

Industeel



ArcelorMittal



## CarElso™ HIC Premium+

Genuine HIC resistant steel plates to meet all specifications

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Genuine HIC resistant steel plates to meet all specifications

- Meets all leading oil & gas companies, engineering and process licensors pressure vessel steel specifications
- Meets NACE MR0175 / ISO 15156-2 as well as NACE MR0103 / ISO 17945
- Enhanced weldability, low carbon equivalent
- Ex-stock availability with the largest available size range
- The full guarantee of the leading HIC resistant pressure vessel plates producer with more than 25 years experience



NO COMPROMISE WITH SAFETY

## Availability

### ● Grades

**Certification 3.2 as per EN 10204** : Industeel CarElso™ HIC Premium+ is ASTM/ASME A/SA 516 grade 60/65/70 triple certified Third party is an internationally recognised body

### ● Sizes

Thickness 8 mm to 105 mm (6 mm possible on request), all positive tolerance, up to 4000 mm wide and 14000 mm long

# CarElso™ HIC Premium+ Product characteristics

## Chemistry

- **EAF steel making route, fully killed, vacuum degassed, fine grain practice**
  - max Ceq 0.41% up to 50 mm, 0.43% above
  - max S .001%; P .008%; Nb .015%; V .005%; O .002%; B .0005%

Segregation mitigation during casting, deep deoxidation to avoid inclusions, inclusion shape controlled with no Ca treatment thanks to naturally low sulfur, ultralow phosphorus levels for enhanced in-service resistance



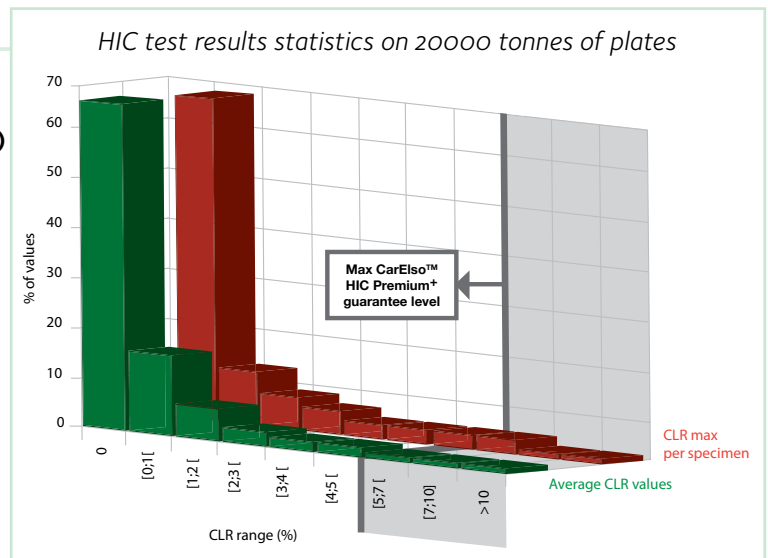
Industeel's HIC testing facilities are ISO 17025 certified

## Mechanical properties

- **Mechanical test after three cycles of simulated PWHT at 610°C 1 hr/25 mm (minimum 1 hour):**
  - ambient tensile properties as per standard
- **Charpy impact test longitudinal and transverse direction**
  - at -51°C for thickness ≤25 mm (20J/16J)
  - at -46°C for thickness >25 mm (41J/34J up to 50mm and 27/20J above)

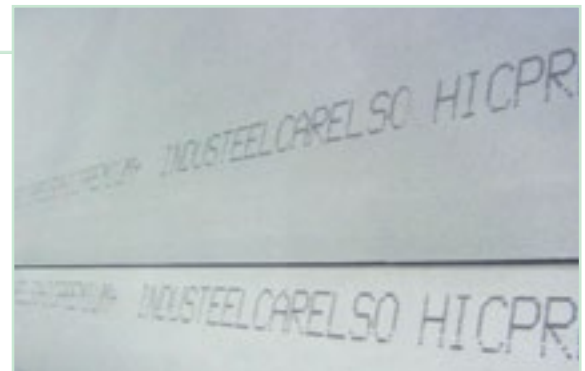
## HIC

- **SSC resistant according to NACE MRO175/ISO15156-2 and NACE MRO103 / ISO 17945 (hardness <22HRC / 248HV<sub>10</sub>)**
- **HIC tested after three cycles of simulated PWHT at 610°C 1 hr/25 mm:**
  - as per NACE TM 0284 solution A
  - per heat on thinnest and thickest plate
  - guarantee of max **CLR 5% CTR 1.5% CSR 0.5%**, on sample **average** and on each **individual** specimen, max crack length 5 mm on each section - on the entire available thickness range
  - ASTM E1268 microexamination on each HIC tested plate
- **HIC resistance guaranteed after already the first cycle of thermal stress relief (e.g. fabrication PWHT)**



## Delivery conditions

- **General requirements as per ASME SA20**
  - Normalized at 920°C
  - Ultrasonic testing control as per SA 578 level C
    - + 75 mm pitch scanning
    - + 100 mm<sup>2</sup> max defect area
  - Surface shotblasted to SA 2.5
  - Low-stress die stamping 2 locations: head and foot of plate
  - Identification paint marking one end + shipping marks
  - Continuous brand marked 2 long edges



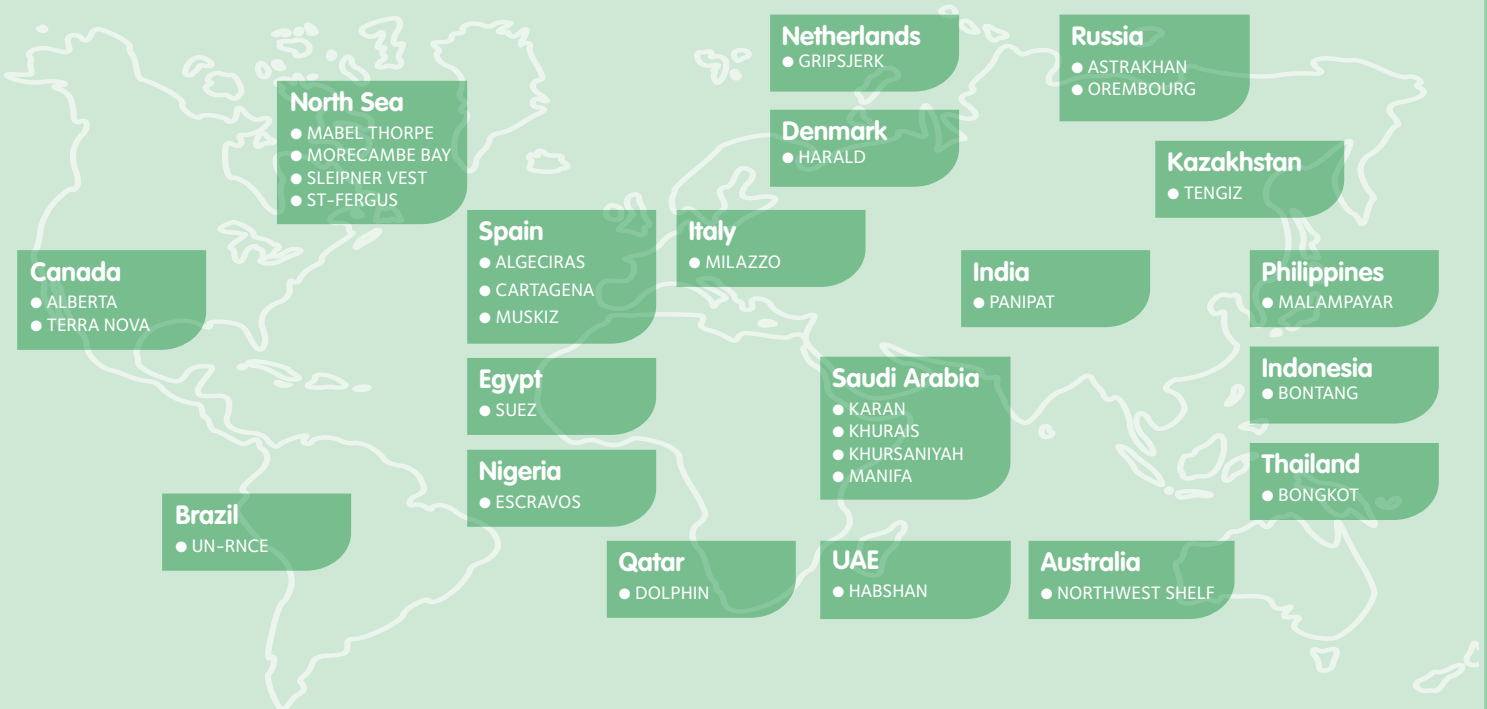
## Compatibility with requirements

- **Compatibility with most demanding specifications like** Axens IN-43, EEMUA179, ENI CAL501S, PDO SP-2041, Petrobras N-1706, Saudi Aramco 01-SAMSS-016, SHELL MESC74/125, SHELL DEP31.22.10.32, TOTAL GS RM PVE 001, and many others...
- **HIC, SSC and other properties guaranteed by Industeel** in PWHT condition on the full lots covered by the certification
  - SSC testing possible on request, material able to pass HIC re-test using dummy samples and several sampling locations
  - Ultrasonic testing quality compatible with EN 10160 S2E2 on request
- Through-thickness ductility guaranteed to Z35 quality level, testing on request



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Industeel has references of CarElso™ HIC resistant materials all around the world and supplies over 20000 tonnes yearly\*.



\* limited selection of references, this list is not exhaustive

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tomorrow**

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