

Insulations Ageing & CUI Implications – A Comparison of Lab & Field Samples

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ABSTRACT

Corrosion under insulation (CUI) is among the leading damage mechanisms in the hydrocarbon industry and its prediction has reportedly been ambiguous as that relies on many unknown unknowns. Insulation condition is one of the key factors in predicting the CUI risk in a modern-day risk-based inspection (RBI) program. On the other hand, there is not much clarity on predicting the insulation condition as the insulation(s) generally tend to change their physical properties while being subjected to heat and external environmental conditions. Also, there are no established baselines to gauge the extent of aging of insulations for accurate prediction of CUI risk(s). This study attempts to compare the aging behavior/ condition of two commonly used types of insulations namely mineral wool and Calcium silicate (CaSil) as they were subjected to aging in (a) lab setting and (b) field environment. To account for aging behaviors, the leachates were prepared per ASTM C871 followed by Inductively coupled plasma (ICP) spectroscopy and corrosion tests via three different methods namely autoclave immersion tests, ASTM C1617 dripping tests and ASTM G189-07 CUI simulation tests. The corroded steel samples from each test configuration and candidate insulations were further characterized by weight loss methods to establish corrosion rate followed by confocal laser topography and scanning electron microscopy (SEM) to understand the corrosion modes.