



ENGINE VALVE STEELS

FOR INLET & EXHAUST VALVE OF I. C. ENGINE

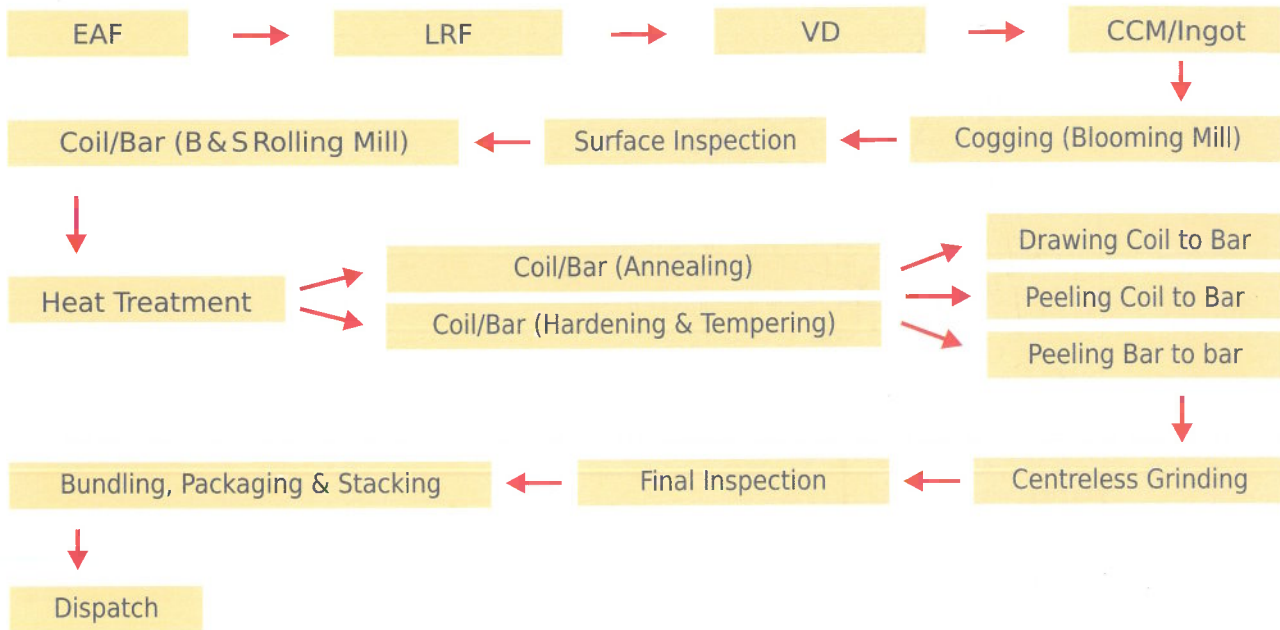


Clean Steel

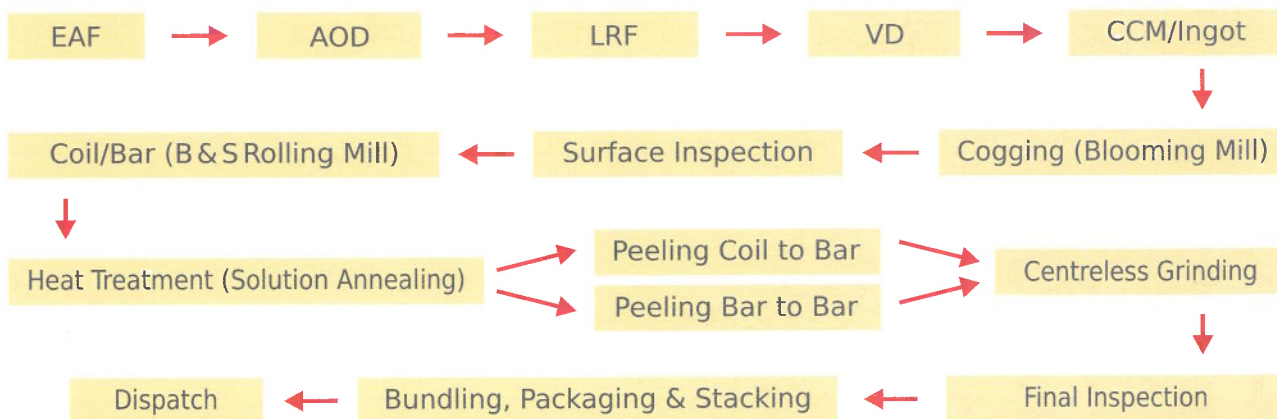
State of the Art Process Technology

MANUFACTURING ROUTE OF ENGINE VALVE STEELS

Martensitic Grades



Austenitic Grades



INSPECTION AND TESTING

- Surface Quality by M.P.I/ Zygo/ECT
- Internal Soundness by Ultrasonic Testing • Dimension & Length Controls
- Metallurgical Testing (Hardness, Microstructure, Inclusion, Grain Size etc.)

ENGINE VALVE STEELS



International Standards of Valve Steels

DIN	W.Nr	BS	JIS	SAE	IS
X45CrSi9-3	1.4718	EN-52	SUH-1	HNV-3	X45Cr9Si3
-	-	-	SUH-11	-	X50Cr9Si2
X40CrSiMo10-2	1.4731	-	SUH-3	HNV-1	X40Cr11Si2Mo1
X85CrMoV18-2	1.4748	-	-	-	-
X55CrMnNiN20-8	1.4875	21-2N	-	EV-12	X55Cr21Mn8Ni2N
X53CrMnNiN21-9	1.4871	21-4N	SUH-35	EV-8	X53Cr22Mn9Ni4N
-	-	21-12N	SUH-37	EV-4	X20Cr21Ni12N
X50CrMnNiNbN21-9	1.4882	21-43N	-	-	-
X33CrNiMnN23-8	1.4866	23-8N	-	EV-16	X33Cr23Ni8Mn3N
NiCr16Fe7TiAl Inconel 751	2.4694	-	SUH-751	J-775	-

Chemical Composition

Grades	C	Mn	Si	S max	P max	Cr	Mo	Ni	W	N	Nb+Ta	Cu	Ti	Al	Fe	V
X45CrSi9-3/(EN-52)	0.40-0.50	0.60 max	2.70-3.30	0.030	0.040	8.00-10.00	-	0.50 max	-	-	-	-	-	-	-	-
SUH-11	0.45-0.55	0.60 max	1.00-2.00	0.030	0.030	7.50-9.50	-	0.60 max	-	-	-	-	-	-	-	-
SUH-3	0.35-0.45	0.60 max	1.80-2.50	0.030	0.030	10.00-12.00	0.70-1.30	0.60 max	-	-	-	0.30 max	-	-	-	-
X85CrMoV18-2	0.80-0.90	1.50 max	1.00 max	0.030	0.040	16.50-18.50	2.00-2.50	-	-	-	-	-	-	-	-	0.30-0.60
21-2N	0.50-0.60	7.00-10.00	0.25 max	0.030	0.045	19.50-21.50	-	1.50-2.75	-	0.20-0.40	-	-	-	-	-	-
21-4N	0.48-0.58	8.00-10.00	0.25 max	0.030	0.045	20.00-22.00	-	3.25-4.50	-	0.35-0.50	-	-	-	-	-	-
21-12N	0.15-0.25	1.50 max	0.70-1.25	0.030	0.050	20.00-22.00	-	10.50-12.50	-	0.15-0.25	-	-	-	-	-	-
21-43N	0.45-0.55	8.00-10.00	0.45 max	0.030	0.045	20.00-22.00	-	3.50-5.50	0.80-1.50	0.40-0.60	1.80-2.50	-	-	-	-	-
23-8N	0.28-0.38	1.50-3.50	0.50-1.00	0.030	0.045	22.00-24.00	0.50 max	7.00-9.00	0.50 max	0.25-0.35	-	-	-	-	-	-
Inconel 751	0.03-0.10	0.50 max	0.50 max	0.015	0.015	14.0-17.0	0.05 max	Base	-	-	0.70-1.20	0.50 max	2.00-2.60	1.10-1.35	5.00-9.00	-

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PRODUCT DETAILS

Size Range :	
Bright Bars	Dia 5.00 mm to 100 mm
Hot Rolled Annealed Wire Rod	Dia 5.50 mm to 38 mm
Hot Rolled Annealed Bars	Dia 15 mm to 160 mm
Standard Length	4000 +50/-00 mm or as per Customer Specified Length
Supply Conditions :	
Dimensional Tolerance: ISO h9, h11, + 0.05/-0.00, +0.05/-0.05, + 0.10 & Black Bar as per IS-3739	
Martensitic Grades	Hot Rolled, Annealed or Hardened & Tempered
	Drawn & Ground, Peeled & Ground and Black bar
Austenitic Grades	Hot Rolled, Solution Annealed, Peeled & Ground and Black Bar

MECHANICAL PROPERTIES

Grade	Condition	Yield Strength N/mm ²	Tensile Strength N/mm ²	% Elongation min	% Reduction in Area min	HRC
EN-52/X45CrSi9-3	H & T	700	900-1100	14	40	25-35
SUH-11	H & T	700	900-1100	14	40	25-35
SUH-3	H & T	700	900-1100	14	40	25-35
X85CrMoV18-2	H & T	800	1000-1200	7	12	25 min
21-2N	Solution Annealed	550	900-1150	8	10	30-40
21-4N	Solution Annealed	580	950-1200	8	10	30-40
21-12N	Solution Annealed	400	800	35	45	23-25
21-43N	Solution Annealed	580	950-1150	10	12	30 min
23-8N	Solution Annealed	550	850-1100	25	30	25 min
Inconel 751	Solution Annealed	630-850	1100-1300	12	20	32-40



BIS Approved
NABL Accredited Chem & Mech Labs.
ISO 9001 & IATF 16949 Certified by UL DQS
ISO 14001 & ISO 45001 Certified by TUV Nord
AD 2000 Merkolatt WO /PED Certified by TUV Nord

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