

Oakley Steel supplies carbon steel boiler plates for use where Sulphide Stress Cracking (SSC) is an issue. The incidence of SSC can be limited by setting a maximum limit on the hardness of plates.

Sulphide stress cracking generally occurs in environments that have a high concentration of H₂S and which are acidic. Hydrogen is absorbed into the steel where it expands causing cracks that can damage or reduce the integrity of the steel structure.

A number of factors affect the likelihood of a steel being effected by SSC. These include: the grade, hardness, form and heat treatment of the steel being used, the H₂S partial pressure, the acidity and the presence of sulphur and chloride ions. Also important is the temperature, the tensile stress applied and the length of time of exposure.

An option for improving SSC resistance (as opposed to HIC, SOHIC or SZC resistance) is to select plates with a maximum hardness

Carbon steel plates with a maximum 22 HRC (according to NACE MR0175:2) are qualified for use in SSC environments. They must however have a maximum of 1% nickel content and require heat treatment (hot-rolled; annealed; normalised, normalised and tempered; normalised, austenitised, quenched and tempered; and, austenitised, quenched and tempered)

Welds are also susceptible to SSC and need to be hardness tested – meeting similar requirements and potentially requiring PWHT if the hardness is too high.

Most carbon steel in pressure vessel quality grades sold by Oakley Steel are suitable for use in an SSC environment providing that they are hardness tested. NACE MR0175 allows for individual results to exceed the 22 HRC so long as the tests are taken in close proximity to each other, that the average is below 22HRC and that no individual value is above 24 HRC.

The following grades are suitable for SSC use with hardness testing:

- A516 60
- A516 70

- Thickness:
5 - 150mm
- Width:
1500, 2055, 2500, 3000mm
- Length:
up to 12000mm

NACE Characteristics

Carbon steels with a hardness of less than 22 HRC (in accordance with NACE MR0175:2 Section 7 and Appendix A) are qualified for SSC resistance. They are not necessarily resistant to HIC or other forms of corrosion caused by high levels of H₂S.



Carbon and low alloy boiler and pressure vessel steel plate

quality steel supplied for: oil & gas, petrochemical & process, construction & shipbuilding industries