

10 Myths of Sour Service Requirements for Metals

Sour service is the production of hydrocarbons that contain hydrogen sulfide (H₂S). Metallic materials used in upstream hydrocarbon production and exposed to H₂S need to comply with ANSI / NACE MR0175 / ISO 15156. In some locations, compliance with this standard is not only a regulatory requirement but also a legal obligation.



NACE MR0175 is a standard that provides guidance to prevent H₂S damage mechanisms such as sulfide stress cracking (SSC), stress corrosion cracking (SCC), hydrogen induced cracking (HIC) just to name a few.



There are many myths about the requirements of this standard; this top ten list covers the most common misconceptions.

1. To meet NACE MR0175, the only requirement is 22HRC.

NOT TRUE: NACE MR0175 does require some materials to comply with a maximum hardness 22HRC, but this does not apply to all the materials. Furthermore, there are additional requirements such as chemical composition, heat treatment and resistance to HIC. (further reading ANSI/MR0175/ISO 15156 2015 part 2 Clause 7, 8, Annex A and 3 Annex B).



2. NACE MR0175 and ISO 15156 are not the same document.

NOT TRUE: ISO 15156 and NACE MR0175 are the same document since 2003 and maintained by the same committee (Reference: Corrosion Conference Paper NACE-03090).

3. Only the National Association of Corrosion Engineers (NACE) can certify materials.

NOT TRUE: NACE does not certify material or suppliers. It is up to the user and supplier to agree the certification requirements (Reference: ANSI/MR0175/ISO 15156 2015 part 1 Clause 5).



4. If a steel has controlled sulfur, HIC testing is not required.

NOT TRUE: the user needs to assess the risk of HIC, and if applicable the user also needs to validate and document the decision to not carry out HIC resistance test. NACE MR0175 provides clear guidance for carbon and low alloy steel products such as flat-rolled, seamless pipes, forgings and castings. (Reference: ANSI/MR0175/ISO 15156 2015 part 2 Clause 8).

5. PWHT is always mandatory

NOT TRUE: As welded carbon and low alloy steels that comply with hardness requirements do not require PWHT. When low-alloy steels require PWHT a minimum temperature of 1150°F/620°F shall be used. (Reference: ANSI/MR0175/ISO 15156 2015 part 2 Clause A.2.1.4).



6. 17-4PH is not good for sour service any more

NOT TRUE: Recently restrictions on the requirements and limits for 17-4PH have been clarified, but there is no reason to state that stainless steel 17-4PH cannot be used for sour service (Reference: ANSI/MR0175/ISO 15156-3 2015 Technical Circular 1 and Corrosion Conference Paper NACE-2014-3816).

7. It is ok to keep certifying to NACE MR0175 2003

NOT TRUE: Since the revision of 2003 was issued there have been numerous updates to standard, these updates are based on laboratory data and proven field experience. Ignoring these updates can lead to failure of equipment and poses a risk to the health and safety of the public and personnel or to the environment.



8. A supplier can certify “only to chemistry and hardness”

NOT TRUE: If a material is exposed to H₂S and NACE MR0175 compliance is mandatory then all relevant requirements need to be met (Reference: ANSI/MR0175/ISO 15156 2015 part 1 Clause 5).

9. SSC testing must always be carried out to certify to NACE

NOT TRUE: SSC-resistant metallic materials may be selected from the materials identified in NACE MR0175 part 2 annex A and part 3 annex A. Nevertheless the end user may opt to test for specific conditions where potential consequences of failure make this justifiable (Reference: ANSI/MR0175/ISO 15156 2015 part 1 Clause 7).



10. You can't change the standard

NOT TRUE: there are many ways to get involved in updating and maintaining the standards; anyone can send an inquiries or clarification to the Maintenance Panel or joining the working groups.



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