



Series	Description
<b>NI-WH</b> <i>metric and imperial sizes</i>	Induction hardened and ground hollow linear shafts steel grade: C60E / OD: Ø16 - 50 mm / Ø5/8" - 2"

### Steel grades correspondents

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI SAE ASTM
C60E	1.1221	Ck60	060A62, 070M60	C60	S58C	60, 60G, 60GA	1064

### Chemical composition - % by weight

Steel grade	Norm	C	Si	Mn	P	S	Cr	Ni	Mo	V
C60+NBK	min. 390	720 - 900	min. 13	0.60 ÷ 0.90	max. 0.030	max. 0.035	max. 0.40	max. 0.40	max. 0.1	-

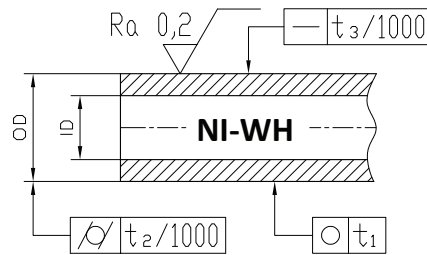
### Mechanical properties for hollow shafts

Steel grade	Yield strength $R_{p0.2}$ N/mm <sup>2</sup>	Tensile strength $R_m$ N/mm <sup>2</sup>	Elongation $A_5$ %
C60+NBK	min. 390	720 - 900	min. 13

*NBK = normalized in a protective atmosphere.*

# Induction Hardened and Ground Hollow Linear Shafts

steel grade: C60E (alternative C55E)



Outside Diameter	Inside Diameter	Weight	Series	Standard length	Surface hardening depth	Roundness (circularity)	Parallelism (cylindricity)	Straightness	Standard tolerance
OD	ID				SHD	t1 max.	t2 max.	t3 max.	ISO h6
mm	mm	kg/m		mm	mm	µm	µm	mm/m	µm
16	7	1.28	NI-WH 16x7	6000	0.4 + 0.4	5	8	0.20	0 / -11
20	14	1.25	NI-WH 20x14	6000	0.6 + 0.5	6	9	0.20	0 / -13
25	15	2.47	NI-WH 25x15	6000	0.8 + 0.8	6	9	0.15	0 / -13
30	18	3.55	NI-WH 30x18	6000	0.9 + 0.8	6	9	0.15	0 / -13
40	28	5.03	NI-WH 40x28	6000	1.2 + 1.1	7	11	0.15	0 / -16
40	26	5.70	NI-WH 40x26	6000	1.2 + 1.1	7	11	0.15	0 / -16
50	30	9.87	NI-WH 50x30	6000	1.5 + 1.2	7	11	0.15	0 / -16

Outside Diameter	Inside Diameter	Weight	Series	Standard length	Surface hardening depth	Roundness (circularity)	Parallelism (cylindricity)	Straightness	Standard tolerance		
OD	ID				SHD	t1 max.	t2 max.	t3 max.	Class "L"		
mm	inch	kg/m		inch	inch	inch	inch	in/ft	inch		
15.875	5/8	6.35	0.25	1.30	NI-WH 15.875x6.35	236.22	0.024 + 0.020	0.000197	0.000315	0.00246	-0.0005 / -0.001
19.05	3/4	11.125	0.438	1.48	NI-WH 19.05x11.125	236.22	0.035 + 0.032	0.000236	0.000354	0.00246	-0.0005 / -0.001
25.4	1	15.494	0.61	2.50	NI-WH 25.4x15.494	236.22	0.035 + 0.032	0.000236	0.000354	0.00185	-0.0005 / -0.001
31.75	1¼	18.288	0.72	4.15	NI-WH 31.75x18.288	236.22	0.035 + 0.032	0.000236	0.000354	0.00185	-0.0005 / -0.001
38.1	1½	22.606	0.89	5.80	NI-WH 38.1x22.606	236.22	0.047 + 0.043	0.000276	0.000433	0.00185	-0.0006 / -0.0011
50.8	2	31.75	1.25	9.69	NI-WH 50.8x31.75	236.22	0.059 + 0.043	0.000276	0.000433	0.00185	-0.0006 / -0.0013

- ✓ Surface hardness: 62±2 HRC
- ✓ Surface roughness: Ra: max. 0.20 µm
- ✓ Length tolerance: ±200 mm
- ✓ Surface hardening depth, SHD: according to EN ISO 15787
- ✓ On request: special lengths, tolerances and dimensions

- ✓ 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.