

## HABA Steel plates

### Product overview, formats

K52	Toolox33
Planstahl	Toolox44
EC80	INOX V2A
CK45	INOX V4A
C-Stahl	2316-S

**Mechanical engineering**

**Plant construction**

**Apparatus construction**

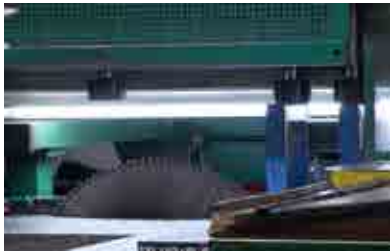
**Jig manufacturing**

**Toolmaking**

# Product overview

## Steel plates

HABA-Produktebezeichnung	K52	Planstahl	EC80
Material no.	1.0577	1.0577	1.7131
Steel quality	Engineering steel	Engineering steel	Case-hardened steel
DIN/EN designation	S355J2+N (old ST52-3N)	S355J2+N (old ST52-3N)	16MnCr5
Surface	grinded	grinded	grinded
<b>HABA standard tolerance</b>			
Quality of finish	≤Ra1.6 (N7)	≤Ra1.6 (N7)	≤Ra1.6 (N7)
Thickness tolerance (mm)	+0.25/0	+0.3/0	+0.4/+0.3
Parallelism (mm)	≤0.05	≤0.1	≤0.05
Evenness (mm)	≤0.2	≤0.3	≤0.15
Length and width tolerance (mm)	+1/0	+1/0	+0.8/+0.3
Customer-specific tolerance (mm)	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm
<b>Mechanical properties</b>			
Machinability	very good	good	very good
Dimensional stability	very good	good	very good
Tensile strength $R_m$ (N/mm <sup>2</sup> )	470-630	470-630	ca. 700
Elastic limit $R_{eH}/R_{p0.2}$ (N/mm <sup>2</sup> )	295-355	295-355	ca. 550
Breaking strain $A_5$	17-22 %	17-22 %	9-11 %
Hardness			
(HBW)	-	-	138-187
(HRC)	-	-	-
Density (kg/dm <sup>3</sup> )	7.85	7.85	7.85
E-module (kN/mm <sup>2</sup> )	~210	~210	~210
Thermal conductivity coefficient (W/mK)	35-45	35-45	35-45
Thermal expansion coefficient (10 <sup>-6</sup> / K)	11-14	11-14	11-14
Weldability	good	good	good
<b>Chemical composition</b>			
Carbon	C ≤0.20 %	≤0.20 %	0.14-0.19 %
Silicium	Si ≤0.55 %	≤0.55 %	≤0.40 %
Manganese	Mn ≤1.60 %	≤1.60 %	1.0-1.3 %
Phosphor	P ≤0.035 %	≤0.035 %	≤0.035 %
Sulfur	S ≤0.035 %	≤0.035 %	≤0.035 %
Chromium	Cr -	-	0.8-1.1 %
Molybdenum	Mo -	-	-
Nickel	Ni -	-	-
	Cr+Mo+Ni -	-	-
Vanadium	V -	-	-
Nitrogen	N -	-	-
CEIHW	-	-	-
CET	-	-	-
<b>Comments / comparisons</b>			
	Extremely low-tension engineering steel which is specially low-tension annealed at HABA and is easy to weld. It is used for intensively processed machine components of all kinds where a high degree of dimensional stability is required.	Normal heat-treated steel well suited for welding and for basic machine components. Planstahl comes mainly into use in mechanical engineering, vehicle and tool construction.	Normalised and additionally low-tension annealed case-hardened steel with excellent machinability and high dimensional stability. Suitable for mechanical engineering parts such as gear wheels and gear parts with a hard, wear-resistant surface and a tough core.

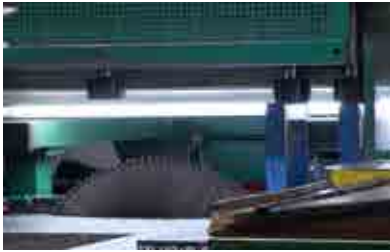


CK45	C-Stahl	Toolox33	Toolox33
1.1191	1.1191	-	-
Unalloyed tempering steel C45E+N	Unalloyed tempering steel C45E+N	pre-hardened steel -	pre-hardened steel -
grinded	milled	grinded	as-rolled
$\leq Ra1.6$ (N7) +0.3/+0.2	$Ra3.2$ (N8) +/-0.2	$\leq Ra1.6$ (N7) +0.2/+0.1	- EN 10 029 Klasse C
$\leq 0.03$ $\leq 0.1$ +0.8/+0.3	$\leq 0.1$ $\leq 0.3$ +/-0.3	$\leq 0.05$ $\leq 0.20$ +0.8/+0.3	EN 10 029 $\leq 0.5$ +0.8/+0.3
within a tolerance of 0.4 mm	within a tolerance of 0.5 mm	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm
very good very good	good good	very good very good	very good very good
560-620 275-340 14-16 %	560-620 275-340 14-16 %	1080 950 $\geq 16$ %	1080 950 $\geq 16$ %
175-210 -	175-210 -	310 29	310 29
7.85 ~210 35-45 11-14	7.85 ~210 35-45 11-14	7.85 ~210 11-14	7.85 ~210 11-14
limited	limited	-	
0.42-0.5 % $\leq 0.40$ % 0.50-0.80 % $\leq 0.035$ % $\leq 0.035$ % $\leq 0.40$ % $\leq 0.10$ % $\leq 0.40$ % $\leq 0.63$ % - - - -	0.42-0.50 % $\leq 0.40$ % 0.50-0.80 % $\leq 0.035$ % $\leq 0.035$ % $\leq 0.40$ % $\leq 0.10$ % $\leq 0.40$ % $\leq 0.63$ % - - - -	0.22-0.24 % 0.6-1.1 % 0.8 % $\leq 0.01$ % $\leq 0.003$ % 1.0-1.2 % 0.30 % $\leq 1$ % - 0.10-0.11 % - 0.62-0.71 0.40-0.44	0.22-0.24 % 0.6-1.1 % 0.8 % $\leq 0.01$ % $\leq 0.003$ % 1.0-1.2 % 0.30 % $\leq 1$ % - 0.10-0.11% - 0.62-0.71 0.40-0.44
Heat-treated and stress relieved steel by HABA with excellent machinability and high dimensional stability. Suitable for intensively processed components, for medium stress in mechanical engineering, toolmaking and vehicle construction.	Normalized heat-treated steel with good machinability, surface-hardenable and weldable within limits. Suitable for basic steel components, in mechanical engineering, vehicle construction and toolmaking which are exposed to medium stress.	Toolox33 is a steel with outstanding dimensional stability. The high impact toughness and wear resistance are exceptional. It is used in mechanical engineering and toolmaking.	Toolox33 is a steel with outstanding dimensional stability. The high impact toughness and wear resistance are exceptional. It is used in mechanical engineering and toolmaking.

# Product overview

## Steel plates

HABA product designation	Toolox44	Toolox44	INOX V2A
Material no.	-	-	1.4301 / 1.4307
Steel quality	pre-hardened steel	pre-hardened steel	stainless steel
DIN/EN designation	-	-	X5CrNi 18-10
Surface	grinded	as-rolled	grinded
<b>HABA standard tolerance</b>			
Quality of finish	Ra1.6 (N7)	-	Ra1.6 (N7)
Thickness tolerance (mm)	+0.2/+0.1	DIN/EN 10029 class C	+/-0.1
Parallelism (mm)	≤0.05	DIN/EN 10029	≤0.1
Evenness (mm)	≤0.20	≤0.5	≤0.20
Length and width tolerance (mm)	+0.8/+0.3	+0.8/+0.3	+0.8/+0.3
Customer-specific tolerance (mm)	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm
<b>Mechanical properties</b>			
Machinability	moderate	moderate	moderate
Dimensional stability	good	good	moderate
Tensile strength $R_m$ (N/mm <sup>2</sup> )	1450	1450	500-700
Elastic limit $R_{eH}/R_{p0.2}$ (N/mm <sup>2</sup> )	1300	1300	190
Breaking strain $A_5$	≥13 %	≥13 %	-
Lengthways	-	-	≥45 %
Crosswise	-	-	≥35 %
Hardness			
(HBW)	450	450	≤215
(HRC)	45	45	-
Density (kg/dm <sup>3</sup> )	7.85	7.85	7.85
E-module (kN/mm <sup>2</sup> )	~210	~210	~210
Thermal conductivity coefficient (W/mK)			
Thermal expansion coefficient (10 <sup>-6</sup> / K)	11-14	11-14	11-14
Weldability	-	-	good
<b>Chemical composition</b>			
Carbon	C 0.32 %	0.32 %	≤0.03 %
Silicium	Si 0.6-1.1 %	0.6-1.1 %	≤1.00 %
Manganese	Mn 0.8 %	0.8 %	≤ 2.00 %
Phosphor	P ≤0.010 %	≤0.010 %	≤0.045 %
Sulfur	S ≤0.003 %	≤0.003 %	≤0.015 %
Chromium	Cr 1.35 %	1.35 %	17.5-19.5 %
Molybdenum	Mo 0.80 %	0.80 %	-
Nickel	Ni ≤1 %	≤1 %	8.0-10.0 %
	Cr+Mo+Ni -	-	-
Vanadium	V 0.14 %	0.14 %	-
Nitrogen	N		≤0.11 %
CEIW	0.92-0.96	0.92-0.96	-
CET	0.55-0.57	0.55-0.57	-
<b>Comments / comparisons</b>			
	Toolox44 is a pre-hardened steel with a hardness of 45 HRC and a yield strength of 1300 N/mm <sup>2</sup> . It is easy to work with suitable tools. Because of the low levels of internal stress, large selections may be machined without movement and stress relieving is neither necessary nor recommended. This steel, which is used in mechanical engineering and toolmaking, may be polished and etched with excellent results.	Toolox44 is a pre-hardened steel with a hardness of 45 HRC and a yield strength of 1300 N/mm <sup>2</sup> . It is easy to work with suitable tools. Because of the low levels of internal stress, large selections may be machined without movement and stress relieving is neither necessary nor recommended. This steel, which is used in mechanical engineering and toolmaking, may be polished and etched with excellent results.	Corrosion-resistant austenitic steel which is used mainly in equipment manufacturing, mechanical engineering, food industry and in the medical field. 1.4301 is easy to weld, very easy to polish and wear-resistant.



INOX V2A	INOX V4A	INOX V4A	2316-S
1.4301 / 1.4307	1.4404 / 1.4401	1.4404 / 1.4401	1.2085
stainless steel	stainless steel	stainless steel	plastic mould steel
X5CrNi 18-10	X2CrNiMo 17-12-2	X2CrNiMo 17-12-2	X3CrS16
as-rolled	grinded	as-rolled	grinded
-	Ra1.6 (N7)	-	Ra1.6 (N7)
DIN/EN 10029 class B	+/-0.1	DIN/EN 10029 class B	+/-0.1
DIN/EN 10029	≤0.1	DIN/EN 10029	≤0.05
Surface ≤1 m <sup>2</sup> : ≤1 mm	≤0.30	Surface ≤1 m <sup>2</sup> : ≤1 mm	≤0.2
+0.8/+0.3	+0.8/+0.3	+0.8/+0.3	+0.8/+0.3
within a tolerance of 0.4 mm	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm	within a tolerance of 0.4 mm
moderate	moderate	moderate	very good
moderate	moderate	moderate	good
500-700	500-700	500-700	950-1100
190	200	190	750-950
-	-	-	≥5 %
≥45 %	≥40 %	≥40 %	-
≥35 %	≥30 %	≥30 %	-
≤215	≤215	≤215	280-325
-	-	-	-
7.85	7.85	7.85	7.85
~210	~210	~210	~210
11-14	11-14	11-14	35-45
11-14	11-14	11-14	10.5-12
good	good	good	-
≤0.03 %	≤0.03 %	≤0.03 %	0.28-0.38
≤1.00 %	≤1.00 %	≤1.00 %	≤1.00 %
≤2.00 %	≤2.00 %	≤2.00 %	≤1.40 %
≤0.045 %	≤0.45 %	≤0.45 %	≤0.03 %
≤0.015 %	≤0.015 %	≤0.015 %	0.05-0.10 %
17.5-19.5 %	16.5-18.5 %	16.5-18.5 %	15.0-17.0 %
-	2-2.5 %	2-2.5 %	-
8.0-10.0 %	10-13 %	10-13 %	≤1.00 %
-	-	-	-
-	-	-	-
≤0.11 %	≤0.11 %	≤0.11 %	-
-	-	-	-
-	-	-	-
Corrosion-resistant austenitic steel which is used mainly in equipment manufacturing, mechanical engineering, food industry and in the medical field. 1.4301 is easy to weld, very easy to polish and wear-resistant.	1.4404 is a non-corroding and acid-resistant austenitic steel. It is used in the field of medical, chemical and food industries.	1.4404 is a non-corroding and acid-resistant austenitic steel. It is used in the field of medical, chemical and food industries.	Tempered, corrosion-resistant plastic mould steel with good machinability and dimensional stability. It is used as pattern plates in plastic injection dies and also for corrosion-resistant components for mechanical engineering.

# HABA storage formats

	K52	Planstahl	EC80	CK45	C-Stahl	Toolox33	Toolox33
Standard format in mm Max format in mm	1000 x 1230 2000 x 3000	1000 x 1230 2000 x 3000	1000 x 1230 2000 x 3000	1000 x 1230 2000 x 3000	1000 x 1230 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000
Thickness in mm	grinded	grinded	grinded	grinded	milled	grinded	as-rolled
5 6 7	◆ ◆	◆ ◆	◆ ◆	◆ ◆		◆ ◆	◆
8 9 10	◆ ◆	◆ ◆	◆ ◆	◆ ◆	◆	◆ ◆	◆ ◆
11 12 13	◆	◆	◆	◆	◆	◆	◆
14 15 16	◆	◆	◆	◆ ◆ ◆	◆	◆	◆ ◆
17 18 19				◆ ◆			◆
20 21 22	◆	◆	◆	◆ ◆	◆	◆	◆ ◆
23 24 25	◆	◆	◆	◆	◆	◆	◆
26 27 28				◆			◆
29 30 32	◆	◆	◆	◆ ◆	◆	◆	◆
35 36 38	◆	◆	◆	◆ ◆	◆	◆	◆
40 45 46	◆ ◆	◆ ◆	◆ ◆	◆ ◆ ◆	◆ ◆	◆ ◆	45 ◆
50 56 60	◆ ◆	◆ ◆	◆ ◆	◆ ◆ ◆	◆ ◆	◆ ◆	55 ◆ 65 ◆
63 70 76	◆	◆	◆	◆ ◆ ◆	◆	◆	
80 90 96	◆ ◆	◆ ◆	◆ ◆	◆ ◆ ◆	◆ ◆	◆ ◆	85 ◆
100 110 120	◆ ◆ ◆	◆ ◆ ◆	◆	◆ ◆ ◆	◆ ◆ ◆	◆	105 ◆
130 140 150	◆ ◆ ◆	◆ ◆ ◆		◆ ◆ ◆	◆ ◆ ◆		

◆ 1-3 days delivery  
 ◆ 3-5 days delivery for special thickness and special tolerances

Subject to changes in stocks

	<b>Toolox44</b>	<b>Toolox44</b>	<b>INOX V2A</b>	<b>INOX V2A</b>	<b>INOX V4A</b>	<b>INOX V4A</b>	<b>2316-S</b>
Standard format in mm Max format in mm	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000 2000 x 3000	1000 x 3000
Thickness in mm	grinded	as-rolled	grinded	as-rolled	grinded	as-rolled	grinded
5	◆		◆	◆	◆		
6	◆	◆	◆	◆	◆	◆	
7							
8	◆	◆	◆	◆	◆	◆	◆
9							
10	◆	◆	◆	◆	◆	◆	◆
11							
12	◆	◆	◆	◆	◆	◆	◆
13							
14		◆					
15	◆	◆	◆	◆	◆	◆	◆
16		◆					
17							
18		◆					
19							
20	◆	◆	◆	◆	◆	◆	◆
21		◆					
22		◆					
23							
24							
25	◆	◆	◆	◆	◆	◆	◆
26							
27							
28		◆					
29							
30	◆	◆	◆	◆	◆	◆	◆
32							
35	◆	◆	◆	◆	◆	◆	◆
36							
38							
40	◆		◆	◆	◆	◆	◆
45	◆	◆	◆	◆	◆	◆	◆
46							
50	◆		◆	◆	◆	◆	◆
55		55 ◆	◆	◆	◆	◆	
60	◆	65 ◆	◆	◆	◆	◆	
63							
70	◆						
76							
80	◆	85 ◆					
90	◆						
96							
100	◆	105 ◆					
110							
120							
130							
140							
150							

◆ 1-3 days delivery  
 3-5 days delivery for special thickness and special tolerances

Subject to changes in stocks

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