

CarElso™ MULTI Multiples Certifications

Providing customers with a comprehensive offer in a very short time is one of the *raison d'être* of distribution. Therefore, we have developed **CarElso™ MULTI offer**, an offer is for multiple certification of heavy plates dispensing stockists with the need to stock each of the products of these standards separately.

Our plates are produced using the low-CO₂ emissions steelmaking process of electric arc furnace (EAF). They can also be delivered with XCarb® certification that guarantees further reduction in CO₂ emissions (product carbon footprint certified by an independent third party is provided for XCarb® products).

Product

Standards

Several different groups of multiple certifications are available, as detailed in the table below:

	Multiple Certification 1	Multiple Certification 2	Multiple Certification 3	Multiple Certification 4	Multiple Certification 5
* ASTM	A516 Grade 60	A516 Grade 60 or Grade 65	A516 Grade 65 or Grade 70		
EN 10025-2	S275JR/J0/J2	S275JR/J0/J2	S355JR/J0/J2/K2	S355JR/J0/J2/K2	
EN 10025-3	S275N/NL		S355N/NL	S355N/NL	S420N/NL S460N/NL
EN 10028-2	P235GH/P265GH	P265GH/P295GH	P355GH		
EN 10028-3	P275NH/NL/NL1		P355NH/N/NL/NL1	P355NH/N/NL/NL2	P420NH/NL1/NL2 P460NH/NL1/NL2
EN 10225-1				S355G10+N / S355NLO	
Offshore rules				AH/DH/EH 32	AH/DH/EH 36

Dimensional range

Guaranteed transverse tensile properties at room temperature are (*Measured on every plates*):

Length mm	Width mm	Thickness mm
≤ 18000	≤ 4350	100 - 400

* ASTM A516/A516M: Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service

EN 10025-2: Hot rolled products of structural steels – Technical delivery conditions for non-alloy structural steels

EN 10025-3: Hot rolled products of structural steels – Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

EN 10028-2: Flat products made of steels for pressure purposes – Non-alloy and alloy steels with specified elevated temperature properties

EN 10028-3: Flat products made of steels for pressure purposes – Weldable fine grain steels, normalized

EN 10225-1: Weldable structural steels for fixed offshore structures – Technical delivery conditions – Part 1: plates

Offshore rules: American Bureau of Shipping (ABS); Bureau Veritas (BV); DNV GL; Lloyd's Register of Shipping (LRS)

Properties

Chemical analysis - Weight %

Chemical analyses comply with each reference standard of the steel grades of CarElso™ MULTI multiple certification offer, as well as any supplementary requirement from the customer.

Our steel grades are made using the electric arc furnace (EAF) route, with a steelmaking process allowing to guarantee very low levels of tramp elements, for e.g. Oxygen (0.0020% max), Sulphur (0.003% max) or Phosphorus (0.008% max).

	Multiple Certification 1	Multiple Certification 2	Multiple Certification 3	Multiple Certification 4	Multiple Certification 5
ASTM	A516 Grade 60	A516 Grade 60 or Grade 65	A516 Grade 65 or Grade 70		
EN 10025-2	S275JR/J0/J2	S275JR/J0/J2	S355JR/J0/J2/K2	S355JR/J0/J2/K2	
EN 10025-3	S275N/NL		S355N/NL	S355N/NL	S420N/NL S460N/NL
EN 10028-2	P235GH/P265GH	P265GH/P295GH	P355GH		
EN 10028-3	P275NH/NL/NL1		P355NH/N/NL/NL1	P355NH/N/NL/NL2	P420NH/NL1/NL2 P460NH/NL1/NL2
EN 10225-1				S355G10+N / S355NLO	
Offshore rules				AH/DH/EH 32	AH/DH/EH 36
Carbon Equivalent wt. %	0.32 – 0.36	0.38 – 0.42	0.43 – 0.45	≤ 0.43	≤ 0.49

Carbon equivalent= $C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15$

Please consult us for further information.

Mechanical properties

Following table provides typical transverse tensile values guaranteed at room temperature as per applicable reference standard.

	Multiple Certification 1	Multiple Certification 2	Multiple Certification 3	Multiple Certification 4	Multiple Certification 5
Yield Strength min	225 MPa	235 MPa	305 MPa	320 MPa	370 MPa
Ultimate Tensile Strength	415 – 470 MPa	440 – 530 MPa	485 – 585 MPa	460 – 570 MPa	520 – 630 MPa

Note: values above are valid for plate thickness over 100 mm.

Impact properties

Charpy-V notch impact properties are fulfilled according to the reference standard. In addition, more stringent requirements can be met as follows:

	Multiple Certification 1	Multiple Certification 2	Multiple Certification 3	Multiple Certification 4	Multiple Certification 5
Test temperature	-50°C	-46°C	-50°C	-40°C	-40°C
Energy (average)	27 J	18 J	27 J	50J	50J

Sampling position and specimen orientation according to the reference standard. Average is done using 3 test values.

Supplementary requirements

We'll carefully examine any supplementary requirement you may need, for example compliance with NACE MR0175 Part 2 / ISO 15156-2 for sour service.

The following stringent guarantee can be provided for HIC testing done as per NACE TM0284, test solution A, for all multiple certification groups. Guarantees provided are only valid for tests done in stress relieved condition (such as normalized + PWHT).

	Specimen	Sample
Crack length ratio (CLR), max	10%	5%

Specimen: average of 3 sections.

Sample: average of all sections.

Please consult us for further information.

Delivery condition

Heat treatment

Quality heat treatment is adapted according the steel grades of the multiple certification.

Internal soundness

Internal soundness of **CarElso™ MULTI** plates is guaranteed as per EN 10160 – S2/E3 or equivalent.

More stringent requirements can be studied on request.

Dimensional tolerances

Tolerances are provided according to EN 10029 Class B. specific tolerances will be studied on request.

Certification

CarElso™ MULTI products are manufactured according to a certified quality management system. Certificates can be provided with homologations from the main independent certification bodies (BUREAU VERITAS, LLOYDS REGISTER, TÜV etc.).

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Technical data and information are to the best of our knowledge at the time of editing. However, they may be subject to some slight variations due to our ongoing research programme on steels. Therefore, we suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.