

## 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:



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

**Minimum Distance**

Distance between indentations  
 > 3x indentation diameter

Distance from edge  
 > 2,5x indentation diameter

**Scales and Application**

Hardness symbol	Indenter	Total test force		Applicable range of Rockwell Hardness	Application range
		Kgf	N		
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**

95 HR B W

Indication of type of ball used,  
 W = Tungsten carbide composite

Rockwell scale symbol

Rockwell hardness symbol

Rockwell hardness value

**MPE and repeatability**

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

\* H is the mean hardness value

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



## 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		<b>10</b>	<b>16</b>	<b>28</b>		42	48	52	56	60	62	65	67	69	71	72	73	75	76
HRE	73	91	97	<b>106</b>															
HRF	76	92	97	<b>105</b>															
HRGW			41	62															
HRKW	45	71	78	91															
HR15N				<b>62</b>		71	75	78	80	83	85	87	88	89	90	91		92	93
HR30N				<b>28</b>		43	50	56	60	64	68	71	73	76	78	79	81	82	84
HR45N				<b>2</b>		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	<b>5</b>	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

Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Ball Ø mm	Standard		Grid	Calibration	Dimension	Material
				N	kgf	N	kgf		ISO	ASTM				
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

Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Ball Ø mm	Standard		Grid	Calibration	Dimension	Material
				N	kgf	N	kgf		ISO	ASTM				
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



Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Ball Ø mm	Standard		Grid	Calibration	Dimension	Material
				N	kgf	N	kgf		ISO	ASTM				
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

Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Ball Ø mm	Standard		Grid	Calibration	Dimension	Material
				N	kgf	N	kgf		ISO	ASTM				
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
63ETB1103	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
63ETB1106	64	HR30N	Rockwell	29.42	3	294.2	30		ISO 6508-3			DAkkS	60x60x16mm	steel
63ETB1107	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
63ETB1108	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
63ETB1116	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


**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

Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Ball Ø mm	Guideline		Grid	Calibration	Dimension	Material
				N	kgf	N	kgf							
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

Order no.	Value	Scale	Test method	Preliminary Test Force		Total Test Force		Standard		Calibration	Dimension	Material
				N	kgf	N	kgf	ISO	ASTM			
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