

Series	Description
NIMAX 500S-ICB	Induction Hardened and Hard Chrome Plated Steel Bars with High Corrosion Resistance and Superior Mechanical Properties steel grade: C45E, 20MnV6, 38MnVS6, 42CrMo4 / Ø20 - 160 mm / Ø3/4" - 6"

Steel grades correspondents

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI SAE ASTM
C45E	1.1191	Ck45	080M46	C45	S45C	45	1045
-	1.5217	20MnV6	55M	-	-	-	A572
38MnVS6	1.1303	38MnSiVS5	-	-	-	-	(10V45) *
42CrMo4	1.7225	42CrMo4	708M40	42CrMo4	SCM440(H)	40ChFA	4140

* equivalent

Chemical composition - in % by weight

Steel grade	C	Si	Mn	P	S	Cr	Mo	Ni	V	N
C45E	0.42 ÷ 0.50	max. 0.40	0.50 ÷ 0.80	max. 0.030	max. 0.035	max. 0.40	max. 0.10	max. 0.40	-	-
20MnV6	0.16 ÷ 0.22	0.10 ÷ 0.50	1.30 ÷ 1.70	max. 0.035	max. 0.035	-	-	-	0.08 ÷ 0.20	-
38MnVS6	0.34 ÷ 0.41	0.15 ÷ 0.80	1.20 ÷ 1.60	max. 0.025	0.020 - 0.060	max. 0.30	max. 0.08	-	0.08 ÷ 0.20	0.010 ÷ 0.020
42CrMo4	0.38 ÷ 0.45	max. 0.40	0.60 ÷ 0.90	max. 0.025	max. 0.035	0.90 ÷ 1.20	0.15 ÷ 0.30	-	-	-

Mechanical properties

Steel grade	Diameter Ø mm	Tensile strength R _m N/mm ²	Yield point R _{p0.2} N/mm ²	Elongation A ₅ %	Hardness * Brinell N/mm ²	Norm
C45E	16 < Ø ≤ 40	min. 650	min. 520	min. 7	200 - 298	EN 10277-5
	18 ≤ Ø ≤ 100	min. 630	min. 520	min. 14	180 - 270	EN 10083-2
	100 < Ø ≤ 160	min. 630	min. 520	min. 16	180 - 270	
20MnV6	6 < Ø ≤ 25	min. 700	min. 620	min. 10	213 - 260	Technical data according to internal norm
	19 < Ø ≤ 80	min. 600	min. 520	min. 18	159 - 172	
	80 < Ø ≤ 160	min. 550	min. 520	min. 18	159 - 172	
38MnVS6	20 < Ø ≤ 160	800 - 950	min. 520	min. 12	240 - 290	EN 10267
42CrMo4+QT	16 < Ø ≤ 40	1000 - 1200	min. 750	min. 11	298 - 359	EN 10083-3
	40 < Ø ≤ 100	900 - 1100	min. 650	min. 12	271 - 331	
	100 < Ø ≤ 160	800 - 950	min. 550	min. 13	240 - 286	

Note:

Impact energy: min. 27J at -20° C for 20MnV6

Impact energy: min. 27J at -40° C for 42CrMo4+QT

* The hardness values are for information only

Induction Hardened and Hard Chrome Plated Steel Bars

steel grade: C45E / 20MnV6 / 38MnVS6, 42CrMo4



Series **NIMAX 500S-ICB** - C45E+C / C45E+QT / AISI1045
NIMAX 500S-ICBM - 20MnV6 / 38MnVS6
NIMAX 500S-ICBV - 42CrMo4+QT

Dimensions	Ø20 - 160 mm / Ø3/4" - 6"
Diameter tolerance	ISO f7 / other, on request
Roundness	max. 1/2 from diameter tolerance
Standard length	5000 - 7500 mm / on request cut lengths and special lengths
Surface roughness	Ra: max. 0.20 µm
Chrome layer thickness	Ø ≥ 20 mm: min. 30 µm
Chrome layer microhardness	min. 900HV0.1



- ✓ The hardening is made mainly for conferring a protection of the surface against mechanical strokes or blows (ex. mining equipment constantly stroked by pebbles and dust). The surface does not withstand a high, direct and continuous pressure (like ball bushing), but only hydraulic seals.
- ✓ 20MnV6 steel grade offers better weldability, enhanced mechanical characteristics, impact resistance even at lower temperatures (-20° C).
- ✓ 42CrMo4+QT steel has high hardenability and good toughness, combined with impact resistance even at very lower temperatures (-40° C), being an excellent material for the oil and gas industry and automotive engineering.
- ✓ 38MnVS6 has excellent machinability, good weldability widely used in civil, mechanical and chemical engineering applications.

Table of dimensions - tolerance

Diameter mm	ISO f7 µm
18 < Ø ≤ 30	-20 / -41
30 < Ø ≤ 50	-25 / -50
50 < Ø ≤ 80	-30 / -60
80 < Ø ≤ 120	-36 / -71
120 < Ø ≤ 160	-43 / -83

High corrosion resistance

Diameter mm	NIMAX 500S-ICB NIMAX 500S-ICBM NIMAX 500S-ICBV
Ø ≥ 20	rating 10 after 500 h in NSS

Tested in our own laboratory according to ISO 9227, evaluated according to ISO 10289.

Correspondence between steel grade and surface hardness

	NIMAX-ICB C45E	NIMAX-ICBM 20MnV6	NIMAX-ICBM 38MnVS6	NIMAX-ICBV 42CrMo4+QT
Surface hardness beneath the chrome layer	58±3 HRC	45±3 HRC	57±3 HRC	59±3 HRC

The hardening depth is defined as the distance from the surface, beneath the chrome layer up to the point where the hardness value has dropped to the value of the steel core hardness, depending on the steel grade. Generally, the hardening depth is between 0.5 - 4.0 mm, depending on diameter and steel grade.

Hardening depth

Diameter mm	Hardening depth mm	Diameter mm	Hardening depth mm
19.05 < Ø ≤ 22	1.2 - 1.5	45 < Ø ≤ 80	2.2 - 2.6
22 < Ø ≤ 25.4	1.4 - 1.7	80 < Ø ≤ 101.6	2.2 - 3.2
25.4 < Ø ≤ 28.575	1.5 - 1.8	101.6 < Ø ≤ 140	2.5 - 3.5
28.575 < Ø ≤ 36	1.5 - 1.9	140 < Ø ≤ 160	2.8 - 4.0
36 < Ø ≤ 45	1.7 - 2.3		