DILLIDUR 550

Wear resistant steel

Material data sheet, edition February 2021[1]

DILLIDUR 550 is a wear resistant steel with a nominal hardness of 550 HBW in delivery condition ex works.
DILLIDUR 550 is preferentially used by the customers where very high resistance to wear is required. Examples of application are extremely stressed parts in earth moving machines, conveyors, crushers and recycling plants.

Product description

Designation and range of application

DILLIDUR 550 can be delivered in thicknesses from 10 mm (0.4 in.)[2] to 100 mm (3.9 in.) and in the following maximum widths:

Plate thickness t [mm] (in.)	Width [mm] (in.)
10 (0.4) ≤ t ≤ 15 (0.6)	2 000 (79)
15 (0.6) < t ≤ 100 (3.9)	3 300 (130)

Chemical composition

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

C	Si	Mn	P	S
≤ 0.37	≤ 0.70	≤ 1.60	≤ 0.020	≤ 0.005

Mo	Ni	Cu	Cr	V	Nb	B
≤ 0.60	≤ 1.40	≤ 0.30	≤ 1.50	≤ 0.08	≤ 0.05	≤ 0.005

The steel is fully killed and fine grain treated.

[1] The current version of this material data sheet can be also found on www.dillinger.de.
[2] The approximately converted values in brackets are for information only.

Indicative values for the carbon equivalent:

Plate thickness [mm] (in.)	51 (2.0)	100 (3.9)
CEV[a]	0.60	0.75
CET[b]	0.47	0.49

[a] CEV = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15
[b] CET = C + (Mn+Mo)/10 + (Cr+Cu)/20 + Ni/40

Delivery condition

The plates are water quenched or water quenched and tempered under controlled conditions.

Mechanical properties in the delivery condition

Hardness

Plate thickness t [mm] (in.)	Surface hardness in Brinell at room temperature [HBW]
t ≤ 51 (2.0)	520 - 580
51 (2.0) < t ≤ 100 (3.9)	500 - 580

Charpy-V impact test on longitudinal specimens (indicative values for 20 mm plate thickness)

Charpy impact energy: 25 J at -40 °C (-40 °F)[3].

Testing

Brinell surface hardness tested once per heat and 40 t.

Identification of plates

Unless otherwise agreed the marking is carried out via steel stamps with at least the following information:

- steel grade (DILLIDUR 550)
- heat number
- number of mother plate and individual plate
- the manufacturer's symbol
- inspection representative's sign

[3] The approximately converted values in brackets are for information only.

Processing

The entire processing and application techniques are of fundamental importance to the reliability of the products made from this steel. The user should ensure that his design, construction 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. Recommendations regarding job safety in accordance with national rules should be observed while considering the higher strength and high hardness.

Cold forming

DILLIDUR 550 can be cold formed to only a limited extend because of its high hardness and strength. In case of such applications please contact the customer service.

Hot forming / Heat treatment

Since DILLIDUR 550 obtains its hardness by accelerated cooling from the austenitizing temperature, 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 works are generally less adequate than those available during plate production.
The steel can be heated, short time, to about 200 °C (392 °F) without any substantial drop in hardness.

Flame cutting and welding

For flame cutting, the following minimum preheating temperature should be observed: 175 °C (347 °F) for all thicknesses.
After flame cutting, attention should be paid to a slow cooling, e.g. by using thermal blankets. This will reduce the risk of hydrogen-induced cracking.
When using ferritic filler materials, attention should be paid to very low hydrogen content and the following preheating temperatures have to be observed: 150 °C (302 °F) for plate thicknesses up to 15 mm and 200 °C (392 °F) for thicker plates.
When using soft austenitic filler materials, a preheating temperature of 50 °C (122 °F) is normally sufficient.
To avoid a hardness loss, the preheat and interpass temperature for flame cutting and welding irrespective of the applied process should not exceed 200 °C (392 °F).
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).

Machining

DILLIDUR 550 can be machined by using sharp carbide tools in spite of its very high hardness. It should be ensured that adequate heavy machine tools, adequate feed and cutting speeds are applied.

General technical delivery requirements

Unless otherwise agreed, the general technical delivery requirements in accordance with EN 10021 apply.

Tolerances

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

Surface quality

Unless otherwise agreed, the specifications will be in accordance with EN 10163-2, class A2.

General note

If special requirements, which are not covered in this material data sheet, are to be met by the steel due to its intended use or processing, these requirements are to be agreed before placing the order. The information in this data sheet is a product description. This data sheet is updated at irregular intervals. The current version is relevant. The latest version is available from the mill or as download at www.dillinger.de.

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