Grade D Ship Plate

OMEGA STEEL CO.
Istanbul · Dilovası plant

Grade D is the −20 °C member of the normal-strength hull steels: 235 MPa yield, 400–520 MPa tensile, fully killed and fine-grain treated, normalised or TM-rolled so that 27 J is guaranteed at −20 °C. Class rules require it in place of Grade A or B for the thicker plates of mild-steel hulls and for cold-water and ice-class tonnage, and shipyards use it for coamings, stringers and bilge strakes where a 235 MPa design does not justify the H-series. Supplied 8–60 mm from class-approved mills, stamped, certified, primed and cut at Dilovası.

Yield ≥ 235 MPa | 27 J at −20 °C | N or TM | Society-stamped | 8–60 mm

Grade D is what a mild-steel hull needs where Grade A is no longer allowed — same strength, same welding, but a normalised plate with a −20 °C guarantee.

CHEMICAL COMPOSITION

Element	C	Si	Mn	P	S	Al
max. % (ladle)	≤ 0.21	0.10–0.35	≥ 0.60	≤ 0.035	≤ 0.035	≥ 0.015 (total)

Fully killed, fine-grain treated (Al total ≥ 0.015 % or Al/Nb/V/Ti equivalent). C + Mn/6 ≤ 0.40 %. Normalised or TM above 25 mm.

MECHANICAL PROPERTIES

Property	Requirement	Typical value	Note
Yield strength ReH	≥ 235 MPa	255–300 MPa	
Tensile strength Rm	400–520 MPa	420–470 MPa	
Elongation A5	≥ 22 %	28–34 %	
Charpy V, longitudinal	≥ 27 J at −20 °C	50–110 J	t ≤ 50 mm; 20 J transverse
Charpy V, t 50–70 mm	≥ 34 J at −20 °C	—	
Bend test	180°, 3 t	passes	

EQUIVALENT GRADES

System	Grade	Note
ASTM A131	Grade D	identical
LR	Grade D	
DNV	NV D	
BV	Grade D	
ABS	Grade D	
GL (legacy)	GL-D	
EN 10025-2 (approx.)	S235J2	no class certificate — commercial only
GOST 5521 (approx.)	D	CIS shipbuilding steel

GRADE SELECTION IN A MILD-STEEL HULL

Member class	≤ 15 mm	15–20 mm	20–25 mm	25–30 mm	30–40 mm	40–50 mm
I — secondary (deck plating in general, side shell)	A	A	A	A	B	D
II — primary (strength deck, bottom shell, bulkheads)	A	A	B	D	D	E
III — special (sheer strake, stringer, bilge strake, coamings)	A	B	D	D	E	E
Ice-belt plating (ice class)	B	D	D	E	E	E

Lower design temperatures shift every entry one grade towards E. The yard's plate schedule fixes the grade per position; we quote and certify to that schedule.

STANDARDS

IACS UR W11 · LR / BV / DNV / ABS / RINA / TL rules · ASTM A131 Grade D · Society certificate (3.2 equivalent)