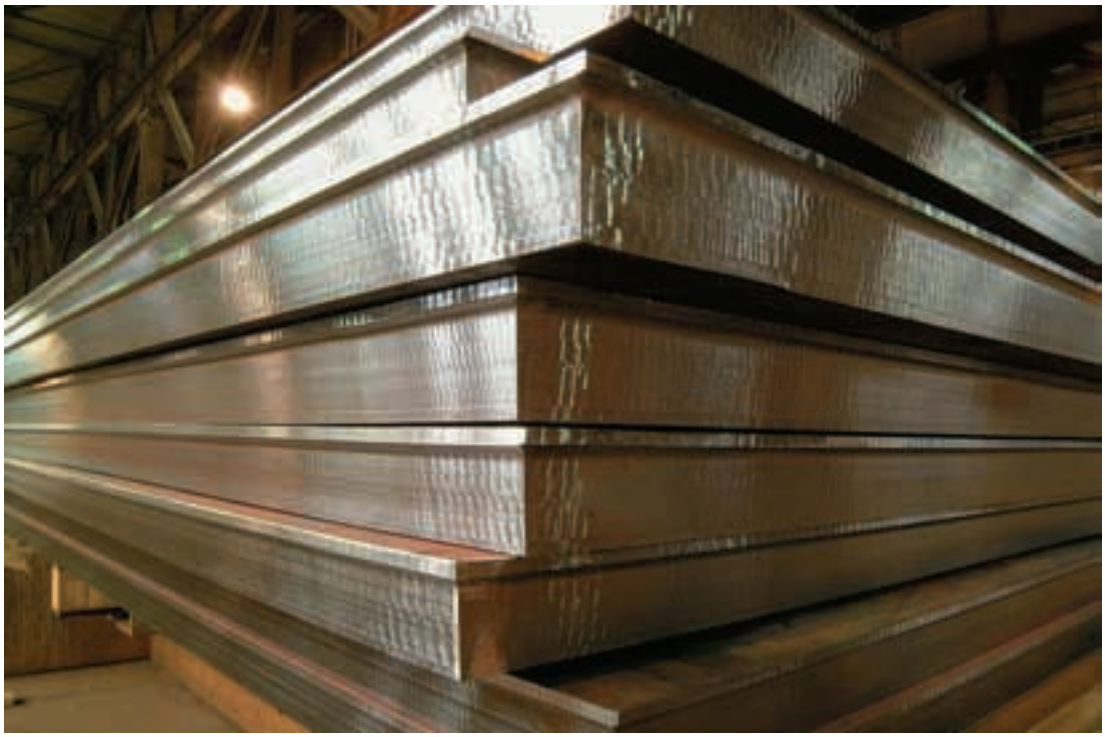
FABRICATED PLATES



Fabricated plates equipped with machined weld-edges

The bevelling of edges is part of the current preparation wherever welding is required. This applies mainly to the construction of storage tanks, shaft linings, bridges, large pipes or tubular, pressure vessels and nowadays piles for offshore wind-mills. The supply of edge-trimmed plates achieved by a machining process is one of the specialities of DILLINGER HÜTTE GTS.

Manufacturing process

While traditional methods of shaping weld-edges use shearing, flame cutting or planing, the plate edge-milling machine cuts all the excess material into fine chips. The reduction to chip form is done by hard metal plates which are arranged at regular intervals at the outer circumference of the profile-milling heads. The machined edges are geometrically exact, smooth, even, and burr-free; their quality surpasses by far the quality of sheared or flame-cut plates. Since the thermal energy, which develops during the reduction to chip form, is virtually absorbed by the chips, the plate itself remains cold so that both hardening of material and resulting cracks can be avoided.

The machining process is based on the "HF milling" method as developed by LINSINGER, the Austrian manufacturer of this equipment: it provides a smooth run and minimal vibrations despite the high performance necessary for the reduction to chip form. The lay-out of the machine is designed for a continuous service so the interruptions for exchanging the profile-milling heads are minimised. The machine comprises two milling stations of 90 kW for processing simultaneously the both longitudinal edges, one of the stations being turned at 90° to assume the machining of the transverse plate edges.

Scope of supply

The edge preparation of plates within the thickness range of between 5 mm and 120 mm is carried out by milling; for larger thickness, flame-cutting will apply. The 4 edges can be individually equipped with a specific weld-edge preparation.

As the milling process is CNC driven, the machine can deal with rectangular, trapezohedral and annular-shaped plates. Special preparation like back-cladding and tapering can also be achieved along the weld-edges.

A high degree of accuracy and an excellent cut-face quality i.e. extensively free of hardening effect characterise the weld-edges prepared by a machining process, both being requirements for performance welding.
Please refer also to the Technical Delivery Conditions on page 32.

Information required

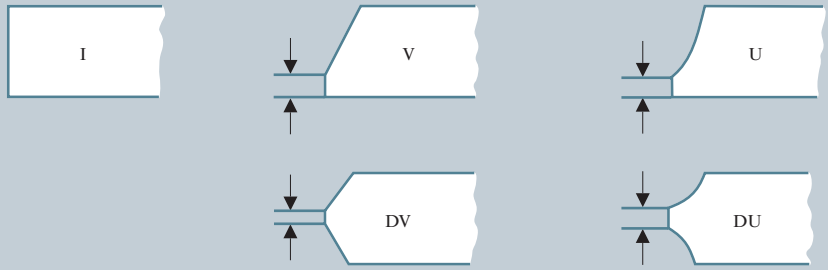
Final plate sizes, rolling radius, weld-edge design.

Dimensional program

Shell plates	machined	flame-cut
Thickness	5 – 120 mm	10 – 230 mm
Width	1.350 – 5.000 mm	800 – 5.200 mm
Length	4.000 – 25.000 mm	2.000 – 18.000 mm
Plate weight	40 t	40 t
Shell-plates rolled to radius	Halves [1)]	Thirds [1)]
Thickness	15 – 230 mm	15 – 230 mm
Width	800 – 4.300 mm	800 – 4.300 mm
Length	4.000 – 14.000 mm	4.000 – 14.000 mm
Radius	≤ 4.000 mm	≤ 6.000 mm

1) Workable plate sizes and other shell design are subject to agreement.

Edge design

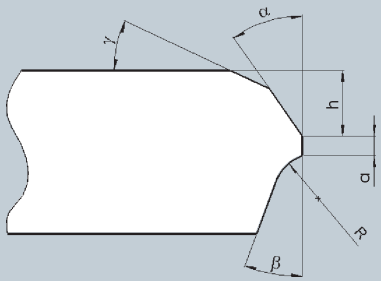


Notes: details of weld-edge preparation e.g. root radius and slope angle must be agreed.

Standard tolerances

Edge preparation	machined	flame-cut
Bevel angle (γ, α)	± 0.5°	± 2.0°
Land location (h) [1]	± 0.5 mm	± 2.0 mm
Land height (a)	± 0.5 mm	± 2.0 mm
Root radius (R) [2]	≤ 0.5 mm	
Slope angle (β) [2]	± 0.5°	
Cut-face quality	ISO 1302-N7/N8	ISO 9013-33

1) measured from the plate top side
2) applicable to U and DU edges only



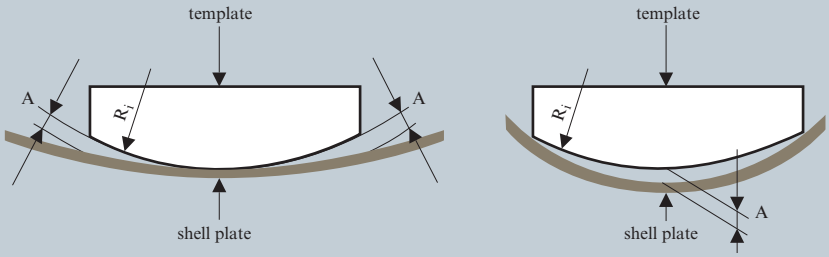
Dimensions	machined	flame-cut
Width	± 1.0 mm	ISO 9013-331
Length	± 1.0 mm	ISO 9013-331
Difference between diagonals	≤ 2.0 mm	ISO 9013-331
Edge straightness	≤ 1,0 mm	

The dimensional tolerances apply to weld-edge prepared plates measured in the flat condition; the tolerances on thickness and flatness are those agreed for the plate, e.g. EN 10029, ASTM A 6 or A 20.

Shape

Curvature	
at the plate ends	≤ 2 mm / 500 mm
away from the end area	≤ 10 mm / 2.000 mm
Straightness of the ends	
s ≤ 20 mm	≤ 4 mm / 1.000 mm
s ≤ 40 mm	≤ 3 mm / 1.000 mm
s > 40 mm	≤ 2 mm / 1.000 mm

s = wall thickness *R_i = internal radius* *A = deviation from the theoritical curvature*



The shape deviations are measured as distance A between a template board (with a chord length of 500 mm respectively 2.000 mm) fitted with the radius and the plate curvature: the checking is carried out as shown in the adjacent sketch after the plates are laid down on a measuring bed set to the nominal radius.