

DILLIDUR IMPACT

WATER QUENCHED WEAR RESISTANT STEEL

— **DILLIDUR IMPACT** is a wear resistant steel with a nominal hardness of 340 HB in delivery condition. The mechanical properties are obtained by water quenching and subsequent tempering.

— **DILLIDUR IMPACT** is successfully applied where high resistance to abrasion is required together with high toughness to resist impact wear and good weldability.

— Application: Heavy earth moving and loading machinery and especially buckets, cutting edges, knives and breakers.

Chemical composition

For the ladle analysis, the following limiting values (%) are applicable:

C	Si	Mn	P	S
≤ 0.21	≤ 0.60	≤ 1.80	≤ 0.020	≤ 0.010

Depending on thickness, the following alloying elements are used singly or in combination:

Mo	Ni + Cu	Cr	V	Nb	B
≤ 0.70	≤ 3.0	≤ 1.50	≤ 0.09	≤ 0.04	≤ 0.005

The steel is fully killed and fine-grain treated. values for the carbon equivalent:

Thickness (mm)	CEV[*]	CET[**]
40 mm ≤ t ≤ 80 mm	0.66	0.40
80 mm < t ≤ 150 mm	0.74	0.43

[*] $C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$
 [**] $C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40$

Mechanical properties in delivery condition

— Range of application:

The production range of the **DILLIDUR IMPACT** plates is 40 - 150 mm , other sizes possible on request.

— Identification of the plates:

The marking is carried out via steel stamps with at least the following information:

- The manufacturer's symbol;
- steel designation (**DILLIDUR IMPACT**);
- heat number;
- plate number.

In addition, the plates are stencilled with the inscription **DILLIDUR IMPACT**.

— General technical requirements:

Unless otherwise agreed, the general technical requirements in accordance with EN 10021 are applicable.

Tensile testing on transverse specimens at room temperature.

Plate thickness (mm)	UTS (MPa)	YS (MPa)	E (%)
≤ 70	980	950	16
70 - 120	900	850	16

— Tolerances:

Unless otherwise agreed, the tolerances are in accordance with EN 10029, with **class A** for thickness.

— Surface quality:

Unless otherwise agreed, the provisions in accordance with EN 10163, class A1 are applicable.

— Testing:

Brinell surface hardness tested once per heat and 40 t in accordance with EN ISO 6506. Unless otherwise agreed, the tests results are documented in a certificate 3.1.B in accordance with EN 10204.

— Hardness:

Surface hardness at room temperature: 310 - 370 HB

Charpy-V impact test on longitudinal specimens.

Plate thickness (mm)	Testing temperature (°C (°F))	Charpy-V impact energy (J)
40 - 150	-40 (-54)	95

Processing information

— Processing properties:

The entire processing and application techniques are of fundamental importance to the reliability of the products made from this steel. The fabricator should ensure that his calculation, design and processing methods are aligned with the material, correspond to the state-of-the-art that the fabricator has to comply with and are suitable for the intended use. The customer is responsible for the selection of the material. The recommendations in accordance with EN 1011 should be applied analogously while considering the higher strength and hardenability.

— Cold bending:

DILLIDUR IMPACT is suitable for cold forming taking its high hardness account. Particular attention should be paid to the fact with increasing yield strength and similar plate thickness, the required forces for the forming operation also increase, as does the so-called springback effect. Grinding of the flame cut or sheared edges in the bending area is recommended to avoid crack initiation. Cold forming of **DILLIDUR IMPACT** should be carried out under consideration of the following recommendations:

	Internal minimum radius	Minimum die opening
Transversal	3 x th	9 x th
Longitudinal	4 x th	12 x th

— Heat treatment:

If a stress relieving treatment has to be considered, because of constructional regulations, constructive reasons or because it is necessary for plate processing, please consult us. The properties of welded components made of **DILLIDUR IMPACT** may be altered by a stress relief heat treatment.

— Hot forming:

Since the original quenched and tempered condition will be altered by forming carried out at temperatures above 500 °C, hot forming without major hardness loss is only possible if a renewed quenching treatment is carried out after forming.

However the hardness achieved by means of such a treatment may differ from that measured in the delivery condition. This is due to the fact that the cooling conditions at the fabricator's re generally less adequate than those available during plate production. The steel can be heated to about 500 °C without any substantial drop in hardness.

— Welding and flame cutting:

For flame cutting, the following minimum preheating temperatures should be respected: 100 °C for plate thickness up to 50 mm and 150 °C for thicker plates. Slow cooling after flame cutting and / or subsequent heating of the flame cut edge is beneficial of reducing detrimental stress concentration, especially for higher plate thickness

Welding of **DILLIDUR IMPACT** requires special care due to the high hardness of the material. For manual arc welding, basic coated rods with very low residual moisture should be used (and dried if necessary according to the manufacturer's instructions).

With increasing plate thickness and high weld restraint, a minimum preheating temperature of 150 °C should be respected, especially in case of, high hardness of the weld metal. this helps recude the risk of cracking in the welded joints. Weld fillers should be as soft as loading conditions of the construction and wear and tear of the weld allow it. For more detailed information concerning calculation of preheating temperatures, please refer to EN 1011.

— Machining:

DILLIDUR IMPACT can be machined with HSS-drills and especially with HSS-Co-alloyed drills with a satisfactory service life it the drill advance and cutting speed are correspondingly accommodated.

General note

- If for application of manufacturing reasons, particular requirements are demanded of the steel which are not covered in this specification, please contact us for special agreement prior to ordering.
- The indications in this data sheet are product descriptions. This data sheet is updated as occasion demands. The latest version is available from the mill.

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