

NACE COMPLIANCE AND FIKE RUPTURE DISCS

What is NACE?

National Association of Corrosion Engineers (NACE) International is a professional organization for the corrosion control industry established in 1943 by 11 Corrosion Engineers. In 1975, NACE issued standard MR0175, to address materials resistant to SSC (sulfide stress cracking)/SCC (stress corrosion cracking) in Sour Oil and Gas Production environments. In 2003, NACE MR0103 was developed to provide a standard set of requirements for materials resistant to SSC used in Sour petroleum refinery equipment. NACE MR0175/ISO 15156 are now harmonized and are the same document as of the 2003 edition.

How does a user know which NACE specification applies to the application?

The following questions determine the appropriate specification:

- Is it down hole or topsides oil & gas environment? If yes, then MR0175.
- Is it for natural gas treatment plants? If yes, then MR0175.
- Is it for Petroleum Refining Environments? If yes, then MR0103.
- For others such as Geothermal or Petrochemical Processing, the owner/operator corrosion engineer should define the required standard.

Does NACE apply to rupture discs? The holder is the pressure boundary and the rupture discs are designed to burst upon an overpressure condition.

Yes. When ISO 15156 is specified, components, including rupture discs and holders, must comply with the materials and conditions listed in the standard or qualified in accordance with Annex B.

What is the NACE “Hardness Exception”?

As received, raw material will be evaluated for NACE compliance. Although a given raw material heat can be NACE certified for chemistry and initial hardness, the finished rupture disc may not be NACE certifiable if the applicable manufacturing processes of forming, scoring, bulging increase the final hardness above NACE hardness maximums, hence the hardness exception.

Which rupture disc models and materials are available without the hardness exception?

Only Fike’s Atlas Inconel 625 1” to 4” rupture discs are certified to NACE MR0175 and MR0103 without exception.

Which rupture disc models and materials are available with the hardness exception?

Standard models Axius, Atlas, P series, SRL, SRX, Poly-SD, SCRD-FSR, HO/HOV series with materials Hastalloy C276, Monel 400 are included in MR0175 and MR0103. Inconel 600 is excluded from MR0175 but included in MR0103. Aluminum, Nickel, Tantalum and **316/316L SST with cold work (from bulging and/or scoring) are not included** in the standard. All other material requests must be evaluated by Fike Engineering.

If 316 SST is an acceptable holder material per NACE, why is this not acceptable for the rupture disc?

NACE MR0175 2013 Edition table 8.2, note b and MR0103 2012 Edition section 2.5 specifically excludes 316/316L SST grades that have been cold worked (from bulging and/or scoring the rupture disc). The compliance with Hardness Exception cannot be applied for 316/316L SST cold worked rupture discs. **However; 316/316L SST holders are NOT AFFECTED as they are not cold worked.**

When evaluating for NACE compliance, what factors are considered?

NACE MR0175 and MR0103 require the following to be evaluated:

- Material hardness
- Material chemistry
- Manufacturing processes, for example: cold work, heat treatment, laser cutting, welding as applicable, which alter the hardness.
- Yield strength, as applies to Hastelloy X, C276 and C22 per NACE MR0175 Part 3, Section A.4.

Who evaluates the environmental conditions?

Evaluating NACE requirements for the environmental conditions is the responsibility of the owner/operator.

How do I specify NACE on rupture disc and rupture disc holder orders?

NACE is standard on Atlas Inconel 625 rupture discs and holders and without specifying. It is included on the certification package. All holders can be ordered with NACE by selecting the material option during order processing and indicating if MR0175 or MR0103. Rupture discs other than Atlas Inconel 625 must specify on the order and the certified with hardness exception will be added after the evaluation and become part of the certification package.

In the past, I was able to order Fike rupture discs in 316/316L SST material with the “compliant with hardness exception” clause, now I cannot. What has changed?

The most recent editions of NACE MR0103 and MR0175 exclude the provision Fike offered in the past. Going forward, we will follow the latest edition practices with materials available as indicated above. An example would be an SRX previously supplied in 316 SST with the NACE hardness exception would be available as Hastelloy C276, Inconel 600 (MR0103 only) or Monel 400 with the same hardness exception.