API 521 8th Edition Ballot

Cold Service Metallurgy
Section 5.5.13.2
(Work Item 21)

Instructions to Voters/Commenters

- Please limit your comments to the red- or blue- lined portions of the ballot only. Note that red indicates modifications to the existing wording, whereas blue indicates new text.
- If you are voting negative with multiple comments, please indicate which comment(s) is the reason for your negative vote, otherwise API's balloting system will categorize all of your comments as negative.

Thanks to Jonathan Webber and the work group for their efforts.

Melissa Marashi (Chevron)
David Fenton (ExxonMobil)

API 521 Task Force Chairs

API STD 521 8th Edition Proposed Language for Ballot

5.5.13 Setting the Mechanical Design Temperature for Flare Headers

5.5.13.1 General

5.5.13.2 Low-temperature Effects/Brittle Fracture

Special attention to stresses is recommended if piping constructed of carbon steel can be cooled below its transition temperature. Cooling can be caused by the entry of cold materials or by autorefrigeration, which occurs when the pressure on low-boiling liquids is reduced. Reference should be made to ASME B31.3 [18] for material specifications, allowable stresses, and impact test requirements for carbon steel piping materials that can be used for temperatures as low as –46 °C (–50 °F). Stress relieving of welded piping systems has proven beneficial as a supplementary precaution in reducing the risk of brittle fracture of carbon steel piping that can operate below its transition temperature. If temperatures below –46 °C (–50 °F) are possible, the usual practice is to construct relief lines of materials that exhibit ductile behavior at the minimum anticipated operating temperature.

As an alternative, a stress analysis may be completed for piping materials to allow for a temperature reduction below its original minimum design temperature. Temperature reduction below the original minimum design temperature can occur when the system pressure is below the design pressure. If it is credible that the piping can be subjected to a subsequent re-pressurization while the piping is still cold, then the pressure at re-pressurization should be considered when evaluating the stress. Some resources for determining the design minimum temperature of a given material include ASME B31.3 and API-579-1/ASME FFS-1, as applicable.

5.5.14 Reaction Forces