

Series	Description
NI-WRA <i>metric and imperial sizes</i>	Induction hardened and ground stainless steel linear shafts steel grade: X90CrMoV18 (W1.4112) / $\varnothing 5 - 50 \text{ mm}$ / $\varnothing 1/4'' - 2''$

Steel grades correspondents

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

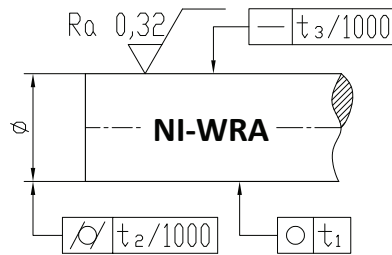
Chemical composition - % by weight

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	-	0.9 ÷ 1.3	0.07 ÷ 0.12

Mechanical properties for steel bars

Steel grade	Diameter \varnothing mm	Tensile strength	Yield strength	Elongation	Hardness
		R_m N/mm ²	$R_{p0.2}$ N/mm ²	A_5 %	Brinell HB
X90CrMoV18+A	5 < \varnothing ≤ 50	min. 738	min. 427	min. 9	max. 285

A=annealed



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

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

- ✓ Surface hardness: 57±2 HRC
- ✓ Surface roughness: Ra: max. 0.32 μ m
- ✓ Length tolerance: ±200 mm
- ✓ 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 minimum guaranteed value of the surface hardness and is established in accordance with ISO 13012, depending on shaft's size.
- ✓ Approximately 75 mm of both shaft ends are not guaranteed to be either in diameter tolerance or in the standard hardness values.