Results from comparisons between Brinell - Vickers - Rockwell and tensile strength measurements on

HARDOX®
wear plate

and

WELDOX®
structural steel plate

No standardized correlation exists between these three methods of hardness testing or to the tensile strength. The data are to be used as a guidance and are based on extensive inhouse measurements on HARDOX and WELDOX steels. They are not to be used for design or acceptance testing. General hardness values for different steels are shown according to the ASTM standard.

Comparison according to SSAB Oxelösund

Brinell HBW 10 mm 29,4kN	Vickers 98 N	Rockwell HRC	Approx. Tensile strength MPa	Approx. Corresponding grade
225	205	19	715	
250	233	22,5	790	
260	243	24	820	WELDOX 700
275	261	26	861	
300	289	29	935	WELDOX 900
320	311	32	995	WELDOX 960
325	317	32,5	1011	
350	345	35,5	1090	
375	373	38	1169	
400	401	40	1245	HARDOX 400
425	429	42,5	1328	
450	458	44,5	1412	HARDOX 450 & WELDOX 1100
475	485	46,5	1494	
500	514	49	1580	HARDOX 500
550	569	52,5	1758	
600	627	55	1940	HARDOX 600
650	682	57,5	2130	

ASTM

Brinell HBW 10 mm 29,4kN	Vickers 98 N	Rockwell HRC	Approx. tensile strength MPa
237	248	22	790
247	260	24	820
258	272	26	860
271	286	28	900
286	302	30	950
301	318	32	1010
319	336	34	1050
336	354	36	1110
353	372	38	1180
371	392	40	1250
390	412	42	1340
409	434	44	1430
432	458	46	1520
455	484	48	1640
482	513	50	1760
512	544	52	1880
543	577	54	2010
577	613	56	2160
615	653	58	2330
654	697	60	

HARDOX and WELDOX are registered trade marks.
These steel grades are manufactured only by SSAB Oxelösund AB.

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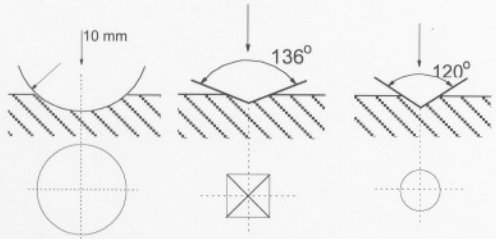
Different methods of hardness measurement



Brinell, HBW **Vickers, HV** **Rockwell, HRC**

Geometry of indenter	Ball Ø = 10mm	Pyramid	Cone
Approximate load	29.4kN	98N	Preload 98N Testload 1,37 kN
Calculation of hardness is based on	Diameter of remaining indentation	Mean value of diagonals of remaining indentation	Difference in penetration depth between the preload and the testload levels
	Diametre (mm)	Diagonal (mm)	Depth, HRC (mm)
400 HBW	3.05	0,215	0,12
500HBW	2.74	0,190	0,10

Due to the different characteristics of the three testing methods, an accurate correlation between them is impossible to achieve. Vickers and Rockwell testing result in local hardness values, while Brinell testing measure an average hardness of a larger area.

All hardness testing requires controlled surface conditions. For Vickers and Rockwell the surface should be polished. SSAB mills off approximately 2 mm of the surface in order to obtain a smooth surface for the Brinell test. Grinding or other machining operations may heat up the surface and decrease the hardness.

The European standard for HBW and ASTM have differing requirements regarding the test method.