

Die Steels

Die Steels produced through Electric Arc Furnace, followed by Secondary Refining at Ladle Refining Furnace and Vacuum Degassing Station ensures Clean Steel which has low Sulphur, Phosphorus and Gas levels in the primary Melt. This helps in achieving better Quality of Die Steels, where the requirements are becoming more and more stringent due to increased consumption of these steels in Critical Industrial applications. Strict Control is exercised on Chemical Composition and other Critical parameters like temperature during forging, rolling and heat treatment, and the tight Quality Systems & Procedures help in meeting Customer's Quality Requirements in an absolute manner. The Electro Slag Remelting (ESR) technology at Star Wire can meet the very stringent Quality Requirements of Dies meant for High Pressure Applications.



Applications

1. Cold work Dies
2. Hot Work Dies
3. Plastic Molds
4. Aluminum Extrusion
5. Die Castings

The characteristic properties of our ESR quality Die Steel

- High Wear Resistance
- Excellent Toughness
- High thermal strength
- High fatigue resistance



2000MT Forging Press



ESR Furnace with Inert atmosphere

Steel Type	Material Grades "ESR/Air Melted"				Typical Applications
	AISI	DIN	JIS	DIN W.Nr.	
Die Steels	D2	X155CrVMo121	SKD11	1.2379	Cutting, Punching, Stamping tools, Shear blades, thread rolling dies.
	H11	X38CrMoV51	SKD6	1.2343	punches, mandrels, die inserts, hot shear blades, molds for plastic materials,
	H12	X40CrMoV51	SKD61	1.2606	die casting dies, forgingsdiw , hot shear blades and extrusion tooling.
	H13	X37CrMoW51	SKD62	1.2344	mandrels, pressure pads, bolsters, die cases, die holders and adaptor rings
	L6	56NiCrMoV7	SKT4	1.2714	Rams, bolsters, mandrels, plungers, sleeves, chipping beds, press & hammer dies
	P20	40CrMnNiMo8-6-4	SKT3	1.2311	Die holders, zinc die casting dies, backers, bolsters and injection moulds
	P20S	40CrMnMoS 8-6	-	1.2312	Die holders, zinc die casting dies bolsters and injection moulds.

Forged Block:
Size 300 -
450mm Square,
Length - As per
requirement

Forged &
Machined Round:
Dia: 100-450mm,
Length - 1000mm
& above

Heat Treated
Condition: As
Forged/Anneale
d/Hardened &
Tempered

Chemical Composition	C	Si	Mn	P	S	Cr	Mo	V	Other
	D2	1.45-1.60	0.10-0.60	0.20-0.60	≤ 0.030	≤ 0.030	11.0-13.0	0.70-1.00	0.70-1.0
H11	0.33-0.41	0.80-1.20	0.25-0.50	≤ 0.030	≤ 0.020	4.80-5.50	1.10-1.50	0.30-0.50	
H12	0.32-0.40	0.90-1.20	0.30-0.60	≤ 0.035	≤ 0.035	5.00-5.60	1.30-1.60	0.15-0.40	W:1.2-1.4
H13	0.35-0.42	0.80-1.20	0.25-0.50	≤ 0.030	≤ 0.020	4.80-5.50	1.20-1.50	0.85-1.15	
L6	0.50-0.60	0.10-0.40	0.60-0.90	≤ 0.030	≤ 0.030	0.80-1.20	0.35-0.55	0.05-0.15	Ni: 1.5-1.8
P20	0.35-0.45	0.20-0.40	1.30-1.60	≤ 0.035	≤ 0.035	1.80-2.10	0.15-0.25	-	
P20S	0.35-0.45	0.30-0.50	1.40-1.60	≤ 0.030	0.05-0.10	1.80-2.00	0.15-0.25	-	

Typical Heat Treatment

Grade	Annealing	Hardening	Tempering
D2	820-850 Deg C /Furnace Cool	Preheating at 650 & 850 deg. C Hardening 1000 to 1030 Deg C	300-480 Deg C
H11	750-800 Deg C/Furnace Cool	Hardening 1000 to 1040 Deg C.	400-600 Deg C
H12	820-840 Deg C/Furnace Cool	Hardening 1000 to 1050 Deg C.	520-700 Deg C
H13	840-860 Deg C/Furnace Cool	Preheating at 720 & 820 deg. C Hardening 1000 to 1030 Deg C	530-550 Deg C
L6	650-700 Deg C/Furnace Cool	Hardening 830 to 870 deg C. /870 to 900 Deg C	400-600 Deg C
P20	710-740 Deg C/Furnace Cool	Hardening 830 to 870 Deg C	400-600 Deg C
P20S	710-740 Deg C/Furnace Cool	Hardening 830 to 870 Deg C	400-600 Deg C

Note: Preheating Before Hardening & Multiple Tempering is done as per application and recommended practice.



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