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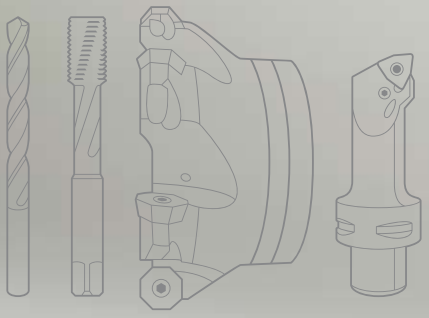

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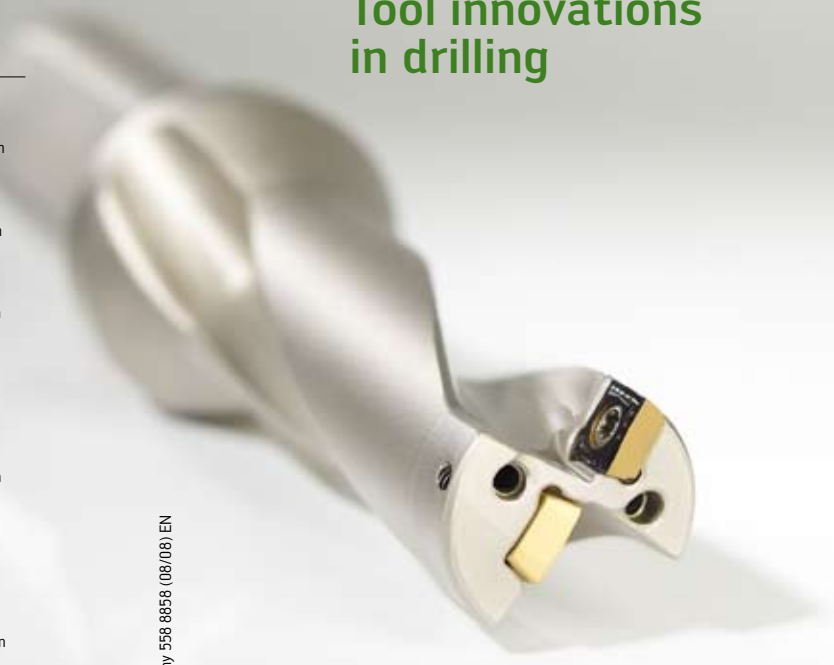
WALTER

Product handbook

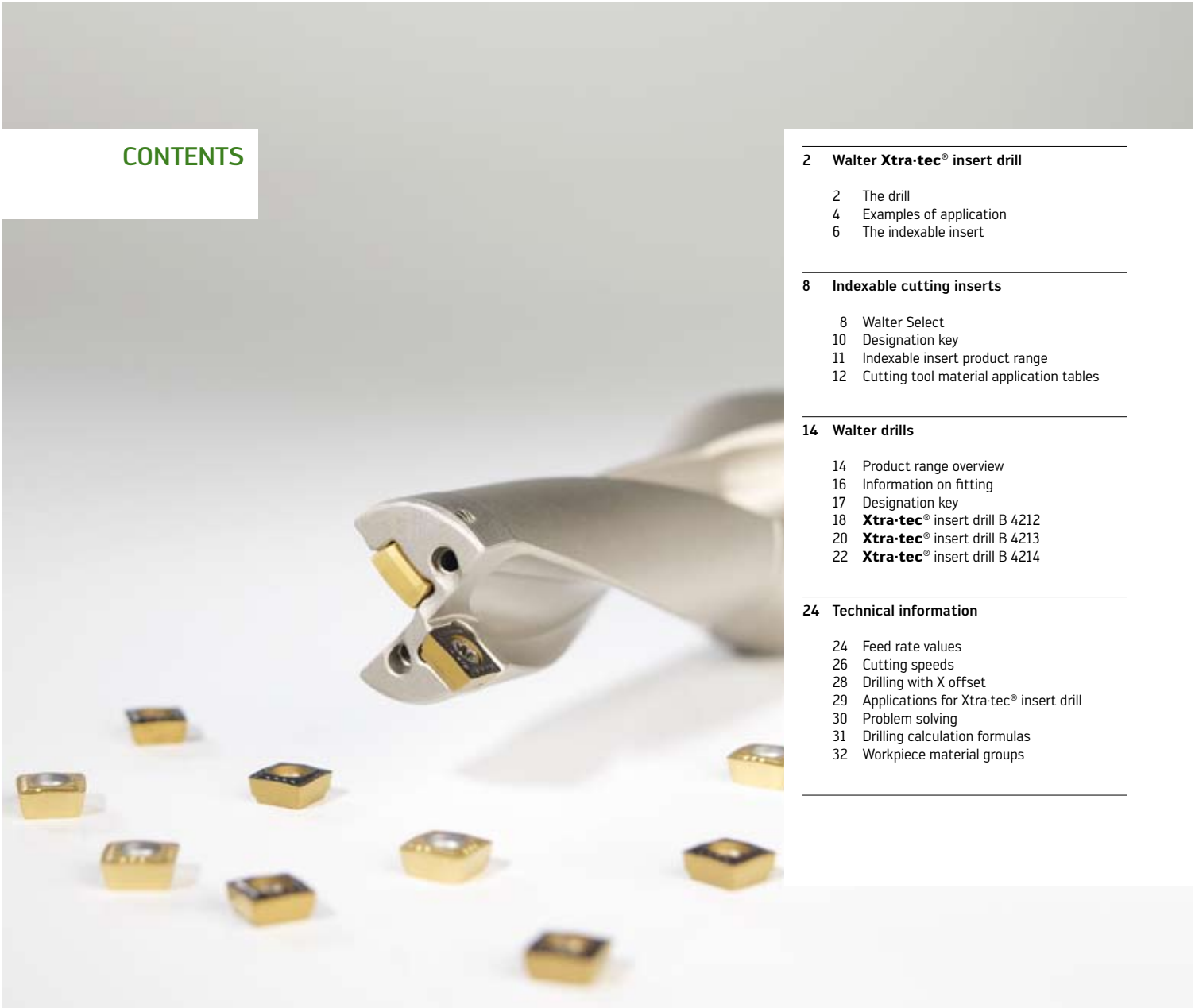
Drilling

_ WALTER XTRA·TEC® INSERT DRILL

Tool innovations in drilling



CONTENTS



Walter Xtra·tec® insert drill: extremely accurate, extremely efficient, extremely cost-effective

THE TOOL

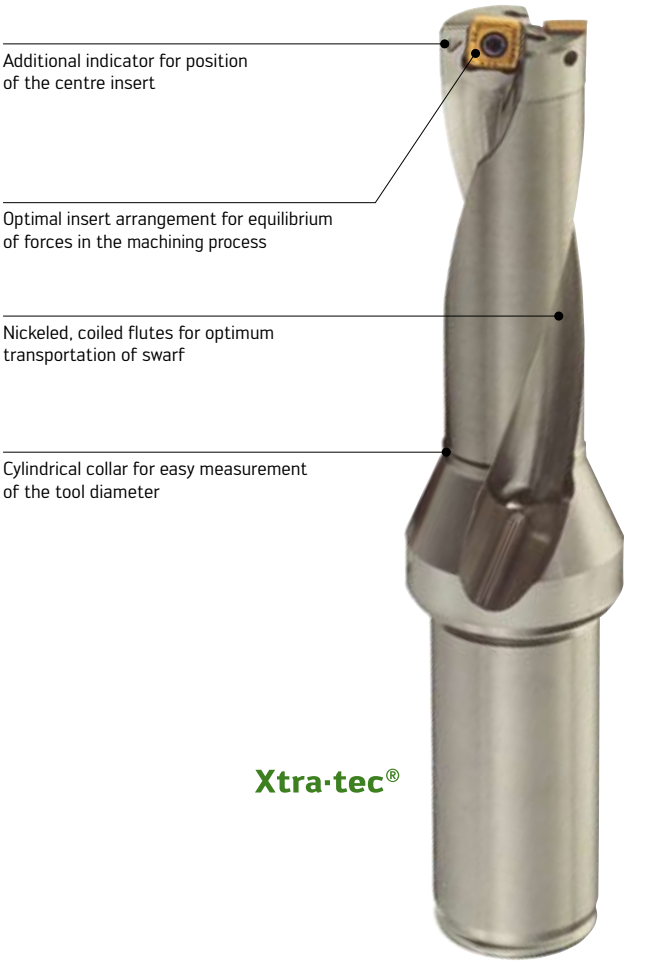
– Drills with four-sided indexable inserts
– Z = 1 effective
– Bore depths of 2–4 x D
– Diameter range of 16.5–35 mm
– Ideal insert position ensures equilibrium of forces during the machining process
– Optimised swarf area for better swarf removal and stable drill body
– Hard nickeled surface provides protection against corrosion and wear and ensures better swarf escape, improved handling and more clamping and loosening torque thanks to Torx Plus screws
– Cylindrical collar for easy measurement of the tool diameter

THE APPLICATIONS

– For all steel and cast materials as well as for stainless or hard-to-machine materials
– For drilling from solid starting bores on sloping or convex surfaces, chain drilling
– Perfectly suitable for general mechanical engineering, the automobile and mass production industries as well as for the aerospace industry

THE BENEFITS

– Increased production of workpiece volumes
– Low drilling tolerances due to optimum equilibrium of forces
– Excellent surface finish thanks to wiper edge on the bore diameter
– Cost reduction:
  • 4 actual cutting edges per insert
  • Higher cutting parameters
  • Fewer additional follow-up operations
– High level of process reliability thanks to non-positive clamping of the insert



Xtra·tec® insert drill B 4213

Application example 1: machining a gearbox housing

Tool:

Designation:	B4213.F32.028.Z01.84R
Indexable insert:	P4840P-4R-E57 / P4841C-4R-E57
Cutting material:	WKP35 / WXP 45
Diameter:	28 mm

Workpiece:

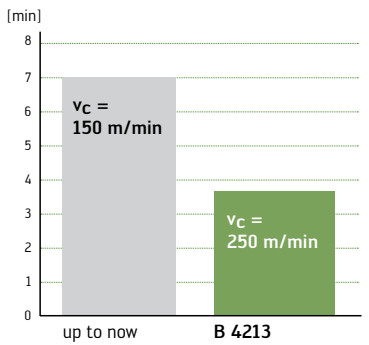
Designation:	gearbox housing
Material:	GG25 / 220 N/mm²
Bore depth:	80 mm (12 bores per component)

Cutting data:

	existing	Walter Xtra·tec insert drill
v_C =	150 m/min	250 m/min
f_Z =	0.08 mm	0.12 mm
Z =	1	1

The benefit:
– Cutting distance increased from 4 m to 10 m
– More free machine capacity
– Higher productivity (55 %)
– Achieve more work pieces with process reliability

Machining time / component



RESULT:

55 % HIGHER PRODUCTIVITY

Application example 2: machining a magnet housing

Tool:

Designation:	B4213.F25.023.Z01.069R
Indexable insert:	P4840P-3R-E57 / P4841C-3R-E57
Cutting material:	WSP45 / WXP45
Diameter:	23.6 mm (0.3 mm off centre)
Stationary use on lathe	

Workpiece:

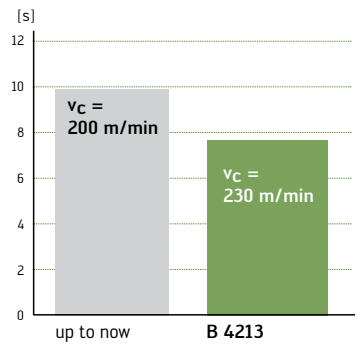
Designation:	magnet housing
Material:	C15 (1.0401) / 450–500 N/mm²
Bore depth:	31 mm

Cutting data:

	existing	Walter Xtra·tec insert drill
v_C =	200 m/min	230 m/min
f_Z =	0.07 mm	0.07 mm
Z =	1	1

The benefit:
– 15 % higher cutting speed
– With same tool edge life (15.5 m)
– No vibrations
– Better surface finish

Machining time / bore



RESULT:

15 % HIGHER CUTTING SPEED

Walter Xtra·tec® insert drill: extremely accurate, extremely efficient, extremely cost-effective

Tiger·tec®

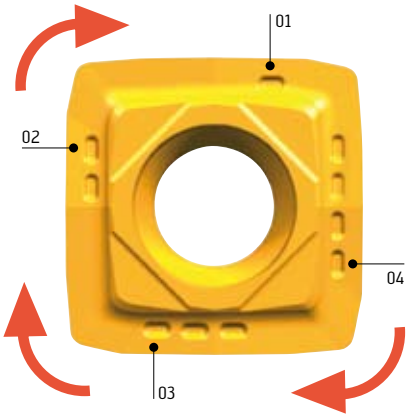
The outer insert

– Wiper edge on the bore diameter
– Circumference of indexable insert fully ground
– Ensures excellent surface finish
– Available in various **Tiger·tec®** cutting material for maximum cutting speeds

The centre insert

– Optimisation phase to minimise the overlap
– Indexable insert fully sintered
– Ensures optimum centring of the tool
– Designed in an extremely tough PVD cutting material for a higher feed rate (gold)

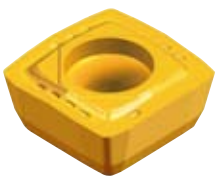
Cutting edge for 1st to 4th use



The indexable insert

– Indentations in the rake face indicate the number of the cutting edge
– The shape of the indentations differentiates the variations in geometry

Geometry variations



A 57 – the stable insert

– 0° rake angle
– For unfavourable machining conditions, mainly for cast and steel mill materials

E 57 – the universal insert

– 13° rake angle
– For average machining conditions
– For cast materials and steel, though also for stainless and hard-to-machine materials

Walter Select

for indexable cutting inserts for drilling:
Step by step guide to the best indexable cutting insert

_ STEP 01

Determine the **material to be machined:**

Groups of the materials to be machined		Identification letters	Machining group*
Steel	All types of steel and cast steel, with the exception of steel with an austenitic structure	**P**	1–13
Stainless steel	Stainless, austenitic steel and austenitic-ferritic steel and cast steel	**M**	14
Cast iron	Grey cast iron, cast iron with spheroidal graphite, malleable cast iron, cast iron with vermicular graphite	**K**	15–20
NE metals	Aluminium and all other non-ferrous metals, non-ferrous materials	**N**	21–30
High temperature alloys and titanium alloys	Heat resisting special alloys based on iron, nickel and cobalt, titanium and titanium alloys	**S**	31–37
Hard materials	Hardened steel, hardened cast iron materials, chilled cast iron	**H**	38–40

* The allocation of the machining groups can be found in the Walter complete catalogue from page 798.

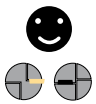
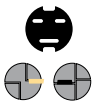
_ STEP 02

Select the **machining conditions:**

Entry/exit conditions	Machine stability, clamping system and workpiece		
	Excellent	Good	Moderate
Entry/exit level			
Normal cast and forged inclines ≤ 5°			
Pronounced entry/exit inclines > 5° cross holes			

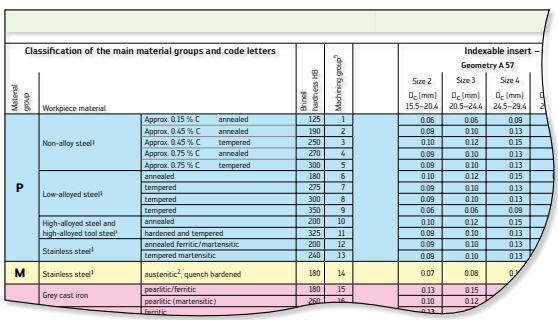
_ STEP 03

Determine your optimum **cutting material/geometry combination** starting from the material (step 01) and machining conditions (step 02):

Workpiece material		Indexable insert geometry	Indexable insert cutting material					
								
P	1–8	A57	WKP 25	WXP 45	WKP 35	WXP 45	WSP 45	WXP 45
		E57	WKP 25	WXP 45	WKP 35	WXP 45	WSP 45	WXP 45
	9–13	A57	WKP 35	WXP 45	WSP 45	WXP 45		
		E57	WKP 35	WXP 45	WSP 45	WXP 45		
M	14	A57	WSP 45	WXP 45	WSP 45	WXP 45	WSP 45	WXP 45
		E57	WSP 45	WXP 45	WSP 45	WXP 45	WSP 45	WXP 45
K	15–20	A57	WKP 25	WXP 45	WKP 25	WXP 45	WKP 35	WXP 45
		E57	WKP 25	WXP 45	WKP 25	WXP 45	WKP 35	WXP 45
N	21–30	A57	WSP 45	WXP 45				
		E57	WSP 45	WXP 45				
S	31–37	A57	WSP 45	WXP 45	WSP 45	WXP 45		
		E57	WSP 45	WXP 45	WSP 45	WXP 45		

_ STEP 04

Select the **cutting data** in the Technical information, see page 24 onwards.



Classification of the main material groups and code letters

Material group	Workpiece material			Brinell hardness HB	Machining group[2]	Indexable insert – Geometry A 57 Size 2 D_w (mm) 15.5–20.4	Size 3 D_w (mm) 20.5–24.4	Size 4 D_w (mm) 24.5–29.4
P	Non-alloy steel[1]	Approx. 0.15 % C	annealed	125	1	0.06	0.06	0.09
		Approx. 0.45 % C	annealed	190	2	0.09	0.10	0.13
		Approx. 0.45 % C	tempered	250	3	0.10	0.12	0.15
		Approx. 0.75 % C	annealed	270	4	0.09	0.10	0.13
		Approx. 0.75 % C	tempered	300	5	0.09	0.10	0.13
	Low-alloyed steel[1]		annealed	180	6	0.10	0.12	0.15
			tempered	275	7	0.09	0.10	0.13
			tempered	300	8	0.09	0.10	0.13
			tempered	350	9	0.06	0.06	0.09
	High-alloyed steel and high-alloyed tool steel[1]		annealed	200	10	0.10	0.12	0.15
			hardened and tempered	325	11	0.09	0.10	0.13
	Stainless steel[1]		annealed ferritic/martensitic	200	12	0.09	0.10	0.13
			tempered martensitic	240	13	0.09	0.10	0.13
M	Stainless steel[1]		austenitic[2], quench hardened	180	14	0.07	0.08	0.1
	Grey cast iron		pearlitic/ferritic	180	15	0.13	0.15	
			pearlitic (martensitic)	260	16	0.10	0.12	
			ferritic			0.13		

P 484 indexable inserts.
Designation keys

Walter Index-able insert designation

C Centre insert

P Outer insert

R right-hand cutting

Walter Grade of cutting material

P 484 0 P–2 R – A57 WKP 25

0 Ground

1 Sintered

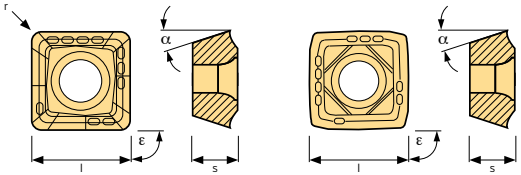
2 Insert size

Walter geometry

A 57 The stable insert

E 57 The universal insert

P 484 indexable inserts.
for Xtra·tec® insert drill



Indexable inserts

	Designation	Cutting edges	l mm	s mm	r mm	α	ε	Tiger·tec® P HC WKP 25	P HC WKP 35	P HC WSP 45	M HC WSP 45	K HC WKP 25	K HC WKP35	S HC WSP 45	HC WXP 45
	P 4840P-2R – A 57	4	5.52	2.38	0.3	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-3R – A 57	4	6.50	2.80	0.4	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-4R – A 57	4	7.80	3.36	0.5	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-5R – A 57	4	9.56	4.12	0.6	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-2R – E 57	4	5.52	2.38	0.3	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-3R – E 57	4	6.50	2.80	0.4	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-4R – E 57	4	7.80	3.36	0.5	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4840P-5R – E 57	4	9.56	4.12	0.6	11°	90°	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	P 4841C-2R – A 57	4	5.95	2.38	0.3	11°	90°								Δ
	P 4841C-3R – A 57	4	7.00	2.80	0.4	11°	90°								Δ
	P 4841C-4R – A 57	4	8.40	3.36	0.5	11°	90°								Δ
	P 4841C-5R – A 57	4	10.29	4.12	0.6	11°	90°								Δ
	P 4841C-2R – E 57	4	5.95	2.38	0.3	11°	90°								Δ
	P 4841C-3R – E 57	4	7.00	2.80	0.4	11°	90°								Δ
	P 4841C-4R – E 57	4	8.40	3.36	0.5	11°	90°								Δ
	P 4841C-5R – E 57	4	10.29	4.12	0.6	11°	90°								Δ

HC = coated carbide

Cutting tool material application tables

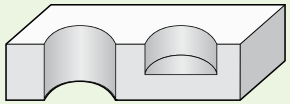
Cutting materials for drilling

WALTER Cutting material designation	Standard designation	Workpiece material group P Steel	M Stainless steel	K Cast iron	N NF metals	S Hard-to-machine materials	H Hard materials	Application range 01 05 10 15 20 25 30 35 40 45	Coating process	Coating structure
WKP 25	HC – P 25	●●							CVD	$TiCN + Al_2O_3$ (+TiN)
	HC – K 25			●●						
WKP 35	HC – P 35	●●							CVD	$TiCN + Al_2O_3$ (+TiN)
	HC – K 35			●●						
WSP 45	HC – P 45	●●							PVD	$TiAlN + Al_2O_3$ (ZrCN)
	HC – M 45		●●							
	HC – S 45					●●				
WXP 45	HC – P 45	●●	●●	●●		●●			PVD	Multilayer TiAlN / TiN

HC = coated carbide

●● Main application
● Additional application

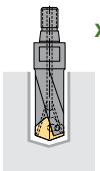
Walter drill product range



L_C = 1 x D_C

D_C [mm]
12–25

B 4011 (R)
L_C 1.3 x D_C
(page 114)

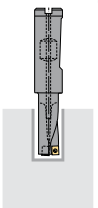


Xtra·tec®

L_C = 2 x D_C

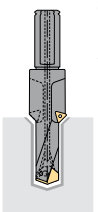
D_C [mm]
10–18

B 3212 (R)
(page 280)



D_C [mm]
12–29

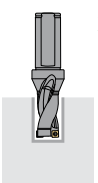
B 4012C (R)
(page 116)



Xtra·tec®

D_C [mm]
16.5–35

B 4212 (R)
(page 18)

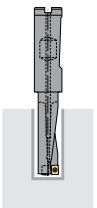


Xtra·tec®

L_C = 3 x D_C

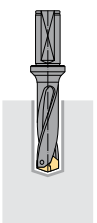
D_C [mm]
10–18

B 3213 (R)
(page 284)



D_C [mm]
12–31

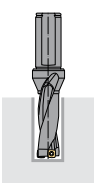
B 4013 (R)
(page 290)



Xtra·tec®

D_C [mm]
16.5–35

B 4213 (R)
(page 20)

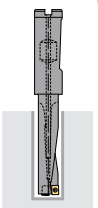


Xtra·tec®

L_C = 4 x D_C

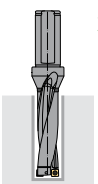
D_C [mm]
10–18

B 3214 (R)
(page 284)



D_C [mm]
17–35

B 4214 (R)
(page 22)

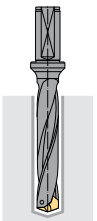


Xtra·tec®

L_C = 5 x D_C

D_C [mm]
12–31

B 4015 (R)
(page 300)

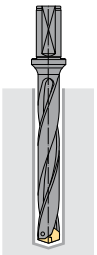


Xtra·tec®

L_C = 7 x D_C

D_C [mm]
12–31

B 4017 (R)
(page 304)



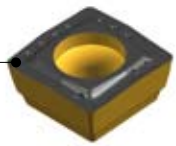
Xtra·tec®

The page details in brackets refer to the Walter complete catalogue or supplementary catalogue.

Information about fitting

Outer insert
P 484 . P

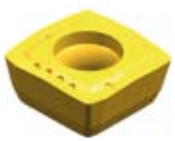
Tiger·tec®



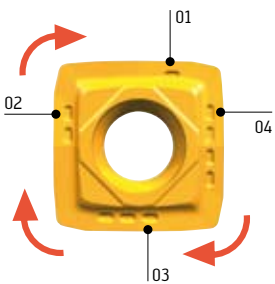
All outer inserts are Tiger·tec® indexable inserts

Centre insert
P 484 . C

Symbol for centre insert



All centre inserts are coloured gold



Use
Cutting edge for 1st to 4th use

Designation key for Xtra·tec® insert drill

Walter tool designation	Shank variants and diameters, e.g.: **F 25** metric, dia. 25 **UF 31** inch, dia. 31	effective number of teeth	**R** clockwise version

B 421 2. F25. 24. Z1. 048 R -3

- **2** 2 x D_C
- **3** 3 x D_C
- **4** 4 x D_C

Nominal diameter [mm]

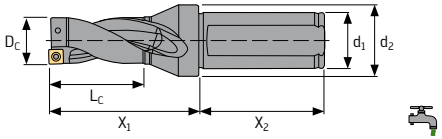
Bore depth [mm]

for insert size

Walter Xtra·tec® insert drill B 4212

Drill, diameter range 16,5–35 mm

RH-cutting, drill depth 2 x D_C



Xtra·tec®

Designation	D_C mm	d_1 mm	d_2 mm	X_1 mm	X_2 mm	L_C mm	kg	No. of inserts	Type
B 4212.F25.16.5.Z1.033R-2	16.5	25	32	58	56	33	0.30	2	
B 4212.F25.17.Z1.034R-2	17.0	25	32	59	56	34	0.31	2	1 x
B 4212.F25.17.5.Z1.035R-2	17.5	25	32	60	56	35	0.32	2	P 484 . P–2R
B 4212.F25.18.Z1.036R-2	18.0	25	32	61	56	36	0.33	2	+
B 4212.F25.18.5.Z1.037R-2	18.5	25	32	62	56	37	0.34	2	1 x
B 4212.F25.19.Z1.038R-2	19.0	25	32	63	56	38	0.34	2	P 484 . C–2R
B 4212.F25.19.5.Z1.039R-2	19.5	25	32	64	56	39	0.35	2	
B 4212.F25.20.Z1.040R-2	20.0	25	32	65	56	40	0.35	2	
B 4212.F25.20.5.Z1.041R-3	20.5	25	32	66	56	41	0.36	2	
B 4212.F25.21.Z1.042R-3	21.0	25	32	67	56	42	0.36	2	1 x
B 4212.F25.21.5.Z1.043R-3	21.5	25	32	68	56	43	0.37	2	P 484 . P–3R
B 4212.F25.22.Z1.044R-3	22.0	25	32	69	56	44	0.37	2	+
B 4212.F25.22.5.Z1.045R-3	22.5	25	32	70	56	45	0.38	2	1 x
B 4212.F25.23.Z1.046R-3	23.0	25	32	71	56	46	0.38	2	P 484 . C–3R
B 4212.F25.23.5.Z1.047R-3	23.5	25	32	72	56	47	0.39	2	
B 4212.F25.24.Z1.048R-3	24.0	25	32	73	56	48	0.40	2	
B 4212.F25.24.5.Z1.049R-4	24.5	25	32	74	56	49	0.40	2	
B 4212.F25.25.Z1.050R-4	25.0	25	32	75	56	50	0.40	2	
B 4212.F32.25.5.Z1.051R-4	25.5	32	40	83	60	51	0.50	2	1 x
B 4212.F32.26.Z1.052R-4	26.0	32	40	84	60	52	0.50	2	P 484 . P–4R
B 4212.F32.26.5.Z1.053R-4	26.5	32	40	85	60	53	0.60	2	+
B 4212.F32.27.Z1.054R-4	27.0	32	40	86	60	54	0.70	2	1 x
B 4212.F32.27.5.Z1.055R-4	27.5	32	40	87	60	55	0.70	2	P 484 . C–4R
B 4212.F32.28.Z1.056R-4	28.0	32	40	88	60	56	0.80	2	
B 4212.F32.28.5.Z1.057R-4	28.5	32	40	89	60	57	0.90	2	
B 4212.F32.29.Z1.058R-4	29.0	32	40	90	60	58	0.90	2	
B 4212.F32.29.5.Z1.059R-5	29.5	32	40	91	60	59	0.90	2	
B 4212.F32.30.Z1.060R-5	30.0	32	40	92	60	60	0.92	2	1 x
B 4212.F32.31.Z1.062R-5	31.0	32	40	94	60	62	0.92	2	P 484 . P–5R
B 4212.F32.32.Z1.064R-5	32.0	32	40	96	60	64	0.95	2	+
B 4212.F32.33.Z1.066R-5	33.0	32	40	98	60	66	0.95	2	1 x
B 4212.F32.34.Z1.068R-5	34.0	32	40	100	60	68	1.00	2	P 484 . C–5R
B 4212.F32.35.Z1.070R-5	35.0	32	40	102	60	70	1.00	2	

Drill bodies, assembly parts and accessories are included in the scope of delivery.

Caution: when through-holes are drilled, a disc of material is thrown off as the tool exits while still rotating. Please implement safety measures.

Assembly parts		for D_C [mm] 16.5 -20	20.5–24	24.5–29	29.5–35
	Clamping screw for insert	FS 2111 (Torx 7 IP)	FS 1454 (Torx 8 IP)	FS 1457 (Torx 9 IP)	FS 2080 (Torx 15 IP)
	Tightening torque	0.9 Nm	1.2 Nm	2.0 Nm	2.5 Nm

Accessories	for D_C [mm] 16.5–20	20.5–24	24.5–29	29.5–35
Torque screwdriver	FS 2001	FS 2001	FS 2003	FS 2003
Interchangeable blade	FS 2011	FS 2012	FS 2013	FS 2014
Screwdriver	FS 2088 (Torx 7 IP)	FS 1483 (Torx 8 IP)	FS 1484 (Torx 9 IP)	FS 1485 (Torx 15 IP)

Indexable inserts

	Designation	Size	Tiger·tec® P WKP 25	P WKP 35	P WSP 45	M WSP 45	K WKP 25	K WKP35	S WSP 45	S HC WXP 45
Outer insert	P 4840P – . R – A 57	2–5	☺	😐	☹	😐	😐	☹	😐	
	P 4840P – . R – E 57	2–5	☺	😐	☹	☹	😐	☹	☹	
Centre insert	P 4841C – . R – A 57	2–5								Δ
	P 4841C – . R – E 57	2–5								Δ

WALTER SELECT

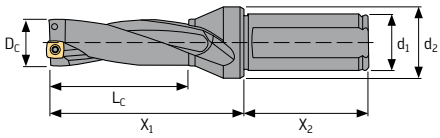
Best indexable insert for:

☺ good ; 😐 average ; ☹ unfavourable machining conditions

Walter Xtra·tec® insert drill B 4213

Drill, diameter range 16.5–35 mm

RH-cutting, drill depth 3 x D_C



Xtra·tec®

Designation	D_C mm	d_1 mm	d_2 mm	X_1 mm	X_2 mm	L_C mm	kg	No. of inserts	Type
B 4213.F25.16.5.Z1.049R-2	16.5	25	32	75	56	49	0.34	2	
B 4213.F25.17.Z1.051R-2	17.0	25	32	76	56	51	0.35	2	
B 4213.F25.17.5.Z1.052R-2	17.5	25	32	77	56	52	0.35	2	1 x
B 4213.F25.18.Z1.054R-2	18.0	25	32	79	56	54	0.35	2	P 484 . P–2R
B 4213.F25.18.5.Z1.055R-2	18.5	25	32	80	56	55	0.35	2	+
B 4213.F25.19.Z1.057R-2	19.0	25	32	82	56	57	0.36	2	1 x
B 4213.F25.19.5.Z1.058R-2	19.5	25	32	84	56	58	0.37	2	P 484 . C–2R
B 4213.F25.20.Z1.060R-2	20.0	25	32	85	56	60	0.38	2	
B 4213.F25.20.5.Z1.061R-3	20.5	25	32	87	56	61	0.39	2	
B 4213.F25.21.Z1.063R-3	21.0	25	32	88	56	63	0.40	2	1 x
B 4213.F25.21.5.Z1.064R-3	21.5	25	32	90	56	64	0.41	2	P 484 . P–3R
B 4213.F25.22.Z1.066R-3	22.0	25	32	91	56	66	0.42	2	+
B 4213.F25.22.5.Z1.067R-3	22.5	25	32	93	56	67	0.43	2	1 x
B 4213.F25.23.Z1.069R-3	23.0	25	32	94	56	69	0.43	2	P 484 . C–3R
B 4213.F25.23.5.Z1.070R-3	23.5	25	32	96	56	70	0.44	2	
B 4213.F25.24.Z1.072R-3	24.0	25	32	97	56	72	0.44	2	
B 4213.F25.24.5.Z1.073R-4	24.5	25	32	99	56	73	0.45	2	
B 4213.F25.25.Z1.075R-4	25.0	25	32	100	56	75	0.50	2	
B 4213.F32.25.5.Z1.076R-4	25.5	32	40	109	60	76	0.70	2	1 x
B 4213.F32.26.Z1.078R-4	26.0	32	40	110	60	78	0.70	2	P 484 . P–4R
B 4213.F32.26.5.Z1.079R-4	26.5	32	40	112	60	79	0.74	2	+
B 4213.F32.27.Z1.081R-4	27.0	32	40	113	60	81	0.75	2	1 x
B 4213.F32.27.5.Z1.082R-4	27.5	32	40	115	60	82	0.77	2	P 484 . C–4R
B 4213.F32.28.Z1.084R-4	28.0	32	40	116	60	84	0.80	2	
B 4213.F32.28.5.Z1.085R-4	28.5	32	40	118	60	85	0.80	2	
B 4213.F32.29.Z1.087R-4	29.0	32	40	119	60	87	0.80	2	
B 4213.F32.29.5.Z1.088R-5	29.5	32	40	121	60	88	0.82	2	
B 4213.F32.30.Z1.090R-5	30.0	32	40	122	60	90	0.85	2	1 x
B 4213.F32.31.Z1.093R-5	31.0	32	40	125	60	93	0.85	2	P 484 . P–5R
B 4213.F32.32.Z1.096R-5	32.0	32	40	128	60	96	0.90	2	+
B 4213.F32.33.Z1.099R-5	33.0	32	40	131	60	99	0.93	2	1 x
B 4213.F32.34.Z1.102R-5	34.0	32	40	134	60	102	0.95	2	P 484 . C–5R
B 4213.F32.35.Z1.105R-5	35.0	32	40	137	60	105	1.00	2	

Drill bodies, assembly parts and accessories are included in the scope of delivery.

Caution: when through-holes are drilled, a disc of material is thrown off as the tool exits while still rotating. Please implement safety measures.

Assembly parts

	for D_C [mm] 16.5 -20	20.5–24	24.5–29	29.5–35
Clamping screw for insert	FS 2111 (Torx 7 IP)	FS 1454 (Torx 8 IP)	FS 1457 (Torx 9 IP)	FS 2080 (Torx 15 IP)
Tightening torque	0.9 Nm	1.2 Nm	2.0 Nm	2.5 Nm

Accessories

	for D_C [mm] 16.5 -20	20.5–24	24.5–29	29.5–35
Torque screwdriver	FS 2001	FS 2001	FS 2003	FS 2003
Interchangeable blade	FS 2011	FS 2012	FS 2013	FS 2014
Screwdriver	FS 2088 (Torx 7 IP)	FS 1483 (Torx 8 IP)	FS 1484 (Torx 9 IP)	FS 1485 (Torx 15 IP)

Indexable inserts

	Designation	Size	Tiger·tec® P WKP 25	P WKP 35	P WSP 45	M HC WSP 45	K HC WKP 25	K HC WKP35	S HC WSP 45	S HC WXP 45
Outer insert	P 4840P – . R – A 57	2–5	☺	😐	☹	😐	😐	☹	😐	
	P 4840P – . R – E 57	2–5	☺	😐	☹	☹	😐	☹	☹	
Centre insert	P 4841C – . R – A 57	2–5								Δ
	P 4841C – . R – E 57	2–5								Δ

WALTER SELECT

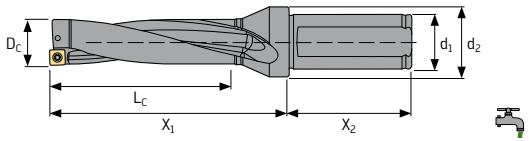
Best indexable insert for:

☺ good ; 😐 average ; ☹ unfavourable machining conditions

Walter Xtra·tec® insert drill B 4214

Drill, diameter range 17–35 mm

RH-cutting, drill depth 4 x D_C



Designation	D_C mm	d_1 mm	d_2 mm	X_1 mm	X_2 mm	L_C mm	kg	No. of inserts	Type
B 4214.F25.17.Z1.068R-2	17	25	32	93	56	68	0,34	2	1 x P 484 . P–2R + 1 x P 484 . C–2R
B 4214.F25.18.Z1.072R-2	18	25	32	97	56	72	0,36	2	
B 4214.F25.19.Z1.076R-2	19	25	32	101	56	76	0,38	2	
B 4214.F25.20.Z1.080R-2	20	25	32	105	56	80	0,40	2	
B 4214.F25.21.Z1.084R-3	21	25	32	109	56	84	0,42	2	1 x P 484 . P–3R + 1 x P 484 . C–3R
B 4214.F25.22.Z1.088R-3	22	25	32	113	56	88	0,45	2	
B 4214.F25.23.Z1.092R-3	23	25	32	117	56	92	0,47	2	
B 4214.F25.24.Z1.096R-3	24	25	32	121	56	96	0,50	2	
B 4214.F25.25.Z1.100R-4	25	25	32	125	56	100	0,52	2	1 x P 484 . P–4R + 1 x P 484 . C–4R
B 4214.F32.26.Z1.104R-4	26	32	40	136	60	104	0,80	2	
B 4214.F32.27.Z1.108R-4	27	32	40	140	60	108	0,83	2	
B 4214.F32.28.Z1.112R-4	28	32	40	144	60	112	0,86	2	
B 4214.F32.29.Z1.116R-4	29	32	40	148	60	116	0,90	2	
B 4214.F32.30.Z1.120R-5	30	32	40	152	60	120	0,93	2	1 x P 484 . P–5R + 1 x P 484 . C–5R
B 4214.F32.31.Z1.124R-5	31	32	40	156	60	124	0,95	2	
B 4214.F32.32.Z1.128R-5	32	32	40	160	60	128	1,00	2	
B 4214.F32.33.Z1.132R-5	33	32	40	164	60	132	1,05	2	
B 4214.F32.34.Z1.136R-5	34	32	40	168	60	136	1,07	2	
B 4214.F32.35.Z1.140R-5	35	32	40	172	60	140	1,20	2	

Drill bodies, assembly parts and accessories are included in the scope of delivery.

Caution: when through-holes are drilled, a disc of material is thrown off as the tool exits while still rotating. Please implement safety measures.

Xtra·tec®

Assembly parts		for D_C [mm] 17 -20	21–24	25–29	30–35
	Clamping screw for insert	FS 2111 (Torx 7 IP)	FS 1454 (Torx 8 IP)	FS 1457 (Torx 9 IP)	FS 2080 (Torx 15 IP)
	Tightening torque	0.9 Nm	1.2 Nm	2.0 Nm	2.5 Nm

Accessories	for D_C [mm] 17 -20	21–24	25–29	30–35
Torque screwdriver	FS 2001	FS 2001	FS 2003	FS 2003
Interchangeable blade	FS 2011	FS 2012	FS 2013	FS 2014
Screwdriver	FS 2088 (Torx 7 IP)	FS 1483 (Torx 8 IP)	FS 1484 (Torx 9 IP)	FS 1485 (Torx 15 IP)

Indexable inserts

	Designation	Size	Tiger·tec® P	P HC	P HC	M	M HC	K	K HC	S	S HC	HC
			WKP 25	WKP 35	WSP 45	WSP 45	WSP 45	WKP 25	WKP35	WSP 45	WSP 45	WXP 45
Outer insert	P 4840P – . R – A 57	2–5	☺	😐	☹	😐	😐	😐	☹	😐	😐	
	P 4840P – . R – E 57	2–5	☺	😐	☹	☹	😐	😐	☹	☹	☹	
Centre insert	P 4841C – . R – A 57	2–5										Δ
	P 4841C – . R – E 57	2–5										Δ

WALTER SELECT

Best indexable insert for:

☺ good · 😐 average · ☹ unfavourable

machining conditions

Feed rate values for Xtra·tec® insert drill

Material group	Workpiece material			Brinell hardness HB	Machining group[5]	Indexable insert – initial value for feed rate f [mm/U] Geometry A 57 Size 2 D_C [mm] 15.5–20.4	Geometry A 57 Size 3 D_C [mm] 20.5–24.4	Geometry A 57 Size 4 D_C [mm] 24.5–29.4	Geometry A 57 Size 5 D_C [mm] 29.5–35	Geometry E 57 Size 2 D_C [mm] 15.5–20.4	Geometry E 57 Size 3 D_C [mm] 20.5–24.4	Geometry E 57 Size 4 D_C [mm] 24.5–29.4	Geometry E 57 Size 5 D_C [mm] 29.5–35
P	Non-alloy steel[1]	Approx. 0.15 % C	annealed	125	1	0.06	0.06	0.09	0.12	0.06	0.06	0.09	0.12
		Approx. 0.45 % C	annealed	190	2	0.09	0.10	0.13	0.18	0.07	0.08	0.11	0.17
		Approx. 0.45 % C	tempered	250	3	0.10	0.12	0.15	0.18	0.08	0.10	0.13	0.17
		Approx. 0.75 % C	annealed	270	4	0.09	0.10	0.13	0.18	0.07	0.08	0.11	0.17
		Approx. 0.75 % C	tempered	300	5	0.09	0.10	0.13	0.18	0.07	0.08	0.11	0.17
	Low-alloyed steel[1]	annealed		180	6	0.10	0.12	0.15	0.20	0.08	0.10	0.13	0.19
		tempered		275	7	0.09	0.10	0.13	0.15	0.07	0.08	0.11	0.14
		tempered		300	8	0.09	0.10	0.13	0.15	0.07	0.08	0.11	0.14
		tempered		350	9	0.06	0.06	0.09	0.12	0.06	0.06	0.09	0.11
	High-alloyed steel and high-alloyed tool steel[1]	annealed		200	10	0.10	0.12	0.15	0.18	0.08	0.10	0.13	0.17
		hardened and tempered		325	11	0.09	0.10	0.13	0.15	0.07	0.08	0.11	0.14
	Stainless steel[1]	annealed ferritic/martensitic		200	12	0.09	0.10	0.13	0.15	0.07	0.08	0.11	0.14
		tempered martensitic		240	13	0.09	0.10	0.13	0.15	0.07	0.08	0.11	0.14
M	Stainless steel[1]	austenitic[2], quench hardened		180	14	0.07	0.08	0.10	0.13	0.07	0.08	0.10	0.13
K	Grey cast iron	pearlitic/ferritic		180	15	0.13	0.15	0.18	0.23	0.10	0.12	0.15	0.22
		pearlitic (martensitic)		260	16	0.10	0.12	0.15	0.20	0.08	0.09	0.12	0.19
	Cast iron with spheroidal graphite	ferritic		160	17	0.13	0.15	0.18	0.23	0.10	0.12	0.15	0.22
		pearlitic		250	18	0.10	0.12	0.18	0.23	0.08	0.09	0.12	0.22
	Malleable cast iron	ferritic		130	19	0.13	0.15	0.18	0.23	0.10	0.12	0.15	0.22
		pearlitic		230	20	0.10	0.12	0.15	0.20	0.08	0.09	0.12	0.19
N	Aluminium wrought alloys	can not be hardened		60	21					0.09	0.10	0.12	0.14
		precipitation hardenable, precipitation hardened		100	22					0.09	0.10	0.12	0.17
	Cast aluminium alloys	≤ 12 % Si, not precipitation hardenable		75	23					0.10	0.12	0.15	0.17
		≤ 12 % Si, precipitation hardenable, precipitation hardened		90	24					0.10	0.12	0.15	0.17
		> 12 % Si, not precipitation hardenable		130	25					0.10	0.12	0.15	0.17
	Copper and copper alloys (Bronze/brass)	Machining alloys, Pb > 1 %		110	26					0.12	0.14	0.17	0.22
		Brass, red brass		90	27					0.12	0.14	0.17	0.22
		Bronze, lead-free copper and electrolytic copper		100	28					0.12	0.14	0.17	0.22
	Non-metallic materials	Curable plastics, fibre-reinforced plastics			29					0.13	0.15	0.18	0.20
		Hard rubber			30								
S	Heat-resistant alloys	Fe base	annealed	200	31	0.08	0.09	0.12	0.15	0.06	0.07	0.10	0.13
			hardened	280	32	0.06	0.06	0.09	0.12	0.06	0.06	0.09	0.11
		Ni or Co base	annealed	250	33	0.08	0.09	0.12	0.15	0.06	0.07	0.10	0.12
			hardened	350	34	0.06	0.06	0.09	0.12	0.06	0.06	0.09	0.11
			cast	350	35	0.06	0.06	0.09	0.12	0.06	0.06	0.09	0.11
	Titanium alloys	Pure titanium		400[3]	36								
		Alpha and beta alloys, precipitation hardened		1050[3]	37	0.08	0.09	0.12	0.14	0.06	0.07	0.10	0.12

[1] and cast steel
[2] and austenitic / ferritic
[3] Rm: tensile strength in MPa = N/mm²
[4] HRC: Rockwell hardness C
[5] The allocation of the machining groups can be found in the Walter complete catalogue from page 798.

When using drills with a drilling depth > 3 x D, the following reductions are recommended:
Cutting speed: –20 % / feed rate when starting bore: –30 %
Feed rate when starting bore on sloping surfaces: –50 %

Cutting speed for Xtra·tec® insert drill

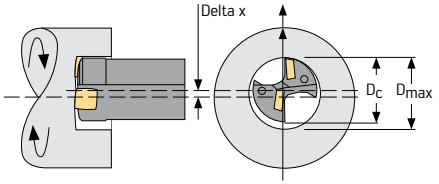
Material group	Workpiece material			Brinell hardness HB	Machining group[5]		Grades of cutting material – initial value for cutting speed vc [m/min]								
							WKP 25 f [mm/U]			WKP 35 f [mm/U]			WSP 45 f [mm/U]		
							0.06	0.10	0.16	0.06	0.10	0.16	0.06	0.10	0.16
P	Non-alloy steel[1]	Approx. 0.15 % C	annealed	125	1		350	320		300	270		250	220	
		Approx. 0.45 % C	annealed	190	2		260	240	220	220	200	180	170	160	150
		Approx. 0.45 % C	tempered	250	3		240	220	200	200	180	150	150	140	130
		Approx. 0.75 % C	annealed	270	4		220	200	180	180	150	140	140	130	120
		Approx. 0.75 % C	tempered	300	5		190	170	150	150	130	120	130	120	110
	Low-alloyed steel[1]	annealed		180	6		260	240	220	220	200	180	170	160	160
		tempered		275	7		240	220	200	200	180	150	150	140	130
		tempered		300	8		220	200	180	190	170	140	150	130	120
		tempered		350	9		200	180	170	180	150	140	150	130	120
	High-alloyed steel and high-alloyed tool steel[1]	annealed		200	10		220	200	180	200	170	150	140	130	120
		hardened and tempered		325	11		180	170	150	200	140	130	130	120	110
	Stainless steel[1]	annealed ferritic/martensitic		200	12					190	170	150	140	130	120
		tempered martensitic		240	13					180	140	130	130	120	110
M	Stainless steel[1]	austenitic[2], quench hardened		180	14					220	200		180	170	
K	Grey cast iron	pearlitic/ferritic		180	15		200	190	170	220	200	180	180	160	130
		pearlitic (martensitic)		260	16		150	130	110	180	150	130	150	130	110
	Cast iron with spheroidal graphite	ferritic		160	17		140	120	110	150	140	130	150	130	120
		pearlitic		250	18		120	110	100	140	130	120	120	110	110
	Malleable cast iron	ferritic		130	19		200	190	170	220	200	180	180	150	130
		pearlitic		230	20		140	130	120	200	150	130	140	130	120
N	Aluminium wrought alloys	can not be hardened		60	21								500	500	500
		precipitation hardenable, precipitation hardened		100	22								450	450	450
	Cast aluminium alloys	≤ 12 % Si, not precipitation hardenable		75	23								300	300	300
		≤ 12 % Si, precipitation hardenable, precipitation hardened		90	24								250	250	250
		> 12 % Si, not precipitation hardenable		130	25								200	200	200
	Copper and copper alloys (Bronze/brass)	Machining alloys, Pb > 1 %		110	26								350	300	250
		Brass, red brass		90	27								300	250	200
		Bronze, lead-free copper and electrolytic copper		100	28								300	250	200
	Non-metallic materials	Curable plastics, fibre-reinforced plastics			29								300	300	300
		Hard rubber			30										
S	Heat-resistant alloys	Fe base	annealed	200	31		100	100		100	100		90	90	
			hardened	280	32		80	80		80	80		70	70	
		Ni or Co base	annealed	250	33		60	60		60	60		50	50	
			hardened	350	34		50	50		50	50		40	40	
			cast	350	35		50	50		50	50		40	40	
	Titanium alloys	Pure titanium		400[3]	36										
		Alpha and beta alloys, precipitation hardened		1050[3]	37								50	45	

[1] and cast steel
[2] and austenitic / ferritic
[3] Rm: tensile strength in MPa = N/mm²
[4] HRC: Rockwell hardness C
[5] The allocation of the machining groups can be found in the Walter complete catalogue from page 798.

Drilling with X offset

$$D = D_C + 2 \cdot X$$

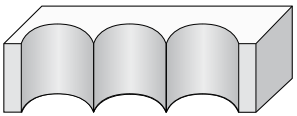
Drill: stationary
Workpiece: rotating



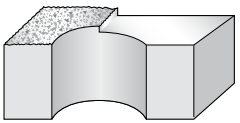
Insert size	D_C [mm]	Range 1 Delta x [mm]	Range 1 D_{max} [mm]	Range 2* Delta x_{max} [mm]	Range 2* D_{max} [mm]
2	16.5	0.6	17.7	0.9	18.3
	17	0.5	18	0.75	18.5
	17.5	0.35	18.2	0.6	18.7
	18	0.3	18.6	0.55	19.1
	18.5	0.2	18.9	0.45	19.4
	19	0.15	19.3	0.4	19.8
	19.5	0.07	19.64	0.3	20.1
	20	0	20	0.25	20.5
3	20.5	0.35	21.2	0.7	21.9
	21	0.3	21.6	0.6	22.2
	21.5	0.17	21.84	0.45	22.4
	22	0.15	22.3	0.45	22.9
	22.5	0.02	22.54	0.3	23.1
	23	0	–	0.3	23.6
	23.5	0	–	0.18	23.86
	24	0	–	0.15	24.3
4	24.5	0.5	25.5	0.85	26.2
	25	0.35	25.7	0.75	26.5
	25.5	0.25	26	0.6	26.7
	26	0.15	26.3	0.55	27.1
	26.5	0.05	26.6	0.4	27.3
	27	0	–	0.4	27.8
	27.5	0	–	0.25	28
	28	0	–	0.25	28.5
	28.5	0	–	0.12	28.74
	29	0	–	0.1	29.2
5	29.5	0.7	30.9	1.1	31.7
	30	0.6	31.2	1.0	32
	31	0.45	31.9	0.8	32.6
	32	0.3	32.6	0.7	33.4
	33	0.15	33.3	0.5	34
	34	0	–	0.4	34.8
	35	0	–	0.3	35.6

Range 1: under normal conditions
Range 2: only achievable under optimum conditions
* Circumference indexable insert can only be used 3 times

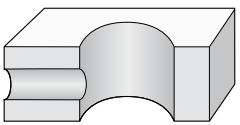
Possible applications for Xtra·tec® insert drill



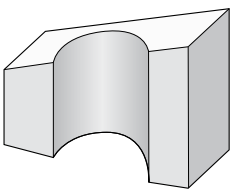
Overlap drilling
If problems occur,
→ reduce feed rate by 30 %



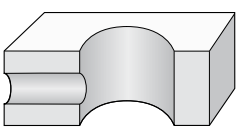
Rough and stepped surfaces
If the entry drill angle > 30°,
→ reduce feed rate by 50 %



Interrupted cut
Problems with interrupted cut
→ feed rate < 30 %



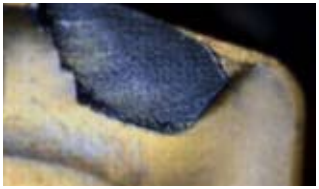
Angled entry drilling
Reduce feed rate by 30 % during entry



Cross-holes
Reducing feed rate by 30 % achieves best results

Stack drilling
is not possible

Problem solving



Inner cutting edge breaks

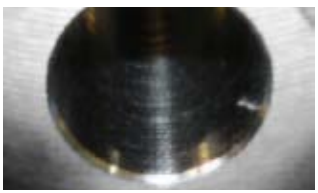
→ Check machine alignment (lathe)
→ Check workpiece clamping and ensure that the tool has maximum stability
→ Use heavier-duty grades of carbide
→ Reduce feed rate values by 50→70 %

Swarf removal not ideal

→ Select indexable inserts with optimum geometry
→ Increase coolant pressure
→ Increase cutting speed by 20 %
→ Optimised swarf control through ~10 % higher feed rate

Excessive cutter wear

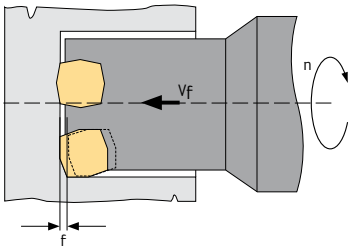
→ Reduce cutting speed by 20 %
→ Increase coolant pressure
→ Use a more wear-resistant grade of carbide, e.g. WKP 25 instead of WKP 35



Poor-quality surface finish

→ Increase coolant pressure
→ Improve workpiece and tool clamping
→ Increase cutting speed by 20 %
→ Reduce feed rate by 10 %

Drilling calculation formulas



Speed n [min^{-1}]	$n = \frac{v_c \cdot 1000}{D_c \cdot \pi}$	[min^{-1}]
Cutting speed V_c [m/min]	$v_c = \frac{D_c \cdot \pi \cdot n}{1000}$	[m/min]
Feed rate per revolution f [mm]	$f = f_z \cdot Z$	[mm]
Feed rate V_f [mm]	$v_f = f \cdot n$	[mm/min]
Metal removal rate Q [cm³/min]	$Q = \frac{v_f \cdot \pi \cdot D_c^2}{4 \cdot 1000}$	[cm^3/min]
Power requirement P_{mot} [kW]	$P_{mot} = \frac{Q \cdot k_c}{60000 \cdot \eta}$	[kW]
Feed force F_f [N]	$F_f = 0{,}63 \cdot \frac{f \cdot D_c \cdot k_c}{2}$	[N]
Specific cutting force k_c [N/mm²]	$k_c = \frac{k_c\,1.1}{h^{mc}}$	[N/mm^2]
Chip thickness h [mm]	$h = fz \cdot \sin\kappa$	[mm]
Torque M_c [Nm]	$M_c = \frac{D_c^2 \cdot k_c \cdot f}{8000} = \frac{P_{mot} \cdot 9500}{n}$	[Nm]

Workpiece material groups

Steel		R_m [N/mm²]	k_c 1.1 [N/mm²]	m_c
P	Low-carbon soft steels; low tensile ferritic steels.	<450	1350	0.21
	Low-carbon free cutting steels	400 <700	1500	0.22
	Normal structural steels, low to medium content of carbon (< 0.5 % C)	450 <550	1500	0.25
	Normal, low-alloy steels and cast steel, heat-treated steel, carbon steel (> 0.5 % C), ferritic and martensitic stainless steels	550 <700	1700	0.24
	Normal tool steels; harder tempering steels; martensitic, stainless steels	700<900	1900	0.24
	Hard-to-machine tool steels, hard, high-alloyed steels and cast steel, martensitic stainless steels	900<1200	2000	0.24
	Hard-to-machine high tensile steels, hardened steels of groups 3–6, martensitic stainless steels	>1200	2900	0.22

Stainless steels		R_m [N/mm²]	k_c 1.1 [N/mm²]	m_c
M	Stainless steels, easier to machine		1750	0.22
	Molybdenum stainless steels, austenitic and duplex, hard to machine		1900	0.20
	Austenitic and duplex, hard to machine		2050	0.20
	Austenitic and duplex, extremely hard to machine		2150	0.20

Cast iron		R_m [N/mm²]	k_c 1.1 [N/mm²]	m_c
K	Cast iron of medium hardness, grey cast iron		1150	0.22
	Low-alloyed cast iron, malleable cast iron, nodular cast iron		1225	0.25
	Cast iron alloy of medium hardness, malleable cast iron, GGG, average cutting properties		1350	0.28
	Hard-to-machine, high-alloyed cast iron, malleable cast iron, GGG, hard to machine		1470	0.30

NF metals		R_m [N/mm²]	k_c 1.1 [N/mm²]	m_c
N	Non-ferrous alloys which are easy to machine, aluminium with <16 % Si, brass, zinc, magnesium		700	0.25
	Non-ferrous alloys which are hard to machine, aluminium with >16 % Si, bronze, copper, aluminium alloys (nickel, copper, magnesium)		700	0.27

High temperature alloys and titanium alloys		R_m [N/mm²]	k_c 1.1 [N/mm²]	m_c
S	High temperature alloys containing nickel, cobalt and iron with a hardness <30 HRC, Incoloy 800 and Inconel 601, 617 and 625, Monel 400		2600	0.24
	High temperature alloys containing nickel, cobalt and iron with a hardness >30 HRC, Inconel 718 and 750-X and Incoloy 925, Monel K-5008		3300	0.24
	Titanium alloys, Ti-6Al-4V		1450	0.23

K_c 1.1 value = specific cutting force at a rake angle of 0°.
With other rake angles, the k_c 1.1 value must be increased or lowered, i.e. by 1 % per degree of rake angle.

The R_m value (tensile strength) is additional information for defining the right workpiece material group if the material was treated for higher tensile strength, e.g. rolled, drawn or heat-treated material.

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EXTREMELY ACCURATE
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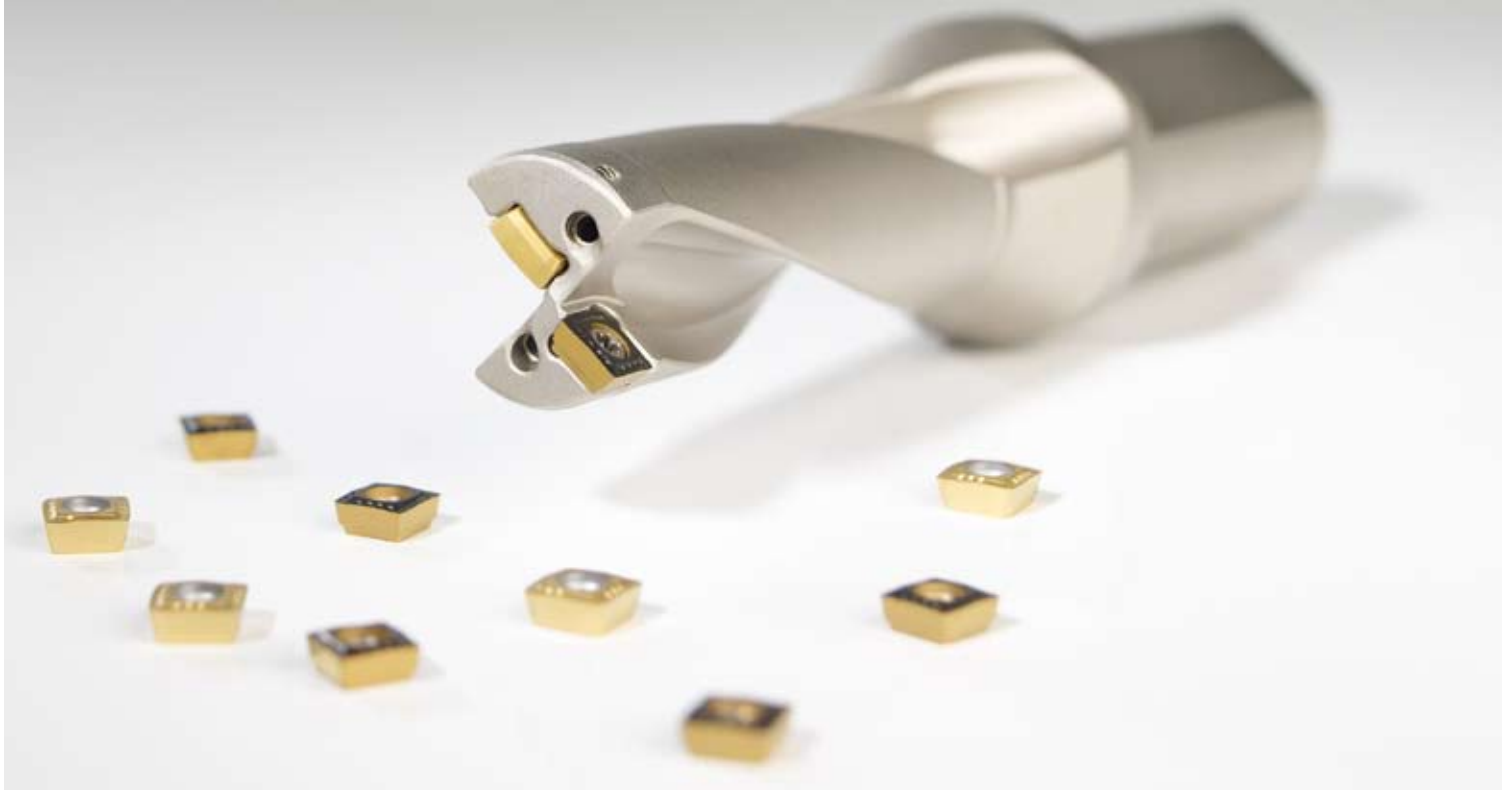

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Cost savings and increase in productivity with the X·treme Plus.

Result
In this application example, speed is more than tripled and costs halved.

Example

Material	42CrMo4	**Bore depth**	20.0 mm
Diameter	8.5 mm	**Number of bores**	>50,000