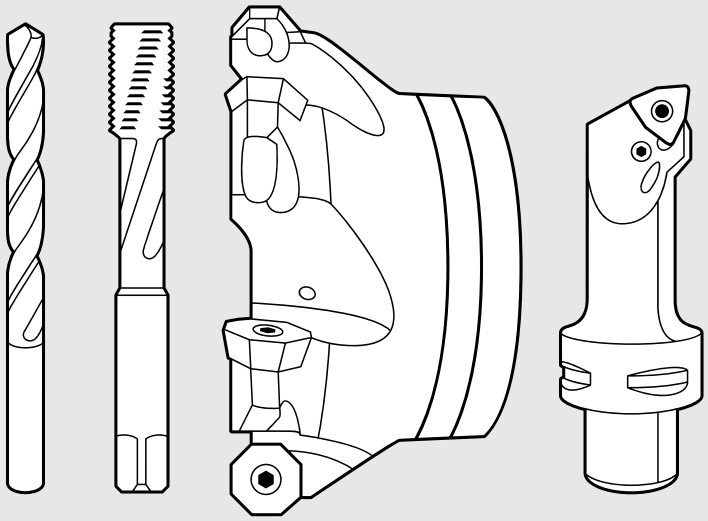
_ METAL IS OUR WHOLE WORLD

Technical Compendium

General




WALTER

Technical Compendium – General

Contents

Technologies at Walter.

Accure·tec®

The patented Walter Accure·tec® technology ensures maximum vibration damping on boring bars for turning and adaptors for milling. Ideal for turning, milling and drilling operations involving extended tool applications.

Krato·tec™

Krato·tec™ is a unique Walter coating technology for solid carbide tools. The core of this consists of an extraordinarily fracture-resistant AlTiN multi-layer coating with a textured top layer. The special layer architecture is highly wear- and adhesion-resistant, even at high cutting speeds, and ensures the tools have universal application.

Tiger·tec® Gold

Tiger·tec® Gold, the new Walter generation platform for unique indexable insert coatings, enables maximum tool life and process reliability. The new grades are based on PVD, CVD or ULP technology, depending on the application. Unique coating properties, protected by multiple patents, guarantee the best protection against tool life-limiting types of wear and ensure outstanding performance.

Tiger·tec® Silver

With Tiger·tec® Silver, Walter is offering a world first in coating technology for indexable inserts. The special aluminium oxide layer with optimised microstructure reduces wear during turning, milling and drilling operations, and increases toughness and temperature resistance for significantly higher cutting data.

Walter BLAXX

Walter BLAXX is the benchmark for a new generation of milling cutters: The milling bodies are extremely robust thanks to their special surface treatment. The milling systems, which are mainly positioned tangentially, are equipped with Tiger·tec® indexable inserts. Tools with the "Walter BLAXX" designation combine high wear resistance with unbeatable performance data.

Walter Green

Walter Green: Sustainability and responsible use of resources are central components of our company principles. We use our "Walter Green" seal to show how we implement these principles – such as by offsetting our CO_2 emissions with environmental conservation projects.

Walter Xpress

Walter Xpress is the rapid ordering and delivery service offered by Walter Multiply for high-quality special tools. It is available for around 10,000 tool varieties, with a maximum delivery time of two to four weeks from the order date. The ordering process is clearly structured and guarantees absolute planning security. Quotations for all enquiries are calculated and provided within 24 hours.

Walter Precision XT

Precision boring tools are always used to finish an existing bore or to improve the precision of existing bores, for instance by correcting their position, narrowing the hole tolerance, or enhancing the surface quality. Precision boring is typically performed using a depth of cut < 0.5 mm (0.02 inches).

Walter Boring XT

Tools for rough boring are used to expand existing bores. Material removal is a key element of this process. The bore to be enlarged is machined in advance or created using casting or forging processes. The rough boring tools themselves can also be used for radial offsetting and multi-edge boring.

XD Technology

Walter Titex solid carbide drilling and reaming tools stand for precision, high performance and cost-efficiency when drilling in practically any material. Walter Titex XD Technology offers the greatest precision and cost-efficiency in deep-hole drilling operations up to $70 \times D_C$ without pecking.

Xill·tec®

With Xill·tec®, the solid carbide milling cutters from the MC230 Advance product line, Walter offers a uniquely wide range, with different dimensions, numbers of teeth and shank versions. This means that users are well-equipped for all conceivable milling operations and ISO materials. Universal application – with excellent quality.

Xtra·tec®

Xtra·tec® indexable insert milling cutters and drills guarantee extremely soft cutting action and optimal surface quality on almost all materials. Indexable inserts with highly positive geometries and the Tiger·tec® coating have a particularly beneficial hardness/toughness ratio. For maximum productivity and process reliability.

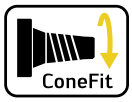
Xtra·tec®XT

Xtra·tec® XT is the latest generation of Walter milling tools. As the "Xtended" Xtra·tec® technology, it offers a completely new perspective on productivity and process reliability. It can cover nearly all milling operations in every common material group: More reliable, productive, cost-efficient than ever before – all while compensating for the CO_2 emissions through Walter Green.

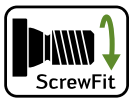
X·treme Evo

For Walter, the X·treme Evo DC260 and DC160 Advance solid carbide drills as well as the X·treme Evo Plus DC180 Supreme and X·treme Evo 3 DC183 Supreme are the embodiment of the "next generation of drilling", offering versatility for a wide range of materials and machine concepts – with outstanding tool life, productivity and process reliability.

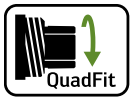
Walter Capto™ is a modular tool adaption system. It is suitable for all turning, milling, drilling and threading operations. Its ISO-standardised polygon taper absorbs torsional moments and bending moments extremely well and ensures optimal repeat accuracy.



Walter ConeFit is an extremely flexible solid carbide milling system with a wide range of high-performance exchangeable heads and shank variants. Its conical thread can self-centre, thereby guaranteeing maximum stability and concentricity.



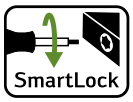
Walter ScrewFit users benefit from maximum flexibility. Its modular interface is suitable for a wide variety of boring bars and adaptors and a wide range of tool diameters and lengths for milling and drilling.



The precision-ground QuadFit interface with taper and support face characterises the precision of the vibration-damped boring bars for turning and thread turning with Walter Accure·tec® technology. The exchangeable head system, which can be rotated by 180°, makes it possible to rapidly replace tools with high indexing accuracy.

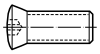
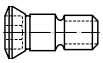
In turning and grooving operations, the Walter precision cooling system provides cooling at the centre of the chip formation. Its dual coolant jets are directed precisely onto the flank and rake faces. In drilling operations, the coolant jets exit close to the cutting edge. This system provides significantly increased tool life, improved chip breaking and chip removal, greater efficiency and higher quality.

"Flash" refers to specialised solid carbide milling cutters for high-feed milling. Their end-face geometry reduces the chip thickness "h" and therefore enables an extremely high feed per tooth. Forces that occur are diverted axially towards the centre of the tool, which helps to stabilise the machining process.



On Walter turning toolholders with "SmartLock", the clamping screw can be operated from the side of the tool. This makes it possible to index the inserts **in** the machine quickly and easily. Indexing times are reduced as a result. Ideal for use on CNC lathe and multi-spindle machines.

Clamping screws for indexable inserts

Screw types	Designation	Dimensions	Torx	Tightening torque Nm
 Clamping screws with 43° head angle for indexable inserts with countersink	FS322	M2,5 × 5,7	7	0,8
	FS258	M3 × 5,7	8	1,5
	FS246	M3 × 7	8	1,5
	FS1163	M3,5 × 10	15	3,0
	FS320	M4 × 5	15	3,0
	FS318	M4 × 6	15	3,0
	FS245	M4 × 6,5	15	3,0
	FS321	M4 × 7	15	3,0
	FS319	M4 × 8	15	3,0
	FS244	M4 × 9	15	3,0
	FS2114	M4 × 9	15IP	2,5
	FS749	M4 × 10,5	15	3,0
	FS326	M4 × 12	15	3,0
	FS1458	M4 × 12	15IP	2,5
	FS954	M4,5 × 11	20	4,5
	FS260	M5 × 9,5	20	5,0
	FS243	M5 × 11	20	5,0
	FS242	M5 × 13	20	5,0
	FS1165	M5 × 12	20	6,0
	FS1010	M6 × 14	20	5,0
	FS1164	M6 × 15	25	10,0
 Fitting screws	FS925	M2,5 × 6,5	8	0,8
	FS397	M3 × 6,9	8	1,0
	FS2070	M3 × 6,5	8IP	2,0
	FS922	M3,5 × 9,5	15	2,5
	FS390	M4 × 0,5 × 8,4	15	4,0
	FS2071	M4 × 8,4	15IP	4,0
	FS1028	M4,5 × 12,8	20	4,0
	FS1153	M4,5 × 14	20	4,0
	FS391	M5 × 0,5 × 9,1	20	5,0
	FS392	M5 × 0,5 × 12,75	20	5,0
	FS393	M5 × 0,5 × 15,45	20	5,0
	FS2072	M5 × 9,55	20IP	5,0
	FS2073	M5 × 0,5 × 12,75	20IP	5,0
	FS2074	M5 × 15,45	20IP	5,0
	FS2075	M6 × 20,35	20IP	5,0
	FS394	M6 × 0,7 × 20,35	20	5,0
	FS395	M8 × 0,75 × 24,7	30	6,0
	FS2107	M8 × 24,7	30IP	10,0

Screw types	Designation	Dimensions	Torx	Tightening torque Nm
 Clamping screws with 60° head angle for indexable inserts with arched countersink in accordance with ISO	FS1358	M1,8 × 3,5	6	0,4
	FS1012	M1,8 × 4,3	6	0,4
	FS2076	M2 × 3,2	6IP	0,6
	FS1003	M2 × 3,25	6	0,4
	FS1151	M2 × 3,45	6	0,4
	FS2147	M2 × 4,25	6IP	0,6
	FS2148	M2 × 4,95	6IP	0,6
	FS1004	M2,2 × 4,6	7	0,6
	FS2084	M2,2 × 4,6	7IP	0,9
	FS2111	M2,2 × 4,85	7IP	0,9
	FS1020	M2,2 × 5,5	7	0,6
	FS2149	M2,2 × 6,4	7IP	0,9
	FS2066	M2,5 × 5,2	7IP	0,9
	FS924	M2,5 × 4,5	8	0,8
	FS1455	M2,5 × 4,5	8IP	0,8 / 1,2
	FS1129	M2,5 × 5,2	8	0,8
	FS2067	M2,5 × 5,7	7IP	0,9
	FS375	M2,5 × 5,8	7	0,8
	FS923	M2,5 × 6	8	0,8 / 1,2
	FS1454	M2,5 × 6	8IP	0,8 / 1,2
	FS2061	M2,5 × 6,5	7IP	0,9
	FS2077	M3 × 5,3	9IP	1,5
	FS1005	M3 × 6	8	1,0
	FS1456	M3 × 6,2	9IP	1,5 / 2,0
	FS2078	M3 × 7,2	9IP	1,5
	FS1013	M3 × 7,5	8	1,0
	FS1457	M3 × 7,7	9IP	1,5
	FS379	M3 × 8,5	8	1,0
	FS2079	M3 × 8,7	9IP	2,0
	FS920	M3,5 × 7,3	15	2,5
	FS2062	M3,5 × 8,1	15IP	3,0
	FS2266	M3,5 × 8,75	10IP	2,0
	FS359	M3,5 × 9	15	2,5
	FS2119	M3,5 × 9,3	15IP	3,0
	FS2063	M3,5 × 10,1	15IP	3,0
	FS1006	M3,5 × 12	15	2,5
	FS2060	M3,5 × 12,1	15IP	3,0
	FS2279	M3,5 × 12	15IP	3,0
	FS2064	M4 × 0,5 × 11	15IP	3,0
	FS2065	M4 × 0,5 × 14	15IP	3,0
	FS1011	M4 × 7,8	15	3,0
	FS2080	M4 × 8,5	15IP	2,5
	FS378	M4 × 9,5	15	3,0
	FS1453	M4 × 9,7	15IP	2,5 / 3,5
	FS1459*	M4 × 10	15IP	4,0
	FS2163	M4 × 10,8	15IP	3,0
	FS2081	M4 × 12	15IP	3,0
	FS1007	M4 × 12	15	3,0
	FS1029	M5 × 9	20	5,0
	FS2139	M5 × 10	20IP	5,0
	FS1030	M5 × 11	20	5,0
	FS2281	M5 × 11	20IP	5,0
	FS1495	M5 × 13	20IP	5,0
	FS1031	M5 × 13	20	5,0
	FS1009	M5 × 16	20	5,0
	FS2112	M5 × 16	20IP	5,0
	FS2090	M5 × 17,25	20IP	5,0
	FS1036	M6 × 14	20	5,0
	FS2089	M6 × 18,25	25IP	5,0
	FS1008	M6 × 18	20	5,0
	FS1152	M8 × 1 × 18,5	30	10,0
	FS2150	M8 × 22	30IP	10,0

* Screw head with radius IP = Torx Plus

Torque screwdriver with interchangeable blades

Torque screwdriver

Designation	Size		Scale range
FS2001	1	4	0,4–1,2 Nm
FS2003	3	4	1,5–5,0 Nm
FS2002	1	4	3.5–10.6 in lbs
FS2004	3	4	13.3–44 in lbs

Designation	Size		Scale range
FS2248	3	4	1,0–6,0 Nm

Interchangeable blades	Designation	Torx	
Torx interchangeable blades Blade length 175 mm	FS2005	6	4
	FS2006	7	
	FS2007	8	
	FS2008	10	
	FS2009	15	
	FS2010	20	
Torx Plus interchangeable blades Blade length 175 mm	FS2085	6IP	4
	SD2001-6IP	6IP/ Magic Spring	
	FS2011	7IP	
	FS2012	8IP	
	FS2013	9IP	
	FS2268	10IP	
	FS2014	15IP	
	FS2015	20IP	
	FS2016	25IP	
Complete blade set (FS2005–FS2016) Blade length 175 mm	FS2017		4

IP = Torx Plus

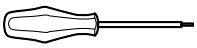
Torque T-handle

Designation		Scale range
FS2041	6	4,5–14 Nm
FS2042	6	40–123 in lbs

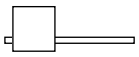
Interchangeable blades	Designation	Torx/WAF	
Torx interchangeable blades Blade length 130 mm	FS2043	15	6
	FS2044	20	
	FS2045	25	
	FS2046	30	
Torx Plus interchangeable blades Blade length 130 mm	FS2047	15IP	6
	FS2048	20IP	
	FS2049	25IP	
	FS2109	30IP	
Hexagonal interchangeable blades Blade length 130 mm	SD2000-2,5 SW	SW2,5	6
	FS2050	SW3	
	FS2051	SW4	
	FS2052	SW5	
Complete blade set (FS2043–FS2052) Blade length 130 mm	FS2053		6

IP = Torx Plus

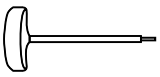
Screwdriver

Screwdriver types	Designation	Torx
 Screwdriver	FS1063	6
	FS2086	6IP
	FS309	7
	SD1001-6IP	6IP/Magic Spring
	FS2088	7IP
	FS230	8
	FS1483	8IP
	FS1128	9
	FS1484	9IP
	FS2267	10IP
	FS229	15
	FS1485	15IP
	FS228	20
	FS1486	20IP
	FS2167	25
	FS1487	25IP
	FS396	30
	FS2109	30IP

IP = Torx Plus

Screwdriver types	Designation	Torx	WAF
 Torx key	FS2146	6IP	–
	FS2087	6IP	–
	FS325	7	–
	FS1490	7IP	–
	FS257	8	–
	FS1466	9IP	–
	FS1050	10	–
	FS255	15	–
	FS1465	15IP	3,5
	FS1496	15IP	4,0
	FS256	20	–
	FS1154	–	2,0
	FS1155	–	2,5

IP = Torx Plus

Screwdriver types	Designation	Torx
 Handle key, small	FS1047	15
	FS1048	20
	FS1049	25
 Handle key, large	FS1172	15
	FS1173	20
	FS1174	25
	FS1175	30

Allen key	Designation	Torx	WAF
	ISO 2936–0,9	–	0,9
	ISO 2936–1,3		1,3
	ISO 2936–1,5	–	1,5
	ISO 2936–2	–	2
	ISO 2936–2,5	–	2,5
	ISO 2936–3	–	3
	ISO 2936–3,5	–	3,5
	ISO 2936–4	–	4
	ISO 2936–5	–	5
	ISO 2936–6	–	6
	ISO 2936–7		7
	ISO 2936–10		10
	ISO 2936–12		12
	ISO 2936–14		14
	ISO 2936–17		17
	FS1464	20IP	–
	FS1592	25IP	–

IP = Torx Plus

Cutting forces of Walter machining groups

Description	Tensile strength min R_m [N/mm²]	Tensile strength max R_m [N/mm²]	Spec. cutting force $k_{c1.1}$ [N/mm²]	Increase value m_c	Walter machining group
Non-alloyed and low-alloy steels, C > 0.25%, low and medium tensile strength	350	750	1500	0,21	P1, P6
Non-alloyed and low-alloy steels, C > 0.55%, not heat-treated	400	900	1700	0,25	P2, P3, P4, P7, P14
Low and high-alloy steels, low heat treatment level	750	1100	2000	0,25	P5, P8, P11, P12
Stainless ferritic/martensitic steels, heat-treated	800	1400	2200	0,25	P15
Low and high-alloy steels, medium heat treatment level	1100	1400	2500	0,25	P9
Low and high-alloy steels, high heat treatment level	1200	1600	3000	0,25	P10, P13
Stainless, austenitic steels	400	900	1800	0,21	M1
Stainless, austenitic/ferritic steels + duplex	600	1000	2000	0,21	M3
Stainless, austenitic steels, precipitation hardened (PH steels)	700	1500	2400	0,21	M2
Grey cast iron + CGI + malleable cast iron with low tensile strength	200	400	800	0,28	K1, K3, K7
Ductile cast iron with low tensile strength + malleable cast iron with higher tensile strength	400	600	950	0,28	K2, K5
Grey cast iron with higher tensile strength	300	400	1200	0,28	K4
Ductile cast iron with high tensile strength + ADI with high tensile strength, non-alloyed + alloyed	600	800	1400	0,28	K6
Wrought aluminium alloy, not hardened			350	0,25	N1
Wrought aluminium alloy, hardened			600	0,25	N2
Cast aluminium alloy < 12% Si, not hardened			600	0,25	N3
Cast aluminium alloy < 12% Si, hardened, cast aluminium alloy ≥ 12%			700	0,25	N4, N5
Pure copper, copper alloy (brass, bronze) with low tensile strength			550	0,25	N7, N8, N9
High tensile copper alloys, bronze with high tensile strength			1000	0,25	N10
Heat-resistant alloys, iron-based, annealed			2400	0,25	S1
Heat-resistant alloys, iron-based, hardened			2500	0,25	S2
Pure titanium			1300	0,25	S6
Titanium alloys, alpha, alpha/beta and beta alloys			1500	0,25	S7, S8
Heat-resistant alloys, nickel-cobalt-based, annealed			2800	0,25	S3
Heat-resistant alloys, nickel-cobalt-based, hardened			2900	0,25	S4
Heat-resistant alloys, nickel-cobalt-based, cast			3000	0,25	S5
Hardened steels 46–52 HRC			3000	0,25	H1
Hardened steels 52–58 HRC			3700	0,25	H2
Hardened steels 58–62 HRC			4300	0,25	H3
Hardened cast iron 50–60 HRC			3500	0,25	H4
Thermoplasts and thermosetting plastics, without abrasive fillers			150	0,2	O1, O2
Fibre-reinforced plastics			300	0,3	O3, O4, O5
Graphite			400	0,25	O6

Comments:
The information consists of standard values and refers to a neutral cutting edge geometry.
The condition of the material and the cutting edge geometry considerably influences the cutting forces.

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
P	Building and construction steels						
	P1	1.0401		C 15	C15		
	P1	1.0402		C 22	C22		
	P2	1.0501		C 35	C35		
	P2	1.0503		C 45	C45		
	P4	1.0535		C 55	C55		
	P4 / P5	1.0601		C 60	C60		
	P6	1.0715		9 SMn 28	11SMn30		
	P6	1.0718		9 SMnPb 28	11SMnPb30		
	P6	1.0722		10 SPb 20	10SPb20		
	P6	1.0726		35 S 20	35S20		
	P6	1.0736		9 SMn 36	11SMn37		
	P6	1.0737		9 SMnPb 36	11SMnPb37	Ledloy	
	P7 / P10	1.0904			55Si7		
	P7 / P10	1.0961		60 SiCr 7	S340MGC, 60SiCr7		
	P1	1.1141		Ck 15	C15E		
	P7 / H2	1.1157		40 Mn 4	40Mn4		
	P1 / P3	1.1158		Ck 25	C25E		
	P7	1.1167		36 Mn 5	36Mn5		
	P7	1.1170		28 Mn 6	28Mn6		
	P2	1.1183		Cf 35	C35G		
	P2	1.1191		Ck 45	C45E		
	P4 / P5	1.1203		Ck 55	C55E		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	080M15, 144917CS, 040A15, 080A15		C18RR, XC18	C15, C16, 1C15	1350	F.111	S 15 C, JIS S 15C	J 409 Grade 1015
	040 A 15, 055 M 15, En 2, 22 CS, 22 HS, C 22, 070 M 20	2D, 2	AF42C20, XC25, 1C22	C20, C21	1450	1C22, F112	S 20 C, S22C, JIS S 20C	1020
	080A32, 080A35, 080M36, 1449.40CS		C35, 1C35, AF55C35	C35, 1C35	1572, 155	F.113	S 35 C	1035
	060A47, 080M46, 1449.50HS, 1449.50CS		1C45, AF 65 C 45	C45, 1C45	1650	F.114	JIS S 45C	1045
	070M55, 5770-50	9	C54, 1C55, AF 70 C 55	C55, 1C55	1655	F.115	S 55 C	1055
	060A62, 5770-60, 1449 60HS.CS		C60, 1C60, AF70C55	C60, 1C60		F.115	S 58 C	1060
	230M07		S250	CF9Mn28	1912	F.2111 - 11SMn28	JIS SUM22	1213
			S250Pb	CF9SMnPb28	1914	F.2112 - 11SMnPb28	SUM22L, SUM23L, SUM24L	12L13, 12L14, J 403 Grade 12L14, J 1397 Grade 12L14
	212M36		35MF6		1957	F.210G		J 403 Grade 1141
	240M07	1B	S300	CF9SMn36		F.2113 - 12 SMn 35	SUM 25	J 403 Grade 1213, J 403 Grade 1215, J 1392 Grade 1213
			S300Pb	CF9SMnPb36	1926	F.2114 - 12 SMnPb 35		J 403 Grade 12L14, J 1397 Grade 12L14
	250A53	45	55S7		2085	F.1440 - 56 Si 7		9255
	250A61		60SC7			F.1442 - 60 SiCr 8		9262
	040A15, 080M15, S14, CS17	32C			1370	F.1511 - C 16 k, F.1110 - C 15 k	S 15, S 15 CK, JIS S 15 C	1015
	150M36	15	35M5					1035, 1041
	070M26		2C25			F.1120 - C 25 k, C25K (F1120)	S 25 C, S 28 C	1025
	150M36	15 B	40M5		2120	F.1203 - 36 Mn5	SMn 438 (H), SCMn 3	1335
	150M28, 150M19, S92	14A, 14B	20M5	C28Mn		28Mn6	SCMn1	1027
	060A35, 080A35		XC38H1TS	C36, C38			S 35 C	1035
	080M46, 060A47		C45RR, XC42H1, XC45, 2C45, XC48, XC48H1		1672	F1140-C45k, F1142-C48k	S 45 C, S 48 C	1045
	060A57	9	XC55H1, 2C55, XC54		1655	F.1150 - C 55 k	S 55 C	1055

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
	Building and construction steels (continued)						
P	P2 / P3	1.1213		Cf 53	C53G		
	P4 / P5	1.1221		Ck 60	C60E		
	P4 / H1	1.1274		Ck 101	C101E, C100S		
	P11	1.3401		X 120 Mn 12	X120Mn12		
	P7 / H2	1.3505		100 Cr 6	100Cr6		
	P7	1.5415		15 Mo 3	16Mo3		
	P3	1.5423		16 Mo 5	16Mo5		
	P7	1.5622		14 Ni 6	14Ni6		
	P11	1.5662		X 8 Ni 9	X8Ni9		
	P11	1.5680		12 Ni 19	X12Ni5, 12Ni19		
	P9	1.5710		36 NiCr 6	36NiCr6		
	P7	1.5732		14 NiCr 10	14NiCr10		
	P7	1.5752		14 NiCr 14	15NiCr13		
	P7 / P9	1.6511		36 CrNiMo 4	36CrNiMo4		
	P7	1.6523		20NiCrMo2-2	21NiCrMo2		
	P9	1.6546		40 NiCrMo 22	40NiCrMo2-2, 40NiCrMo2KD		
	P7 / P9	1.6582		34 CrNiMo 6	34CrNiMo6		
	P7	1.6587		17 CrNiMo 8, 17 CrNiMo 6, 17 CrNiMo 6 BG	17CrNiMo6, 18CrNiMo7-6		
	P7	1.6657		14 NiCrMo 134	14NiCrMo13-4		
	P7	1.7015		15 Cr 3	15Cr2KD		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	060A52, 070M55		XC48H1TS				S 50 C	1050, 1055
	060A62, 070M60, CS60		C60RR, XC60, 2C60		1665, 168	F.511, F.512	S 58 C	1060
	060A96, 5770-95, CS95		C100RR, C100, XC100, E 100		1870		SUP4	1095
			Z120M12, Z120Mn12		2183	F.82551-AM-X 120 Mn 12	SCMnH1, SCMnH11	
	BL3, 534A99, 535A99, 2S135, S135		Y100C6, 100C6, 100Cr6	100Cr6	2258	F.5230 100 Cr6, F.1310-100 Cr 6, F.131	SUJ 2, SUJ 4	L3, 52100
	1501-240, 1503-243B, 3606-243, 3059-243		15D3, 15Mo3	16Mo3 (KG KW)	2912	F.2601-16 Mo 3		ASTM A20, GR
	1503-245-420			16Mo5KG, 16Mo5KW		F.2602-16Mo5	SB 450 M, SB 480 M	4520
			16N6, 15N6, 15Ni6	14Ni6KG, 14Ni6KT		F.2641-15Ni6		ASTM A350 LF5
	1501-509;510, 3603-509LT, 1502-502-650, 509-690, 1503-509-690		Z8N9, 9Ni490	X10Ni9, X12Ni09		F.2645-X8 Ni09	SL9N53(60)	ASTM A353
			Z18N5, 5Ni390					2515, 2517
	640A35		35NC6				SNC 236	3135
			14NC11	16NiCr11		F.1540-15NiCr11	SNC 415 (H)	3415
	655M13, 655A12, 655H13	36A, 36B	14NC11, 12NC15, 14NC12, 13NiCr14				SNC 815 (H), SNC22, JIS SNC 815	3310, 3415, 9314
	816M40	110	40NCD3, 36CrNiMo4, 35NCD5	38NiCrMo7 (KB)		F.1280-35NiCrMo4		9840
	805H20, 805M20, 806M20	362	20NCD2, 22NCD2	20NiCrMo2	2506	F1552-20NiCrMo2, F1534-20NiCrMo3	SNCM 220 (H)	J 1268 Grade 8620H, 8620
	311-Type7		40NCD2	40NiCrMo2 (KB)		F1204-40NiCrMo2, F1205-40NiCrMo2DF	SNCM 240	8740
	816M40, 817M40	24	35NCD6, 34CrNiMo6, 34CrNiMo8	35NiCrMo6KB	2541	F1272-40NiCrMo7, 34CrNiMo6	SNCM 447, JIS SNc M447	4340
	820A16		18NCD6	18NiCrMo7		F.1560-14 NiCrMo13, F.156		
	832H13, 832M13, S157	36C	16NCD13	15NiCrMo13		F1560-14NiCrMo13, F.1569-14NiCrMo131		
	523M15	206	12C3, 15Cr2, 18C3				SCr 415 (H)	5132

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
P	**Building and construction steels** (continued)						
	P7 / P8	1.7033		34 Cr 4	34Cr4		
	P7 / P9	1.7035		41 Cr 4	41Cr4		
	P9	1.7045		42 Cr 4	42Cr4		
	P7	1.7131		16 MnCr 5	16MnCr5		
	P7 / P9	1.7176		55 Cr 3	55Cr3		
	P8	1.7218		25 CrMo 4	25CrMo4		
	P7 / P9	1.7220		34 CrMo 4	34CrMo4		
	P7 / P9	1.7223		41 CrMo 4	41CrMo4		
	P7 / P9	1.7225		42 CrMo 4	42CrMo4		
	P7	1.7262		15 CrMo 5	15CrMo5		
	P7	1.7335		13 CrMo 4 4	13CrMo4-5		
	P7 / P10	1.7361		32 CrMo 12	32CrMo12		
	P7	1.7380		10 CrMo 9 10	10CrMo9-10		
	P7	1.7715		14 MoV 6 3	14MoV6-3		
	P7 / P9	1.8159		50 CrV 4	51CrV4		
	P7	1.8509		41 CrAlMo 7	41CrAlMo7	Nitralloy 135	
	P7 / P10	1.8523		39 CrMoV 13 9	40CrMoV13-9		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	530A32, 530H32, 530M32		32C4, 34Cr4	34Cr4(KB)		F.8221-35 Cr 4, F.224	SCr 435 (H)	5132
	530M40, 530A40, 530H40	18	42C4, 41Cr4	41Cr4, 41Cr4KB		38Cr4, 38Cr41, 42Cr4, F.1202-42Cr4	SCR4, SCr 440 (H)	5140
	530A40	18	42C4, 42C4TS	41Cr4	2245	F1201, F1202, F1206, F.1202-42Cr4	SCR4, SCr 440 (H), SCr 440	5140, 5140H
	527M17, 590H17, 590M17		16MC5, 16MC4, 16MnCr5	16MnCr5	2511, 2173	F.1515-16 MnCr5, F.151		J 1268 Grade 4118H, C5115
	525A58, 525A60, 525H60	48	55Cr3, 55C3	55Cr3	2253	F.1431-55 Cr3, F.143	SUP 9 (A)	5155
	1717CDS110, 708A25		25CD4, 25CrMo4	25CrMo4 (KB)	2225	F8372-AM26CrMo4, F8330-AM25CrMo4, F1256-30CrMo4-1, F.222	SCM420, SCM430, SCCrM1	4130
	708A37	19B	35CD4, 34CrMo4, 35CD4 / 34CrMo5	34CrMo4KB, 35CrMo4, 35CrMo4F	2234	F8331-AM34CrMo4, F8231-34CrMo4, F1250-35CrMo4, F1254-35CrMo4DF, F.125	SCM 432, SCCrM 3, SCM 435 H	4135, 4137, J 1268 Grade 4135H
	708M40, 3111-5.1		42CD4TS	41CrMo4		F8332-AM42CrMo4, F8232-42CrMo4, F1252-40CrMo4	SCm 440, JIS SCM 440	4140
	708A42, 708M40, 709M40	19A	42CD4, 42CrMo4	38CrMo4KB, 42CrMo4, G40CrMo4	2244	F8332-AM42CrMo4, F8232-42CrMo4, F1252-40CrMo4	SCM 440 (H), SNB 7, JIS SCM 440	4140
			12CD4			F.1551-12CrMo4	SCM 415 (H)	
	620-440, 1503-620-440, 1502, 620-470, 3606-620, 620-540, 3604-620-440		15CD3.05, 15CD4.05	14CrMo3, 16CrMo3	2216	F.2631-14CrMo45	SFVA F 12	A387 Grade 12Cl2, ASTM A182
	722M24	40B	30CD12	32CrMo12	2240	F.124.A		
	3059-622-490, 3606-622, 1502-622, 3604-622, 622Gr.31, 622Gr.45		12CD9.10, 10CrMo9-10, 10CrMo9-11	12CrMo9 (KW KG), G14CrMo9, 10	2218	TU.H	SFVAF22A, BSCMV4, SCPH32-CF	A387 Grade 22, A387 Grade 22Cl2, ASTM A182
	1503-660-460, 3604-660					F.2621-13 MoCrV6		
	735A50, 735A51, 735H51, 735M50	47	50CV4, 51CrV4, 50CrV4	50CrV4	2230	F.1430-51CrV4	SUP 10	6150
	905M39	41B	40CAD6.12	41CrAlMo7	2940	F.1740-41CrAlMo7	SACM 645, JIS SACM 645	Nitralloy 135
	897M39	40C						

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
P	**Stainless and heat-resistant steels**						
	P14 / P15	1.4000		X 7 Cr 13	X6Cr13		
	P14	1.4001		X 7 Cr 14	X7Cr14		
	P14 / P15	1.4006		X 10 Cr 13, X 12 Cr 13	X12Cr13, X10Cr13		
	P14	1.4016		X 6 Cr 17	X6Cr17		
	P15	1.4027		G-X 20 Cr 14	GX20Cr14		
	P15	1.4034		X 46 Cr 13	X46Cr13		
	P15	1.4057		X 20 CrNi 17 2	X19CrNi17-2, X17CrNi16-2		
	P14 / P15	1.4104		X 12 CrMoS 17	X14CrMoS17		
	P14	1.4113		X 6 CrMo 17 1	X6CrMo17-1		
	P15	1.4313		X 4 CrNi 13 4	X3CrNiMo13-4		
	P15	1.4718		X 45 CrSi 9 3	X45CrSi9-3-1		
	P14	1.4724		X 10 CrAl 13, X 10 CrAlSi 13	X10CrAlSi13, X10CrAl13		
	P14	1.4742		X 10 CrAl 18, X 10 CrAlSi 18	X10CrAl18, X10CrAlSi18		
	P15	1.4747		X 80 CrNiSi 20	X80CrNiSi20	Sil XB	
	P14	1.4762		X 10 CrAl 24, X 10 CrAlSi 25	X10CrAl24, X10CrAlSi25		
	Tool steels						
	P4	1.1545		C 105 W 1	C105U		
	P4	1.1663		C 125 W	C125W, C125U		
	P7 / H2	1.2067		100 Cr 6	99Cr6, 102Cr6		
	P11 / H3	1.2080		X 210 Cr 12	X210Cr12		
	P11 / H1	1.2344		X 40 CrMoV 5 1	X40CrMoV5-1		
	P11 / H3	1.2363		X 100 CrMoV 5 1	X100CrMoV5-1		
	P7 / H2	1.2419		105 WCr 6	107WCr5, 105WCr6, 100WCr6		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	403S17		Z6013, Z6Cr13, Z8C12	X6Cr13	2301	F.3110-X6 Cr13	SUS403, SUS410S, SUS429	403, 13/6
	403S17		Z3014, Z8C13FF	X6Cr13		F.8401-AM-X12 Cr13	SUS403, SUS410S, SUS429	403, 410S, 429
	410S21, 410C21, ANC1A		Z12C13, Z12Cr13, Z10C13	X12Cr13, X10Cr13	2302	F.3401-X12 Cr13	SUS 410, JIS SUS 410	410
	430S15, 430S17, 430S18	60	Z8C17, Z6Cr17	X8Cr17	2320	F.3113-X8 Cr17	SUS 430	430
	ANC1B, ANC1C, 420C24, 420C29		Z20C13M				SCS 2	
	420S45		Z40C14, Z40Cr14, Z38C13M, Z44C14	X40Cr14		F.3405-X46 Cr13		420
	431S29, 6S80, S80	57	Z15CN16.02	X16CrNi16	2321	F.3427-X15 CrNi16, F.313, F3427-X19CrNi172	SUS 431, JIS SUS 431	431
			Z10CF17	X10CrS17	2383	F3117-X10CrS17, F3413-X14CrMoS17	SUS 431, SUS430F	430F, J 405 Grade 51435
	434S17		Z8CD17.01	X8CrMo17	2325	F3116-X6CrMo171	SUS 434	434
	425C11, 425C12		Z5CN13.4, Z4CND13.4M, Z6CN13-4, Z8CD17-01	GX6CrNi13 04	2385		SCS 5, SCS 6	CA6. 13/4
	401S45	52	Z45CS9	X45CrSi8		F.3220-X 4 ScrSi 09-03	SUH 1	HNV3
	403S17		Z10C13, Z13C13	X10CrAl12		F.13152-X 10 CrAl13		405
	430S15	60	Z10CAS18, Z12CAS18	X8Cr17		F.3153-X 10 CrAl 18	SUH 21	430
	443S65	59	Z80CSN20.02			F.3222-X 80CrSiNi20-02	SUH 4	HNV6
			Z10CAS24, Z12CAS25	X16Cr26	2322	F.3154-X 10 CrAl24	SUH 446	446
			C105E2U, Y1105	C100KU	1880	F515, F516	SK 3 (TC105)	W110
			Y2120			F.5123 C120		W112
	BL3, 534A99		100Cr6RR, 100C6, Y100C6		2258	F.5230 100 Cr6, F.1310 - 100 Cr6, F.131	SUJ 2, SUJ 4	L3, 52100, L1
	BD3		X200Cr12, Z200C12	X205Cr12KU		F.5212 X210 Cr12	SKD 1, SKS	D3
	BH13		X40CrMoV5, Z40CDV5	X40CrMoV511KU	2242	F.5318 X40 CrMoV5	SKD 61	H13, P20
	BA2		X100CrMoV5, Z100CDV5	X100CrMoV51KU	2260	F.5227 X100 CrMoV5	SKD 12, JIS SKD 12	A2, D2
			105WC13	107WCr5KU	2140	F.5233 105 WCr5, F.523	SKS 2, SKS 3, SKS 31	

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
P	**Tool steels** (continued)						
	P14 / H3	1.2436		X 210 CrW 12	X210CrW12-1, X210CrW12		
	P7 / H2	1.2542		45 WCrV 7	45WCrV8, 45WCrV7		
	P11 / P13	1.2581		X 30 WCrV 9 3	X30WCrV9-3		
	P14 / H3	1.2601		X 165 CrMoV 12	X165CrMoV12		
	P7 / P10 / H1	1.2713		55 NiCrMoV 6	55NiCrMoV6		
	P7 / H3	1.2833		100 V 1	100V1		
	P11 / H3	1.3243		S 6-5-2-5	HS6-5-2-5		
	P11 / H3	1.3255		S 18-1-2-5	HS18-1-2-5		
	P11 / H3	1.3343		S 6-5-2	HS6-5-2		
	P11 / H3	1.3348		S 2-9-2	HS2-9-2		
	P11 / H3	1.3355		S 18-0-1	HS18-0-1		
M	**Stainless and heat-resistant steels**						
	M1	1.4301		X 5 CrNi 18 10	X5CrNi18-10		
	M1	1.4305		X 10 CrNiS 18 9	X8CrNiS18-9		
	M1	1.4306		X 2 CrNi 19 11	X2CrNi19-11		
	M1	1.4308		G-X 6 CrNi 18 9	GX5CrNi19-10		
	M2	1.4310		X 12 CrNi 17 7	X9CrNi18-8, X10CrNi18-8		
	M1	1.4311		X 2 CrNiN 18 10	X2CrNiN18-10		
	M1	1.4401		X 5 CrNiMo 17 12 2	X5CrNiMo17-12-2, X4CrNiMo17-12-2, X5CrNiMo18-10		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
			X210CrW12-1, Z210CW12-01, Z 210 CW 12	X215CrW121KU	2312	F.5213 X210 CrW12, F.521		D6
	BS1		45WCrV8, 45WCrV20	45WCrV8KU	2710	F.5241 45 WCrSi 8, F.524, F524145WCrSi 8		S1
	BH21		X30WCrV9, Z30WCV9	X30WCrV93KU		F.5323 X30 WCrV9	SKD 5	O1, H21
				X165CrMoW12KU	2310	F.5211 X160 CrMoV12		
	BH224					F.528, F520S		L6
	BW2		C105E2UV1, Y1105V, 100V2	102V2KU			SKS 43	W210
	BM35		Z85WDKCV06-05-05-04-02, Z90WDKCV06-05-05-04-02	HS6-5-2-5	2723	F.5613 6-5-2-5	SKH 55	S7, M35
	BT4		Z80WKCV18-05-04-01	HS18-1-1-5		F.5530 18-1-1-5	SKH 3	T4
	BM2		Z85WDCV06-05-04-02	HS6-5-2-5	2722	F.5603 6-5-2	SKH 51	M2
			Z100DCWV09-04-02-02	HS2-9-2	2782	F.5607 2-9-2		M7
	BT1		Z80WCV18-04-01	HS18-0-1		F.5520 18-0-1	SKH 2	T1
	304S15, 304S16, 304S31, 304S11, 304S17, LW21, LWCF21	58E	Z4CN19-10FF, Z5CN17-08, Z6CN18-09, Z7CN18-09	X5CrNi18 10	2332, 233	F.3451-X5 CrNi18-10, F.314, F.3504-X6CrNi19 10, F3504-X5CrNi1810	SUS 304	304, 304H
	303S21, 303S22, 303S31	58M	Z10CNF18.09, Z8CNF18-09	X10CrNiS18 09	2346	F.3508-X10CrNiS18-09	SUS 303, JIS SUS 303	J 405 Grade 30303, 303
	304S11, LW20, LWCF20, S536, T74, 304C12 (LT196), 305S11		Z1CN18-12, Z2CN18-10, Z3CN19.10M, Z3CN18-10, Z3CN19-11, Z3CN19-11FF	X3CrNi18 11, X2CrNi18 11, GX2CrNi19 10	2352	F.3503-X 2CrNi19-10, F3503-X 2CrNi18-10	JIS SCS 19, JIS SUS 304L	304L
	304C15, 304C15 (LT196)		Z6CN18.10M				SCS 13	
	301S21, 301S22, 302S26		Z12CN17.07, Z12CN18.07, Z11CN17-08, Z11CN18-08, Z12CN18-09	X12CrNi17 07	2331	F.3517-X12CrNi17 07	SUS 301	301
	304S62		Z3CN18-07Az, Z3CN18-10AZ	X2CrNiN18 11	2371	F3541-X2CrNiN1810	SUS 304 LN	304LN
	316S13, 316S17, 316S19, 316S31, 316S33, 316S16		Z6CND17.11, Z3CD17-11-01, Z6CND17-11, Z6CND17-11-02FF, Z7CND17-11-02, Z7CND17-12-02	X5CrNiMo17 12	2347	F.3543-X5CrNiMo17-12, F.3543-X6 CrNiMo17-12-03, F3543-X5CrNiMo17-122	SUS 316	316

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
M	**Stainless and heat-resistant steels** (continued)						
	M1	1.4408		G-X 6 CrNiMo 18 10	GX5CrNiMo19-11-2		
	M1	1.4429		X 2 CrNiMoN 17 13 3	X2CrNiMoN17-13-3		
	M1	1.4435		X 2 CrNiMo 18 14 3, X 2 CrNiMo 18 12	X2CrNiMo18-14-3		
	M1	1.4438		X 2 CrNiMo 18 16 4	X2CrNiMo18-15-4		
	M1	1.4460		X 4 CrNiMoN 27 5 2	X3CrNiMoN27-5-2		
	M1	1.4541		X 6 CrNiTi 18 10	X6CrNiTi18-10		
	M1	1.4550		X 6 CrNiNb 18 10	X6CrNiNb18-10		
	M1	1.4571		X 6 CrNiMoTi 17 12 2	X6CrNiMoTi17-12-2		
	M1	DIN 1.4565, 1.4581		G-X 5 CrNiMiNb 18 10	GX5CrNiMoNb19-11-2		
	M1	1.4583		X 10 CrNiMoNb 18 12	X10CrNiMoNb18-12		
	M1	1.4828		X 15 CrNiSi 20 12	X15CrNiSi20-12		
	M2	1.4871		X 53 CrMnNiN 21 9	X53CrMnNiN21-9		
	M1	1.4878		X 12 CrNiTi 18 9	X12CrNiTi18-9, X10CrNiTi18-10		
	Fe-based heat-resistant alloys						
	M1	1.4558		X 2 NiCrAlTi 32 20	X2NiCrAlTi32-20		
	M1	1.4563		X 1 NiCrMoCu 31 27 4	X1NiCrMoCu31-27-4		
	M1	1.4864		X 12 NiCrSi 36 16	X12NiCrSi36-16, X12NiCrSi35-16	Incoloy DS	
	M1	1.4958		X 5 NiCrAlTi31-20	X5NiCrAlTi31-20		
	M1	1.4977			X 40 CoCrNi 20 20		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	316C16, 316C16 (LT196), ANC4B					F.8414-AM-X7 CrNiMo20 10	SCS 14	
	316S62, 316S63		Z2CND17.13Az	X2CrNiMoN17 13	2375	F3543-X2CrNiMoN17133	SUS 316 LN	316LN
	316S11, 316S13, 316S14, 316S31, LW22, LWCF22, 316S12		Z2CND17.13, Z3CND17-12-03, Z3CND18-14-03	X2CrNiMo17 13	2353	F.3533-X2 CrNiMo 17-12-03, F.3534-X6 CrNiMo 17-12-03		316L
	317S12		Z2CND19.15, Z2CND19-15-04, Z3CND19-15-04	X2CrNiMo18 16	2367	F3539-X2CrNiMo18164	SUS 317 L	317L
			Z3CND25-07Az, Z5CND27-05Az		2324	F3309-X8CrNiMo27-05, F3552-X8CrNiMo266	SUS 329 J1	329
	321S12, 321S31, 321S51 (1010, 1105) LW24, LWCF24	58B, 58C	Z6CNT18.10	X6CrNiTi18 11	2337	F.3553-X7 CrNiTi 18-11, F.3523-X 6 CrNiTi 18-11, 09 Ch 18N10T, F3523-X6CrNiTi1810	SUS 321, JIS SUS 321	321, 15/5 PH, 17/4 PH
	347S20, 347S31, 347S51, ANC3B	58F, 58G	Z6CNNb18.10	X6CrNiNb18 11, X8CrNiNb18 11	2338	F.3552-X 7 CrNiNb 18-11, F.3524-X 67 CrNiNb 18-11, F3524-X6CrNiNb1810	SUS 347	347, 13/8 MO
	320S31, 320S17, 320S18	58J	Z6CNDT17.12	X6CrNiMoTi17 12	2350	F.3552-X 6 CrNiMoTi17-12-03, F3535-X6CrNiMoTi17122	SUS 316 Ti	316Ti, 326Ti
	318C17, ANC4C		Z4CNDNb18.12M	GX6crNiMoNb20 11			SCS 22	Nitronic 50.60
				X6CrNiMoNb17 13				
	309S24		Z15CNS20.12, Z17CNS20-12, Z9CN24-13	X16CrNi23 14		F3312-X15CrNiSi20-12	SUH 309	309
	349S54		Z52CMN21.09, Z53CMNS21-09Az, Z53CMN21-09Az	X53CrMnNiN21 9		F.3217-X53 CrMnNiN 21-09	SUH 35, SUH 36	EV8, 2205 Duplex
	321S20, 321S51	58B, 58C	T6CNT18.12 (B), Z6CNT18-10		2337	F.3523-X 6CrNiTi 18 11	SUS 321	321
								N08800 Incoloy 800
								N08028 Alloy 28
	NA17		Z12NCS37.18, Z12NCS35.16, Z20NCS33-16			F.3313-X12 CrNi 36-16	SUH 330	N08830 Alloy 330
			Z 42 CNKDWNb					

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
K	**Grey cast iron**						
	K3	0.6010	EN-JL1010	GG-10, GG 10	EN-GJL-100		
	K3	0.6015	EN-JL1020	GG-15, GG 15	EN-GJL-150		
	K3	0.6020	EN-JL1030	GG-20, GG 20	EN-GJL-200		
	K3	0.6025	EN-JL1040	GG-25, GG 25	EN-GJL-250		
	K4	0.6030	EN-JL1050	GG-30, GG 30	EN-GJL-300		
	K4	0.6035	EN-JL1060	GG-35, GG 35	EN-GJL-350		
	K4	0.6040		GG-40, GG 40	EN-GJL-400		
	K4	0.6660		GGL-NiCr 20 2			
	K4			GG-26Cr, GG 26Cr	EN-GJL-260 Cr		
	K7			GGV 45	EN-GJV-450		
	Ductile cast iron						
	K5	0.7040	EN-JS1030	GGG-40	EN-GJS-400-15		
	K6	0.7050	EN-JS1050	GGG-50	EN-GJS-500-7		
	K6	0.7060	EN-JS1060, EN-JS 1092	GGG-60	EN-GJS-600-3, EN-GJS-600-3U		
	K6	0.7070	EN-JS1070, EN-JS 1102	GGG-70	EN-GJS-700-2, EN-GJS-700-2U		
	Malleable cast iron						
	K1	0.8035	EN-JM 1010	GTW-35, GTW-35-04	GTW-35-04, EN-GJMW-350-4		
	K1	0.8040	EN-JM 1030	GTW-40-05, GTW-40	EN-GJMW-400-5, GTW-40-05		
	K1	0.8045	EN-JM 1040	GTW-45-07, GTW-45	EN-GJMW-450-7		
	K1	0.8135	EN-JM 1130	GTS-35-10, GTS-35	EN-GJMB 350-10		
	K1	0.8145	EN-JM 1140	GTS-45-06, GTS-45	EN-GJMB 450-6, GTS-45-06		
	K1	0.8155	EN-JM 1160	GTS-55-04, GTS-55	EN-GJMB 550-4, GTS-55-04		
	K2	0.8165	EN-JM 1180	GTS 65-02, GTS-65	EN-GJMB 650-2, GTS-65-02		
	K2	0.8170	EN-JM 1190	GTS 70-02, GTS-70	EN-GJMB 700-2, GTS-70-02		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
			Ft10D, FGL100	G10	0110	FG 10	FC 100, FC10	ASTM A-48-76
	Grade 150		Ft15D, FGL150	G15	0115	FG 15	FC 150	NO 20B
	Grade 220		Ft20D, FGL200	G20	0120	FG 20	FC 200, FC20	NO 30B
	Grade 260		Ft25D, FGL250	G25	0125	FG 25	FC25, FC 250	NO 35B
	Grade 300		Ft30D, FGL300	G30	0130	FG 30	FC 300	NO 40B
	Grade 350		Ft35D, FGL350	G35	0135	FG 35	FC 350	NO 55B
	Grade 400		Ft40D, FGL400		0140			
	L-NiCr20 2		L-NC 20 2		0523			
	420 / 12		FGS 400-12	GS400-12	0717		FCD 400, FCD40	60/40/18
	500 / 7		FGS 500-7	GS500-7	0727		FCD 500, FCD50	70/50/05
	600 / 3		FGS 600-3	GS600-3	0732		FCD 600, FCD60	80/55/06
	700 / 2		FGS 700-2	GS700-2	0737		FCD 700, FCD70	100/70/03 120/90/02
	W 35-04		MB 35-7				FCMW 330	
	W 410 / 4		MB 40-10				FCMW 350	
	45-07		MB 45-7				FCMWP 440	
	B 340 / 12		MN 35-10		0815		FCMB 340	32510
	P 440 / 7, P 45-06		MP 50-5		0854			40010
	P 540 / 5, P 55-04		MP 60-3		0856			50005
	P 65-02				0862			60004
	P 70-02		MP 70-2		0862			70003

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
N	**Aluminium alloys**						
	N1	3.0255	EN AW-1050A	Al99.5	Al99.5		
	N4	3.1371	EN AC-21000	G-AlCu4TiMg	G-AlCu4TiMg		
	N2	3.1655	EN AW-2011	AlCuBiPb	AlCu6BiPb		
	N2	3.1734		Y-Legierung	AlCu4Mg1.5Ni2, WL 3.1734		
	N4	3.2371	EN AC-42100	G-AlSi7Mg	G-AlSi7Mg, AlSi7Mg		
	N4	3.2373	EN AC-43300	G-AlSi9Mg	G-AlSi9Mg, AlSi9Mg		
	N4	3.2381	EN AC-43000	G-AlSi10Mg	G-AlSi10Mg, AlSi10Mg		
	N4	3.2382	EN AC-43400	GD-AlSi10Mg	AlSi10Mg(Fe)		
	N4	3.2383	EN AC-43200	G-AlSi10MgCu	G-AlSi10MgCu, AlSi10Mg (Cu)		
	N3	3.2581	EN AC-44200	G-AlSi12	G-AlSi12, AlSi12		
	N3	3.2582	EN AC-44300	GD-AlSi12	GD-AlSi12, AlSi12 (Fe)		
	N3	3.2583	EN AC-47000	G-AlSi12 (Cu)	G-AlSi12 (Cu)		
	N2	3.3315	EN AW-5005A	AlMg1	AlMg1C		
	N3	3.3561	EN AC-51300	G-AlMg5	G-AlMg5		
	N2	3.4345	EN AW-7022	AlZnMgCu0.5	AlZnMgCu0.5		
	N4	DIN 3.3211					
	N4	DIN 3.4365					
	Copper alloys						
	N7	2.0240	CW502L	CuZn15	CuZn15	Medium red tombac, gold tombac	
	N7	2.0265	CW505L	CuZn30	CuZn30	Half tombac, soldered brass, cartridge brass, polished copper, metarsic	
	N7	2.0321	CW508L	CuZn37	CuZn37	Pressed brass, etching quality, tuned brass, soft brass, stamped brass	
	N7	2.0592	CC765S	G-CuZn35Al1, GK-CuZn35Al1, GZ-CuZn35Al1	CuZn35Mn2Al1Fe1-C		
	N7	2.0596	CC764S	G-CuZn34Al2, GK-CuZn34Al2, GZ-CuZn34Al2	CuZn34Mn3Al2Fe1-C		
	N7	2.0966	CW307G	CuAl10Ni5Fe4	CuAl10Ni5Fe4		
	N7	2.0975	CC333G	G-CuAl11Ni, G-CuAl10Ni	G-CuAl11Ni		
	N7	2.1050	CC480K	G-CuSn10Zn	CuSn10-C		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	1B		A5	4507	4007	L-3051	A1x1, A1050	1050A
			A-U5GT			L-2140	AC1B	B26
	FC1		A-U5PbBi	6362	4355	L-3182	A2011	2011
	LM14		A-U4NT	3045		L-2150	AC5A	
	2L99, LM25		A-S7G0.3	7257	4244	L-2651	AC4C, JIS AC4 CH (AL 9)	B25
			A7-S10G	3051	4253		AC4A, JIS AC4 A (AL 4)	A13560
	LM9		A-S10G	3051	4253	L-2560, L-2561	JIS AC4 A (AL 4V)	A13600
	LM9		A-S10G	3051	4253	L-2560, L-2561	AC4A	
			A-S9GU				JIS ADC3 (AL 4)	A360.2
	LM6		A-S13	4514	4261	L-2520, L-2521	AC3A	A413.2
	LM6, LM20		A-S13, A-S12	4514, G-AlSi13	4261	L-2520, 21	AC3A	A413.0
	LM20		A-S12U	3048	4260	L-2530	ADC1 (AK 12), AC3A (AL 12)	413.1
	N41		A-G0, 6	5764	4106	L-3350	A2x8, A5005	5005A
	N6, LM5		A-G6	3058	4146	L-3320	JIS AC7A (AL28)	5056A, 514.1
			A-Z5GU0.6					
								6061-T6
								7075-T6
	CZ 102		CuZn15				C2300	C23000
	CZ 106		CuZn30				C2600	C26000
	CZ 108		CuZn37				C2720	C27400
	HTB 1							C86500
								C86200
	CA 104		CuAl9Ni5Fe3Mn, U-A10N					C63000
	AB2		CuAl11Ni5Fe	G-CuAl11Fe4Ni4				B-148-52
	G1, CT1							C90700

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
	Copper alloys (continued)						
	N7	2.1052	CC483K	G-CuSn12, GZ-CuSn12, GC-CuSn12	CuSn12-C		
	N9	2.1090	CC493K	G-CuSn7ZnPb, GZ-CuSn7ZnPb, GC-CuSn7ZnPb	CuSn7Zn4Pb7-C	Red brass 7	
	N9	2.1096	CC491K	G-CuSn5ZnPb	CuSn5Zn5Pb5-C	Red brass 5	
	N9	2.1098	CC490K	G-CuSn2ZnPb	CuSn3Zn8Pb5-C	Alloy 5A	
	N9	2.1176	CC495K	G-CuPb10Sn, GZ-CuPb10Sn, GC-CuPb10Sn	CuSn10Pb10-C		
	N9	2.1182	CC496K	G-CuPb15Sn, GZ-CuPb15Sn, GC-CuPb15Sn	CuSn7Pb15-C		
	N9	2.1188	CC497K	G-CuPb20Sn	CuSn5Pb20-C		
	N7	2.1293	CW106C	CuCrZr	CuCr1Zr		
	N7			CuAl6.5Fe2.5Sn0.25		AMPCO 8	
	N7					AMPCO 6	
	N10			CuAl13Fe4.5		AMPCO 21	
	N10					AMPCO 26	
N	**Magnesium-based alloys**						
	N6	3.5101	EN-MC35110	G-MgZn 4 SE 1 Zr 1	EN-MCMgZn4RE1Zr, G-MgZn4SE1Zr1		
	N6	3.5103	EN-MC65120	G-MgSE 3 Zn 2 Zr 1	EN-MCMgRE3Zn2Zr, G-MgSE3Zn2Zr1		
	N6	3.5106	EN-MC65210	G-MgAg 3 SE 2 Zr 1	EN-MCMgRE2Ag2Zr, G-MgAg3SE2Zr1		
	N6	3.5161		MgZn6Zr, MgZn 6 Zr F 29	MgZn6Zr, MgZn6Zr F29		
	N6	3.5200		MgMn2	MgMn2		
	N6	3.5312		MgAl3Zn	MgAl3Zn		
	N6	3.5470	EN-MC21320	MgAl4Si1	EN-MCMgAl4Si		
	N6	3.5612		MgAl6Zn	MgAl6Zn		
	N6	3.5632	EN-MC21150	G-MgAl 6 Zn 3	G-MgAl6Zn3	AZ63	
	N6	3.5662		G-MgAl 6	G-MgAl6		
	N6	3.5812	EN-MC21110	G-MgAl 8 Zn 1	G-MgAl8Zn1	AZ81 hp	
	N6	3.5912	EN-MC21120	GD-MgAl 9 Zn 1	GD-MgAl9Zn1	AZ91	

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	Pb2		A53-707, CuSn12					Amcoloy 712, B505
			CuSn7Pb6Zn4					C93200
	LG2		CuPb5Sn5Zn5					C83600
	LG1							
	LB2		CuPb10Sn10					C93700
	LB1							C93800
	LB5		CuPb20Sn5					C94100
	CC 102			CuCrZr				C18200
								AMPCO 8
								AMPCO 6
								AMPCO 21
								AMPCO 26
	RZ5, MAG5, MAG9, TZ6		G-Z4TR, ZH62					ZE41
	ZRE1, MAG6		G-TR3Z2					EZ33
	MSR, QE22		G-Ag2, 5					QE22
	ZW1, ZW3, ZW6, ZW21, MAG 161, MAG 131, MAG 141, MAG 151							M1
	MAG 101, AM503		G-M2					
	AZ31, MAG 111		G-A3Z1, AZ31					52, 510
			G-A4S1					
	MAG121, AZM		G-A6Z1, AZ61					520, 531
			AZ63					
	MAG1, MAG2, AZ80, AZ81, A8		G-A9, AZ81	AZ81 hp			AZ81 hp	AZ81
	AZ91, MAG3, MAG7		G-A9Z1, AZ91	AZ91 hp				HK31

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
S	**Titanium and titanium alloys**						
	S6	3.7025		Ti 1	Ti 99.8	TitaniumGrade1	
	S7	3.7115.1		TiAl 5 Sn 2	TiAl5Sn2.5		
	S6	3.7124		TiCu2	TiCu2		
	S7	3.7164, 3.7165		TiAl 6 V 4	TiAl6V4	TitaniumGrade5	
	Ni/Co-based heat-resistant alloys						
	S3	2.4360		NiCu30Fe	NiCu30	Monel 400	
	S4	2.4375		NiCu30Al	NiCu30Al3Ti	Monel K500	
	S3	2.4630		NiCr20Ti		Nimonic 75	
	S3	2.4642		NiCr30Fe		Inconel 690, Alloy 690	
	S4	2.4668		NiCr19Fe19NbMo, NiCr19Fe19Nb5Mo3, NiCr19NbMo	NiCr19Nb5Mo3	Inconel 718, Udimet 630	
	S4	2.4669		NiCr15Fe7TiAl, Alloy X-750	NiCr15Fe7Ti2Al	Inconel X-750, Alloy X-750	
	S3	2.4856		NiCr22Mo9Nb, Alloy 625	NiCr22Mo9Nb	Inconel 625	
	S3	2.4858		NiCr21Mo, Alloy 825	NiFe30Cr21Mo3	Incoloy 825	
	S4	DIN 2.4698					
	S4	DIN 2.4654					
H	**Hardened cast iron**						
	H4	0.9640		G-X300CrMoNi1521	GX300CrMoNi15-2-1		
	H4	0.9645		G-X260CrMoNi2021	GX260CrMoNi20-2-1		
	H4	0.9650		G-X260Cr27	GX260Cr27		
	H4	0.9655		G-X300CrMo271	GX300CrMo27-1		
	Chilled cast iron						
	H4	0.9620		G-X260NiCr42	GX260NiCr42	Ni-Hard 2	
	H4	0.9625		G-X330NiCr42	GX330NiCr42	Ni-Hard 1	
	H4	0.9630		G-X300CrNiSi952	GX300CrNiSi952	Ni-Hard 4	
	H4	0.9635		G-X300CrMo153	GX300CrMo15-3		

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
	TA.1		T-35			Ti-P01		R2050
								R54620
	TA.21, TA.22, TA.23, TA.24, TA.52, TA.53, TA.54, TA.55, TA.58		T-U2			Ti-P11		
	TA.10, TA.11, TA.12, TA.13, TA.28, TA.56		T-A6V			Ti-P63		4911, 4928, 4935, 4954, 4965, 4967, 6AL4V
	3072-76, NA13		NU30					Monel 400
	3072-76, HC202, 3146, Na18							AMS 4676, Monel K500
	HR5, 703 B, 203-4		NC 20 T					Nitronic 75, Nimonic 90/120
								Inconel 690
	HR 8		NC 19 FeNb					Inconel 718
	HR 505		NC 15 FeTNb					5542G, Inconel X-750
			NC 22 FeDNB					Incoloy 825
	3072-76		NC 21 FeDU					
								Hastelloy C
								Waspaloy
	Grade3A, Grade3B, BS4844							
	Grade3C							
	Grade3D				0466			A532111A 25% CR
	Grade3E							A532111A 25% CR
	Grade2A, BS4844 (1986) 2A				0512			Ni-Hard 2
	Grade2B, BS4844 (1986) 2B				0513			Ni-Hard 1
	Grade2C, Grade2D, Grade2E, BS4844 (1986) 2E				0457			Ni-Hard 4
	Grade3A;B, Grade3B							

Material comparison table

Material group	Machining group	Germany					
		Mat. no. DIN	Mat. no. DIN EN	DIN	DIN EN	Manufacturer designation	
0	**Thermosetting plastics**						
	02					EP, Epoxid, Epoxy	
	02					Bakelite	
	02					Pertinax	
	02					Resitex	
	Thermoplastics						
	01					PMMA, Polymethylmetacrylate, Plexiglas, Acrylic glass	
	01					PC, Polycarbonate, Makrolon	
	01					PA, Polyacrylamide	

	Great Britain		France	Italy	Sweden	Spain	Japan	USA
	B.S.	EN	AFNOR	UNI	SS	UNE	JIS	AISI / SAE
								Epoxy, Bakelite
								Phenolic
								Phenolic W/Glass
								Resitex
								Plexiglas, Acrylic, Polycarbonate
								UHMW
								Acetal Plastics, Delrin, Celcon, Teflon, Nylon

Hardness comparison table
Tensile strength, Brinell, Vickers and Rockwell hardness (extract from DIN 50150)

Tensile strength R_m N/mm²	Vickers hardness HV	Brinell hardness HB	Rockwell hardness HRC
255	80	76,0	
270	85	80,7	
285	90	85,5	
305	95	90,2	
320	100	95,0	
335	105	99,8	
350	110	105	
370	115	109	
385	120	114	
400	125	119	
415	130	124	
430	135	128	
450	140	133	
465	145	138	
480	150	143	
495	155	147	
510	160	152	
530	165	156	
545	170	162	
560	175	166	
575	180	171	
595	185	176	
610	190	181	
625	195	185	
640	200	190	
660	205	195	
675	210	199	
690	215	204	
705	220	209	
720	225	214	
740	230	219	
755	235	223	
770	240	228	20,3
785	245	233	21,3
800	250	238	22,2
820	255	242	23,1
835	260	247	24,0
850	265	252	24,8
865	270	257	25,6
880	275	261	26,4
900	280	266	27,1
915	285	271	27,8
930	290	276	28,5
950	295	280	29,2
965	300	285	29,8
995	310	295	31,0
1030	320	304	32,2
1060	330	314	33,3
1095	340	323	34,4
1125	350	333	35,5
1155	360	342	36,6
1190	370	352	37,7
1220	380	361	38,8
1255	390	371	39,8
1290	400	380	40,8
1320	410	390	41,8
1350	420	399	42,7
1385	430	409	43,6
1420	440	418	44,5
1455	450	428	45,3
1485	460	437	46,1
1520	470	447	46,9
1555	480	(456)	47,7
1595	490	(466)	48,4
1630	500	(475)	49,1
1665	510	(485)	49,8
1700	520	(494)	50,5
1740	530	(504)	51,1
1775	540	(513)	51,7
1810	550	(523)	52,3
1845	560	(532)	53,0
1880	570	(542)	53,6
1920	580	(551)	54,1
1955	590	(561)	54,7
1995	600	(570)	55,2
2030	610	(580)	55,7
2070	620	(589)	56,3
2105	630	(599)	56,8
2145	640	(608)	57,3
2180	650	(618)	57,8
	660		58,3
	670		58,8
	680		59,2
	690		59,7
	700		60,1
	720		61,0
	740		61,8
	760		62,5
	780		63,3
	800		64,0
	820		64,7
	840		65,3
	860		65,9
	880		66,4
	900		67,0
	920		67,5
	940		68,0

Any hardness values converted on the basis of this table will be approximate only. See DIN 50150.
Values in brackets are theoretically calculated values.

Material property	Unit / test method	Symbol
Tensile strength	N/mm²	R_m
Vickers hardness	Diamond pyramid 136° Testing force F ≥ 98 N	HV
Brinell hardness Calculated from: HB = 0.95 × HV	$0.102 \times F/D^2 = 30$ N/mm² F = testing force in N D = sphere diameter in mm	HB
Rockwell hardness C	Diamond cone 120° Overall testing force 1471 ± 9 N	HRC

ISO tolerances

Nominal size range in mm	Tolerances* for external dimensions																
	d11	e8	h5	h6	h7	h8	h9	h10	h11	h12	p7	js14	js16	k6	k10	k11	k12
> 3	−20 −80	−14 −28	0 −4	0 −6	0 −10	0 −14	0 −25	0 −40	0 −60	0 −100	+16 +6	+125 −125	+300 −300	+6 0	+40 0	+60 0	+100 0
> 3 ≤ 6	−30 −105	−20 −38	0 −5	0 −8	0 −12	0 −18	0 −30	0 −48	0 −75	0 −120	+24 +12	+150 −150	+375 −375	+9 +1	+48 0	+75 0	+120 0
> 6 ≤ 10	−40 −130	−25 −47	0 −6	0 −9	0 −15	0 −22	0 −36	0 −58	0 −90	0 −150	+30 +15	+180 −180	+450 −450	+10 +1	+58 0	+90 0	+150 0
> 10 ≤ 18	−50 −160	−32 −59	0 −8	0 −11	0 −18	0 −27	0 −43	0 −70	0 −110	0 −180	+36 +18	+215 −215	+550 −550	+12 +1	+70 0	+110 0	+180 0
> 18 ≤ 30	−65 −195	−40 −73	0 −9	0 −13	0 −21	0 −33	0 −52	0 −84	0 −130	0 −210	+43 +22	+260 −260	+650 −650	+15 +2	+84 0	+130 0	+210 0
> 30 ≤ 50	−80 −240	−50 −89	0 −11	0 −16	0 −25	0 −39	0 −62	0 −100	0 −160	0 −250	+51 +26	+310 −310	+800 −800	+18 +2	+100 0	+160 0	+250 0
> 50 ≤ 80	−100 −290	−60 −106	0 −13	0 −19	0 −30	0 −46	0 −74	0 −120	0 −190	0 −300	+62 +32	+370 −370	+950 −950	+21 +2	+120 0	+190 0	+300 0
> 80 ≤ 120	−120 −340	−72 −126	0 −15	0 −22	0 −35	0 −54	0 −87	0 −140	0 −220	0 −350	+72 +37	+435 −435	+1100 −1100	+25 +3	+140 0	+220 0	+350 0
> 120 ≤ 180	−145 −395	−85 −148	0 −18	0 −25	0 −40	0 −63	0 −100	0 −160	0 −250	0 −400	+83 +43	+500 −500	+1250 −1250	+28 +3	+160 0	+250 0	+400 0
> 180 ≤ 250	−170 −460	−100 −172	0 −20	0 −29	0 −46	0 −72	0 −115	0 −185	0 −290	0 −460	+96 +50	+575 −575	+1450 −1450	+33 +4	+185 0	+290 0	+460 0

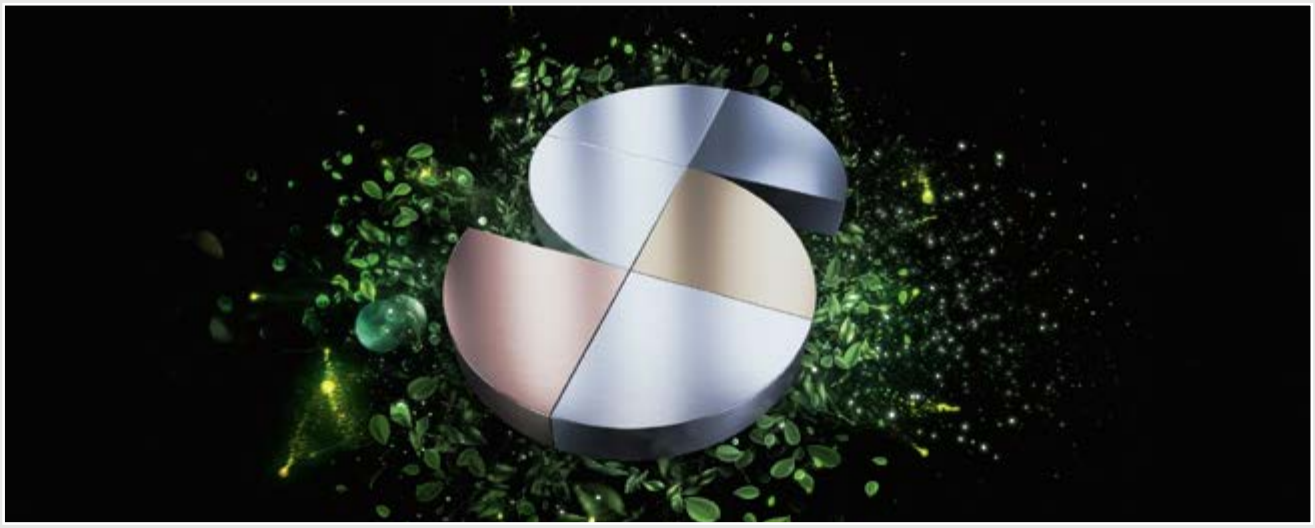
Nominal size range in mm	Tolerances* for external dimensions
	z9
> 3	+51 +26
> 3 ≤ 6	+65 +35
> 6 ≤ 10	+78 +42
> 10 ≤ 14	+93 +50
> 14 ≤ 18	+103 +60
> 18 ≤ 24	+125 +73
> 24 ≤ 30	+140 +88
> 30 ≤ 40	+174 +112
> 40 ≤ 50	+196 +136
> 50 ≤ 65	+246 +172
> 65 ≤ 80	+284 +210
> 80 ≤ 100	+345 +258
> 100 ≤ 120	+397 +310
> 120 ≤ 140	+465 +365
> 140 ≤ 160	+515 +415
> 160 ≤ 180	+565 +465
> 180 ≤ 200	+635 +520

Nominal size range in mm	Tolerances* for internal dimensions			
	H6	H7	H11	H12
> 3	+6 0	+10 0	+60 0	+0,10 0
> 3 ≤ 6	+8 0	+12 0	+75 0	+0,12 0
> 6 ≤ 10	+9 0	+15 0	+90 0	+0,15 0
> 10 ≤ 18	+11 0	+18 0	+110 0	+0,18 0
> 18 ≤ 30	+13 0	+21 0	+130 0	+0,21 0
> 30 ≤ 50	+16 0	+25 0	+160 0	+0,25 0
> 50 ≤ 80	+19 0	+30 0	+190 0	+0,30 0
> 80 ≤ 120	+22 0	+35 0	+220 0	+0,35 0
> 120 ≤ 180	+25 0	+40 0	+250 0	+0,40 0
> 180 ≤ 250	+29 0	+46 0	+290 0	+0,46 0

* Tolerances in µm in accordance with DIN ISO 286

Tiger·tec® Gold

tigertec-gold.walter



Sustainable products and services – certified and transparent

Walter is a company that takes responsibility for people and the environment. Sustainability is a central component of our corporate strategy. It pervades our products and business divisions and is reviewed and certified by independent third parties on a regular basis.

Proven to be produced to high standards

All processes, procedures, methods and instruments that we use are checked and certified by an independent body according to strict criteria. Occupational health and safety, quality assurance and environmentally friendly actions (for example through resource-saving, energy-efficient and CO_2-offset production) are examples of this. Our social commitment shows that Walter has a broader definition of responsibility.

Transparency throughout the entire process chain – for your peace of mind

The integrated management system at Walter includes the sustainable use of resources and production equipment as well as of people – our customers, partners and employees. So that you can count on all of our products meeting these requirements throughout the entire process chain, we apply our own benchmarks to our suppliers too.

Certification

The integrated management system at Walter includes certification in accordance with:

- ISO 9001 (Quality management)
- VDA 6.4 (Production equipment for the automotive industry)
- ISO 14001 (Environmental management)
- ISO 45001 (Occupational health and safety management)
- ISO 50001 (Energy management)

You can find more information on Walter certification here:

Occupational health and safety
Walter protects its employees against health hazards. To prevent accidents, we continuously review our processes and take proactive measures as a precaution.

Environmental and energy management
Environmental protection is an important company objective for Walter. We use energy efficiently and deploy practical methods to sustainably reduce the consumption of energy, water and resources.

Quality management
Walter is continuously improving its products and processes. We ensure our product quality using effective measures and procedures – and check it on a regular basis with our comprehensive quality management system.

Walter AG

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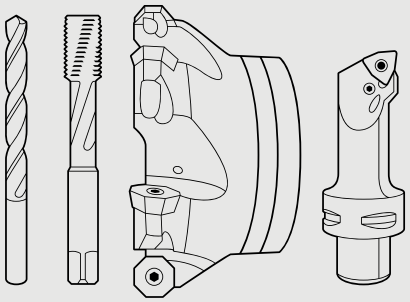

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