

MATERIAL SPECIFICATION SHEET FOR DIE BLOCK STEEL : DIN 1.2714

1.0 Scope / Characteristics / Uses :

Die steel is characterized by high hardness, wear resistance, and strength combined with sufficient toughness. They have good through hardening property due to presence of alloying elements like Cr, Ni, Mo, V.

Die block steel is very popular in steel forging industry for drop or hammer forging for dies of large dimensions, particularly with heavy embossing

2.0 Steel Making process :

This steel is produced by melting selected scraps and standard Ferro-alloys in electric furnace. The molten metal is refined in Ladle Furnace with synthetic / basic slag and finally Vacuum Degassed. The bottom poured ingots of this metal is subjected to systematically sequenced press forging with reduction ratio of minimum 5:1. This is followed by controlled cooling, and annealing or hardening tempering and finally grinding or proof machining before dispatch.

3.0 Material Specification :

Unless otherwise specified in the order, the material will be supplied as per standard for DIN 1.2714.

4.0 Equivalent grades in the various international standards :

German	:	DIN 1.2714 (X56NiCrMoV-7)
American	:	AISI L6 (DB-6)
British	:	BS EN 224
France	:	AFNOR -55 BCD V7
Russian	:	GOST - 5CHMN
Japanese	:	JIS SKT 5

5.0 Chemical Composition :

Grade	C	Mn	Si	S	P	Cr	Ni	Mo	V
DIN 1.2714	0.50	0.65	0.10	0.03	0.03	1.00	1.50	0.45	0.07
	0.60	0.95	0.40	max	max	1.20	1.80	0.55	0.12

Gas content (Maximum) : Hydrogen 2 ppm, Oxygen 30 ppm & Nitrogen : 80 ppm

6.0 Supply / Surface Condition :

As forged & fully ground or proof machined, as required.

7.0 Heat Treatment :

Annealed or Spherodised annealed or Hardened & tempered, as required.

8.0 Hardness

In annealed condition : 255 BHN max
In hardened & tempered condition : 38 to 42 HRC
(Hardness variation, from surface to core : 20 to 25 BHN)

9.0 Decarburisation

Depth of decarburization from surface : 0.5 mm maximum

10.0 Inclusion Rating (ASTM E 45)

	A	B	C	D
Thin (Max)	1.0	0.5	0.5	1.0
Heavy (Max)	—	—	—	—

11.0 Grain size (ASTM E 112) 6 to 8

12.0 Tensile strength (in annealed condition) :

750 N/mm² min (Only for reference not specified in standards)

13.0 Macrostructure

C2, S2, R2 as per ASTM A 381. Will be free from central shrinkage, porosity, cracks or any other harmful defect.

14.0 Microstructure :

Microstructure of annealed material, observed at 500 magnification in microscope, on samples taken from central portion of the bars, will show fine carbide spheroids evenly distributed on ferritic matrix.

15.0 Ultrasonic Soundness :

Material tested 100% according to ASTM A 388 (with probe of 24mm dia, frequency: 2MHz) satisfactory as per acceptance std of 4 mm FBH. Alternative equivalent DIN (German) std. SEP 1921 group 3 E/e.

16.0 Size Tolerance :

Rounds : on dia :- -0, +2 mm
Squares : on width & thickness : -0, + 10 mm

17.0 Length

Rounds : 2.5 to 5.5 meters , with max 20% short length upto 1 meter
Flats / Squares : 2.0 to 4.0 meters with max 20% short length upto 1 meter