

### ASTM A 516 Pressure Vessel Quality Plate with HIC resistance

**HIC plate or Hydrogen Induced Cracking resistant plate is carbon steel plate, such as A516, which has been further tested to demonstrate that it is resistant to hydrogen induced cracking.**

The steel plate must meet all the standard requirements of the grade – such as chemical composition and have the same mechanical properties – but the manufacturing process has been developed so that when the steel is tested in a synthetic sour service environment the cracks that form have certain maxima. This gives designers the confidence to use carbon steel boiler plate in sour service avoiding much more expensive stainless steel plate.

It is mainly used for pressure vessel and boiler manufacture in the oil and gas and petrochemical industries where the oil has high sulphur content – known as sour service. The improved crack resistance helps to reduce maintenance and full life costs – as well as improved safety over standard boiler plate.

When steels are evaluated for resistance (not immunity) to HIC one of the key factors is the level of sulphur in the steel and typically maximum allowable levels are 0.003% in plates if the acceptance tests in TM0284 are to be met.

Oakley Steel offers HIC plate in the following ASTM grades A516 grades 60, 65 and 70.

- Thickness: 8 - 80mm
- Width: 1500, 2055, 2500, 3000
- Length: up to 12000mm

All plates come with certification according to EN10204 3.2.

European (EN) and American (ASTM/ASME) pressure vessel quality steel grades can both be produced with HIC resistance. EN10028 specifies the acceptance requirements for

the EN grades (starting with P) and the test requirements are specified in EN10229.

American grades are specified in NACE MR0175 and the testing requirements in NACE TM0284. Generally we offer A516 plate in grades 60, 65 and 70 which have been tested to TM0284 and which meet acceptance class I of EN 10028-3.

There are three acceptance classes for HIC plates under EN 10028-3. Each acceptance class sets requirements for the maximum permissible % of the crack to length ratio (CLR), the crack to thickness ratio (CTR) and the crack sensitivity ratio (CSR). Acceptance class I is the most resistant, followed by II and then III.

**The table below shows the acceptable test results using Test Solution A (pH3).**

Acceptance Class	CLR %	CTR %	CSR %
I	≤5	≤1.5	≤0.5
II	≤10	≤3	≤1
III	≤15	≤5	≤2

Oakley Steel offer HIC resistant plate that meets acceptance class I.



### Carbon and low alloy boiler and pressure vessel steel plate

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