



# SSAB

Record: Thread milling/ Tapping



Date: 2009-09-03	Material: HARDOX 500	<b>Materialdata</b>
Thickness	30	mm
Hardness in Brinell 4-32 mm	470-530	HBW
Hardness in Brinell 32-80 mm	450-540	HBW
Hardness in Rockwell	49	HRC
Sträckgräns ( Yield strength )		
Brottgräns ( Tensile strength )		
Chargenr. 87090	Serialnr. 3540206	

### Machine info

Type of machine	Fadal VMC 4020		
Location for machining	LAB		
Type of drill chuck	Hydrogrip chuck from Sandvik Coromant		
Type of attachment for the tool in the machine	ISO 40		
Effect on the spindle motor	16.8 kw	Coolant mix	7 %

### Tap/thread milling tools info

Manufacturer / Distributors	SPPW / SMICUT		Type of tap/thread milling tool	
Name on tap/thread milling tools	NB1212D35 2.0 ISO AC		HSS-P	
Pitch of thread/course	Range	2.0	M2 – M36	HSSE-PM
Tap for blind or through holes	Blind and through		HSSE, HSS-Co	
Article number	NB1212D35 2.0 ISO AC		Helix angle/ Straight tap ( S )	15°
Size on the tap/thread milling tool	M16		Thread milling tools with insert	
Type of coating	TiAlCN		Solide carbide tap	
Number of flute on the tool	4		Solide carbide thread milling tools	X
Internal/External coolant	External		Thread forming tap	
Lubrication ( thread paste/oil or coolant)	Coolant		Type of insert	

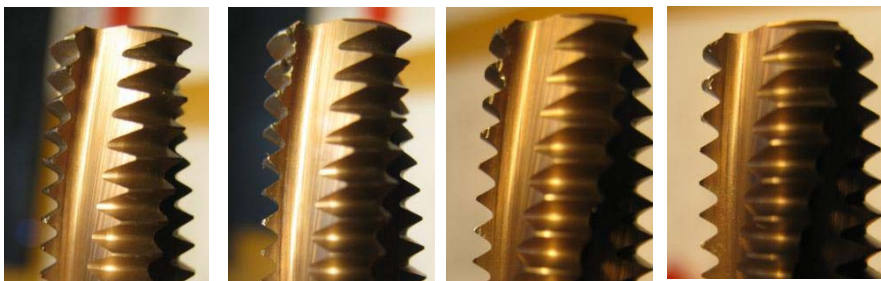
The thread will be burr free and you don't need to chamfer the thread.

### Thread attempt

Number of passes (radial ) is 2.

In the first cut we have 2/3 in engagement and in the second cut we have 1/3, that's the reason why we have 2 different feed rate.

Speed ( n )	1326	rpm	Comment: Test 3 ( THROUGH HOLES )
Cutting speed ( Vc )	50	m/min	( More vibrations in this test compare to test 1 and test 2 )
Feed rate ( vf ) first cut 2/3	44	mm/min	After 14 threaded holes there's wear/chip on the lower cutting edges and also 1 big chip on of the cut/flute. After 28 holes the thread is good down
Feed rate ( vf ) second cut 1/3	51	mm/min	
Feed rate ( fz )	0.033/0.038	mm/rev	to Z- 25mm and the wear/chip is about the same
Diameter on the drilled holes	14.2	mm	as after 14 holes. After 56 holes the wear/ chip is about the same as before but there are now also some
Total threaded holes	84	st	wear on the cutting edges in the centre of the tool, the thread is even now good down to Z -25 mm. I stop the
Total thread length	2520	mm	thread attempt after 84 holes, the chip/wear is about
Cost of tap/thread milling tool	2494	SEK	the same and the thread is still good down to Z-25.
Cost of insert		SEK	Reinar Schimdt was here under the test. ( SEE PHOTO )
Cost per hole	30	SEK	The last 14 holes we going up on Z to see if we have less of vibration than we have in test 1 and 2, there we did the thread burr free , but there are no difference.





# SSAB

## Record: Thread milling/ Tapping



Date: 2009-09-04	Material: HARDOX 600	<b>Materialdata</b>
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Thickness	30	mm
Hardness in Brinell	570-640	HBW
Hardness in Rockwell	55	HRC
Sträckgräns ( Yield strength )		
Brottgräns ( Tensile strength )		
Chargenr. 79104	Serialnr. 2414065	

### Machine info

Type of machine	Fadal VMC 4020		
Location for machining	LAB		
Type of drill chuck	Hydrogrip chuck from Sandvik Coromant		
Type of attachment for the tool in the machine	ISO 40		
Effect on the spindle motor	16.8 kw	Coolant mix	7 %

### Tap/thread milling tools info

Manufacturer / Distributors	SPPW / SMICUT		Type of tap/thread milling tool	
Name on tap/thread milling tools	NB1414D33 2.5 ISO AC		HSS-P	
Pitch of thread/course	Range	2.5	M2 – M36	HSSE-PM
Tap for blind or through holes	Blind and through		HSSE, HSS-Co	
Article number	NB1414D33 2.5 ISO AC		Helix angle/ Straight tap ( S )	15°
Size on the tap/thread milling tool	M20		Thread milling tools with insert	
Type of coating	TiAlCN		Solide carbide tap	
Number of flute on the tool	4		Solide carbide thread milling tools	X
Internal/External coolant	External		Thread forming tap	
Lubrication ( thread paste/oil or coolant)	Coolant		Type of insert	

The thread will be burr free and you don't need to chamfer the thread.

### Thread attempt

Number of passes (radial) is 2.

In the first cut we have 2/3 in engagement and in the second cut we have 1/3, that's the reason why we have 2 different feed rate.

Speed ( n )	796	rpm	Comment: Test 1 ( THROUGH HOLES )
Cutting speed ( Vc )	35	m/min	Very slight wear after 8 holes. After 24 threaded
Feed rate ( vf ) first cut 2/3	28	mm/min	holes there is a small chip on 1 of the cut/flute
Feed rate ( vf ) second cut 1/3	31	mm/min	and the wear is smooth over the other cutting
Feed rate ( fz )	0.035/0.039	mm/rev	edges and I also adjust the diameter with 0.03
Diameter on the drilled holes	18	mm	because of the wear/chip. After 32 holes there's
Total threaded holes	64	st	about the same wear/chip and I adjust the Ø
Total thread length	1920	mm	with 0.05 and after 40 I adjust Ø with 0.05 and
Cost of tap/thread milling tool	2818	SEK	further with 0.07 after 48 holes and the wear
Cost of insert		SEK	chip is about the same. I stop the thread milling
Cost per hole	44	SEK	attempt after 64 threaded holes. ( SEE PHOTO )

I have Reinar Schimdt from the company SMICUT/ SPPW with me under the test.

After 4-6 holes when the cutting edges has some wear the sound from the vibration stop.

