

Standard Practice

Avoiding Caustic Stress Corrosion Cracking of Refinery Equipment and Piping

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Foreword

Caustic is used in many petroleum refinery applications in a wide range of concentrations and temperatures. This standard practice is intended to provide guidance to those designing, fabricating, and/or maintaining equipment and piping that are exposed to caustic environments.

Caustic stress corrosion cracking (SCC) of carbon steel (CS) equipment has been reported in industry since the 1930s, e.g., in riveted steam boilers. NACE has published guidance for handling sodium hydroxide (NaOH) in the form of a “Caustic Service Chart” since at least the mid-1960s. It is believed that the majority of the data used to produce the curves in the chart were developed by H.W. Schmidt, et. al.¹ The Caustic Service Chart is currently published in the *NACE Corrosion Engineer's Reference Book*.² A modified copy of the chart is included as Figure 1 in this standard practice.

An informal review of current industry caustic-handling practices was completed in 1999. This standard practice incorporates the findings of that survey as they apply to refinery applications.

This standard practice was prepared by NACE Task Group (TG) 177 (formerly T-8-25), “Refineries, Environmental Cracking.” TG 177 was formed in 1998 to disseminate information on environmental cracking in refineries. Work Group (WG) 177a was formed from that TG to survey the industry on practices to mitigate caustic SCC and to develop a standard practice for avoiding caustic SCC of refinery equipment and piping. This standard practice was originally published in 2003, reaffirmed in 2008, and revised in 2015 under Specific Technology Group (STG) 34, “Petroleum Refining and Gas Processing.” TG 177 is administered by STG 34 and is sponsored by STG 60—Corrosion Mechanisms. This standard is issued by NACE under the auspices of STG 34.

In NACE standards, the terms *shall*, *must*, *should*, and *may* are used in accordance with the definitions of these terms in the *NACE Publications Style Manual*. The terms *shall* and *must* are used to state a requirement, and are considered mandatory. The term *should* is used to state something is good and is recommended, but is not considered mandatory. The term *may* is used to state something considered optional.

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