, dates and charts are correctly collected and attached to this document.
The valve to be tested, as well the test equipment, shall be dry, dust free and oil free. The valve components shall be thoroughly cleaned and degreased before testing.
The valve assembly shall not be painted, except for primer, or otherwise coated with materials capable of sealing against leakage.

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8 INSTRUMENTATIONS

All instruments used during testing shall be uniquely identified and shall be periodically calibrated in accordance with the procedure SGQ008, the operational procedures PI0003, PI0013 and LT001. The calibration certificates shall not be older than 1 year.

9 TEST DESCRIPTION

9.1 Valve selection

The sampling percentage shall be subject to an agreement between the manufacturer and the purchaser, with a minimum of one valve of the lot, and shall be selected at random from each production lot of valves per valve type, pressure class, and nominal size.

9.2 Preparation of test valves

The selected valves shall have been successfully tested according to the relevant production test standards and the purchaser's specifications, prior to the acceptance test specified in this procedure and ISO 15848-2.
The packing shall be dry before production test.
Valve joints tightness test shall be performed using appropriate safety precautions that ensure robustness of the test rig and safety to personnel and environment.

9.3 Stem seal adjustment

Compression of stem seal shall be initially adjusted according to the packing standard instructions reported on valve assembly drawing and instruction manuals.

9.4 General

Valves shall be tested in vertical position with the end connections closed with blind flanges suitable to supply test fluid.
The tightness of the end connections, temporary closed to perform the test, is outside the scope of this procedure. Evaluation of the blanked end connections should be done to ensure that they do not affect the leak rate measurements of the valve joints.

9.5 Production test

Apply the test pressure and after pressure is stabilized, isolate the pressure source and maintain the test pressure for the required waiting time and for the duration of the test.

10 TEST PARAMETERS

10.1 Test fluid

The test fluid shall be Helium gas with 97% minimum purity.

10.2 Leakage measurement

Leakages shall be measured by sniffing method in accordance with ISO 15848-1 - Annex B, as described in this procedure, and shall be expressed in *ppmv* (parts per million volume).

10.3 Test pressure

The test pressure shall be 6 (barg), unless otherwise agreed by the manufacturer and the purchaser.
In the case of testing pressure different than 6 (barg), test pressure shall never exceed the specified pressure/temperature rating per ASME B16.34 and the maximum design pressure at design temperature of the bellows, if any.
All pressure measuring devices shall be capable of measuring the fluid pressure with an accuracy of ± 5% of the required test pressure.
During the tests the pressure can be adjusted any time it is necessary to correct any pressure variation. If pressure adjustment is required, slowly increase it or bleed the pressure avoiding Helium contamination of the testing area.

10.4 Test temperature

The test temperature shall be in the range of 5°C to 40°C, depending on local climate.

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10.5 Waiting time

The measurement shall start after the test pressure has been stabilized for 15 minutes.

10.6 Leakage measurement

Fugitive emission shall be measured with a mass spectrometer connected to a sniffing probe.
Leakage shall be measured using the sniffing technique after instrument calibration in accordance with LT001 or by a helium to gas mixture approximately equal to the ppmv values to be checked.
Before to perform fugitive emission, the equipment detection time shall be checked to find how long it takes for the Helium from the calibrated leak to be detected by the analyzer.
Holding time for the fugitive emission test shall be at least two times the above detection time.

a) The tests shall be carried out in a still (draft free) environment. The background noise (the ambient methane concentration) shall be measured, prior to each measurement, around the source by moving the probe randomly at a distance of one or two meters from the source. When there is interference in the measurement with a leak nearby, the ambient concentration can be determined closer to the source, but the distance should in no case be smaller than 25 cm.

b) The probe must be positioned as close as possible to the potential leak source, namely:

   - at the interface where the stem exits the packing;
   - at the outer edge of the body seals.

c) Move the probe along the interface periphery while observing the instrument readout.

d) If an increased meter reading is observed, slowly sample the area where leakage is indicated until the maximum meter reading is obtained.

e) Leave the probe inlet at this maximum reading location for approximately two times the instrument detection time.

f) The operator reads the maximum value and records it by making the probe remain in the same place during a period of time about twice the instrument response time (e.g. a few seconds for a 5-m standard probe).

g) The absence of difference between this measurement and the background noise determines whether there are no detectable emissions.

Detectable emissions from emission source impose the background level to be lower than the acceptable emission level. Back ground level shall be lower than 50 ppmv.

11 TEST PROCEDURE AND EVALUATION OF TEST RESULTS

11.1 Check of stem (or shaft) seal leakage

The procedure for checking the leakage of stem or shaft seals is as follows.

a) Half open the test valve and pressurize to the level specified in 10.3. Measure the stem seal leakage using the sniffing method in accordance with the procedure exposed in paragraph 10.6.

b) Then, fully open and close the pressurized test valve five times.

c) Half open the test valve after the mechanical cycles and measure the stem seal leakages as in a).

d) If the reading exceeds the values of the required tightness class according to Table 1 according to the ISO class reported in the Prototype Test Certification (see Annex 1), the test shall be considered as having failed. A corrective action shall be proposed and agreed with the purchaser or the lot of valves shall be rejected.

The mass spectrometer shall not read leakage rate exceeding the values specified in the below table.

Table 1 — Tightness classes for stem seals:

Class	Measured leakage - *ppmv*
A	≤ 50
B	≤ 100
C	≤ 200

The applicable class for AST valves is reported in the test certificate, see ANNEX 1.

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11.2 Check of body seal(s) leakage

The procedure for measuring the leakage of body seals is as follows.

a) Half open the test valve and pressurize to the level specified in 10.3. After the test pressure has been stabilized, detect leakage of the body seal(s) in accordance with the procedure exposed in paragraph 10.6.

b) If the reading exceeds the value of 50 ppmv, the test shall be considered as having failed. A corrective action shall be proposed and agreed with the purchaser or the lot of valves shall be rejected.

Table 2 — Leakage from body seals:

Measured leakage - ppmv
≤ 50

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ANNEX 1 – AST CONTROL VALVES FUGITIVE EMISSION CERTIFICATE

Industry & Facilities Division

BUREAU VERITAS

APPROVAL CERTIFICATE
FUGITIVE EMISSION
TYPE TEST
M18026/19/PG/pg
1 / 1

PROTOTYPE TEST ACC. ISO 15848-1

Client : AST S.p.a.	**Inspection date: 21/02/2019 (Final date)**

- The undersigned GUARAGNI Paolo, Surveyor of BUREAU VERITAS, acting within the scope of the general conditions which regulate the interventions of our company, did attend at request of Messrs. AST S.p.a. to their works for the purpose of witnessing the Fugitive emission according to:
- ISO 15848-1 2nd edition 2015-06-01 Class CC1

Control globe valve Type CV - 8400

Valve size	Class
2”	1500

Manufactured and assembled in accordance with drawing/s n° 84BD0100 Rev.0

List of documents

Fugitive Test Certificate N°: FET 002_2019 Rev.0

THE FOLLOWING TESTS WERE CARRIED OUT:

1) The valve was Tested at room & temperature (RT / +400°) according to
- ISO 15848-1 2nd edition 2015-06-01 Class BH CC1 SSA 1

ON THE BASIS OF THE RESULTS, THE ABOVE CONTROL GLOBE VALVE SATISFACTORILY PASSED THE "PROTOTYPE TEST "

For further details of test arrangements and test results, see REPORT OF PROTOTYPE TEST N°: FET 002_2019 Rev.0

Date:	**21.02.2019**	**Issued by:** GUARAGNI P. (name and signature)
BV STAMP		**Inspection Center: MILANO**
		Diffusion:
		☐ **Client** ☐ ☐

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