Industeel

ArcelorMittal

Steels for Offshore and Shipbuilding

Industeel, subsidiary of ArcelorMittal

Industeel is a subsidiary of ArcelorMittal
ArcelorMittal is the world's leading steel and mining company.
The ArcelorMittal group is committed to "transforming tomorrow"
5 fundamental values help us meet this far-reaching challenge.

Boldness

We are there to help you succeed in your boldest projects. Let our innovation materialise your boundless imagination.

Sustainability

Our solutions are built to last, optimizing the reliability and life cycle costs of your critical applications and structures. We can deliver steel plates with optimised resistance to challenging service conditions to make your projects even more reliable. At the same time, we are developing cleaner processes and greener products for a more sustainable environment.

Quality

Industeel has a longstanding reputation for quality. We supply plates for a wide range of critical applications in which the quality of the steel is crucial to the safety of equipment. For this reason, the performance levels of Industeel products often go beyond the requirements of applicable standards.

Leadership

Industeel is a leader in the field of special steel plates. Much more than a mere material supplier, we work hand in hand with customers, experts and international organizations to drive progress and deliver innovative solutions to the challenges faced by industry.

Safety

ArcelorMittal is committed to achieving zero incidents, injuries and fatalities at our mines and at our steel plants. With an aim to become the safest steel and mining company in the world, our business units are rigorously following our group-wide safety programme, "Journey to Zero", with its objective of zero incidents, zero fatalities and zero occupational illnesses.

Experience, Expertise, Excellence

Industeel, leading producer of high quality steels

Specializing in carbon, low alloy and stainless steels, Industeel offers a complete range of high quality steel grades designed to meet the most stringent specifications.
Industeel meets all cutomer requirements providing the widest dimensional range, from 10mm up to 1200 mm in thickness.
Heavy ingots up to 130t unit weight are transformed into extra-heavy forged plates through a unique combination of hot forging and hot rolling to ensure excellent internal plate quality, good dimensional tolerances and good surface quality.

- Careful selection of high-quality scraps
- Electric Arc Furnace followed by RH degassing
- Quarto hot rolling on line with a 12 Mtons forging press to provide optimal compactness
- Automatic quenching device and high precision tempering furnaces for an excellent homogeneity through the cross section
- Separate normalizing heat treatment to achieve fine grain sizes and structures
- Precise oxy-cutting, saw cutting and milling available on site to deliver ready-to-shape parts
- Full support of our dedicated R&D center for approval extensions or technical tips, including a full expertise on welding

The 3 Industeel mills are approved by Lloyd's, American Bureau of Shipping (ABS), DNV-GL (Det Norske Veritas) and Bureau Veritas for the manufacturing of steel grades fitting to offshore requirements.

Jack-up rigs

SuperElso® 690 CR

SuperElso® 690CR is a 690 MPa (100 ksi) yield strength quenched and tempered steel developed for legs of offshore jack-up platforms.

This grade has been specially designed for offshore applications requiring the use of heavy thick plates (up to 254 mm/10") with demanding mechanical properties requirements.

The chemical composition of SuperElso® 690 CR has been carefully adapted and allows the achievement of high impact values (> 50 J at -60 °C) across the thickness while respecting the tensile properties required.

The very low carbon content of this material allows cutting and welding under classical conditions, increasing in this way the cost efficiency of manufacturing.

Mechanical properties of SuperElso® 690CR

THICKNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELONGATION MIN %	S690 CR* J (-60 °C)
≤ 254	690	790 - 940	16	32 / 32

*Min impact energy (J) Longitudinal and Transverse at ¼ thickness

WELDING CONDITIONS	
Preheating	120 °C
Postheating	250 °C / 2 h
Max Interpass Temperature	< 170 °C
Post Welding Heat Treatment	Not recommended

Key points :

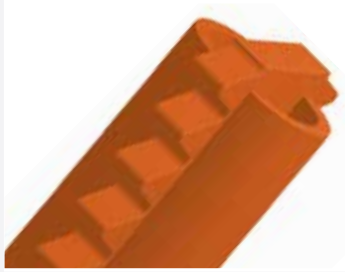
- **Good weldability**
- **Tough HAZ in as welded conditions**
- **Used without PWHT**
- **Resistant to hydrogen embrittlement under cathodic protection**
- **Approved by ASME, Lloyd's, ABS, DNV**

Racks

- Length: up to 15 m
- Thickness: up to 254 mm
- Width: 600 to 1100 mm

Chords

- Length: up to 7 m
- Thickness: up to 130 mm



Welded elements

- Length: up to 24.5 m
- Weight: up to 70 tons

Industeel produces welded elements for jack-up leg manufacture. These elements are assembled from cut racks and hot pressed chords welded on both sides of each rack.

- Very tight tolerances providing to these products a geometry comparable to machined parts with stringent guarantees on squareness.

- Hot pressed chords up to 5 inches in thickness with extra tight dimensional tolerances and mechanical properties identical to the racks.

- **Welded elements** assembled from racks and chords with a wide size range in one piece.

- **Exceptional tolerances** of flatness and camber chord twist guaranteed on finished welded elements.

- **Homogeneous properties** in weld deposit metal, Heat Affected Zone and base metal.

Industeel has worldwide experience of more than 30 years on the jack-up market and is recognized as one of the few major suppliers.

Almost 200 000 tons of SuperElso® 690CR are present all around the world as jacking systems or jack-up legs.

References

Shipyards
- JURONG, PPL, KFELS (Singapore)
- LETOURNEAU, FRIED & GOLDMAN (USA)
- HYUNDAI (South Korea)
- DSOC (China) (Dalian shipbuilding Offshore Co.)
- ABG shipyard (India)...

Designs
- FRIEDE & GOLDMAN : JU2000E, SUPER M2, JU2000A...
- BMC : PACIFIC CLASS 375
- MSC : CJ70, CJ46...
- KFELS : Mod V, Mod VI
- Technip : TPG 500

Rowan Gorilla VI : Letourneau

PPL

TPG 500 for Total Fina Elf (Elgin Field)

Structural parts for offshore and shipbuilding

Industeel grades have been approved by Lloyd's, ABS and DNV institutes in a wide dimensional range.
Our total process of clean steel and heat treatment allows to reach excellent and homogeneous mechanical properties troughout the entire thickness and reach **Charpy impact values at -60°C for a thickness of 210 mm.**

	Grade	Maximum thickness
EuroNorm	**EURONORM - EN 10025-6** S690 - Q / QL / QL1 S890 – Q / QL S960 – Q / QL	
EuroNorm	**EURONORM - EN 10225** S355 G10+N and below S420 G1/G2+QT S460 G1/G2+QT	700 mm (150 mm per std)
ASTM	**ASTM** A 514 A to Q A 517 A to Q	11"
DNV·GL	**DNV " Extra High Strength Steels"** EO 690 (QT) FO 690 (QT) D/E 32-36 (N)	254 mm 215 mm 250 mm
ABS	**ABS** DH/EH 32-36 (N) EQ/FQ 51-56-70 (QT)	250 mm 210 mm
Lloyd's Register	**Lloyd's Register** AH / DH / EH / 32-36 (N)	400 mm

Beyond the steel plates

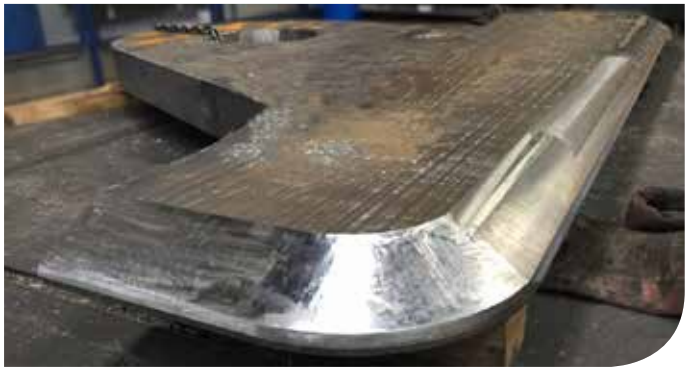
Industeel's flame cut machining facilities and subcontractors network allow us to machine the heavy plates to final shape based on your drawings whatever the thickness.

Your benefits are :

- simplified manufacturing process without further intermediate
- cost saving as we take care of the scraps

Your order is followed at each step of the process and we take of everything.

Success story : LR EH 36 grade, 250 and 300 mm, for Royal IHC



Steel pieces have been :

- casted
- hot rolled and forged
- oxycut
- bevelled
- blasted
- painted
- delivered

ArcelorMittal

With 40 sales offices in 40 different countries around the world, Industeel stands as one of the foremost international steel makers, with an unmatched capacity of support everywhere around the world.

For more information

Industeel France
Châteauneuf plant
118 route des etaings
F - 42803 RIVE-DE-GIER Cedex
FRANCE
P: +33477752141

Industeel France
Le Creusot plant
56, rue Clemenceau - BP 19
F - 71201 LE CREUSOT Cedex
FRANCE
P: +33385805539

Industeel Belgium
Charleroi plant
266 rue de Châtelet
B - 6030 CHARLEROI
BELGIUM
P: +3271441699

https://industeel.arcelormittal.com

Industeel marketing – November 2019

transforming
tomorrow