

DILLIMAX 690 T

PLATES WITH HIGH ELASTIC LIMIT

DILLIMAX 690 T is a high strength quenched and tempered, fine grained structural steel with a minimum yield strength of 690 MPa (100 ksi) in its delivery condition (referring to the lowest thickness range), with mechanical properties achieved by water quenching followed by tempering.

DILLIMAX 690 T fulfils the requirements of EN 10137. It is preferentially used for welded steel structures within mechanical constructions, plant constructions and structural steel works, such as machines for structural engineering, conveying plants, hoists, cranes, flood gates, bridges and frameworks.

CHEMICAL ANALYSIS

Max. values of casting, are given below (in %):

C	Si	Mn	P	S	Cr	Ni	Mo	V+Nb	B
0,18	0,50	1,60	0,020	0,010	1,50	1,50	0,60	0,10	0,0040

The steel is of fine grain steel quality du

SUPPLY CONDITIONS - Water quenched and tempered according to EN 10137.

TYPICAL MECHANICAL CHARACTERISTICS

Thickness mm.	Tensile strength Rm N/mm ²	Minimum elastic limit ReH N/mm ²	Minimum Elongation A5 %	Resilience KCV -40 °C Joule
65	770 - 940	690	14	30/27
65 100	770 - 940	670	14	30/27
100 150	720 - 900	630	14	30/27

BENDING TEST - Deformation upon bending with a transverse test piece:
Bend angle 180 °C; Drill diameter \geq 3 times the thickness of the test piece.

TESTING - Tensile and impact tests will be performed according to EN 10137 once per heat and 40 t. Tests on every heat treated plate may be possible request.

The specimens for the tensile test are prepared according to EN 10137. Testing is carried out on specimens of gauge length $l_0 = 5.65 \cdot S_0$ or $l_0 = 5d_0$, in accordance with EN 10002-1. Tensile tests according to ASTM A370 may be agreed. The impact test will be carried out on Charpy-V-specimens in accordance with EN 10045-1. Unless otherwise agreed, the test will be performed temperature of the corresponding quality on transverse test specimens taken as follows:

- for plate thicknesses \leq 40 mm: close to the surface
- for thicknesses $>$ 40 mm: at 1/4 of the plate thickness

Unless otherwise agreed, the test results are documented in a certificate 3.1 B in accordance with EN 10204

IDENTIFICATION OF THE PLATES - The plates are identified by stamping which includes:

- heat number
- rolled plate number
- steel destination
- the manufacturer's brand

Moreover, the plates are stencilled **DILLIMAX 690 T**.

WORKABILITY - The processing and application techniques are of fundamental importance to reliability of products made from these steel qualities. The fabricator should ensure that his calculation, design and processing methods are aligned with the material, correspond to the state of the art and suitable for the intended application. The customer is responsible for the selection of material. The recommendations of the EN 1011 should be observed.

COLD FORMING - Cold forming means forming below the maximum allowable stress relief temperature (560 °C / 1040 °F). **DILLIMAX 690 T** can be cold formed with regard to its high yield strength. Flame cut or sheared edges in the bending area should be grinded before cold forming.

HOT FORMING - Hot forming means forming at temperatures above the maximum allowable stress relief temperature (560 °C / 1040 °F). The original quenched and tempered condition will thereby be altered. As a result, a new quenching and tempering treatment is always necessary after hot forming. It should be noted that when applying a new quenching and tempering treatment. It is not always possible to obtain the same properties as with the original hot forming at the mill, because of different hot forming equipment, for instance. In this respect we recommend you to contact us prior to ordering, in all cases where hot forming is required. However, it is the fabricator's responsibility to obtain the required values of the steel through an appropriate heat treatment.

WELDING AND FLAME CUTTING - Due to its high yield strength, **DILLIMAX 690 T** requires special care during plate processing. For general welding instruction, please consult the EN 1011. In order to ensure that the tensile strength of the weld metal fulfils the requirements of the base metal, the heat input and interpass temperature must be limited during welding. Experience has shown that the welding conditions should be chosen so that the cooling time $t_{8/5}$ does not exceed 15 second. This is applicable when using suitable filler materials of a corresponding yield strength class.

The high yield strength of the base material must be taken into account when choosing the filler materials. It should be considered that increased heat input leads to lower tensile properties in the weld metal. If a stress relieving heat treatment is planned during or after plate processing, this must also be considered when selecting the filler materials. To avoid hydrogen-induced cold cracking, only filler materials which add very little hydrogen to the base metal, may be used. Therefore, shielded arc welding should be preferred. For manual arc welding, electrodes with basic coating (type HD<5 in accordance with ISO 3690), and dried according to the manufacturer's instructions, should be used. For flame cutting, the following minimum preheating temperatures are recommended: 50 °C (120 °F) for plate thickness between 20 and 50 mm. 50 - 150 °C (120 - 300 °F) for thicker plates, depending on thickness.

HEAT TREATMENT - If a stress relieving has to be considered because of constructional regulations, constructive reasons or because it is necessary for plate processing, please consult us. The properties of structural components can be altered by a stress relief heat treatment.

TOLERANCES - **DILLIMAX 690 T** plates are manufactured according to the EN 10029 with class A for thickness and table 4, steel group H, for the maximum flatness deviation.

SURFACE QUALITY - **DILLIMAX 690 T** plates are in accordance with EN 10163, A2.

STOCK AVAILABILITY - **DILLIMAX 690 T** plates are normally available in the following formats and thicknesses: from 10 mm to 100 mm in the format 2500 mm x 8000 mm.

SERVICE - Our work shop can offer oxya cutting on **DILLIMAX 690 T** plates, as per client's drawings, using our CAD-CAM system. Our sales dept is at your service for any quotations and further information.

