

EDS

Engineering,
GM DAEWOO Auto & Technology
Standards

METHOD OF ROCKWELL HARDNESS TEST

EDS-T-7117

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1. PURPOSE

This standard aims at standardizing works by unifying a using method of Rockwell hardness tester used by **GMDAT**.

2. SCOPE

This standard specifies the method of Rockwell A, B, C and Rockwell superficial N and T hardness test for metallic materials mainly used by **GMDAT**.

3. DEFINITIONS

3.1. Rockwell and Rockwell superficial hardness

When the diamond or ball indenter is preliminary pressed under the standard load, additionally applied the test load and then applied the standard load again, the hardness shall be determined by the difference between the depth of indentations under those two standard loads mentioned above and also by using the defining formula. When the standard weight is 10kgf (98.07N), it is nominated Rockwell hardness and when 3kgf (29.42N), it is Rockwell superficial hardness.

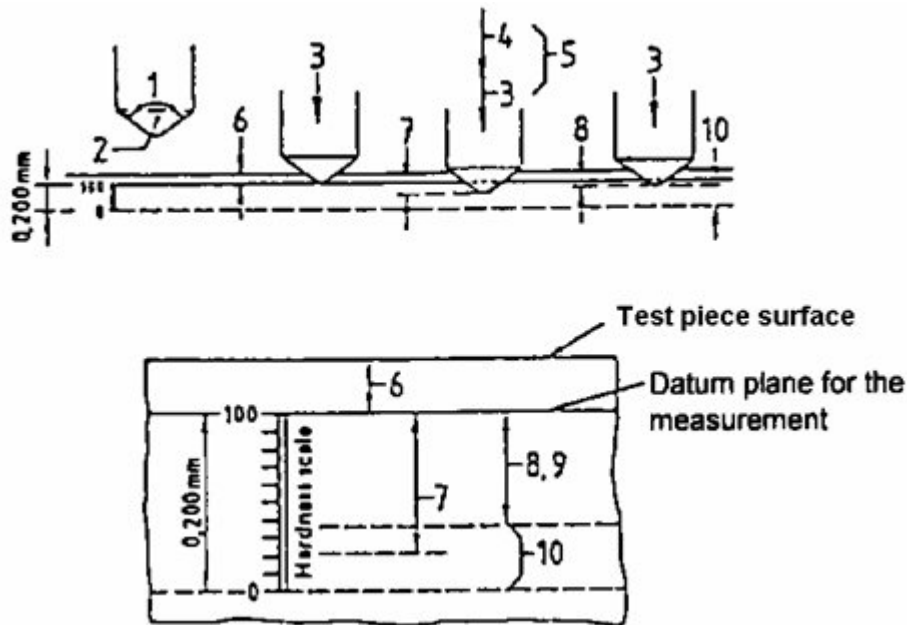
3.2. Scale of hardness and its content

	Scale	Indenter	Standard load [kgf/(N)]	Test load [kgf/(N)]	Defining formula for hardness	Applicable hardness
Rockwell hardness	A	Diamond with a radius of curvature at the tip 0.2mm and a conical angle 120°	10 (98.07)	60 (588.4)	HR=100-e	40 ~ 95
	C			150 (1471.0)		0 ~ 70
	B	Steel or tungsten carbide alloy ball with a diameter 1.5875mm(¹ / ₁₆ in)		100 (980.7)	HR=130-e	0 ~ 100
Rockwell superficial hardness	15N	Diamond with a radius of curvature at the tip 0.2mm and a conical angle 120°	3 (29.42)	15 (147.1)	HR=100-e	20 ~ 95
	30N			30 (294.2)		
	45N			45 (441.3)		
	15T	Steel or tungsten carbide alloy ball with a diameter 1.5875mm(¹ / ₁₆ in)		15 (147.1)		0 ~ 90
	30T			30 (294.2)		
	45T			45 (441.3)		

※ 'e' is the difference between the depth of indentations, expressed in μm . Refer to [Test Principle 4].

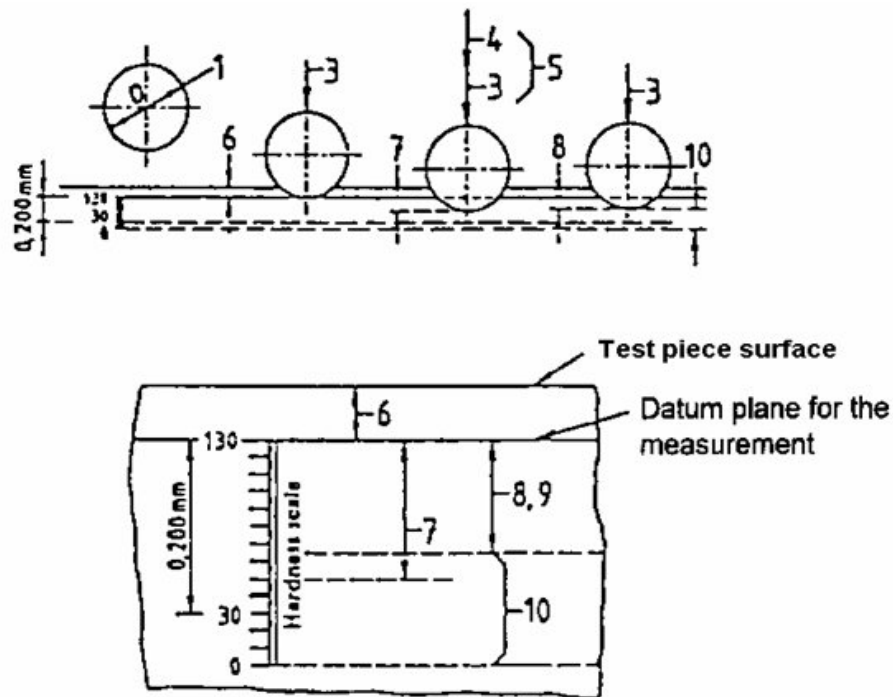
4. TEST PRINCIPLE

4.1. Rockwell hardness A, C scale



No.	Designation	Content
1	-	Conical angle of diamond indenter = 120°
2	-	Radius of curvature at the tip of diamond indenter = 0.200mm
3	F_0	Standard load
4	F_1	Test load
5	F	Total load
6	t_0	Depth of indentation under the standard load
7	t_1	Increased depth of indentation by the test load
8	t_b	Depth of permanent deformation by an indenter after removing the test load
9	e	Depth of permanent deformation, expressed in units of 0.002mm
10	HRA HRC	Rockwell hardness = $100 - e$

4.2. Rockwell hardness B scale



No.	Designation	Content
1	D	Diameter of ball indenter = 1.5875mm(1/16 inch)
3	F_0	Standard load
4	F_1	Test load
5	F	Total load
6	t_0	Depth of indentation under the standard load
7	t_1	Increased depth of indentation by the test load
8	t_b	Depth of permanent deformation by an indenter after removing the test load
9	e	Depth of permanent deformation, expressed in units of 0.002mm
10	HRB	Rockwell hardness = 130 - e