

Information Bulletin No. IB16-013

August 17, 2016

ALERT
Preventing High Temperature Hydrogen Attack (HTHA)

This Information Bulletin is intended to increase awareness of a potential safety risk identified by the U.S. Chemical Safety Board.

“Washington, DC August 11, 2016 – Today the U.S. Chemical Safety Board (CSB) issued a safety alert entitled [“CSB Safety Alert: Preventing High Temperature Hydrogen Attack \(HTHA\)”](#) focused on preventing accidents similar to the fatal 2010 explosion and fire at the Tesoro Refinery in Anacortes, WA that fatally injured 7 workers.”

Details of the Tesoro investigation are provided at:

http://www.csb.gov/assets/1/7/Tesoro_Anacortes_2014-May-01.pdf.

The CSB investigation of the Tesoro accident identified that API RP 941 did not predict that HTHA could occur in the operating region of the vessel and *“the carbon steel Nelson curve has repeatedly proven to be unreliable to predict HTHA”*.

The CSB safety alert provides the following guidance to prevent HTHA equipment failure:

- “1. Identify all carbon steel equipment in hydrogen service that has the potential to harm workers or communities due to catastrophic failure;*
- 2. Verify actual operating conditions (hydrogen partial pressure and temperature) for the identified carbon steel equipment;*
- 3. Replace carbon steel process equipment that operates above 400 °F and greater than 50 psia hydrogen partial pressure; and*
- 4. Use inherently safer materials, such as steels with higher chromium and molybdenum content. “*

Owners and users of process equipment in hydrogen service are advised to review the information recently published by the U.S. Chemical Safety Board, and take appropriate action to ensure the safe operation of their pressure equipment in hydrogen service. Information Bulletin [IB11-010](#), issued July 25, 2011, provides some background information on the Tesoro Refinery failure.

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