



# DICUT

HEAVY PLATES WITH IMPROVED LASER CUTTING PROPERTIES

Technical Information Revision 1 March 2001

DILLINGER HÜTTE GTS



## DICUT: plates for higher quality and productivity for laser and plasma cutting

DICUT steels are structural steels with improved laser and plasma cutting properties. They offer advantages with regard to cutting speed as well as regularity and quality of the cut. Due to their specific chemical analysis, their improved surface quality, their special flatness and the homogeneity of their mechanical properties DICUT steels lead to:

- an increase of cutting speed up to 40%
- a very good quality of the cut
- an easy extraction of the pieces out of the plate.

DICUT steels have been developed in numerous laboratory studies and validated in industrial tests.

They also offer considerable advantages for **plasma cutting** and **oxycutting** compared to the standard steels.

### Designation

DICUT steels are available in accordance with the steel grades of EN 10 025 and EN 10 113-3 indicated in the following table.

Other grades are available upon inquiry.

### Chemical composition

DICUT steels are guaranteed with a very low silicon

content ( $\leq 0,04\%$ ).

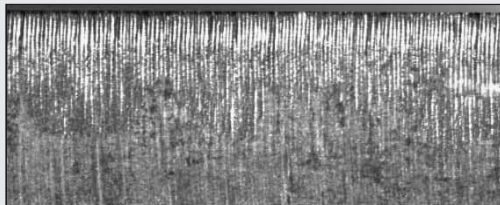
The DICUT steels' chemical composition complies with the requirements of the specified standard.

### Technical properties

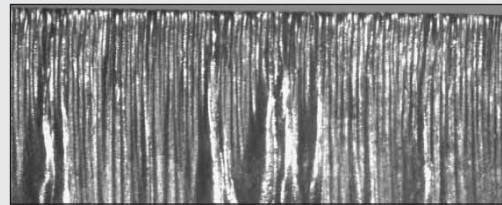
The low silicon content of the DICUT steels facilitates the diffusion of the cutting gas (oxygen) in the iron oxide. This leads to a minimisation of burs on the cut edges and an improved visual aspect of the cut.

The low sulphur and phosphorus contents of the DICUT steels also have a favourable effect on the quality of the cut. DICUT plates are characterised by improved properties of both surfaces. This

### Quality of the cut



DICUT S235, thickness 20 mm



S235 standard, thickness 20 mm



Grade	thicknesses	widths [mm]	lengths [mm]
EN 10025	[mm]		
DICUT S235 (JR, J0, J2)	8 to 30*	up to 2400**	up to 8000**
DICUT S275 (JR, J0, J2)	8 to 30*		
DICUT S355 (JR, J0, J2, K2)	8 to 25*		
EN 10113-3	[mm]		
DICUT S355 (M, ML)	8 to 30*		
DICUT S420 (M, ML)	8 to 30*		
DICUT S460 (M, ML)	8 to 20*		

\* other thicknesses upon inquiry

\*\* higher widths and lengths upon inquiry

special surface quality is achieved by a rolling process specially adapted to DICUT steels, precautions during handling of the plates and a special surface treatment on both surfaces. This results in an increased laser cutting productivity and allows for an optimum, clean cutting of the plates.

To assure an optimum cutting speed and a good quality of the cut, DICUT plates have a special flatness level.

DICUT steels can be dip galvanized in accordance with EN 1461.

DICUT are of course weldable using all modern and classical welding processes.

### Delivery condition

DICUT plates are delivered in the following conditions:

#### **EN 10 025:**

Normalising rolling (N)

#### **EN 10 113-3:**

Thermomechanical rolling (M)

These delivery conditions, in combination with the improved surface quality, allow to optimise the efficiency of the laser beam. The cutting speed is therefore considerably enhanced.

Upon request, DICUT steels can be delivered in the primed condition. In this case, particular fabrication conditions are applicable (see paragraph fabrication conditions).

### Mechanical properties in the delivery condition

The mechanical properties are in accordance with the specified standard.

### Tolerances

Unless otherwise agreed, thickness tolerances are in accordance with EN 10 029, class A.



In order to allow cutting on automated cutting machines, and to assure homogeneous geometrical characteristics of all cut pieces, DICUT plates are delivered with a special flatness which also leads to a high precision of the cut. This flatness corresponds to EN 10 029 with tolerances of 5 and 8 mm respectively measured over 1000 and 2000 mm plate length.

#### **Identification**

To avoid a deterioration of the laser cutting properties (pollution of the cutting oxygen), the traditional colour marking is not applied. The following information is written with special ink which does not have a negative effect for laser cutting on one end of each plate:

- Manufacturer's sign
- DICUT and steel grade
- heat number
- plate number

To avoid a local deterioration of the quality of cut DICUT plates are delivered without steel stamping unless otherwise agreed.

#### **Packaging and transport**

DICUT plates are delivered in hydrophobic paper package in order to maintain the quality of the plates after storage on site. To eliminate any humidity which would accelerate the oxidation process, the plates are heated before packaging. Other packaging conditions are possible upon inquiry. The contents of each package are indicated on a label. The transport is performed on lorries or covered goods wagons.

#### **Fabrication conditions**

The fabrication conditions for DICUT plates are the same as for the corresponding standard grades.

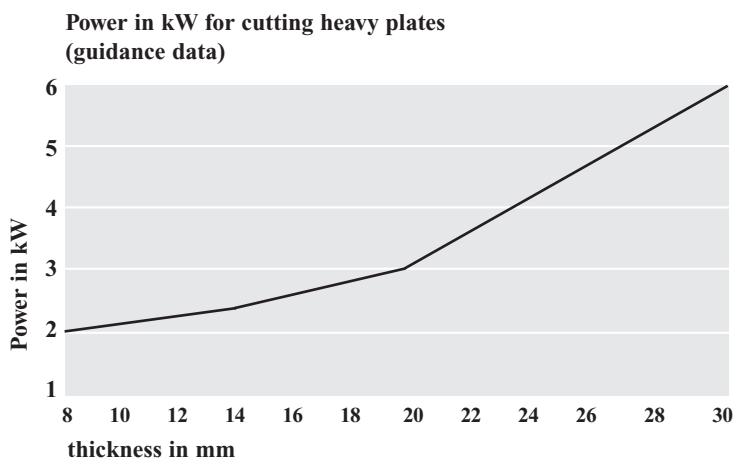
We point out to the fact that besides an optimised plate design, precise adjustment of the cutting machine and the appropriate fabrication technique are of fundamental importance for a good result of the laser cut.

To avoid any oxidation, we recommend to stock the plates in a covered hall - if possible without humidity - and to close the paper package after taking out individual plates. For parts of

plates which shall be reutilized after cutting we recommend to put them back into the package or, if this is not possible, to oil the upper surface.

Taking into account the development of the laser cutting technology for thicker plates, the necessary laser power has been determined as a function of the plate thickness. Tests have shown that the necessary power of the laser machine does not increase linearly with the thickness. For machines < 3 kW the maximum plate thickness is about 20 mm. For plate thicknesses > 20 mm, the power increases rapidly above 3 kW.

For plate thicknesses > 15 mm, we recommend to apply the pulse mode for perforations if possible.



We propose a length of at least the plate thickness for the notches and a tangential attack of 45° for cutting holes.

In any case for cutting of heavy plates it is suggested to follow an optimised cutting schedule. As a matter of fact, the high power leads to a high heat input in the plate which has an effect on the laser beam. This also has to be taken into consideration for continuous cutting of all pieces from one plate.

### **Primered plates**

Cutting primered plates without preparation leads to a reduction of the cutting speed. It also has an impact on the quality of the cut. Therefore we recommend to burn off the primer in advance at high speed via laser according to the initial cutting schedule.

### **General notes**

If special requirements, which are not listed in this technical information, are to be met by the steel due to its intended use or processing, these requirements have to be agreed upon before the order. The marketing department of Dillinger Hütte GTS is at your disposal for any further information.



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