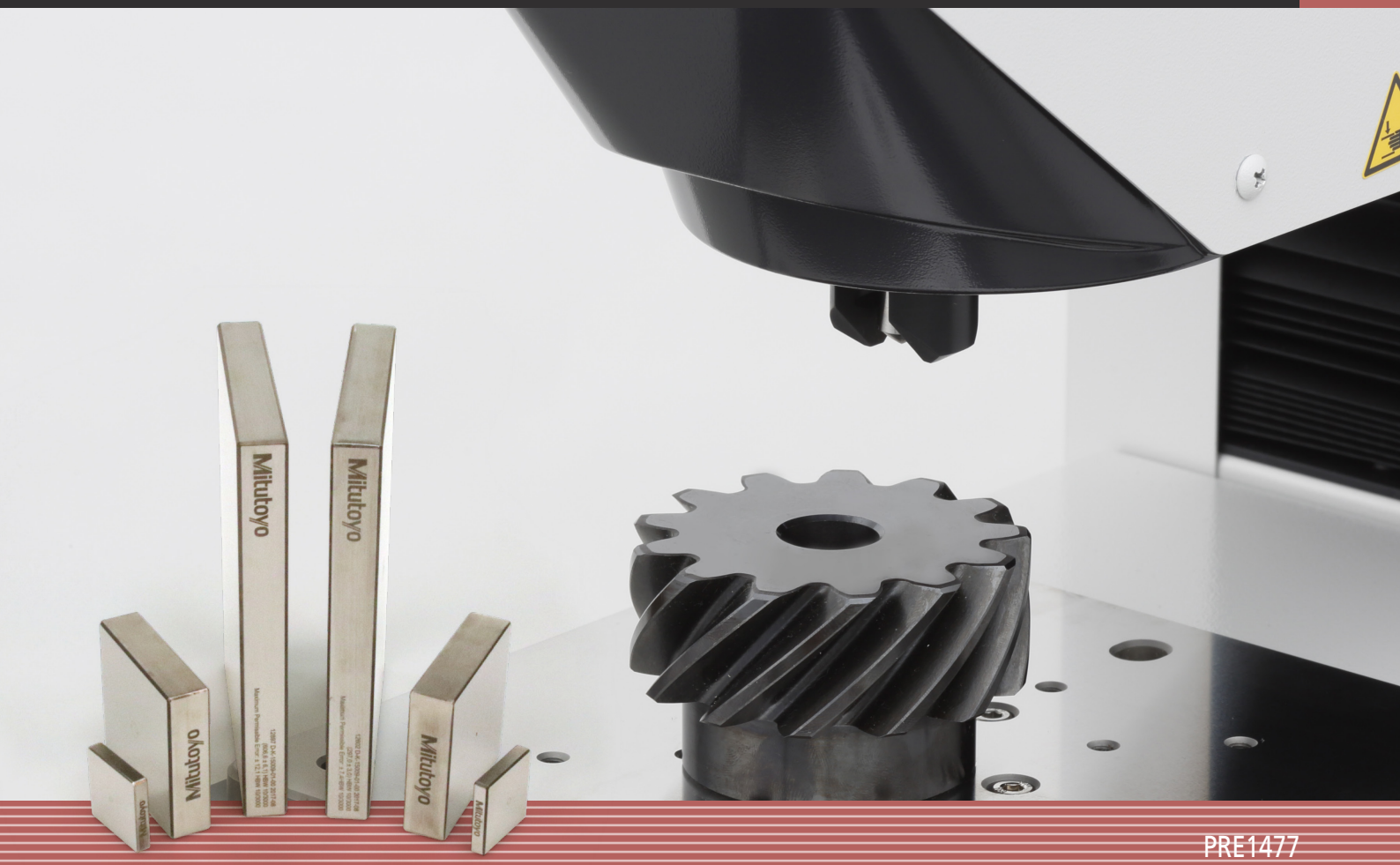
Mitutoyo

HARDNESS REFERENCE MATERIALS AND INDENTERS

ACCESSORIES FOR HARDNESS TESTING

TEST EQUIPMENT AND SEISMOMETERS



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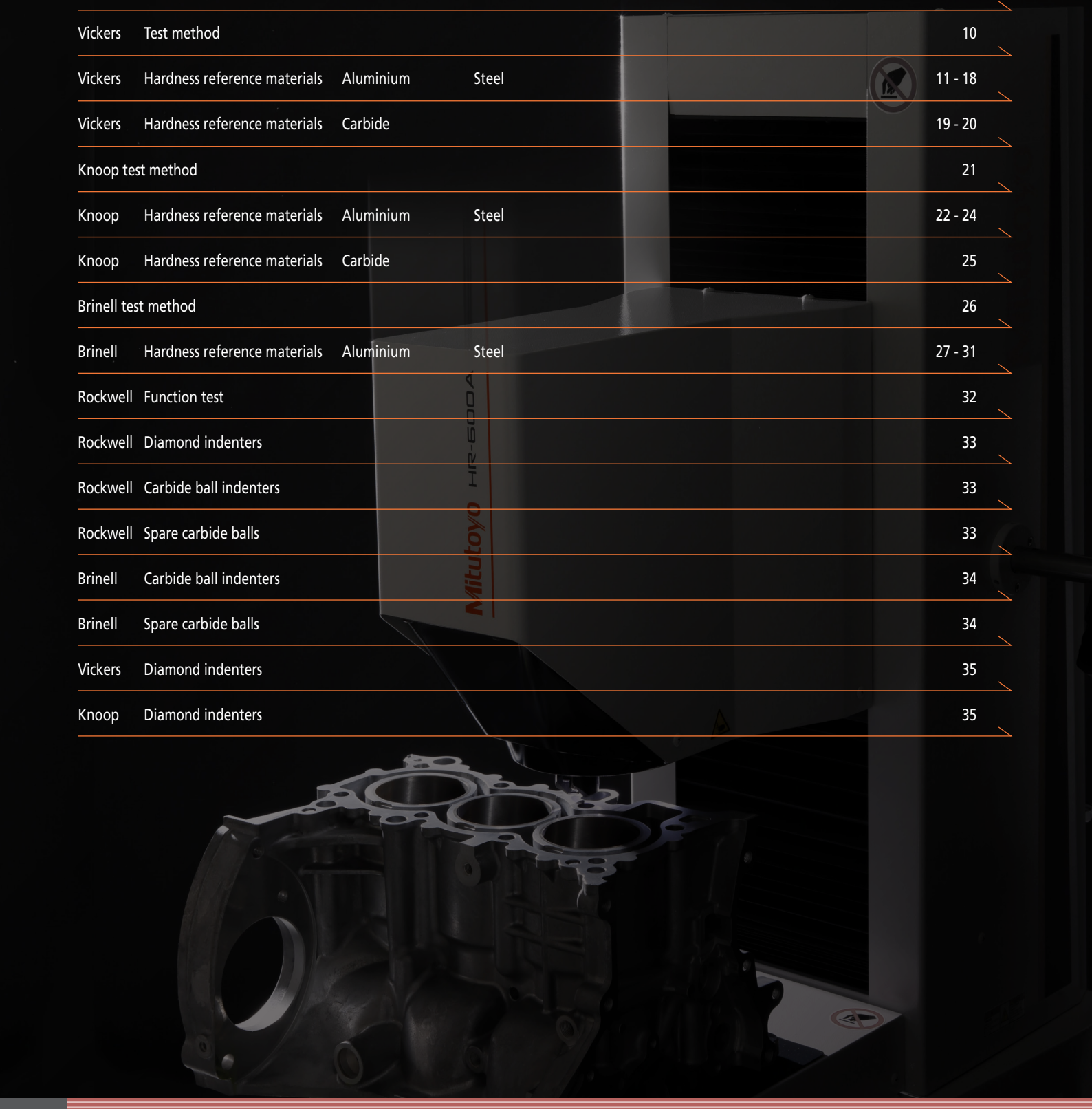

Hardness reference materials in quality control: The best way to boost process reliability!

The daily verification, performed by the user, is described in the according hardness testing standards and significantly contributes to quality management processes.

In the daily verification process, all parameters of the hardness test system that build-up to the hardness value, are examined by indentations on the hardness reference material. This periodical inspection of the machine by means of hardness reference materials should be carried out daily before the start of the test schedule.

If the device is used only once a week, the check should only be done on that day.

In a three-shift operation, a check at the beginning of each shift makes sense.

Vickers, Knoop, and Brinell reference materials have a reference indentation for checking the optical measuring system.

During the calibration process of the hardness reference material, the reference indentation is marked on the surface of the test and the measurements are recorded in the calibration certificate. After measuring the reference indentation, the determined values can be compared with those in the calibration certificate and the function of the optical measuring system can be assessed.

An according documentation enhances the process safety, as value shifts due to damage or malfunction can be detected easily.

A comprehensive direct and indirect verification should be performed once a year as part of calibration.
The direct examination includes test force, measuring system, test cycle, and indenter.

Indirect testing using a hardness reference material block indicates the correct interaction of all the parameters that were checked in the direct verification of the testing machine. In addition, the repeatability of the results of the hardness testing machine can also be checked with hardness test blocks.

Mitutoyo reference materials:

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- First-class quality
- Independent DAkkS calibration according to DIN EN ISO in an accredited laboratory
- Multiple calibrations (up to 3 scales on one test block), surface grid, and calibrations according to ASTM on request
- Large square or rectangular surface
- Space advantage over triangular or round plates
- Short delivery time
- MPE "Maximum Permitted Error" of the hardness testing system engraved – all relevant information at a glance:
  (does not apply for carbide reference materials)

Example:

12599 D-K-15009-01-00 2019-06
(387,8 ± 3,9) HV10
Maximum permissible error ± 11,6 HV10

DAkkS Accreditation number and date

12599 D-K-15009-01-00 2019-06

Hardness of reference block, scale, and range

(387,8 ± 3,9) HV10

MPE of hardness testing machine

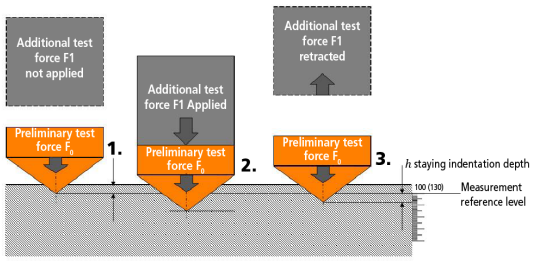
Maximum permissible error ± 11,6 HV10

Rockwell Test Method

Rockwell EN ISO 6508

Test Method

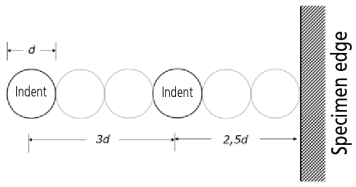
Hardness symbol	Definition	
HRA HRC HRD	Standard Rockwell hardness	$100 - \frac{h}{0{,}002}$
HRBW HREW HRFW HRGW HRHW HRKW	Standard Rockwell hardness	$130 - \frac{h}{0{,}002}$
HRN HRTW	Rockwell Superficial hardness	$100 - \frac{h}{0{,}001}$



Minimum Distance

Distance between indentations
› 3x indentation diameter

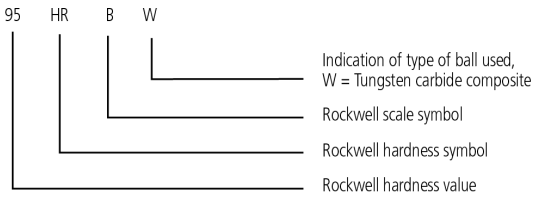
Distance from edge
› 2,5x indentation diameter



Scales and Application

Hardness symbol	Indenter	Total test force Kgf	Total test force N	Applicable range of Rockwell Hardness	Application range
HRA	Diamond	60	588,4	20 - 95 HRA	Carbide, sheet steel
HRD	Diamond	100	980,7	40 - 77 HRD	Case- hardened steel
HRC	Diamond	150	1471	10 – 70 HRC	Steel (100HRB or more to 70HRC or less)
HRFW	1,5875mm ball	60	588,4	60 - 100 HRFW	Bearing metal, annealed copper
HRBW	1,5875mm ball	100	980,7	20 - 100 HRBW	Brass
HRGW	1,5875mm ball	150	1471	30 - 94 HRGW	Hard aluminum alloy, beryllium copper, phosphor bronze.
HRHW	3,175mm ball	60	588,4	80 - 100 HRHW	Bearing metal, grind stone
HREW	3,175mm ball	100	980,7	70 - 100 HREW	Bearing metal
HRKW	3,175mm ball	150	1471	40 - 100 HRKW	Bearing metal
HR15N	Diamond	15	147,1	70 - 94 HR15N	Thin surface-hardened layer on steel such as carburized or nitrided
HR30N	Diamond	30	294,2	42 - 86 HR30N	
HR45N	Diamond	45	441,3	20 - 77 HR45N	
HR15TW	1,5875mm ball	15	147,1	67 - 93 HR15TW	Sheet of mild steel, brass, bronze, etc.
HR30TW	1,5875mm ball	30	294,2	29 - 82 HR30TW	
HR45TW	1,5875mm ball	45	441,3	10 - 72 HR45TW	

Designation of test results



MPE and repeatability

Rockwell Scale	Hardness range of the calibrated reference material	Permissible bias Rockwell units	Permissible repeatability range of the testing machine[a]
HRA	20 - 40	± 2 HRA	≤ 0,02 (100 – $\bar{H}$) or 0,8 HRA [b]
	45 - 75		
	80 - 95	± 1,5 HRA	
HRBW	10 - 50	± 4 HRBW	≤ 0,04 (130 – $\bar{H}$) HRBW
	60 - 80	± 3 HRBW	
	85 - 100	± 2 HRBW	
HRC	10 - 30	± 1,5 HRC	≤ 0,02 (100 – $\bar{H}$) or 0,8 HRC [b]
	35 - 55		
	60 - 70		
HRD	40 - 47	± 2 HRD	≤ 0,02 (100 – $\bar{H}$) or 0,8 HRD [b]
	55 - 63		
	70 - 77	± 1,5 HRD	
HREW	70 - 77	± 2,5 HREW	≤ 0,04 (130 – $\bar{H}$) HREW
	84 - 90		
	93 - 100	± 2 HREW	
HRFW	60 - 75	± 3 HRFW	≤ 0,04 (130 – $\bar{H}$) HRFW
	80 - 90		
	94 - 100	± 2 HRFW	
HRGW	30 - 50	± 6 HRGW	≤ 0,04 (130 – $\bar{H}$) HRGW
	55 - 75	± 4,5 HRGW	
	80 - 94	± 3 HRGW	
HRHW	80 - 94	± 2 HRHW	≤ 0,04 (130 – $\bar{H}$) HRHW
	96 - 100		
HRKW	40 - 60	± 4 HRKW	≤ 0,04 (130 – $\bar{H}$) HRKW
	65 - 80	± 3 HRKW	
	85 - 100	± 2 HRKW	
HRN		± 2 HRN	≤ 0,04 (100 – $\bar{H}$) or 1,2 HRN[b]
HRTW		± 3 HRTW	≤ 0,06 (100 – $\bar{H}$) or 2,4 HRTW[b]

[a] $\bar{H}$ is the mean hardness value

[b] The higher value of both is regarded as the permissible repeatability range of the hardness testing machine.

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ROCKWELL

ISO 6508-3, ASTM E18 (option) — **Dimensions: 60x60x16mm**

HRA	31	40	44	53	57	62	65	68	71	73	75	77	79	80	81	82	83	84	85
HRB	40	66	72	89	93	100													
HRC						25	30	35	40	45	50		55		60		63	65	67
HRD		**10**	**16**	**28**		42	48	52	56	60	62	65	67	69	71	72	73	75	76
HRE	73	91	97	**106**															
HRF	76	92	97	**105**															
HRGW			41	62															
HRKW	45	71	78	91															
HR15N				**62**		71	75	78	80	83	85	87	88	89	90	91		92	93
HR30N				**28**		43	50	56	60	64	68	71	73	76	78	79	81	82	84
HR45N				**2**		22	31	38	44	50	54	58	61	64	67	69	71	73	74
HR15TW	70	80	82	87	91														
HR30TW	43	57	62	72	78														
HR45TW	**5**	36	43	57	66														

Aluminium — **Steel**

Shown hardness values are only an approximation and can turn out different after heat treatment.
Values indicated in orange are outside the application range of ISO 6508-3.

Optional availability:
- calibration of up 3 test scales on one test block
- calibration according to ASTM E18
- lasered grid for accurate indentation spacing

				Preliminary Test Force		Total Test Force			Standard					
Order no.	Value	Scale	Test method	N	kgf	N	kgf	Ball Ø mm	ISO	ASTM	Grid	Calibration	Dimension	Material
HRA														
63ETB001	31	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB001D	31	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	aluminium
63ETB1126	40	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1127	44	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB003	53	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1176	57	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB006	62	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB008	65	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB010	68	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1128	71	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB012	73	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB012D	73	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB1129	75	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1130	77	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1131	80	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB015	81	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1132	82	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB016	83	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB017	84	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB018	85	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB018D	85	HRA	Rockwell	98.07	10	588.4	60		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel

				Preliminary Test Force		Total Test Force			Standard					
Order no.	Value	Scale	Test method	N	kgf	N	kgf	Ball Ø mm	ISO	ASTM	Grid	Calibration	Dimension	Material
HRBW														
63ETB021	40	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB021D	40	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	aluminium
63ETB1133	66	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB023	72	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1135	89	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1136	93	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1136D	93	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB029	100	HRBW	Rockwell	98.07	10	980.7	100	1.5875	ISO 6508-3			DAkkS	60x60x16mm	steel
HRC														
63ETB033	25	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB033D	25	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB034	30	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB035	35	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB036	40	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB037	45	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB037D	45	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB038	50	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB039	55	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB040	60	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB040DG	60	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3	ASTM E18	Grid	DAkkS	60x60x16mm	steel
63ETB041	63	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB042	65	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB042D	65	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB043	67	HRC	Rockwell	98.07	10	1471	150		ISO 6508-3			DAkkS	60x60x16mm	steel
HRD														
63ETB1138	10	HRD	Rockwell	98.07	10	980.7	100		non standard			Works	60x60x16mm	steel
63ETB1139	16	HRD	Rockwell	98.07	10	980.7	100		non standard			Works	60x60x16mm	steel
63ETB1140	28	HRD	Rockwell	98.07	10	980.7	100		non standard			Works	60x60x16mm	steel
63ETB1141	42	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB047	48	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB048	52	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB049	56	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB049D	56	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB050	60	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1142	62	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1143	65	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB052	67	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1144	69	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB053	71	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB054	73	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB054D	73	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	steel
63ETB055	74	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1145	76	HRD	Rockwell	98.07	10	980.7	100		ISO 6508-3			DAkkS	60x60x16mm	steel

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				Preliminary Test Force		Total Test Force			Standard					
Order no.	Value	Scale	Test method	N	kgf	N	kgf	Ball Ø mm	ISO	ASTM	Grid	Calibration	Dimension	Material
HREW														
63ETB1008	73	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1008D	73	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	aluminium
63ETB1146	91	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1009	97	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1009D	97	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3	ASTM E18		DAkkS	60x60x16mm	aluminium
63ETB1147	106	HREW	Rockwell	98.07	10	980.7	100	3.175	ISO 6508-3			Works	60x60x16mm	aluminium
HRFW														
63ETB1100	76	HRFW	Rockwell	98.07	10	588.4	60	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1101	92	HRFW	Rockwell	98.07	10	588.4	60	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1102	97	HRFW	Rockwell	98.07	10	588.4	60	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1103	105	HRFW	Rockwell	98.07	10	588.4	60	1.5875	non standard			Works	60x60x16mm	aluminium
HRGW														
63ETB1104	41	HRGW	Rockwell	98.07	10	1471	150	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1105	62	HRGW	Rockwell	98.07	10	1471	150	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
HRKW														
63ETB1106	45	HRKW	Rockwell	98.07	10	1471	150	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1107	71	HRKW	Rockwell	98.07	10	1471	150	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1108	78	HRKW	Rockwell	98.07	10	1471	150	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1109	91	HRKW	Rockwell	98.07	10	1471	150	3.175	ISO 6508-3			DAkkS	60x60x16mm	aluminium
HR15N														
63ETB1110	62	HR15N	Rockwell	29.42	3	147.1	15		non standard			Works	60x60x16mm	aluminium
63ETB1111	71	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB090	75	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB091	78	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1112	80	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB093	83	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB094	85	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1113	87	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB095	88	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1114	89	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB096	90	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB097	91	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB098	92	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB099	93	HR15N	Rockwell	29.42	3	147.1	15		ISO 6508-3			DAkkS	60x60x16mm	steel

				Preliminary Test Force		Total Test Force			Standard					
Order no.	Value	Scale	Test method	N	kgf	N	kgf	Ball Ø mm	ISO	ASTM	Grid	Calibration	Dimension	Material
HR30N														
63ETB1115	28	HR30N	Rockwell	29.42	3	294.2	30		non standard			Works	60x60x16mm	aluminium
63ETB1116	43	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB103	50	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1121	56	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1122	60	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB106	64	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB107	68	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1123	71	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB108	73	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1124	76	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1125	78	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1134	81	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB111	82	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1148	84	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
HR45N														
63ETB1149	2	HR45N	Rockwell	29.42	3	441.3	45		non standard			Works	60x60x16mm	aluminium
63ETB1150	22	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB116	31	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1151	38	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1152	44	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1153	50	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1154	58	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB121	61	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1155	64	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1156	67	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1157	69	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1158	71	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1159	73	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB125	74	HR45N	Rockwell	29.42	3	441.3	45		ISO 6508-3			DAkkS	60x60x16mm	steel
HR15TW														
63ETB1011	80	HR15TW	Rockwell	29.42	3	147.1	15	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1160	70	HR15TW	Rockwell	29.42	3	147.1	15	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB130	82	HR15TW	Rockwell	29.42	3	147.1	15	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1161	87	HR15TW	Rockwell	29.42	3	147.1	15	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB133	91	HR15TW	Rockwell	29.42	3	147.1	15	1.5875	ISO 6508-3			DAkkS	60x60x16mm	steel
HR30TW														
63ETB1117	43	HR30TW	Rockwell	29.42	3	294.2	30	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1118	57	HR30TW	Rockwell	29.42	3	294.2	30	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1119	62	HR30TW	Rockwell	29.42	3	294.2	30	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1120	72	HR30TW	Rockwell	29.42	3	294.2	30	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1013	78	HR30TW	Rockwell	29.42	3	294.2	30	1.5875	ISO 6508-3			DAkkS	60x60x16mm	steel
HR45TW														
63ETB1162	5	HR45TW	Rockwell	29.42	3	441.3	45	1.5875	non standard			Works	60x60x16mm	aluminium
63ETB1163	36	HR45TW	Rockwell	29.42	3	441.3	45	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1164	43	HR45TW	Rockwell	29.42	3	441.3	45	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1165	57	HR45TW	Rockwell	29.42	3	441.3	45	1.5875	ISO 6508-3			DAkkS	60x60x16mm	aluminium
63ETB1166	66	HR45TW	Rockwell	29.42	3	441.3	45	1.5875	ISO 6508-3			DAkkS	60x60x16mm	steel

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DAkkS calibration according to VDI/VDE 2616-1					Dimensions: 60x60x16mm				
HR2,5/62,5	63	74	79	84					
HR2,5/187,5					60	67	72	77	80
	Aluminium				Steel				

Shown hardness values are only an approximation and can turn out different after heat treatment.

Optional availability:
- lasered grid for accurate indentation spacing

				Preliminary Test Force		Total Test Force			Guideline					
Order no.	Value	Scale	Test method	N	kgf	N	kgf	Ball Ø mm			Grid	Calibration	Dimension	Material
HR 2,5/62,5														
63ETB1167	63	HR 2,5/62,5	Rockwell	98.07	10	612.9	62.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	aluminium
63ETB1168	74	HR 2,5/62,5	Rockwell	98.07	10	612.9	62.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	aluminium
63ETB1169	79	HR 2,5/62,5	Rockwell	98.07	10	612.9	62.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	aluminium
63ETB1170	84	HR 2,5/62,5	Rockwell	98.07	10	612.9	62.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	aluminium
HR 2,5/187,5														
63ETB1171	60	HR 2,5/187,5	Rockwell	98.07	10	1839	187.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	steel
63ETB1172	67	HR 2,5/187,5	Rockwell	98.07	10	1839	187.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	steel
63ETB1173	72	HR 2,5/187,5	Rockwell	98.07	10	1839	187.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	steel
63ETB1174	77	HR 2,5/187,5	Rockwell	98.07	10	1839	187.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	steel
63ETB1175	80	HR 2,5/187,5	Rockwell	98.07	10	1839	187.5	2.5	VDI/VDE 2616-1			DAkkS	60x60x16mm	steel

Carbide Reference Materials Rockwell

ISO 6508-3, ASTM E18 (option)	Dimensions: 45x35x8mm			
HRA	89.1	90.1	91.9	92.8
	Carbide			

Shown hardness values are only an approximation and can turn out significantly higher.

Optional availability:

- calibration up to 3 test scales on one test block
- calibration according to ASTM E92

			Preliminary Test Force			Total Test Force		Standard				
Order no.	Value	Scale	Test method	N	kgf	N	kgf	ISO	ASTM	Calibration	Dimension	Material
HRA												
63CTB083	89	HRA	Rockwell	98.07	10	588.4	60	ISO 6508-3		DAkkS	45x35x8mm	carbide
63CTB084	90	HRA	Rockwell	98.07	10	588.4	60	ISO 6508-3		DAkkS	45x35x8mm	carbide
63CTB085	92	HRA	Rockwell	98.07	10	588.4	60	ISO 6508-3		DAkkS	45x35x8mm	carbide
63CTB086	93	HRA	Rockwell	98.07	10	588.4	60	ISO 6508-3		DAkkS	45x35x8mm	carbide

Vickers Test Method

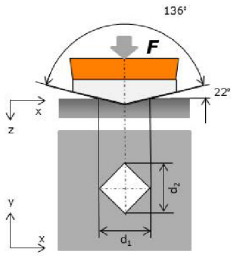
Vickers EN ISO 6507

Test Method

$$HV = \frac{\text{Testforce F}}{\text{surface of indentation}}$$

$$HV = 0{,}102 \times \frac{2F \sin \frac{136^\circ}{2}}{d^2} = 0{,}1891 \times \frac{F}{d^2}$$

$$d = \frac{d_1 - d_2}{2} \text{ mean diagonal length}$$



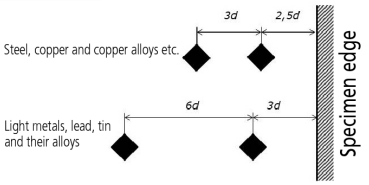
Minimum Distance

Distance between indentations (centre)

- Minimum distance 3,0x indentation diagonal for steel etc.
- Minimum distance 6,0x indentation diagonal for lead etc.

Distance from centre of indentation to specimen edge

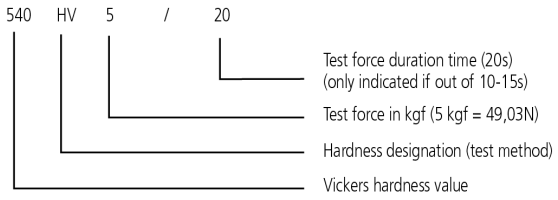
- Minimum distance 2,5x indentation diagonal for steel etc.
- Minimum distance 3,0x indentation diagonal for lead etc.



Scales and Application

Test force range	Hardness symbol	Nominal value of the test force F	Indenter	Application	Hardness Range
Microhardness test	HV 0,001	0,009 807	Diamond pyramid 136°	Microstructure, very thin layers of material, ceramic materials, HV0,1 hardening depth: CHD NHD SHD	1 HV to 3000 HV diagonal length >20 µm
	HV 0,002	0,019 61			
	HV 0,003	0,029 42			
	HV 0,005	0,049 03			
	HV 0,01	0,098 07			
	HV 0,015	0,147			
	HV 0,02	0,196 1			
	HV 0,025	0,245 2			
	HV 0,05	0,490 3			
	HV 0,1	0,980 7			
Low-force hardness test	HV 0,2	1,961	Diamond pyramid 136°	Thin layers of material, sheet metal, general small parts, hardening depth: CHD NHD SHD, surface hardness, weld testing	
	HV 0,3	2,942			
	HV 0,5	4,903			
	HV 1	9,807			
	HV 2	19,61			
	HV 3	29,42			
Hardness test (Macro)	HV 5	49,03	Diamond pyramid 136°	General parts, weld testing, sintered parts, surface hardness, Jominy test (HV30)	
	HV 10	98,07			
	HV 20	196,1			
	HV 30	294,2			
	HV 50	490,3			
	HV 100	980,7			

Designation of test results



MPE and repeatability

Hardness of the calibrated reference material H_{CRM}	Maximum permissible relative HV repeatability of the testing machine r_{rel} %HV		
	HV 5 to HV 100	HV 0,2 to < HV 5	< HV 0,2
HV ≤ 250	6.0 %	12.0 %	18.0%
HV > 250	4.0 %	8.0 %	12.0%

Mean diagonal length $\bar{d}$ mm	Maximum permissible error HVb_{rel} of the testing machine ± %HV
$0{,}02 \leq \bar{d} < 0{,}06$	$0{,}24/\leq \bar{d}$
$0{,}06 \leq \bar{d} \leq 1{,}4$	3

$$\bar{d} = \frac{(d_1 + d_2 + d_3 + d_4 + d_5)}{5}$$

VICKERS MICRO

ISO 6507-3, ASTM E92 (option) — **Dimensions: 30x30x6mm**

HV0,01	**200**	**250**	**300**												
HV0,015	**200**	**250**	**300**	**350**	**400**										
HV0,02	**200**	**250**	**300**	**350**	**400**	**450**	**500**								
HV0,025	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**				
HV0,05	200	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**850**	**900**
HV0,1	200	250	300	350	400	450	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**850**	**900**
HV0,2	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV0,3	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV0,5	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV1	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900

Steel

Tolerance of nominal value ± 25HV

Values indicated in orange are outside the 20µm limit of ISO 6507 and are exclusively supplied with ASTM E92 calibration certificates.

Optional availability:

- calibration of up 3 test scales on one test block
- calibration according to ASTM E92
- lasered grid for accurate indentation spacing

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV0,01											
63ETB497	200	HV0,01	Vickers	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB498	250	HV0,01	Vickers	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB499	300	HV0,01	Vickers	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
HV0,015											
63ETB514	200	HV0,015	Vickers	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
63ETB515	250	HV0,015	Vickers	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
63ETB516	300	HV0,015	Vickers	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
63ETB517	350	HV0,015	Vickers	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
63ETB518	400	HV0,015	Vickers	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
HV0,02											
63ETB531	200	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB532	250	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB533	300	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB534	350	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB535	400	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB536	450	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
63ETB537	500	HV0,020	Vickers	0.1961	0.02		ASTM E92		DAkkS	30x30x6mm	steel
HV0,025											
63ETB548	200	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB549	250	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB550	300	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB551	350	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB552	400	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB553	450	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB554	500	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB555	550	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB556	600	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB557	650	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
63ETB558	700	HV0,025	Vickers	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel

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				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV0,05											
63ETB578	200	HV0,05	Vickers	0.4903	0.05	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB579	250	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB580	300	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB581	350	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB582	400	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB583	450	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB584	500	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB585	550	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB586	600	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB587	650	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB588	700	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB589	750	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB590	800	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB591	850	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
63ETB592	900	HV0,05	Vickers	0.4903	0.05		ASTM E92		DAkkS	30x30x6mm	steel
HV0,1											
63ETB595	200	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB596	250	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB597	300	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB598	350	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB599	400	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB600	450	HV0,1	Vickers	0.9807	0.1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB601	500	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB602	550	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB603	600	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB604	650	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB605	700	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB606	750	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB607	800	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB608	850	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
63ETB609	900	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	30x30x6mm	steel
HV0,2											
63ETB612	200	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB613	250	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB614	300	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB615	350	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB616	400	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB617	450	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB618	500	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB619	550	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB620	600	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB621	650	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB622	700	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB623	750	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB624	800	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB625	850	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB626	900	HV0,2	Vickers	1.961	0.2	ISO 6507-3			DAkkS	30x30x6mm	steel

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV0,3											
63ETB629	200	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB630	250	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB631	300	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB632	350	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB633	400	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB634	450	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB635	500	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB636	550	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB637	600	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB638	650	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB639	700	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB640	750	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB641	800	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB642	850	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB643	900	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	30x30x6mm	steel
HV0,5											
63ETB647	200	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB648	250	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB649	300	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB650	350	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB651	400	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB652	450	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB653	500	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB654	550	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB655	600	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB656	650	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB657	700	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB658	750	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB659	800	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB660	850	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB661	900	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	30x30x6mm	steel
HV1										30x30x6mm	
63ETB664	200	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB665	250	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB666	300	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB667	350	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB668	400	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB669	450	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB670	500	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB671	550	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB672	600	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB673	650	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB674	700	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB675	750	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB676	800	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB677	850	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel
63ETB678	900	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	30x30x6mm	steel

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VICKERS MACRO

ISO 6507-3, ASTM E92 (option) — **Dimensions: 60x60x16mm**

HV1	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV2	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV3	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV5	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV10	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV20	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV30	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV50	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
HV100	80	110	130	170	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
	Aluminium											**Steel**							

Tolerance of nominal value ± 25HV

Optional availability:

- calibration of up 3 test scales on one test block
- calibration according to ASTM E92
- lasered grid for accurate indentation spacing

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV1										60x60x16mm	
63ETB760	80	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB761	110	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB762	130	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB763	170	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB764	200	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB765	250	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB766	300	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB767	350	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB768	400	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB769	450	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB770	500	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB771	550	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB772	600	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB773	650	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB774	700	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB775	750	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB776	800	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB777	850	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB778	900	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	60x60x16mm	steel

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				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV2											
63ETB680	80	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB681	110	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB682	130	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB683	170	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB684	200	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB685	250	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB686	300	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB687	350	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB688	400	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB689	450	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB690	500	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB691	550	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB692	600	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB693	650	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB694	700	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB695	750	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB696	800	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB697	850	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB698	900	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	60x60x16mm	steel
HV3											
63ETB700	80	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB701	110	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB702	130	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB703	170	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB704	200	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB705	250	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB706	300	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB707	350	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB708	400	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB709	450	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB710	500	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB711	550	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB712	600	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB713	650	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB714	700	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB715	750	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB716	800	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB717	850	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB718	900	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	60x60x16mm	steel

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				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV5											
63ETB720	80	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB721	110	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB722	130	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB723	170	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB724	200	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB725	250	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB726	300	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB727	350	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB728	400	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB729	450	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB730	500	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB731	550	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB732	600	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB733	650	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB734	700	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB735	750	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB736	800	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB737	850	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB738	900	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	60x60x16mm	steel
HV10											
63ETB1300	80	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB740	110	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB741	130	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB742	170	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB743	200	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB744	250	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB745	300	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB746	350	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB747	400	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB749	500	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB750	550	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB751	600	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB752	650	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB753	700	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB754	750	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB755	800	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB756	850	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB757	900	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB853	450	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	60x60x16mm	steel

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				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV20											
63ETB1301	80	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB866	110	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB867	130	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB868	170	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB869	200	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB870	250	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB871	300	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB872	350	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB873	400	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB874	450	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB875	500	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB876	550	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB877	600	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB878	650	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB879	700	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB880	750	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB881	800	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB882	850	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB883	900	HV20	Vickers	196.1	20	ISO 6507-3			DAkkS	60x60x16mm	steel
HV30											
63ETB1302	80	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB888	110	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB889	130	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB890	170	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB891	200	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB892	250	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB893	300	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB894	350	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB895	400	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB896	450	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB897	500	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB898	550	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB899	600	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB900	650	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB901	700	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB902	750	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB903	800	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB904	850	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB905	900	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	60x60x16mm	steel

MADE IN GERMANY

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV50											
63ETB1303	80	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB906	110	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB907	130	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB908	170	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB909	200	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB910	250	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB911	300	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB912	350	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB913	400	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB914	450	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB915	500	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB916	550	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB917	600	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB918	650	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB919	700	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB920	750	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB921	800	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB922	850	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB923	900	HV50	Vickers	490.3	50	ISO 6507-3			DAkkS	60x60x16mm	steel
HV100											
63ETB1304	80	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB924	110	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB925	130	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB926	170	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	aluminium
63ETB927	200	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB928	250	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB929	300	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB930	350	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB931	400	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB932	450	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB933	500	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB934	550	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB935	600	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB936	650	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB937	700	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB938	750	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB939	800	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB940	850	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel
63ETB941	900	HV100	Vickers	980.7	100	ISO 6507-3			DAkkS	60x60x16mm	steel

Carbide Reference Materials Vickers

VICKERS

ISO 6507-3, ASTM E92 (option)	Dimensions: 45x35x8mm				
HV 0,1	1300	1400	1600	1700	
HV 0,2	1300	1400	1600	1700	2100
HV 0,3	1300	1400	1600	1700	2100
HV 0,5	1300	1400	1600	1700	2100
HV1	1300	1400	1600	1700	2100
HV2	1300	1400	1600	1700	2100
HV3	1300	1400	1600	1700	2100
HV5	1300	1400	1600	1700	2100
HV10	1300	1400	1600	1700	2100
HV30	1300	1400	1600	1700	
	Carbide				

Values indicated in orange are outside the 20µm limit of ISO 6507 and are exclusively supplied with ASTM E92 calibration certificates.
Shown hardness values are only an approximation and can turn out significantly higher.

Optional availability:

- calibration of up 3 test scales on one test block
- calibration according to ASTM E92

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV0,1											
63CTB001	1300	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB002	1400	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB012	1600	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB004	1700	HV0,1	Vickers	0.9807	0.1		ASTM E92		DAkkS	45x35x8mm	carbide
HV0,2											
63CTB006	1300	HV0,2	Vickers	1.961	0.2		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB007	1400	HV0,2	Vickers	1.961	0.2		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB008	1600	HV0,2	Vickers	1.961	0.2		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB009	1700	HV0,2	Vickers	1.961	0.2		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB010	2100	HV0,2	Vickers	1.961	0.2		ASTM E92		DAkkS	45x35x8mm	carbide
HV0,3											
63CTB011	1300	HV0,3	Vickers	2.942	0.3	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB003	1400	HV0,3	Vickers	2.942	0.3		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB013	1600	HV0,3	Vickers	2.942	0.3		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB014	1700	HV0,3	Vickers	2.942	0.3		ASTM E92		DAkkS	45x35x8mm	carbide
63CTB015	2100	HV0,3	Vickers	2.942	0.3		ASTM E92		DAkkS	45x35x8mm	carbide
HV0,5											
63CTB016	1300	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB017	1400	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB018	1600	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB019	1700	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB020	2100	HV0,5	Vickers	4.903	0.5	ISO 6507-3			DAkkS	45x35x8mm	carbide
HV1											
63CTB021	1300	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB022	1400	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB023	1600	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB024	1700	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB025	2100	HV1	Vickers	9.807	1	ISO 6507-3			DAkkS	45x35x8mm	carbide

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HV2											
63CTB026	1300	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB027	1400	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB028	1600	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB029	1700	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB030	2100	HV2	Vickers	19.61	2	ISO 6507-3			DAkkS	45x35x8mm	carbide
HV3											
63CTB031	1300	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB032	1400	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB033	1600	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB034	1700	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB035	2100	HV3	Vickers	29.42	3	ISO 6507-3			DAkkS	45x35x8mm	carbide
HV5											
63CTB036	1300	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB037	1400	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB038	1600	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB039	1700	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB040	2100	HV5	Vickers	49.03	5	ISO 6507-3			DAkkS	45x35x8mm	carbide
HV10											
63CTB046	1300	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB047	1400	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB048	1600	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB049	1700	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB050	2100	HV10	Vickers	98.07	10	ISO 6507-3			DAkkS	45x35x8mm	carbide
HV30											
63CTB0041	1300	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB0042	1400	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB0043	1600	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB0044	1700	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	45x35x8mm	carbide
63CTB0045	2100	HV30	Vickers	294.2	30	ISO 6507-3			DAkkS	45x35x8mm	carbide


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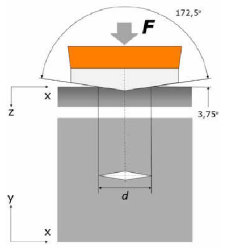
Knoop Test Method

Knoop EN ISO 4545

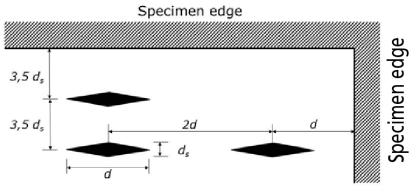
$$HK = \text{Constant} \times \frac{\text{Testforce F}}{\text{surface of indentation}}$$

$$HK = 0{,}102 \times \frac{2F \tan(\alpha/2)}{d\,(\beta/\tan)} = 1{,}451 \times \frac{F}{d^2}$$



Distance between indentations (centre)
- Long side $\bar{d}$: Minimum distance 2,0x indentation diagonal d
- Short side $\bar{d}$: Minimum distance 3,5x indentation diagonal d

Distance from centre of indentation to specimen edge
- Long side $\bar{d}$: Minimum distance 1,0x indentation diagonal d
- Short side $\bar{d}$:Minimum distance 3,5x indentation diagonal d



Knoop hardness test

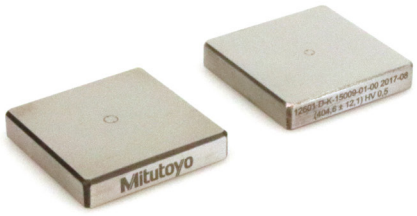
Hardness symbol	Nominal value of the test force F N	Application range
HK 0,001	0,009807	Microstructure, very thin layers of material, ceramic materials, glass (especially HK0,1) surface hardness, hardening depth CHD NHD: HK0,1 - HK2
HK 0,002	0,01961	
HK 0,005	0.04903	
HK 0,005	0.04903	
HK 0,01	0,09807	
HV 0,02	0,1961	
HK 0,025	0,2452	
HK 0,05	0,4903	
HK 0,1	0,9807	
HK 0,2	1,961	
HK 0,3	2,942	
HK 0,5	4,903	
HK 1	9,807	
HK 2	19,61	

620 HK 0,1 / 20
- 620: Vickers hardness value
- HK: Hardness designation (test method)
- 0,1: Test force in kgf (0,1 kgf = 0,9807N)
- 20: Test force duration time (20s) (only indicated if out of 10-15s)

Hardness of the calibrated reference material H_{CRM}	Maximum permissible relative HK repeatability of the testing machine r_{rel} %HK	
	HK 0,5 to HK 2	HK 0,001 to < HK 0,5
100 ≤ HK ≤ 250	16.0 %	18.0 %
250 < HK ≤ 650	10.0 %	10.0 %
HK > 650	8.0 %	8.0 %

Mean diagonal length $\bar{d}$ mm	Maximum permissible error HKb_{rel} of the testing machine ± %HK
0,02 ≤ $\bar{d}$ < 0,06	$0{,}24/ \leq \bar{d}$
0,06 ≤ $\bar{d}$	4

$$\bar{d} = \frac{(d_1+d_2+d_3+d_4+d_5)}{5}$$



MADE IN GERMANY

KNOOP MICRO

ISO 4545-3, ASTM E92 (option)	Dimensions: 30x30x6mm							
HK0,005	250	300	400	500				
HK0,01	250	300	400	500	600			
HK0,015	250	300	400	500	600	700		
HK0,025	250	300	400	500	600	700	800	900
HK0,03	250	300	400	500	600	700	800	900
HK0,05	250	300	400	500	600	700	800	900
HK0,1	250	300	400	500	600	700	800	900
HK0,2	250	300	400	500	600	700	800	900
HK0,3	250	300	400	500	600	700	800	900
HK0,5	250	300	400	500	600	700	800	900
HK1	250	300	400	500	600	700	800	900
HK2	250	300	400	500	600	700	800	900
	Aluminium				Steel			

Values indicated in orange are outside the 20µm limit of ISO 4545 and are exclusively supplied with ASTM E92 calibration certificates.

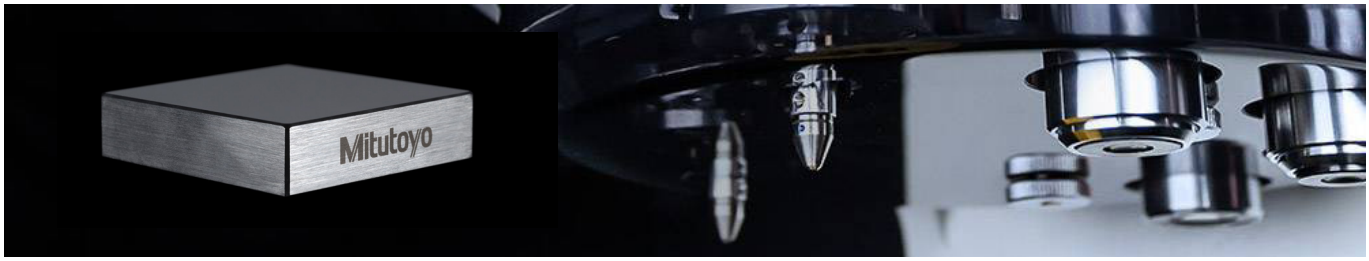
Optional availability:

- calibration of up 3 test scales on one test block
- calibration according to ASTM E92
- lasered grid for accurate indentation spacing

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HK0,005											
63ETB943	250	HK0,005	Knoop	0.04903	0.005		ASTM E92		DAkkS	30x30x6mm	steel
63ETB944	300	HK0,005	Knoop	0.04903	0.005		ASTM E92		DAkkS	30x30x6mm	steel
63ETB945	400	HK0,005	Knoop	0.04903	0.005		ASTM E92		DAkkS	30x30x6mm	steel
63ETB1212	500	HK0,005	Knoop	0.04903	0.005		ASTM E92		DAkkS	30x30x6mm	steel
HK0,01											
63ETB951	250	HK0,01	Knoop	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB952	300	HK0,01	Knoop	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB953	400	HK0,01	Knoop	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB1213	500	HK0,01	Knoop	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
63ETB956	600	HK0,01	Knoop	0.09807	0.01		ASTM E92		DAkkS	30x30x6mm	steel
HK0,015											
63ETB959	250	HK0,015	Knoop	0.1471	0.015	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB960	300	HK0,015	Knoop	0.1471	0.015	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB961	400	HK0,015	Knoop	0.1471	0.015	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1214	500	HK0,015	Knoop	0.1471	0.015	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB964	600	HK0,015	Knoop	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel
63ETB965	700	HK0,015	Knoop	0.1471	0.015		ASTM E92		DAkkS	30x30x6mm	steel

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HK0,025											
63ETB967	250	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB968	300	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB969	400	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1216	500	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB972	600	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB973	700	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1217	800	HK0,025	Knoop	0.2452	0.025	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1218	900	HK0,025	Knoop	0.2452	0.025		ASTM E92		DAkkS	30x30x6mm	steel
HK0,03											
63ETB1227	250	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1228	300	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1229	400	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1230	500	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1231	600	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1232	700	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1233	800	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1234	900	HK0,03	Knoop	0.2942	0.03	ISO 4545-3			DAkkS	30x30x6mm	steel
HK0,05											
63ETB975	250	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB976	300	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB977	400	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1219	500	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB980	600	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB981	700	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1220	800	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1221	900	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	30x30x6mm	steel
HK0,1											
63ETB984	250	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB985	300	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB986	400	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1222	500	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB989	600	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB990	700	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1223	800	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1224	900	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	30x30x6mm	steel
HK0,2											
63ETB862	300	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB993	250	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB994	400	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1235	500	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB997	600	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB998	700	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1225	800	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1226	900	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	30x30x6mm	steel

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HK0,3											
63ETB564	250	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB565	300	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB566	400	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1207	500	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB569	600	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB570	700	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1208	800	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1209	900	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	30x30x6mm	steel
HK0,5											
63ETB465	250	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB466	300	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB467	400	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1200	500	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB470	600	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB471	700	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1201	800	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1202	900	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	30x30x6mm	steel
HK1											
63ETB474	250	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB475	300	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB476	400	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1203	500	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB479	600	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB494	700	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1204	800	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1205	900	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	30x30x6mm	steel
HK2											
63ETB512	250	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB513	300	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB529	400	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1206	500	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB547	600	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB593	700	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1210	800	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel
63ETB1211	900	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	30x30x6mm	steel



Carbide Reference Materials Knoop

KNOOP

ISO 4545-3, ASTM E92 (option)	Dimensions: 45x35x8mm				
HK 0,005	1300	1400			
HK 0,1	1300	1400	1600	1700	2100
HK 0,2	1300	1400	1600	1700	2100
HK 0,3	1300	1400	1600	1700	2100
HK 0,5	1300	1400	1600	1700	2100
HK 1	1300	1400	1600	1700	2100
HK 2	1300	1400	1600	1700	2100
			Carbide		

Shown hardness values are only an approximation and can turn out significantly higher.

Optional availability:

- calibration of up 3 test scales on one test block
- calibration according to ASTM E92

				Preliminary Test Force		Standard					
Order no.	Value	Scale	Test method	N	kgf	ISO	ASTM	Grid	Calibration	Dimension	Material
HK0,05											
63CTB051	1300	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB052	1400	HK0,05	Knoop	0.4903	0.05	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK0,1											
63CTB053	1300	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB054	1400	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB055	1600	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB056	1700	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB057	2100	HK0,1	Knoop	0.9807	0.1	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK0,2											
63CTB058	1300	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB059	1400	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB060	1600	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB061	1700	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB062	2100	HK0,2	Knoop	1.961	0.2	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK0,3											
63CTB063	1300	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB064	1400	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB065	1600	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB066	1700	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB067	2100	HK0,3	Knoop	2.942	0.3	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK0,5											
63CTB068	1300	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB069	1400	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB070	1600	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB071	1700	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB072	2100	HK0,5	Knoop	4.903	0.5	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK1											
63CTB073	1300	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB074	1400	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB075	1600	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB076	1700	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB077	2100	HK1	Knoop	9.807	1	ISO 4545-3			DAkkS	45x35x8mm	carbide
HK2											
63CTB078	1300	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB079	1400	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB080	1600	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB081	1700	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	45x35x8mm	carbide
63CTB082	2100	HK2	Knoop	19.61	2	ISO 4545-3			DAkkS	45x35x8mm	carbide

Brinell Test Method

Brinell EN ISO 6506

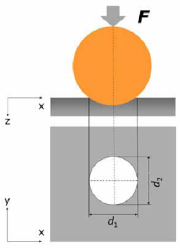
Test Method

$$HBW = \text{constant} \times \frac{\text{Testforce F}}{\text{surface of indentation}}$$

$$HBW = 0{,}102 \times \frac{\text{Testforce F}}{\pi D^2 (1 - \sqrt{1 - d^2/D^2})}$$

$$d = \frac{d_1 - d_2}{2}$$ mean indentation diameter

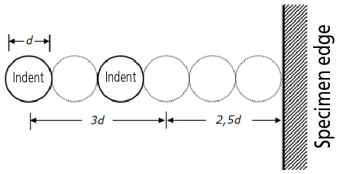
D = ball diameter



Minimum Distance

Distance between indentations
› 3x indentation diameter

Distance from edge
› 2,5x indentation diameter



Scales and Application

Hardness symbol Brinell scales	Ball diameter D mm	Test force F N	Force-area index 0,102 × F/D2	HBW Hardness as in ISO 6506-4	Material/Range as recommended in ISO 6506-1
HBW 1/30	1	294,2	30	95,5 - 653,8 HBW	Steel Nickel and Titanium alloys Cast iron >140HBW Copper alloys >200HBW
HBW 2,5/187,5	2,5	1839			
HBW 5/750	5	7355			
HBW 10/3000	10	29420			
HBW 10/1500	10	14710	15	47,77 - 326,9 HBW	Light metals and their alloys
HBW 1/10	1	98,07	10	31,85 – 217,8 HBW	Cast iron <140HBW Copper and copper alloys 35 - 200 HBW Light metals and their alloys 35 - 200 HBW
HBW 2,5/62,5	2,5	612,9			
HBW 5/250	5	2452			
HBW 10/1000	10	9807			
HBW 1/5	1	49,03	5	15,92 – 109 HBW	Copper and copper alloys <35 HBW Light metals and their alloys 35 - 80 HBW
HBW 2,5/31,25	2,5	306,5			
HBW 5/125	5	1226			
HBW 10/500	10	4903			
HBW 1/2,5	1	24,52	2,5	7,96 - 54,48 HBW	Light metals
HBW 2,5/15,625	2,5	153,2			
HBW 5/62,5	5	612,9			
HBW 10/250	10	2452			
HBW 1/1	1	9,807	1	3,18 - 21,79 HBW	Lead Tin
HBW 2,5/6,25	2,5	61,29			
HBW 5/25	5	245,2			
HBW 10/100	10	980,7			

Designation of test results

360 HBW 2,5 187,5 / 20

- Test force duration time (20s) (only indicated if out of 10-15s)
- Test force in kgf (187,5 kgf = 1839N)
- Ball diameter, in mm
- Hardness designation (test method)
- Brinell hardness value

MPE and repeatability

Hardness of the calibrated reference material H_c			Permissible repeatability of the testing machine (r_{rel}) %	permissible error E_{rel} of the testing machine ± %
Force-area index 30				
< 250 HBW			3	± 3,0
250 HBW ≤ H_c ≤ 450 HBW			2,5	± 2,5
> 450 HBW			2	± 2,0
Force-area index 10	Force-area index 5	Force-area index 2,5		
< 100HBW	< 70HBW	< 70HBW	3	± 3,0
100 HBW ≤ H_c ≤ 200HBW	70 HBW ≤ H_c ≤ 100 HBW	N/A	3	± 3,0
> 200 HBW	> 100 HBW	N/A	3	± 3,0

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BRINELL

ISO 6506-3, ASTM E10 (option) — **Dimensions: 60x60x16mm**

HBW 1/2,5	80														
HBW 1/5	80	110	130												
HBW 1/10	80	110	130	170	200	250									
HBW 1/30		110	130	170	200	250	300	350	400	450	500	550	600	650	
HBW 2,5/15,625	80														
HBW 2,5/31,25	80	110	130												
HBW 2,5/62,5	80	110	130	170	200	250									
HBW 2,5/187,5		110	130	170	200	250	300	350	400	450	500	550	600	650	
		Aluminium							**Steel**						

Tolerance of nominal value **± 25HBW**

Optional availability:

- calibration of up 3 test scales on one test block
- lasered grid for accurate indentation spacing

				Test Force			Standard					
Order no.	Nominal Value	Scale	Test method	N	kgf	Force Area Ratio	ISO	ASTM	Calibration	Grid	Dimension	Material
HBW 1/2,5												
63ETB196	80	HBW 1/2,5	Brinell	24.52	2.5	2.5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
HBW 1/5												
63ETB210	80	HBW 1/5	Brinell	49.03	5	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB210D	80	HBW 1/5	Brinell	49.03	5	5	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB211	110	HBW 1/5	Brinell	49.03	5	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB211D	110	HBW 1/5	Brinell	49.03	5	5	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB212	130	HBW 1/5	Brinell	49.03	5	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
HBW 1/10												
63ETB224	80	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB224D	80	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB225	110	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB226	130	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB226D	130	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB227	170	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB228	200	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB228D	200	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB229	250	HBW 1/10	Brinell	9.807	1	10	ISO 6506-3		DAkkS		60x60x16mm	steel

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				Test Force			Standard					
Order no.	Nominal Value	Scale	Test method	N	kgf	Force Area Ratio	ISO	ASTM	Calibration	Grid	Dimension	Material
HBW 1/30												
63ETB239	110	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB240	130	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB241	170	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB242	200	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB242D	200	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB243	250	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB244	300	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB245	350	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB245D	450	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB246	400	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB247	450	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB248	500	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB249	550	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB250	600	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB250D	600	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB251	650	HBW 1/30	Brinell	294.2	30	30	ISO 6506-3		DAkkS		60x60x16mm	steel
HBW 2,5/15,625												
63ETB267	80	HBW 2,5/15,625	Brinell	153.2	15.625	2.5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
HBW 2,5/31,25												
63ETB282	80	HBW 2,5/31,25	Brinell	306.5	31.25	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB282D	80	HBW 2,5/31,25	Brinell	306.5	31.25	5	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB283	110	HBW 2,5/31,25	Brinell	306.5	31.25	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB283D	110	HBW 2,5/31,25	Brinell	306.5	31.25	5	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB285	130	HBW 2,5/31,25	Brinell	306.5	31.25	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium


Kögel Werkstoff- und Materialprüfsysteme GmbH

Deutsche Akkreditierungsstelle GmbH

Deutschen Kalibrierdienst

Kalibrierschein


Kögel Werkstoff- und Materialprüfsysteme GmbH


Kögel Werkstoff- und Materialprüfsysteme GmbH

Deutsche Akkreditierungsstelle GmbH

Deutschen Kalibrierdienst

Kalibrierschein


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				Test Force			Standard					
Order no.	Nominal Value	Scale	Test method	N	kgf	Force Area Ratio	ISO	ASTM	Calibration	Grid	Dimension	Material
HBW 2,5/62,5												
63ETB299	80	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB299D	80	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB299G	80	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS	Grid	60x60x16mm	aluminium
63ETB301	110	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB301G	110	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS	Grid	60x60x16mm	aluminium
63ETB302	130	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB302D	130	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	aluminium
63ETB302G	130	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS	Grid	60x60x16mm	aluminium
63ETB303	170	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB303G	170	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS	Grid	60x60x16mm	aluminium
63ETB304	200	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB304D	200	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB305	250	HBW 2,5/62,5	Brinell	612.9	62.5	10	ISO 6506-3		DAkkS		60x60x16mm	steel
HBW 2,5/187,5												
63ETB315	110	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB316	130	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB317	170	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB318	200	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB318D	200	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB318G	200	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS	Grid	60x60x16mm	steel
63ETB319	250	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB320	300	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB320G	300	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS	Grid	60x60x16mm	steel
63ETB321	350	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB321D	350	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB322	400	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB322G	400	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS	Grid	60x60x16mm	steel
63ETB323	450	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB324	500	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB325	550	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB326	600	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3		DAkkS		60x60x16mm	steel
63ETB326D	600	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
63ETB1400	650	HBW 2,5/187,5	Brinell	1839	187.5	30	ISO 6506-3	ASTM E10	DAkkS		60x60x16mm	steel
HBW 5/62,5												
63ETB343	80	HBW 5/62,5	Brinell	612.9	62.5	2.5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
HBW 5/125												
63ETB358	80	HBW 5/125	Brinell	1226	125	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium
63ETB359	110	HBW 5/125	Brinell	1226	125	5	ISO 6506-3		DAkkS		60x60x16mm	aluminium

BRINELL

ISO 6506-3, ASTM E10 (option) — **Dimensions: 150x100x16mm**

HBW 5/62,5	80														
HBW 5/125	80	110													
HBW 5/250	80	110	130	170	200	250									
HBW 5/750		110	130	170	200	250	300	350	400	450	500	550	600	650	
HBW 10/250	80														
HBW 10/500	80	110	130												
HBW 10/1000	80	110	130	170	200	250									
HBW 10/1500	80	110	130	170	200	250	300								
HBW 10/3000		110	130	170	200	250	300	350	400	450	500	550	600	650	
		Aluminium							Steel						

Tolerance of nominal value **± 25HBW**

Optional availability:

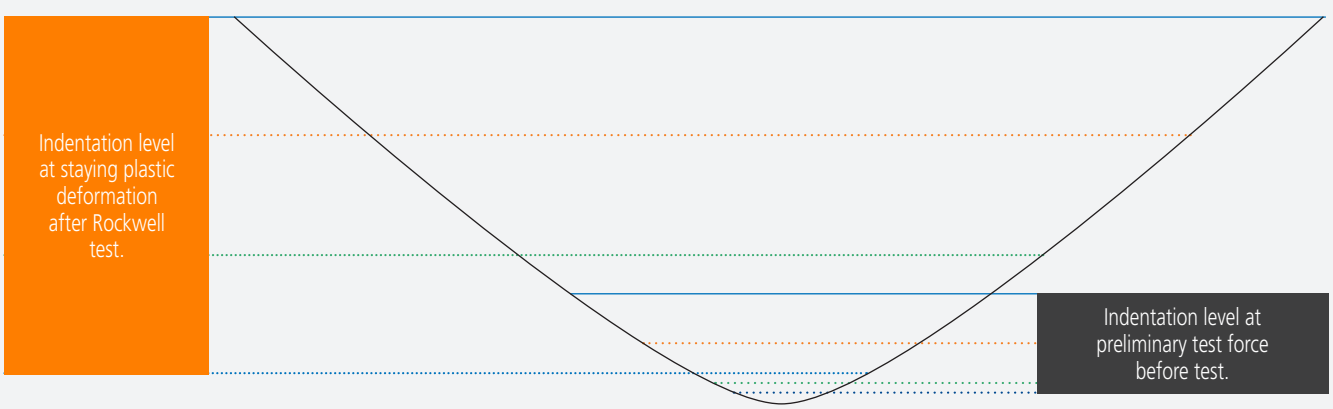
- calibration of up 3 test scales on one test block
- calibration according to ASTM E92

				Test Force			Standard					
Order no.	Nominal Value	Scale	Test method	N	kgf	Force Area Ratio	ISO	ASTM	Calibration	Grid	Dimension	Material
HBW 5/250												
63ETB387	80	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB387D	80	HBW 5/250	Brinell	2452	250	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB388	110	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB389	130	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB389D	130	HBW 5/250	Brinell	2452	250	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB390	170	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB391	200	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB391D	200	HBW 5/250	Brinell	2452	250	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB392	250	HBW 5/250	Brinell	2452	250	10	ISO 6506-3		DAkkS		150x100x16mm	steel
HBW 5/750												
63ETB403	110	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB404	130	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB405	170	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB406	200	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB406D	200	HBW 5/750	Brinell	7355	750	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB407	250	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB408	300	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB409	350	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB409D	350	HBW 5/750	Brinell	7355	750	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB410	400	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB411	450	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB412	500	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB413	550	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB414	600	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB414D	600	HBW 5/750	Brinell	7355	750	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB415	650	HBW 5/750	Brinell	7355	750	30	ISO 6506-3		DAkkS		150x100x16mm	steel

				Test Force			Standard					
Order no.	Nominal Value	Scale	Test method	N	kgf	Force Area Ratio	ISO	ASTM	Calibration	Grid	Dimension	Material
HBW 10/250												
63ETB418	80	HBW 10/250	Brinell	2452	250	2.5	ISO 6506-3		DAkkS		150x100x16mm	aluminium
HBW 10/500												
63ETB434	80	HBW 10/500	Brinell	4903	500	5	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB434D	80	HBW 10/500	Brinell	4903	500	5	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB435	110	HBW 10/500	Brinell	4903	500	5	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB435D	110	HBW 10/500	Brinell	4903	500	5	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB436	130	HBW 10/500	Brinell	4903	500	5	ISO 6506-3		DAkkS		150x100x16mm	aluminium
HBW 10/1000												
63ETB450	80	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB450D	80	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB451	110	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB452	130	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB452D	130	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	aluminium
63ETB453	170	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB454	200	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB454D	200	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB455	250	HBW 10/1000	Brinell	9807	1000	10	ISO 6506-3		DAkkS		150x100x16mm	steel
HBW 10/1500												
63ETB063	80	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB064	110	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB067	130	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB068	170	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB069	200	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB070	250	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB076	300	HBW 10/1500	Brinell	14710	1500	15	ISO 6506-3		DAkkS		150x100x16mm	steel
HBW 10/3000												
63ETB481	110	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB482	130	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB483	170	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	aluminium
63ETB484	200	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB484D	200	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB485	250	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB486	300	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB487	350	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB487D	350	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB488	400	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB489	450	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB490	500	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB491	550	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB492	600	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel
63ETB492D	600	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3	ASTM E10	DAkkS		150x100x16mm	steel
63ETB493	650	HBW 10/3000	Brinell	29420	3000	30	ISO 6506-3		DAkkS		150x100x16mm	steel

Rockwell Diamond Indenter - Function Test

Additonally, the geometrical specification for the calibration of Rockwell diamond indenters, a „function test“ is described in the relevant standards ISO 6508-2 and ASTM E-18.
The intention is to verify the applicability of the indenter in regard to various indentation depth levels under different test forces.
The diagram shows 4 indentation levels, as described in the ISO standard.



ISO 6508 Table 4
25HRC
63HRC
64HR30N
91HR15N
MPE function test: +- 0,8HR units

63DIA001 Table 4
Alternate hardness levels for diamond indenters used for Rockwell regular and superficial scales (A, C, D, and N)

Scale	Nominal Hardness	Ranges
HRC	25	22 to 28
HRC	63	60 to 65
HR30N	64	60 to 69
HR15N	91	88 to 94

63DIA021 Table 5
Hardness levels for diamond indenters to be used for Rockwell regular scale testing only (A, C, and D)

Scale	Nominal Hardness	Ranges
HRC	25	22 to 28
HRC	63	60 to 65

63DIA022 Table 6
Hardness levels for diamond indenters to be used for Rockwell superficial scale testing only (N)

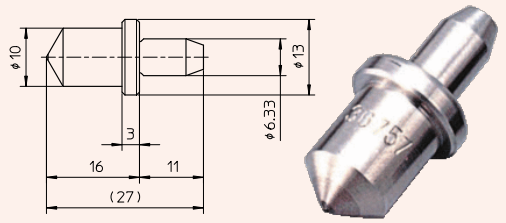
Scale	Nominal Hardness	Ranges
HR15N	91	88 to 94
HR30N	64	60 to 69
HR45N	25	22 to 29

Rockwell Diamond Indenter

Code number	Description	Test Method 1	Standard 1	Standard 2	Calibration	AR-ARK Series	HR-100-200-400MR	HR-300-400MS	HR-500 Series	HR-600 Series
63DIA001	Diamond Indenter Rockwell w. function test table 4, HRA HRC HRD HRN	Rockwell	ISO 6508-2		DAkkS certificate	•		•	•	•
63DIA021	Diamond Indenter Rockwell w. function test table 5, HRA HRC HRD	Rockwell	ISO 6508-2		DAkkS certificate	•	•	•	•	•
63DIA022	Diamond Indenter Rockwell w. function test table 6, HRN	Rockwell	ISO 6508-2		DAkkS certificate	•		•	•	•
63DIA004	Diamond Indenter Rockwell w. function test	Rockwell	ASTM E18		DAkkS certificate	•	•	•	•	•
63DIA002	Diamond Indenter Rockwell without function test	Rockwell	ISO 6508-2		DAkkS certificate	•	•	•	•	•
63DIA023	Diamond Indenter Rockwell without function test	Rockwell	ISO 6508-2	ASTM E18	DAkkS certificate	•	•	•	•	•
63DIA007	Diamond Indenter Rockwell without function test HR-500, short	Rockwell	ISO 6508-2		DAkkS certificate				•	
63DIA008	Diamond Indenter Rockwell w. function test long type L 28 mm	Rockwell	ISO 6508-2		DAkkS certificate	•	•	•		
63DIA009	Diamond Indenter Rockwell w. function test slim type W 6 mm	Rockwell	ISO 6508-2		DAkkS certificate	•	•	•	•	•

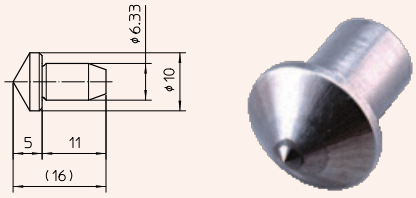
Standard shape diamond indenter

63DIA001
63DIA021
63DIA022
63DIA004
63DIA002
63DIA023



Short type diamond indenter 63DIA007 for inside testing from 22mm

63DIA007



Rockwell Ball Indenter

Code number	Description	Test Method 1	Standard 1	Standard 2	Calibration	AR-ARK Series	HR-100-200-400MR	HR-300-400MS	HR-500 Series	HR-600 Series
11AAD465	ø1.5875mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	•
11AAD466	ø3.175 mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	•
11AAD467	ø6.35 mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	
11AAD468	ø12.7 mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	
11AAD735	ø6.35 mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	•
11AAD742	ø12.7 mm Rockwell carbide ball indenter	Rockwell			without certificate	•	•	•	•	•

11AAD465

11AAD466

11AAD467

11AAD468

Rockwell Replacement Balls

Code number	Description	Test Method 1	Standard 1	Standard 2	Calibration	AR-ARK Series	HR-100-200-400MR	HR-300-400MS	HR-500 Series	HR-600 Series
19BAA507	ø1.5875 mm Rockwell carbide ball 1pc.	Rockwell			without certificate		•	•	•	•
19BAA508	ø3.175 mm Rockwell carbide ball 1pc.	Rockwell			without certificate		•	•	•	•
19BAA509	ø6.35 mm Rockwell carbide ball 1pc.	Rockwell			without certificate		•	•	•	•
19BAA510	ø12.7 mm Rockwell carbide ball 1pc.	Rockwell			without certificate		•	•	•	•
63BAL013	ø1.5875 mm Rockwell carbide ball 1pc.	Rockwell	ISO 6508-2	ASTM E18	DAkkS certificate		•	•	•	•
63BAL014	ø3.175 mm Rockwell carbide ball 1pc.	Rockwell	ISO 6508-2	ASTM E18	DAkkS certificate		•	•	•	•
63BAL015	ø6.35 mm Rockwell carbide ball 1pc.	Rockwell	ISO 6508-2	ASTM E18	DAkkS certificate		•	•	•	•
63BAL016	ø12.7 mm Rockwell carbide ball 1pc.	Rockwell	ISO 6508-2	ASTM E18	DAkkS certificate		•	•	•	•

Brinell Indenter

Code number	Description	Test Method 1	Test Method 2	Standard 1	Standard 2	Calibration	HR-100-200-300-400-500 Series	HR-600 Series	HV-100 Series
11AAD469	ø1 mm Brinell carbide ball indenter	Brinell				without certificate	•		•
11AAD470	ø2.5 mm Brinell carbide ball indenter	Brinell				without certificate	•		•
11AAD471	ø5 mm Brinell carbide ball indenter	Brinell				without certificate	•		
11AAD472	ø10 mm Brinell carbide ball indenter	Brinell				without certificate	•		
11AAD721	ø1 mm Brinell carbide ball indenter	Brinell				without certificate	•	•	
11AAD722	ø2.5 mm Brinell carbide ball indenter	Brinell				without certificate	•	•	
11AAD723	ø5 mm Brinell carbide ball indenter	Brinell	Ball indentation test			without certificate	•	•	
11AAD724	ø10 mm Brinell carbide ball indenter	Brinell				without certificate	•	•	


11AAD469

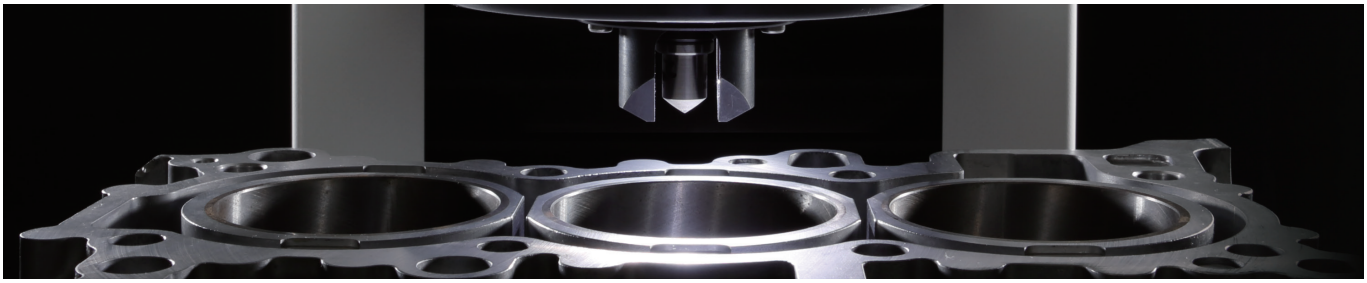

11AAD470


11AAD471


11AAD472

Brinell Replacement Balls

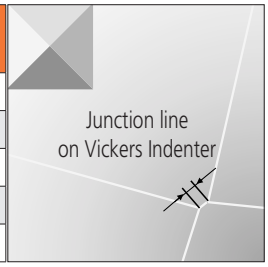
Code number	Description	Test Method		Standard 1	Standard 2	Calibration	HR-100-200-300-400-500 Series	HR-600 Series	HV-100 Series
19BAA281	ø1 mm Brinell carbide ball 1pc.	Brinell				without certificate	•	•	•
19BAA283	ø2.5 mm Brinell carbide ball 1pc.	Brinell				without certificate	•	•	•
19BAA162	ø5 mm Brinell carbide ball 1pc.	Brinell				without certificate	•	•	
19BAA163	ø10 mm Brinell carbide ball 1pc.	Brinell				without certificate	•	•	
63BAL009	ø1 mm Brinell carbide ball 1pc.	Brinell		ISO 6506-2	ASTM E10	DAkkS certificate	•	•	•
63BAL010	ø2.5 mm Brinell carbide ball 1pc.	Brinell		ISO 6506-2	ASTM E10	DAkkS certificate	•	•	•
63BAL011	ø5 mm Brinell carbide ball 1pc.	Brinell		ISO 6506-2	ASTM E10	DAkkS certificate	•	•	
63BAL012	ø10 mm Brinell carbide ball 1pc.	Brinell		ISO 6506-2	ASTM E10	DAkkS certificate	•	•	



Vickers Indenters

The grinding process for Vickers diamond indenters leaves a junction line at the point, where the faces of the diamond join together, rather than having a perfect tip. ISO and ASTM standards define the maximum length of the junction line depending on the test force that is being used. Due to the obtained length, the indenter is classified for the use in different test force ranges. The values in the table include uncertainty of measurement.

Parameters for Vickers indenters DIN EN ISO	6507-2
Plane angle	136° ± 30'
Junction line between opposite faces	junction line
HV 5	2,0 µm
HV 0,2 - HV5	1,0 µm
HV 0,01 - 0,2	0,5 µm

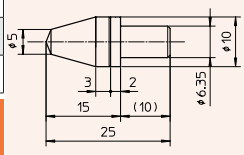


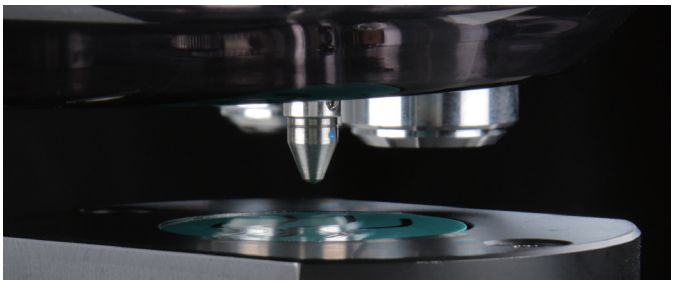
Vickers Diamond Indenter - Macro

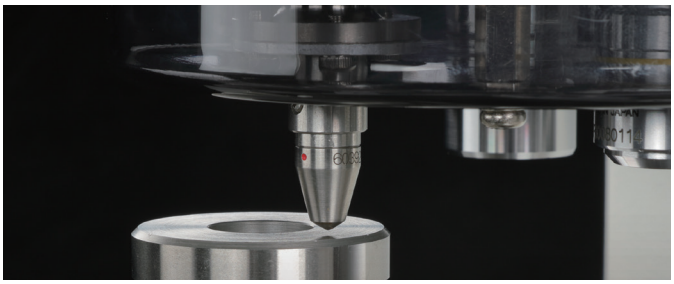
Code number	Description	Test Method	Standard 1	Calibration	HV-100 Series	AVK Series
63DIA011	Diamond Indenter Vickers, usable from HV 0,2	Vickers	ISO 6507-2	DAkkS certificate	•	•
63DIA012	Diamond Indenter Vickers, usable from HV 5	Vickers	ISO 6507-2	DAkkS certificate	•	•
63DIA020	Diamond Indenter Vickers ASTM E92	Vickers	ASTM E92	DAkkS certificate	•	•

Knoop Diamond Indenter - Macro

Code number	Description	Test Method	Standard 1	Calibration	HV-100 Series	AVK Series
63DIA014	Diamond Indenter Knoop	Knoop	ISO 4545-2	DAkkS certificate	•	•
63DIA018	Diamond Indenter Knoop	Knoop	ASTM E92	DAkkS certificate	•	•





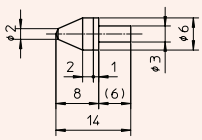


Knoop Diamond Indenter - Micro

Code number	Description	Test Method	Standard 1	Calibration	HM-100 Series	HM-200 Series	MVK-Series
63DIA013	Diamond Indenter Knoop	Knoop	ISO 4545-2	DAkkS certificate	•	•	•
63DIA017	Diamond Indenter Knoop	Knoop	ASTM E92	DAkkS certificate	•	•	•

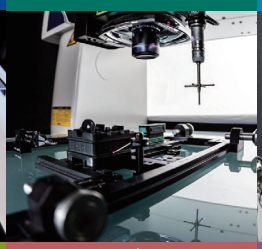
Vickers Diamond Indenter - Micro

Code number	Description	Test Method	Standard 1	Calibration	HM-100 Series	HM-200 Series	MVK-Series
63DIA015	Diamond Indenter Vickers, usable from HV0,01	Vickers	ISO 6507-2	DAkkS certificate	•	•	•
63DIA016	Diamond Indenter HV0,2	Vickers	ISO 6507-2	DAkkS certificate	•	•	•
63DIA019	Diamond Indenter ASTM E92	Vickers	ASTM E92	DAkkS certificate	•	•	•



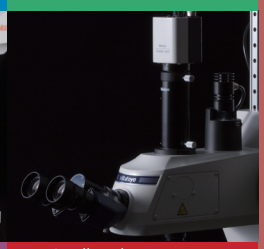
Coordinate Measuring Machines

Vision Measuring Systems



Form Measurement

Optical Measuring



Sensor Systems

Test Equipment and Seismometers

Digital Scale and DRO Systems

Small Tool Instruments and Data Management

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