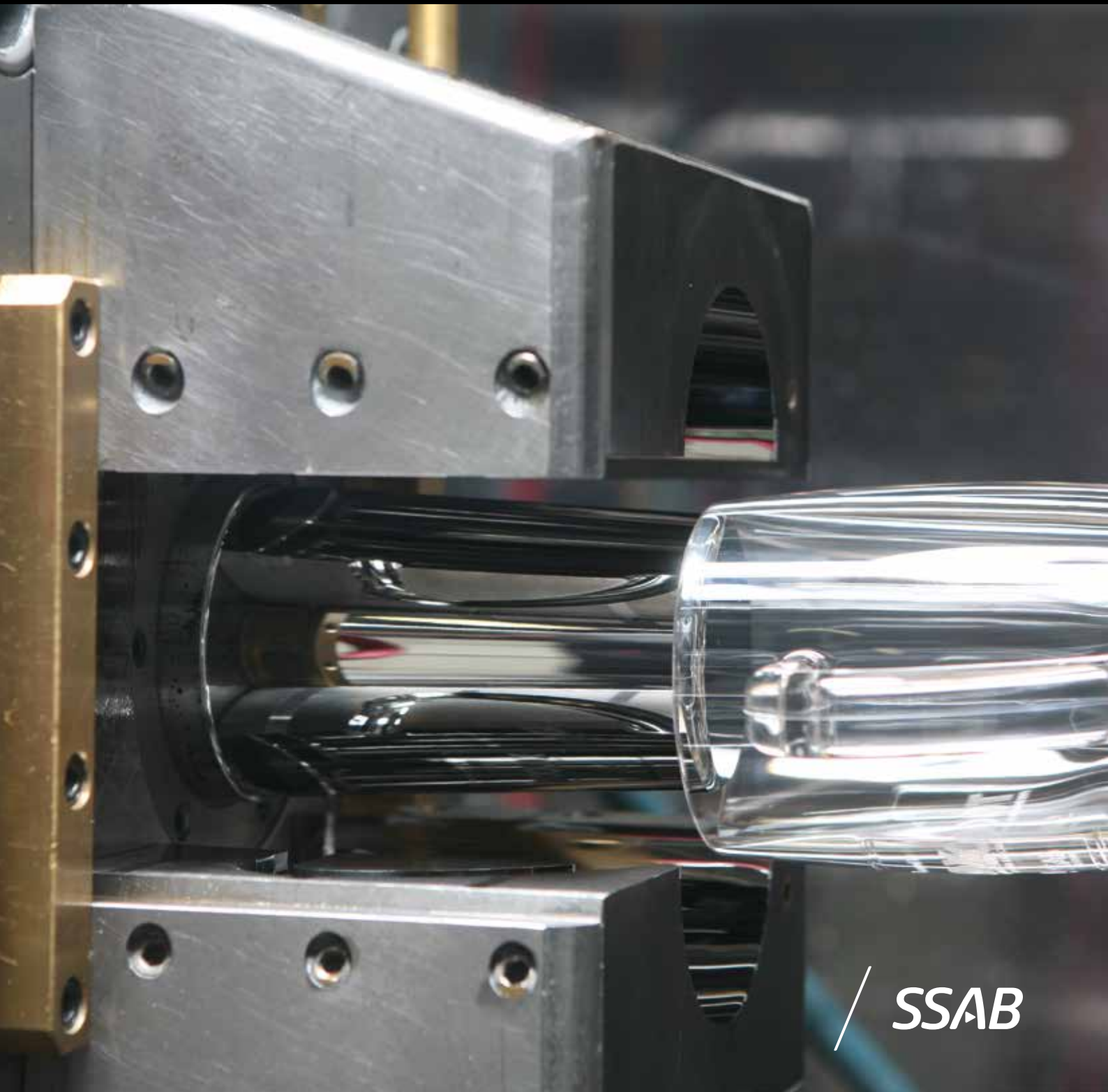


Machining Recommendations



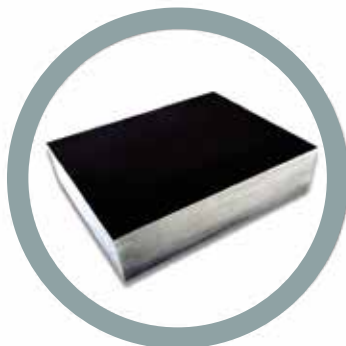
WHAT IS TOOLOX?

Toolox® is a modern quenched and tempered prehardened engineering and tool steel, delivered with measured and guaranteed mechanical properties. The basic idea is to save you time by delivering Toolox heat treated and ready to use. It provides you with lower costs, reduced risks and saves you valuable time in your production process due to its excellent machinability. This combined with the benefit of working with the hardest prehardened tool steel in the world gives you a simple to use material with a wide variety of uses.

Toolox is based on the same low carbon content as in Hardox® and Strenx®, but it is specially developed for tools and machine components working at high temperatures. It has excellent fatigue properties, and you can increase the surface hardness with nitriding or PVD coatings to gain more control over the service life of your tools or components.

In the information that follows, you will find our recommendations of tools to process Toolox. Similar tools from other suppliers might work, but here are the ones we have tested so far.

SHORTER LEAD TIME FROM CONCEPT TO PRODUCTION



1. Your customer has an idea



2. Manufacturing



3. Transport



4. Quenching and tempering



5. Adjusting

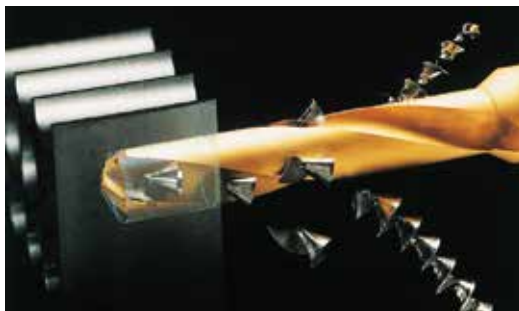


6. Production

DRILLING RECOMMENDATIONS

HSS DRILLS

Use only HSS drills when you have unstable machine conditions. If the machine conditions are good you can use different solid/brazed cemented carbide drill or drills with exchangeable heads.



HSS-Co



Use an HSS-Co drill (8% Co) with a low helix angle and a robust core that can withstand high torques.

HSS HSS-E HSS-Co



Individual holes can be drilled with an ordinary HSS drill. For a rational production, either a microalloyed (HSS-E) or a Cobalt alloyed (HSS-Co) drill is recommended.

METRIC (mm)	Toolox 33	Toolox 40	Toolox 44
V_c m/min	~ 15	~ 9	~ 7
D_c (mm)	Feed rate (mm/min and speed (rpm)		
5	0.10/950	0.05/570	0.05/445
10	0.10/475	0.10/290	0.09/220
15	0.16/325	0.16/190	0.15/150
20	0.23/235	0.22/150	0.20/110
25	0.30/195	0.28/110	0.25/90
30	0.35/165	0.35/90	0.30/75
*35	0.40/136	0.40/80	0.35/63
*40	0.45/119	0.45/70	0.40/55

US (in.)	Toolox 33	Toolox 40	Toolox 44
V_c ft/min	~ 50	~ 30	~ 23
D_c (in)	Feed rate (in./min) and speed (rpm)		
0.197	0.004	0.002	0.002
0.394	0.004	0.004	0.004
0.591	0.006	0.006	0.006
0.787	0.009	0.009	0.008
0.984	0.012	0.011	0.010
1.181	0.014	0.014	0.012
1.378	0.016	0.016	0.014
1.575	0.018	0.018	0.016

*** WHEN USING A LARGE DRILL DIAMETER (>30 MM), MAKE SURE THAT:**

1. The machine is large and stable enough to raise sectional forces.
2. The spindle has zero play.
3. The workpiece is well clamped.
4. Motor output is equal to or greater than 7.5 kW.



ADVICE TO REDUCE VIBRATIONS AND INCREASE THE LIFETIME OF THE DRILL

- ▶ Minimize the distances to the column and between to drill tip and the workpiece
- ▶ Don't use a longer drill than necessary
- ▶ Always use metal supports
- ▶ Clamp securely
- ▶ Use a solid and firm table
- ▶ Always use coolant
- ▶ Coolant mix 8-10 %
- ▶ Just before the drill breaks through, disengage the feed rate for a second. Otherwise, play/springback can snap the drill tip. Re-engage the feed rate after the play/springback stops.

SOLID CEMENTED CARBIDE DRILL

For stable machine conditions and with internal coolant. Coolant mix 8-10 % for all drilling.



Diameter (mm)	METRIC	Toolox 33 65-90		Toolox 40 50-70		Toolox 44 40-65	
	V_c (m/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (mm/rev)	min-max	start value	min-max	start value	min-max	start value
3.0 -5.0		0.08-0.15	0.10	0.06-0.12	0.08	0.06-0.11	0.07
5.01-10.0		0.09-0.16	0.12	0.08-0.15	0.11	0.08-0.13	0.10
10.01-15.0		0.16-0.22	0.18	0.14-0.20	0.16	0.12-0.18	0.15
15.01-20.0		0.22-0.28	0.25	0.16-0.24	0.20	0.16-0.20	0.18

*drilling 7x Dc, reduce the feed ~20 %

*drilling with external coolant ,reduce the speed and feed ~ 20 %

Diameter (in.)	US	Toolox 33 213-295		Toolox 40 164-230		Toolox 44 131-213	
	V_c (ft/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (in./rev)	min-max	start value	min-max	start value	min-max	start value
0.118-0.197		0.003-0.006	0.004	0.002-0.005	0.003	0.002-0.004	0.003
0.197-0.394		0.004-0.006	0.005	0.003-0.006	0.004	0.003-0.005	0.004
0.394-0.591		0.006-0.009	0.007	0.006-0.008	0.006	0.005-0.007	0.006
0.591-0.787		0.009-0.011	0.010	0.006-0.009	0.008	0.006-0.008	0.007

DRILLS WITH EXCHANGEABLE DRILL HEADS OR BRAZED CEMENTED CARBIDE DRILL

For stable machine conditions and with internal coolant.



Diameter (mm)	METRIC	Toolox 33 50-80		Toolox 40 50-65		Toolox 44 40-60	
	V_c (m/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (mm/rev)						
	7.5-12.0	0.10-0.16	0.13	0.08-0.15	0.12	0.08-0.14	0.11
	12.01-20.0	0.15-0.23	0.20	0.12-0.22	0.17	0.12-0.20	0.15
	20.01-25.0	0.18-0.27	0.22	0.15-0.25	0.19	0.14-0.22	0.17
	25.01-30.0	0.20-0.30	0.24	0.17-0.27	0.21	0.16-0.25	0.19

* Drilling with 25-30xD reduces the Feed rate by ~15-20 %

* The recommendation is to have at least 25 bar pressure on the waterpump.

Diameter (in.)	US	Toolox 33 164-262		Toolox 40 164-213		Toolox 44 131-197	
	V_c (ft/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (in./rev)						
	0.295-0.472	0.004-0.006	0.005	0.003-0.006	0.005	0.003-0.006	0.004
	0.473-0.787	0.006-0.009	0.008	0.005-0.009	0.007	0.005-0.008	0.006
	0.788-0.984	0.007-0.011	0.009	0.006-0.010	0.007	0.006-0.009	0.007
	0.985-1.181	0.008-0.012	0.009	0.007-0.011	0.008	0.006-0.010	0.007

LONG HOLE DRILLING WITH 16-20xD

For stable machine conditions and with internal coolant.



Diameter (mm)	METRIC	Toolox 33 50-70		Toolox 40 50-65		Toolox 44 40-60	
	V_c (m/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (mm/rev)						
	6.0	0.12-0.16	0.14	0.10-0.15	0.12	0.08-0.14	0.11
	8.0	0.14-0.20	0.16	0.11-0.18	0.14	0.10-0.18	0.13
	10.0	0.17-0.24	0.19	0.13-0.22	0.16	0.12-0.21	0.15
	12.0	0.18-0.26	0.20	0.15-0.24	0.18	0.14-0.23	0.17

* The cutting data on this page has been formulated in cooperation with Seco Tools.

Diameter (in.)	US	Toolox 33 164-262		Toolox 40 164-213		Toolox 44 131-197	
	V_c (ft/min)	min-max	start value	min-max	start value	min-max	start value
	f_n (in./rev)						
	0.236	0.005-0.006	0.006	0.004-0.006	0.005	0.003-0.006	0.004
	0.315	0.006-0.008	0.006	0.004-0.007	0.006	0.004-0.007	0.005
	0.394	0.007-0.009	0.007	0.005-0.009	0.006	0.005-0.008	0.006
	0.472	0.007-0.010	0.008	0.006-0.009	0.007	0.006-0.009	0.007

MILLING RECOMMENDATIONS

CLAMPING

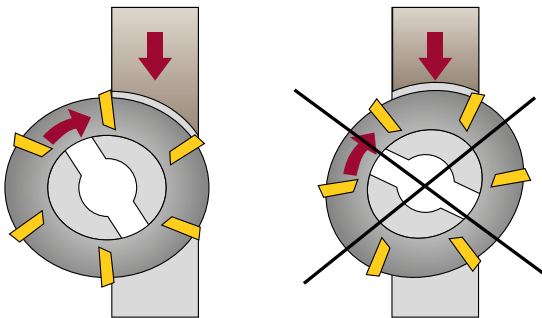
Toolox has a very low level of residual stresses. To get the full effect make sure to use deformation-free clamping. If blanks are gas cut, mill off 5-10mm from the gas-cut edge to get a blank free from residual stresses.

The machinability of Toolox has been improved. During milling you will notice it because the chips produced are very bluish. We have modified the carbide morphology as compared to traditional tool steels, using less carbon in Toolox. Therefore, the heat generated during milling is transferred into the chip and not into the cutting edge/workpiece.



MILLING ADVICE

- ▶ Position the cutter off-center (to the left) to achieve a thicker chip at the entry and to avoid thick chip on the exit.
- ▶ Avoid cutting through the center line of the cutter, because this can generate vibration.
- ▶ Always use down milling (climb milling).
- ▶ The recommendation is that the radial engagement of the cutter (a_e) should be 25 or 75-80% of the diameter.



If you enter the workpiece with the roll-into-cut method, the chip thickness on the exit is always zero, and it will help to give a longer tool life.

Roll-into-cut method

Wear after 800 passes



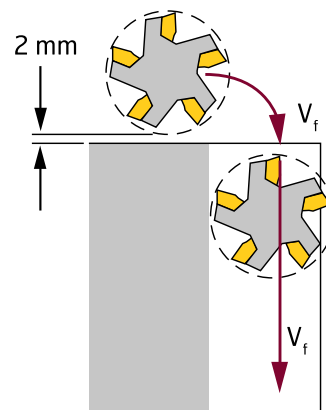
Straight into the workpiece

Wear after 390 passes



Roll-into-cut method

$$\text{Prog. rad.} = \left(\frac{D_e}{2}\right) + 2$$



INSERT GRADES FOR MILLING

	ISO	ANSI	
P	01	C8	↑
	10	C7	
	20		
	30	C6	
	40		
M	50	C5	↓
	10		↑
	20		
	30		
K	40		↓
	01	C4	↑
	10	C3	
	20	C2	
H	30	C1	↓
	01	C4	↑
	10	C3	
	20	C2	
	30	C1	↓



- ↑ Wear resistance
- ↓ Toughness

- P** ISO P = Steel
- M** ISO M = Stainless steel
- K** ISO K = Cast iron
- H** ISO H = Hardened steel



* Example insert grade 1030.

“The last 2 numbers in the insert grade indicate where in this scale the insert belongs, if the insert has wear or toughness resistance.”

INSERT GEOMETRY

The macro geometry affects many parameters in the cutting process. An insert with a strong cutting edge can work at higher loads, but it will also generate higher cutting forces, consume more power and generate more heat.

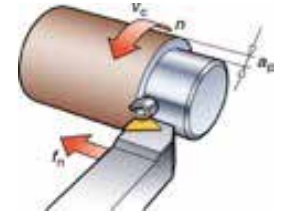


Parameter	Geometry		
	L	M	H
Edge strength			
Cutting forces			
Power consumption			
Max chip thickness			
Heat generated			

* Use insert grade P 30-50 with light cutting geometry and a coarse - pitch cutter if the machine power is low and with unstable machine conditions.

TURNING RECOMMENDATIONS

The cutting data recommendations below are applicable to tough cemented carbide grades. These are necessary for operations in which impact may occur, such as when turning plate with gas-cut edges.



METRIC		Toolox 33 150-200	Toolox 40 90-140	Toolox 44 80-120
V_c (m/min)				
Feed rate (f_n)		min-max	min-max	min-max
Insert grade P25 (mm/rev)		0.20-0.40	0.20-0.40	0.20-0.40

At higher Feed rate, lower the cutting speed

US		Toolox 33 492-656	Toolox 40 295-459	Toolox 44 262-394
V_c (ft/min)				
Feed rate (f_n)		min-max	min-max	min-max
Insert grade P25 (in./rev)		0.008-0.016	0.008-0.016	0.008-0.016

Formulae for turning

$$V_c = \frac{\pi * d * n}{1000} \quad n = \frac{V_c * 1000}{\pi * d} \quad vf = n * f_n$$

Definitions

V_c = cutting speed (m/min, ft/min)
 n = speed (rpm)
 f_n = Feed rate (mm/rev, in./rev)
 v_f = Feed rate (mm/min, in./min)
 d = workpiece \emptyset
 π = 3,14
 a_p = cutting depth (mm, in.)

FACE MILLING RECOMMENDATION

Round inserts have strong cutting edges and are good to use when the surface has holes and cavities etc



METRIC Recommendation for average machine conditions with a 45° setting angle						
V_c (m/min)	Toolox 33 180-220		Toolox 40 90-140		Toolox 44 120-160	
Feed rate (f_z)	min-max	start value	min-max	start value	min-max	start value
Insert grade P30	0.15-0.35	0.25	0.15-0.35	0.25	0.15-0.35	0.25

US Recommendation for average machine conditions with a 45° setting angle						
V_c (ft/min)	Toolox 33 591-722		Toolox 40 295-459		Toolox 44 394-525	
Feed rate (f_z)	min-max	start value	min-max	start value	min-max	start value
Insert grade P30	0.006-0.014	0.010	0.006-0.014	0.010	0.006-0.014	0.010

METRIC Recommendation for average machine conditions with round inserts						
V_c (m/min)	Toolox 33 180-220		Toolox 40 170-210		Toolox 44 140-180	
Feed rate (f_z)	min-max	start value	min-max	start value	min-max	start value
Insert grade P30	0.10-0.25	0.15	0.10-0.25	0.15	0.10-0.25	0.15

US Recommendation for average machine conditions with round inserts						
V_c (ft/min)	Toolox 33 591-722		Toolox 40 558-689		Toolox 44 459-591	
Feed rate (f_z)	min-max	start value	min-max	start value	min-max	start value
Insert grade P30	0.000-0.001	0.001	0.000-0.001	0.001	0.000-0.001	0.001

SHOULDER MILLING RECOMMENDATION

METRIC

Recommendation for average machine conditions with a 90° setting angle

V_c (m/min)	Toolox 33 180-220		Toolox 40 140-180		Toolox 44 120-160	
	min-max	start value	min-max	start value	min-max	start value
Feed rate (f_z)						
Insert grade P30	0.12-0.25	0.17	0.12-0.25	0.17	0.12-0.25	0.17



US

Recommendation for average machine conditions with a 90° setting angle

V_c (ft/min)	Toolox 33 591-722		Toolox 40 459-591		Toolox 44 394-525	
	min-max	start value	min-max	start value	min-max	start value
Feed rate (f_z)						
Insert grade P30	0.005-0.010	0.007	0.005-0.010	0.007	0.005-0.010	0.007

END MILLING RECOMMENDATION FOR SOLID CEMENTED CARBIDE TOOL



METRIC

Slot milling recommendation				Shoulder milling recommendation		
	Toolox 33	Toolox 40	Toolox 44	Toolox 33	Toolox 40	Toolox 44
V_c (m/min)	85-110	75-100	70-95	200-230	180-210	160-190
Feed rate (f_z)	min-max	min-max	min-max	min-max	min-max	min-max
Diameter	3.0-6.0	0.01-0.03	0.01-0.03	0.01-0.03	0.02-0.05	0.02-0.04
	8.0-12.0	0.04-0.07	0.03-0.06	0.03-0.06	0.07-0.10	0.06-0.09
	14.0-20.0	0.07-0.10	0.06-0.09	0.06-0.08	0.10-0.14	0.10-0.13

* If possible, use only compressed air to remove the chip and use weldon chuck for tool over $\varnothing 10$.

US

Slot milling recommendation				Shoulder milling recommendation		
	Toolox 33	Toolox 40	Toolox 44	Toolox 33	Toolox 40	Toolox 44
V_c (ft/min)	279-361	246-328	230-312	656-755	591-689	525-623
Feed rate (f_z)	min-max	min-max	min-max	min-max	min-max	min-max
Diameter	0.118-0.236	0.000-0.001	0.000-0.001	0.000-0.001	0.001-0.002	0.001-0.002
	0.315-0.472	0.002-0.003	0.001-0.002	0.001-0.002	0.003-0.004	0.002-0.004
	0.551-0.787	0.003-0.004	0.002-0.004	0.002-0.003	0.004-0.006	0.004-0.005



Slot milling advice

a_p (depth of cut) max 0.5 x D



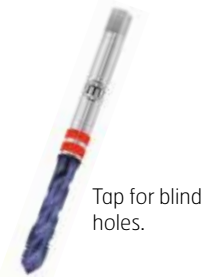
Shoulder milling advice

a_p (use the whole cutting length)
 a_e (radial depth of cut) max 0.1 x D

TAPPING RECOMMENDATIONS

With the correct tools you can perform all tapping/thread milling operations using all Toolox grades. We recommend four-flute taps, which can withstand the very high torque that occurs during tapping in hard materials. If is not critical, the drilled hole can be 3% larger than standard. This will increase the lifetime of the tap.

* Thread oil or thread paste is recommended as lubricant.



Tap for blind holes.



Tap for through holes.

METRIC	V_c (m/min)	Toolox 33 7-10	Toolox 40 4-9	Toolox 44 3-5
US	V_c (ft/min)	Toolox 33 23-33	Toolox 40 13-30	Toolox 44 10-16
	Size	Speed (rpm)	Speed (rpm)	Speed (rpm)
	M5	445-635	255-570	190-320
	M6	370-530	210-475	160-265
	M8	270-400	160-360	120-200
	M10	220-320	125-285	95-160
	M12	185-265	105-240	80-130
	M16	140-200	80-180	60-100
	M20	110-160	60-140	45-80

* We recommend thread milling for thread below M5 especially in Toolox 40 and 44.



METRIC		Toolox 33	Toolox 40	Toolox 44
	V_c (m/min)	80-110	60-80	50-70
	f_z mm	0.03-0.06	0.02-0.05	0.02-0.05
US		Toolox 33	Toolox 40	Toolox 44
	V_c (ft/min)	263-361	197-263	164-230
	f_z (in.)	0.001-0.002	0.001-0.002	0.001-0.002

* To manage thread milling, a CNC machine is necessary and the thread should be made in 2 passes.

COUNTERSINKING & COUNTERBORING

Countersinking and counterboring are best performed using tools that have replaceable inserts. Always use a revolving pilot and use coolant.

METRIC	V_c (m/min)	Toolox 33 40 - 80	Toolox 40 25 - 70	Toolox 44 20 - 50
	Feed rate (mm/rev)	0.10-0.20	0.10-0.20	0.10-0.20
	Dc (mm)	Speed (rpm)		
	19	670-1340	420-1175	335-840
	24	530-1060	330-930	265-665
	34	375-750	235-655	185-470
	42	300-600	190-530	150-380
	57	225-440	140-390	110-280

* Reduce the cutting data by about 30 % in countersinking.

US	V_c (ft/min)	Toolox 33 131-262	Toolox 40 82-230	Toolox 44 66-164
	Feed rate (in./rev)	0.004-0.008	0.004-0.008	0.004-0.008
	Dc (in.)	Speed (rpm)		
	0.748	670-1340	420-1175	335-840
	0.945	530-1060	330-930	265-665
	1.339	375-750	235-655	185-470
	1.654	300-600	190-530	150-380
	2.244	225-440	140-390	110-280



RESULTS FROM OUR OWN TESTS



MACHINE INFO

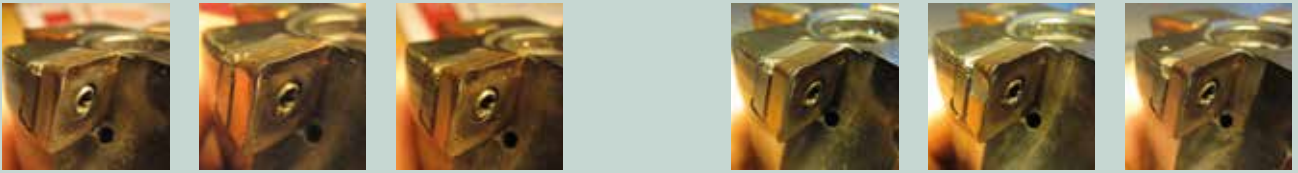
VMC FADAL 4020 HT modell 1997
 Spindle type ISO 40 taper
 Through spindle coolant
 Spindle speed max 10,000 rpm
 Effect on the spindle motor 16.8 kw
 Torque 303 Nm.

The machine used during the tests.

Toolox 33	Tool	Ø	V _c	f	a _p	a _e	runtime
Shoulder milling	Coromill 490	50 mm	180 m	0.17 mm	4 mm	13 mm	196 min
		1.969 in.	591 ft.	0.007 in.	0.157 in.	0.512 in.	196 min

Runtime 132 min

Runtime 196 min



Toolox 40	Tool	Ø	V _c	f	a _p	a _e	runtime
Face milling	Coromill 345	100 mm	160 m	0.25 mm	2 mm	68 mm	43 min
		3.937 in.	525 ft.	0.010 in.	0.079 in.	2.677 in.	43 min



Toolox 44	Tool	Ø	V _c	f	a _p	a _e	runtime
Face milling	Coromill 345	100 mm	150 m	0.25 mm	2 mm	61 mm	32 min
		3.937 in.	492 ft.	0.010 in.	0.079 in.	2.402 in.	32 min



Toolox 44	Tool	Ø	V _c	f	a _p	a _e	runtime
Shoulder milling	End milling	16 mm	180 m	0.12 mm	34 mm	1.6 mm	103 min
		0.630 in.	591 ft.	0.005 in.	1.339 in.	0.063 in.	103 min

Photo after 250 passes and with a run-time of 72 min.



Toolox 33	Tool	Ø	V _c	f _n	total	drill depth	coolant flow
Drilling/ blind holes	Corodril 840	6.8 mm	80 m	0.12 mm	1105	23 mm	1.9 l/min
		0.630 in.	591 ft.	0.005 in.		0.906 in.	0.502 GPM

After 264 drilled holes

After 1105 drilled holes

Good chip formation



Toolox 40	Tool	Ø	V _c	f _n	total	drill depth	coolant flow
Drilling/ blind holes	Seco Feedmax	4.3 mm	70 m	0.12 mm	608	16 mm	0.2 l/min
		0.169 in.	230 ft.	0.005 in.		0.630 in.	0.053 GPM

After 608 drilled holes



Toolox 44	Tool	Ø	V _c	f _n	total	drill depth	coolant flow
Drilling/ blind holes	Seco Feedmax	4.3 mm	60 m	0.06 mm	438	15 mm	0.21 l/min
		0.169 in.	197 ft.	0.002 in.		0.591 in.	0.053 GPM

After 438 drilled holes



Toolox 40	Tool	drill Ø	Ø	V _c	thread depth	Total
Tapping / blind holes	Manigley 131/3 DUO	4.3 mm	M5	11 m	12 mm	330
		0.169 in.	M5	36 ft.	0.472 in.	330

Toolox 40	Tool	drill Ø	Ø	V _c	thread depth	Total
Tapping / blind holes	Manigley 131/3 DUO	10.2 mm	M12	8 m	24 mm	217
		0.402 in.	M12	26 ft.	0.945 in.	217

Toolox 44	Tool	drill Ø	Ø	V _c	thread depth	Total
Tapping / blind holes	Manigley 105/4 DUO	4.3 mm	M5	3 m	10 mm	183
		0.169 in.	M5	10 ft.	0.394 in.	183

After 183 threaded holes



Toolox 40	Tool	drill Ø	Ø	V _c	thread depth	Total
Tapping / blind holes	Rekord 2 DF-NI TICN	14.2 mm	M16	6 m	25 mm	276
		0.560 in.	M16	20 ft.	0.984 in.	276

After 276 threaded holes



TOOL RECOMMENDATIONS FOR TOOLOX

DRILLING IN TOOLOX

Tool name	Article No.	Diameter range
Seco Feedmax	* SD203A-12.0-36-12R1	2.0-20.0 mm (0.079-0.787 in.)

*Example for Ø 12

Solid cemented carbide drill

Supplier: Seco
Sweden
www.secotools.com



Tool name	Article No.	Diameter range
Seco Feedmax	* SD216A-12.0-180-12R1	3.0-14.10 mm (0.118-0.555 in.)

*Example for Ø 12

Long holes drilling with 16-20xD Solid cemented carbide drill

Supplier: Seco
Sweden
www.secotools.com



Tool name	Article No.	Diameter range
Cordrill R840 Delta C	R840-xxxx-30-A1A	3.0-20.0 mm (0.118-0.787 in.)

Solid cemented carbide drill

Supplier: Sandvik Coromant AB
Sweden
www.sandvik.coromant.com



Tool name	Article No.	Diameter range
Crownloc	* SD103-12.00-40-16R7	10.0-25.99 mm (0.394-1.023 in.)

*Example for Ø 12

Drill with exchangeable drill heads Drill heads grade: P

Supplier: Seco
Sweden
www.secotools.com



Tool name	Article No.	Diameter range
Chamdrill	DCM xxx-xxx-xxA-xx.xx	7.5-25.9 mm (0.295-1.020 in.)

Drill with exchangeable drill heads Drill heads grade: IC908

Supplier: Iscar
Israel
www.iscar.com



DRILLING IN TOOLOX

Tool name	Article No.	Diameter range
HSS -E Co 8 Taper Shank Drills, WN 103	832xxxxx	8.0-40.0 mm (0.315-1.575 in.)

High-speed steel drill alloyed with 8 % cobalt (HSS-Co 8 %)

Supplier: Alpen-MayKestag
Austria
www.alpenmaykestag.com



Tool name	Article No.	Diameter range
HSS A100	A100xx.xx	0.2-20.0 mm (0.008-0.787 in.)

High-speed steel drill standard Only for Toolox 33

Supplier: Dormer
Sweden
www.dormertools.com



TAPPING IN TOOLOX

Tap for blind holes

Tool name	Article No.	Diameter range
1641 TC	1641TC Mxx	18.0-75.0 mm (0.709-2.953 in.)

HSS-P tap with TiCN coating

Supplier: Yamawa
Japan
www.yamawa.eu



Tap for through holes

Tool name	Article No.	Diameter range
105/4 DUO	433xx	20.5-60.0 mm (0.807-2.362 in.)

HSSE-PM tap with TiCN coating

Supplier: Manigley
Switzerland
www.manigley.ch



Tap for blind holes

Tool name	Article No.	Diameter range
131/3 DUO	433xx	3.0-25.0 mm (0.118-0.984 in.)

HSSE-PM tap with TiCN coating

Supplier: Manigley
Switzerland
www.manigley.ch



Tap for blind holes

Tool name	Article No.	Diameter range
Rekord 1D-Ti-TiCN	B0459601.xxxx	M3-M10
Rekord 2D-Ti-TiCN	C0459601.xxxx	M12-M24

HSSE tap with TiCN coating

Supplier:
Emuge Franken
Germany
www.emuge.de/english



Tap for through holes

Tool name	Article No.	Diameter range
Rekord 1C-Ti-TiCN	B0309601.xxxx	M3-M10
Rekord 2C-Ti-TiCN	C0309601.xxxx	M12-M24

THREAD MILLING IN TOOLOX

Tool name	Article No.	Diameter range
GSF-VHM 2xD IKZ-HB TiCN	GSF333106xxxx	M3-M16

Solid carbide thread milling cutter with TiCN coating

Supplier: Emuge Franken
Germany
www.emuge.de/english



Tool name	Article No.	Diameter range
Solid carbide thread mill	NBxxxxCxx x.xISO AC	M2-M42

Solid carbide thread milling cutter with TiAlCN coating

Supplier: SmiCut
Sweden
www.smicut.se



* For information about distributors contact Smicut.

COUNTERBORING IN TOOLOX

Use counterbore with indexable inserts that always have a grade number ending in H

Tool name	Article No.	Diameter range
WHV counterbore	XWHV-xx.x	18.0-75.0 mm (0.709-2.953 in.)

Supplier: Granlund tool AB
Sweden
www.granlund.com



COUNTERSINKING IN TOOLOX

Use countersink with indexable inserts that always have a grade number ending in H

Tool name	Article No.	Diameter range
KV countersink	xKV9-xx.x	20.5-60.0 mm (0.807-2.362 in.)

Supplier: Granlund tool AB
Sweden
www.granlund.com

END MILLING IN TOOLOX

Tool name	Article No.	Diameter range
JS 554 Siron-A	JS 554 xxxx	3.0-25.0 mm (0.118-0.984 in.)

Solid end milling cutter with Siron-A coating

Supplier: Seco
Sweden
www.secotools.com



MILLING WITH INSERT IN TOOLOX

Tool name	Article No.	Diameter range
Coromill 345	345-xxxxxx-13x	40-250 mm (1.575-9.843 in.)

Face milling with Coromill 345

Supplier: Sandvik Coromant AB
Sweden
www.sandvik.coromant.com



Tool name	Article No.	Diameter range
Coromill 300	R300-xxxxx-xxx	10-200 mm (0.394-7.874 in.)

Face milling with Coromill 300

Supplier: Sandvik Coromant AB
Sweden
www.sandvik.coromant.com



Tool name	Article No.	Diameter range
Coromill 490	490-xxxxx-xxx	20-250 mm (0.787-9.843 in.)

Shoulder/face milling with Coromill 490

Supplier: Sandvik Coromant AB
Sweden
www.sandvik.coromant.com

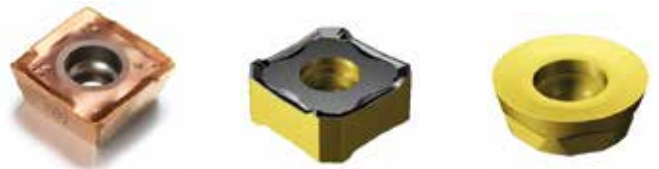


INSERT GRADE IN TOOLOX

Tool name	Article No.	Insert grade	Insert geometry
Coromill 300	R300-xxxxx-Px	1010	L-M-H
	R300-xxxxx-Px	1030	L-M-H
Coromill 345	345R-1305x-Px	1010	L-M-H
	345R-1305x-Px	1030	L-M-H
Coromill 490	490R-xxxxxxx-Px	1010	L-M
	490R-xxxxxxx-Px	1030	L-M-H

Use insert grade P1030 for average machine conditions. In very stable machine conditions and with a rigid set-up, insert grade P1010 is more suitable, especially in Toolox 40 and 44. Then you can increase the cutting speed by approximately 20-30%.

Supplier: Sandvik Coromant AB
Sweden
www.sandvik.coromant.com



APPLICATION AREAS

MOULDS



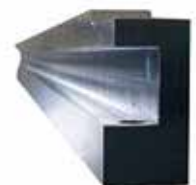
COLD WORK



HOT WORK



MACHINE COMPONENTS



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The SSAB logo consists of the letters 'SSAB' in a bold, blue, sans-serif font. The letters are closely spaced and have a slight shadow effect.