



HS 100

The HS 100 category is for high strength structural steel for applications that require minimum yield strength levels of 100,000 psi (690 MPa). HS 100 steel is suitable for use in transport vehicles; mining, construction, forestry and lifting equipment; and structural applications exposed to climatic conditions.

PRODUCTION

HS 100 steel is typically quenched from 920 C (1690 F) and tempered at 620 C (1150 F). Alternatively, a microalloyed ("MA") chemical formulation and thermomechanically controlled processing ("TMCP") is used. All HS 100 steel has a fully killed fine grain structure.

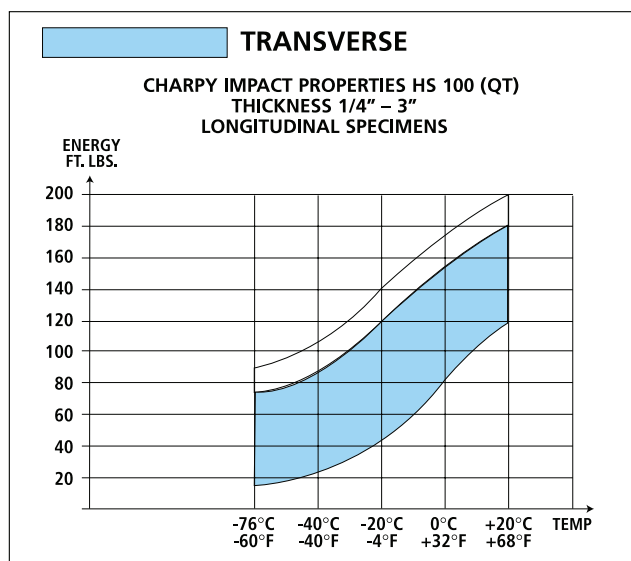
MECHANICAL PROPERTIES

Tensile, impact and hardness tests (if applicable) are carried out in accordance with ASTM A6 or the applicable EN standard. Yield and tensile tests are taken transverse to the rolling direction, while impact tests are longitudinal or parallel.

Yield Strength	100,000 psi (690 MPa) min. up to 2 1/2" 90,000 psi (690 MPa) min. above 2 1/2" up to 4"
Tensile Strength	110,000 psi to 130,000 psi (760 - 900 MPa) min. up to 2 1/2" 100,000 psi to 130,000 psi (690 - 895 MPa) above 2 1/2" up to 4"
Brinell Hardness	235-293 BHN (unreported)
Impact Values	27 joules (20 ft/lb) @ -40 C (-40 F) (min.)

IMPACT VALUES

The HS 100 category has minimum longitudinal impact properties of 27 J at -40 C (or 20 ft lbs. at -40 F). In addition, the HS 100 category has a maximum phosphorus content of 0.025% and a maximum sulphur content of 0.025%. Low levels of sulphides and oxides are necessary for good toughness and high impact values. The Charpy V-Notch test is the most common method of toughness evaluation. Typical results:



CHEMISTRY & WELDABILITY

HS 100 steel is weldable using standard SMAW (“stick”), SAW, GMAW (“MIG”), FCAW, or GTAW (“TIG”) methods and low hydrogen practices. Preheat temperature depends on plate thickness. Carbon equivalent (CE) is generally between 0.39 and 0.72 for thicknesses between 0.125” and 4”. Chemical composition varies slightly with delivery condition (in either case, additional elements may be added as reported):

QUENCHED & TEMPERED

THICKNESS	C	Si	Mn	P	S	Cr	Mo	Ni	B
3/16” < 3/4”	0.10 - 0.20	0.15 - 0.35	1.10 - 1.50	0.025 MAX	0.025 MAX	0.10 - 0.30	0.15 - 0.35	N/A	0.001 - 0.005
>3/4” = 2”	0.10 - 0.22	0.15 - 0.35	1.10 - 1.50	0.025 MAX	0.025 MAX	0.25 - 0.60	0.20 - 0.50	0.30 - MAX	0.001 - 0.005
> 2” - 4”	0.10 - 0.22	0.15 - 0.30	1.10 - 1.15	0.025 MAX	0.025 MAX	0.25 - 0.90	0.25 - 0.50	0.80 - MAX	0.001 - 0.005

MICROALLOYED

C	Mn	P	S	Si	Nb	Mo	Ti
0.12 MAX	2.10 - MAX	0.025 MAX	0.010 MAX	0.10 MAX	0.09 MAX	0.50 MAX	0.15 MAX

FLATNESS

The HS 100 category has a flatness tolerance of 1/2 ASTM A6 (Table 14) and a maximum flatness tolerance according to EN 10029 of Class N (Table 4), Steel Type H.

FORMING

HS 100 steel requires a minimum top round die radius of 2T (where T is the thickness of the plate) transverse to the grain direction or 3T parallel to the grain direction for cold forming.

TRADE NAMES

CSA 100QT, ASTM A514, N-A-XTRA M700, WELDOX 700, DILLIMAX 690, Algoma 100, RQT 701, Supral-sim 690, Superelso 690CR, Bisplate 80, JFE-HITEN 780M, USS T-1 100, USS Con-Pac 100, ST 100XF, PAS 700, Optim 700, Domex 700