



# Product sheet:

# TOOLOX33®, 300 HBW with ESR properties

Specification			
Hardness	HBW 280 - 330		
Impact toughness	Test temperature 20 °C	Impact energy, Charpy-V-test for plate, transverse direction; min J ≤ 130 mm	Impact energy, Charpy-V-test for forged bar, thickness direction; min J < 130 mm
Milling	At a cutting speed of 300 Sandvik Coromill 200 and	At a cutting speed of 300 m/min, feed 0.15 mm and 10 min effective machining time using Sandvik Coromill 200 and inserts GC 1025, we guarantee maximum edge weer of 0.3 mm.	ctive machining time using um edge wear of 0.3 mm.
Ultrasonic inspection	Ultrasonic inspection is carried out according to: EN 10 160 (rolled plates) EN 10228-3 (forged bars) with extra demands acording to specifikation SS	Ultrasonic inspection is carried out according to: EN 10 160 (rolled plates) EN 10228-3 (forged bars) with extra demands acording to specifikation SSAB V6.	
Etching:	TOOLOX 33 fulfils the etcl	TOOLOX 33 fulfils the etching requirements of NADCA 207-2003	3.
Dimensions	TOOLOX 33 is supplied as between 150 - 300 mm.	TOOLOX 33 is supplied as plate in thicknesses between 5 - 130 mm, or as forged bars in thicknesses between 150 - 300 mm.	nm, or as forged bars in thicknesses
Delivery condition	Quenched and tempered	Quenched and tempered at a minimum temperature of 590 °C.	
Heat treatment	TOOLOX 33 is not intende after delivery from SSAB C	TOOLOX 33 is not intended for further heat treatment. If TOOLOX 33 is heated above 590 °C after delivery from SSAB Oxelösund AB no guarantees for the properties of the steel are given	X 33 is heated above 590 °C perties of the steel are given.
Nitriding/coating	Nitriding or surface coatin	Nitriding or surface coating may be carried out if the temperature is below 590 °C	e is below 590 °C.
Testing	Testing according to EN 10 Hardness is measured on a	Testing according to EN 10 025 and EN ISO 6506-1. Hardness is measured on a milled surface 0.5 - 2 mm below the original surface	original surface.
Tolerances	Thickness, length, width a tolerances for new rolling Forged bars; Accor	Thickness, length, width and flatness tolerances according to "Dimension program and tolerances for new rolling of tool steel plates from SSAB Oxelösund". Forged bars; According to DIN 7527.	imension program and nd".
Surface finish	On delivery from SSAB Oxelösund A - free from mill s - not repair welc - surface defects Forged bars according to DIN 7527.	On delivery from SSAB Oxelösund AB the plate meets the following specifications: - free from mill scale - not repair welded - surface defects below the nominal ordered thickness are not permitted Forged bars according to DIN 7527.	ing specifications: thickness are not permitted.





# Technical information TOOLOX33®

#### Usage

table for plastic moulding, for rubber moulding and machine components. With proper surface treatment, the service life of the get good dimensional stability. TOOLOX 33 has a low carbide content, and is therefore excellent to machine. TOOLOX 33 is sui-TOOLOX 33 is a new steel delivered quenched and tempered with high impact toughness and very low residual stresses to tool/component can be prolonged.

#### Typical Values

Commission of the Commission o	
Ser trademant and Collection Collection	
	Inclusions
the second of th	
the second secon	$\circ$
PRODUCTION OF THE PROPERTY OF	_
0 0 5	_
To the second	_
	S
usion a fract ect rai	
B Q 0	$\circ$
The second of th	_
THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT	_
nclusion size (eq	<b>U</b> 1
Contract the contract of the c	
⊃ 6 6	
The state of the s	
Property of the contract of th	
iclusion size (equi) real fraction spect ratio	
The state of the s	
Carry and the property of the property of the party of th	
RECORD OF THE PROPERTY OF THE PROPERTY OF THE PARTY OF TH	
And the state of t	
july di	
Carried Company of the Company of th	
THE RESERVE THE PROPERTY OF THE PARTY OF THE	
Education of the Control of the Cont	
the second secon	
Christian or high the State of	
Constitution of the contract o	
E. PRESIDENT AND RECORD FOR COMPLETE AND RECORD FOR THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERS	
- o o	
the state of the s	
hat the state of t	
5.7	
Partie and the Control of the Contro	
6μm 0.015% 1.2	
2. The Assertation of the Control of	
the last test and See Holland State Proceedings	
ESSESSED FOR THE PROPERTY OF T	
English and Street Continues and the street of the street	
to the second of	
Participation of the participa	
COLUMN TO THE PROPERTY OF THE PARTY OF THE P	
IC TO DESCRIPTION AND ADMINISTRATION ADMINISTRATION AND ADMINISTRATION ADMINISTRATION AND	

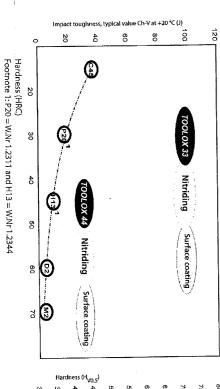
k6385454#16#16#4

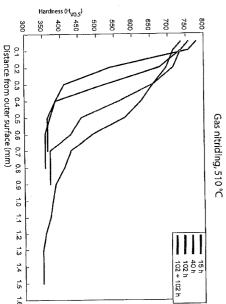
Hardness [HRC]	Hardness [FB]	impact toughness [J]	R MPa	Compressive yeild strength	Elongation, A <sub>2</sub> [%]	Yeild strength, R [MPa]	Tensile strength, R [MPa]		Mechanical properties
5	15	2	1	Ō.	Q				#1 ⇒
g.	B		. ≤	Ō.	Ħ		ī	iiinii	#1 ≌
S	v	<u>o</u> .	a	S.	<u>_</u>	16	3		# ≓
	T	ō	5 (1)	š	300	ထူ	, D	01114	ته ا
꼰	巫	2		ن الح		. 7	9	Maria	-
	14114	ด		<u>0</u>	22.	20	. 5	e de la composición dela composición de la composición de la composición de la composición dela composición de la composición de la composición dela composición dela composición de la composición de la composición dela	Шĕ
		Y2	anni.	ō.	0	8	- 20		観光
oğum.		w.	ili).	и.	M.	N	3-6		組ん
file it has				76		- ₹	~		猫 子
Mark Viel	304		Hilb)	Ŗ		₽	Ţ	Hill (	0
	MY.			Ξ.					all co
			II.	3.0	1111111				17.5
		200		53			170		20
		10 H						1112	51
	19.02		Tall)		u kan	MET L	WE.		77
Hall (4)	faill		unii ii		24.		14.19	iiol <sub>u</sub> r	
							15.15	被制	413
				tille,					125
es de la job				Heli.				neni	
	<i>1</i> 46 5 6			Heis	acan	MI.			
		lime.		Mili	diliji.	910		11114	44
			14,44	800	Hilli		) Y	7.0	213
29	310	100	100	õ	M.E	αυ	ı o	0 10 2	
φ.	0	0	:000	Ψ	1110	heim		(4	10.5
		10217							
(Sund)	loilli		Mr. B	laj.		Khii	4.74		
		ile, b	100					78	10
		1900		u de	li Ri			4	
				M. II				1116	5 8
		170		750		000	3 4	1 200.6	2,1
		o	Line, i	Ŏ	, K	Ç	) (C	5 4 6	199
	Hiii			man)					90
	W L					144			
				Ш					
		Musi	, ile				ii ciji		
								1121	0.00
		180		700	i inii		500	PER IL C	10
		O		Θ.		ig di	muz		D 1
la sales a		an in		hii i					
	HII.			d a		Meric	M.		
				140					
		igerii		Milit	160				1,000
						9.5			2.1
		180		590		iii ii.			<b>4</b> 1
	inii Ai			9					
				HIII	Harri.				
				mili					186
				捌膊				inii)	134
				ti di					#500 <b>.</b> C
				560	шш				
			illilli	Ö	1616				nii -
P. Januaria	wini	HOM:	ишни	11/1/21:	HELLIS	in in	10.06	He wi	

Heat conductivity IW/m - K. Thermal expansion coefficient [10-6	PF
#20°C 200°C #400°C #400°C #50°C 35 35 35 36 36 36 36 36 36 36 36 36 36 36 36 36	ıysi
at conductivity emal expansio	cal
e du	pr
onductivity.[W	ор
<u> </u>	21
tyTW/n on coe	es
onductivity (WimKl.) al expansion coefficien	
응 즈	
n-K( -fficient (10-6/K)	
10	
δ)	
twity[Wim-K] ansion coefficient [10-6/K]	
#20°C :200°C H   Conductivity.PW/m-IKI   35 35   mai expansion coefficient [10-6/K)	
-20	
31	
-2	
. ნ გ 8	
5.0	
C +4000 55	
-20°C 1.200°C 4000°C 35 35 30 30 13.1 13	
+20°С ;200°С ;490°С 35 35 36 30 13.1 13.1 13.1	
	and the second
2,0°C -200°C -400°C -200°C -400°C -200°C -20	
+20°C -:200°C +400°C 35 35 35 30 30 30 30 30 30 30 30 30 30 30 30 30	Transport
20°C 120°C 140°C C 35 35 30 ent. (10-6/K) 13.1 13.1	
Programme Broker (1982)	3

### Surface technology







CCAD





#### Machining TOOLOX33®

. TOOLOX 33 can be machined using conventional machines. It is important that sharp tools are used, with a positive cutting evaluation of best practice. angle and that vibration is avoided. Use the following recommendations as guidelines and the starting point for your own

#### Milling

Cutting speed  $V_c = 150-250 \text{ m/min}$ Always use a positive cutting angle Cemented carbide cutter ISO class P 20



Speed (rpm)

n I

Feed f = 0,10-0,20 mm/tand

Roughing circular inserts Use milling cutters with

setting angle Use milling cutters with a 45° Finishing



#### Drilling

Carbide

diameter D are dependent on the drill bit Feed (f) and speed (rpm) (n) f = 0.10-0.18 mm/revolutionCutting speed Vc = 40-50 m/min

Use coolant



Varvtal: High-speed steel HSS-Co Cutting speed  $V_c = 13-15$  m/min

$$n = \frac{V_c \times 1000}{\pi \times D}$$



Use coolant

A ST	

5 10 20 25	D [mm]
0:10 0:10 0:16 0:23 0:30	Feed, f [mm/varv]

#### Threading

Feed (f) = 0.03 mm/toothCutting speed  $V_c = 30 \text{ m/min}$ Thread milling



 $V_c = 7-9 \text{ m/min}$ Cutting speed

Threading HSS-Co



D	
	<b>S S 0</b>
	∞ o <u>g</u>
	-
Speed 450 300 250 200	
Speed 450 3005 250 200	a.a.a.1656 <b>a</b>
Speed 450 300 250 200	
peed 450 300 250 250	5
ed 0	
	30 45
	peed 450 300
	peed 450

## Gas cutting / Welding

Recommended preheat temperature when gas cutting and welding.

Min. 175°C

Recommended stress relief annealing (after slow cooling to room temperature).

after gas cutting and welding.

For further information see Best Practice or please contact SSAB Oxelösund.