Series	Description
NI-WRA *metric and imperial sizes*	Induction hardened and ground stainless steel linear shafts steel grade: X90CrMoV18 (W1.4112) / Ø5 - 50 mm / Ø1/4″ - 2″

Steel grades correspondents

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI SAE ASTM
X90CrMoV18	1.4112	X90CrMoV18	-	-	-	-	440B

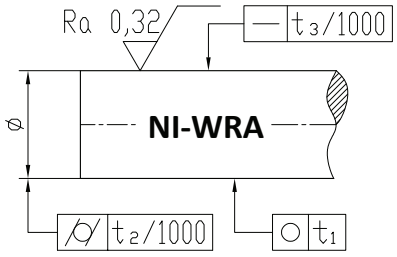
Chemical composition - % by weight

Steel grade	Norm	C	Si	Mn	P	S	Cr	Ni.	Mo	V
X90CrMoV18	EN 10088-3	0.85 ÷ 0.95	max. 1.0	max. 1.0	max. 0.040	max. 0.030	17.0 ÷ 19.0	-	0.90 ÷ 1.30	0.07 ÷ 0.12

Mechanical properties for steel bars

Steel grade	Diameter Ø mm	Tensile strength R_m N/mm²	Yield strength $R_{p\,0.2}$ N/mm²	Elongation A_5 %	Hardness Brinell HB
X90CrMoV18+A	5 < Ø ≤ 50	min. 738	min. 427	min. 9	max. 285

A=annealed



Shaft Diameter Ø	Weight	Series	Standard length	Surface hardening depth SHD	Roundness (circularity) t1 max.	Parallelism (cylindricity) t2 max.	Straightness t3 max.	Standard tolerance ISO h6
mm	kg/m		mm	mm	µm	µm	mm/m	µm
5	0.15	NI-WRA 5	3000	min. 0.4	4	6	0.25	0 / -8
6	0.22	NI-WRA 6	3000	0.4 + 0.9	4	6	0.25	0 / -8
8	0.39	NI-WRA 8	6000	0.4 + 0.9	4	6	0.20	0 / -9
10	0.62	NI-WRA 10	6000	0.4 + 0.9	4	6	0.20	0 / -9
12	0.89	NI-WRA 12	6000	0.6 + 0.9	5	8	0.20	0 / -11
14	1.21	NI-WRA 14	6000	0.6 + 0.9	5	8	0.20	0 / -11
15	1.39	NI-WRA 15	6000	0.6 + 0.9	5	8	0.20	0 / -11
16	1.58	NI-WRA 16	6000	0.6 + 0.9	5	8	0.20	0 / -11
20	2.46	NI-WRA 20	6000	0.8 + 0.8	6	9	0.20	0 / -13
25	3.85	NI-WRA 25	6000	0.9 + 0.8	6	9	0.15	0 / -13
30	5.55	NI-WRA 30	6000	0.9 + 0.8	6	9	0.15	0 / -13
40	9.86	NI-WRA 40	6000	1.5 + 1.3	7	11	0.15	0 / -16
50	15.41	NI-WRA 50	6000	1.5 + 1.3	7	11	0.15	0 / -16

Shaft Diameter Ø		Weight	Series	Standard length	Surface hardening depth SHD	Roundness (circularity) t1 max.	Parallelism (cylindricity) t2 max.	Straightness t3 max.	Standard tolerance Class "L"
mm	inch	kg/m		inch	inch	inch	inch	in/ft	inch
6.35	1/4	0.25	NI-WRA 6.35	118.11	0.016 + 0.035	0.00016	0.00024	0.00308	-0.0005 / -0.001
9.525	3/8	0.56	NI-WRA 9.525	236.22	0.016 + 0.035	0.00016	0.00024	0.00246	-0.0005 / -0.001
12.7	1/2	0.99	NI-WRA 12.7	236.22	0.024 + 0.035	0.00020	0.00031	0.00246	-0.0005 / -0.001
15.875	5/8	1.55	NI-WRA 15.875	236.22	0.024 + 0.035	0.00020	0.00031	0.00246	-0.0005 / -0.001
19.05	3/4	2.24	NI-WRA 19.05	236.22	0.032 + 0.032	0.00024	0.00035	0.00246	-0.0005 / -0.001
25.4	1	3.98	NI-WRA 25.4	236.22	0.035 + 0.032	0.00024	0.00035	0.00185	-0.0005 / -0.001
31.75	1¼	6.21	NI-WRA 31.75	236.22	0.059 + 0.051	0.00028	0.00043	0.00185	-0.0005 / -0.001
38.1	1½	8.94	NI-WRA 38.1	236.22	0.059 + 0.051	0.00028	0.00043	0.00185	-0.0006 / -0.0011
50.8	2	15.90	NI-WRA 50.8	236.22	0.087 + 0.063	0.00028	0.00043	0.00185	-0.0006 / -0.0013

- Surface hardness: 57±2 HRC
- Surface roughness: Ra: max. 0.32 µm
- Length tolerance: ±200 mm
- Surface hardening depth, SHD: according to EN ISO 15787
- On request: special lengths, tolerances and dimensions
- Additional chrome plating on request

- *The hardening depth (SHD according to EN ISO 15787 or Rht according to DIN 6773) is defined as the distance from the steel surface up to the point where the hardness value is 80% of the minimum guaranteed value of the surface hardness and it is established in accordance with ISO 13012, depending on the shaft's size.*
- *The minimum guaranteed value of the surface hardness varies between the steel grade.*