Rockwell Hardness HR30N Scale Definition

Reference values for HR30N				
Symbol	*Test parameter*	*Reference value*	*Start measurement*	*Stop measurement*
F_0	Preliminary test force	29,419 95 N [1]	-	-
F	Total test force	294,199 5 N [1]	-	-
α	Included angle of the indenter cone (between surface axial-plane line segments)	120°	Line segment start: ±30° (from the axis) [2]	Line segment end: 400 µm on conical surface
r	Spherical tip radius of the indenter	200 µm	-30° (from the axis) [2]	+30° (from the axis) [2]
t_{pa}	Application time of preliminary test force	0,2 s ≤ t_{pa} ≤ 2 s	~1 % F_0	~99 % F_0
t_{pd}	Duration time of constant preliminary test force before initial measurement	(3 − t_{pa}/2) s	~99 % F_0	Measurement
t_{aa}	Application time of additional test force	≤ 4 s [3]	~101 % F_0	~99 % *F (loading)*
v_{fa}	Mean indentation velocity of final additional test force application	30 µm·s^{-1}	~80 % *F*	~99 % *F*
t_{td}	Duration time of total test force	5 s	~99 % *F (loading)*	~99 % *F (unloading)*
t_{ar}	Removal time of additional test force	≤ 2 s	~99 % *F (unloading)*	~101 % F_0
t_{rd}	Duration time of recovery force before final measurement	4 s	~101 % F_0	Measurement
T	Temperature of test	23 °C	Start of test	End of test
	[1] *The defined values of preliminary test force and total test force are the SI equivalents of the original Rockwell hardness method-defined forces of 3 kgf and 30 kgf, respectively, converted to N by multiplying the kgf values by the conversion factor 9,806 65.* [2] *These dimensions define the theoretical points of blend between the spherical tip and conical surface of the diamond indenter (see Figure 2). The actual points of blend are usually different; therefore, the blend areas should not be included in the measurement of the tip radius or cone angle.* [3] *The value of t_{aa} is dependent on the hardness of the material under test. The stated range of ≤ 4 s is to maintain compliance with consensus standards.*			

Figure 1. Illustrations of the applied force and the resulting indentation-depth occurring during the HR30N test cycle.

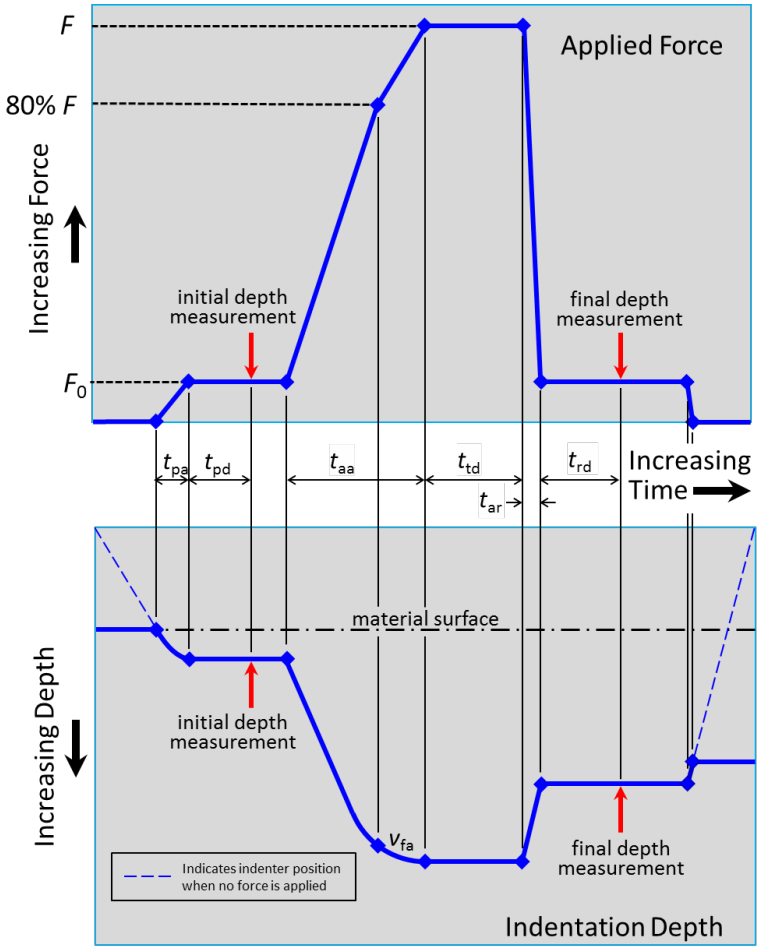

Figure 2. Illustration of the axial cross-section of an ideally-shaped diamond indenter indicating the dimensions specified above and the theoretical points of blend between the spherical tip and conical surface.