TECHNICAL BULLETIN

Prepared by IHC A-1144, with Custodian WG-3

TB 062/24 – June 2024

Inspection Requirements of Air Separation Unit Coldbox Internal Components

As part of a programme of harmonisation of industry standards, the European Industrial Gases Association, (EIGA) has published EIGA TB 062, *Inspection Requirements of Air Separation Unit Coldbox Internal Components*, jointly produced by members of the International Harmonisation Council and originally published by the Compressed Gas Association as CGA PS-72, *Inspection Requirements of Air Separation Unit Coldbox Internal Components.*

This publication is intended as an international harmonised standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association, and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

Question

Should the internal components of an air separation unit (ASU) coldbox be subjected to periodic inspection?

Answer

The European Industrial Gases Association *does not recommend* that the internal components of an ASU coldbox be subjected to periodic inspections.

Reasons

An ASU coldbox is the cylindrical or rectangular metal enclosure surrounding the cryogenic equipment (internal components) such as distillation columns, exchangers, separators, vessels, associated piping, instrumentation with an annular space that is insulated and purged with dry, clean, noncorrosive gas or kept under vacuum.

Based on more than 60 years of industry operating experience, the industrial gases industry does not carry out periodic inspections of cryogenic equipment within an ASU coldbox for the following reasons:

- Cryogenic plants are constructed from materials that have low corrosion potential. These materials retain their corrosion resistance at temperatures lower than ambient and experience shows that corrosion at cryogenic temperatures is negligible;
- Process fluids are dry, clean, and noncorrosive;
- The ASU coldbox annular space is purged with dry, clean, and noncorrosive gas or kept under vacuum, which minimizes the risk of corrosion;
- Limited presence of the traditional failure mechanisms for such equipment—namely erosion and fatigue due to the external cryogenic ASU coldbox enclosure;

***EUROPEAN INDUSTRIAL GASES ASSOCIATION** AISBL*
AVENUE DE L'ASTRONOMIE 30 ♦ B-1210 BRUSSELS
PHONE +32 2 217 70 98 ♦ E-mail : info@eiga.eu - www.eiga.eu

- Design and construction are carried out to well established and internationally recognized codes and standards. Design takes into account pressures, loadings, temperature changes, and movements expected during normal operation, startup, and shutdown;

- Operating mode of a cryogenic ASU is generally steady state with few pressure and temperature variations;

- Materials used in the construction of ASU coldbox internal components, typically austenitic stainless steel and aluminum, have significantly enhanced yield and ultimate tensile strengths at cryogenic operating temperatures; and

- Materials used in the construction of ASU coldbox internal components have high fracture toughness characteristics. The critical defect size for the initiation of an unstable fracture can allow a defect to be detected from an increase in the ASU coldbox pressure or from the presence of cold patches well before the critical defect size is reached.

Periodic inspection and maintenance of the ASU coldbox enclosure are used to ensure its integrity (for example, tightness, purge gas, perlite level, vacuum, absence of embrittlement and corrosion of the carbon steel structure, icing). These inspections are intended to confirm that the environment within the ASU coldbox is dry and inert, and that there are no indications of cryogenic and/or pressure leaks.

The ASU coldbox enclosure's exterior inspection includes actions to manage the risk of pressure release and loss of cryogenic inventory from ASU coldbox located pressure equipment. Guidance on ASU coldbox design, operation, and inspection is given in CGA P-8.8, Safe Design and Operation of Cryogenic Enclosures [1].

References

Unless otherwise specified, the latest edition shall apply.

[1] EIGA Doc 170, *Safe Design and Operation of Cryogenic Enclosures*, www.eiga.eu

EUROPEAN INDUSTRIAL GASES ASSOCIATION *AISBL*
AVENUE DE L'ASTRONOMIE 30 ♦ B-1210 BRUSSELS
PHONE +32 2 217 70 98 ♦ E-mail : info@eiga.eu - www.eiga.eu