Technical Data

Appendix 1—Rockwell/Brinell Hardness Conversion

If the work materials hardness is available in Rockwell B (HRB) or Rockwell C (HRC) numbers, they should be converted into Brinell hardness numbers by the following equations shown in Table A and Table B.

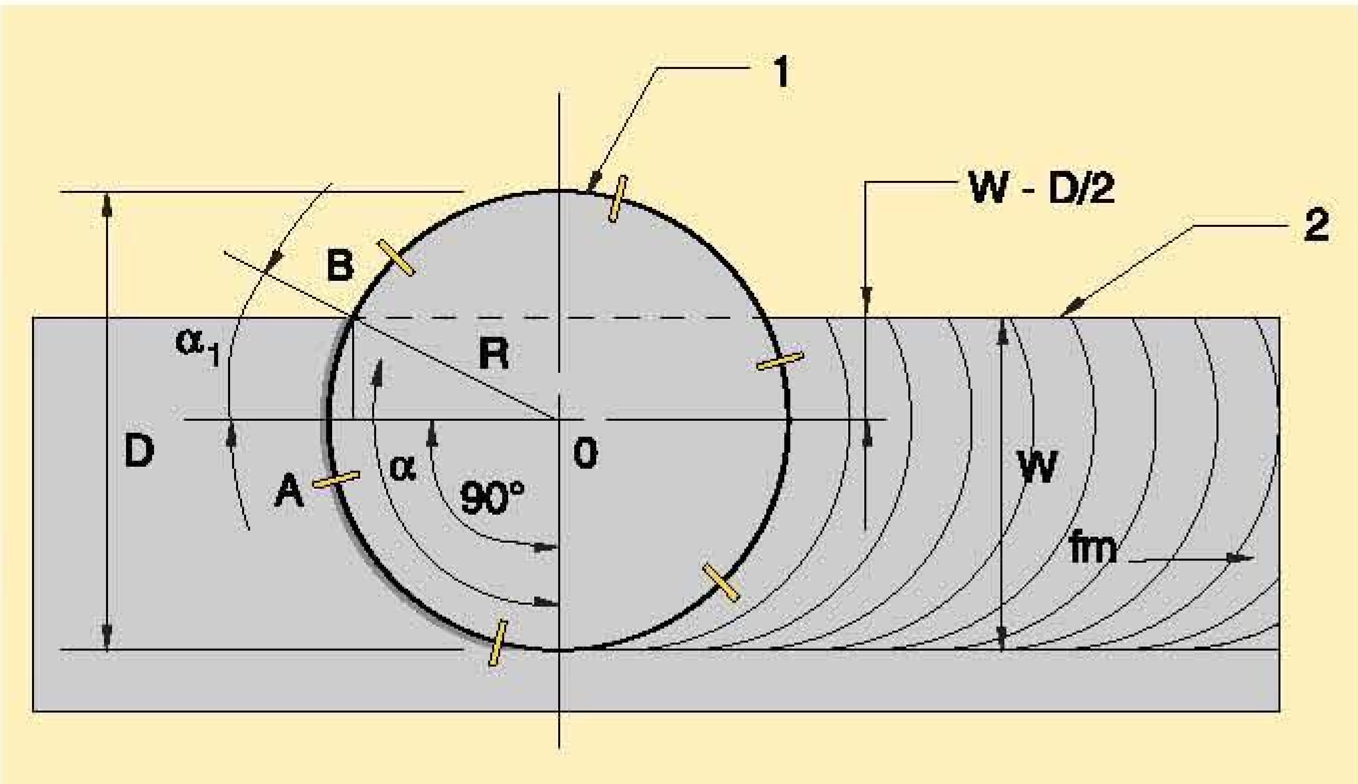
Table A. Brinell–Rockwell C Hardness Relationship

Rockwell C Hardness Numbers (HRC)		Equations to Convert Rockwell C Hardness (HRC) into Brinell Hardness (HB)
from	to	
21	30	HB = 5.970 x HRC + 104.7
31	40	HB = 8.570 x HRC + 27.6
41	50	HB = 11.158 x HRC + 79.6
51	60	HB = 17.515 x HRC – 401

Table B. Brinell–Rockwell B Hardness Relationship

Rockwell B Hardness Numbers (HRB)		Equations to Convert Rockwell B Hardness (HRB) into Brinell Hardness (HB)
from	to	
55	69	HB = 1.646 x HRB + 8.7
70	79	HB = 2.394 x HRB – 42.7
80	89	HB = 3.297 x HRB – 114
90	100	HB = 5.582 x HRB – 319

Appendix 2—Engagement Angle and Number of Inserts in Cut



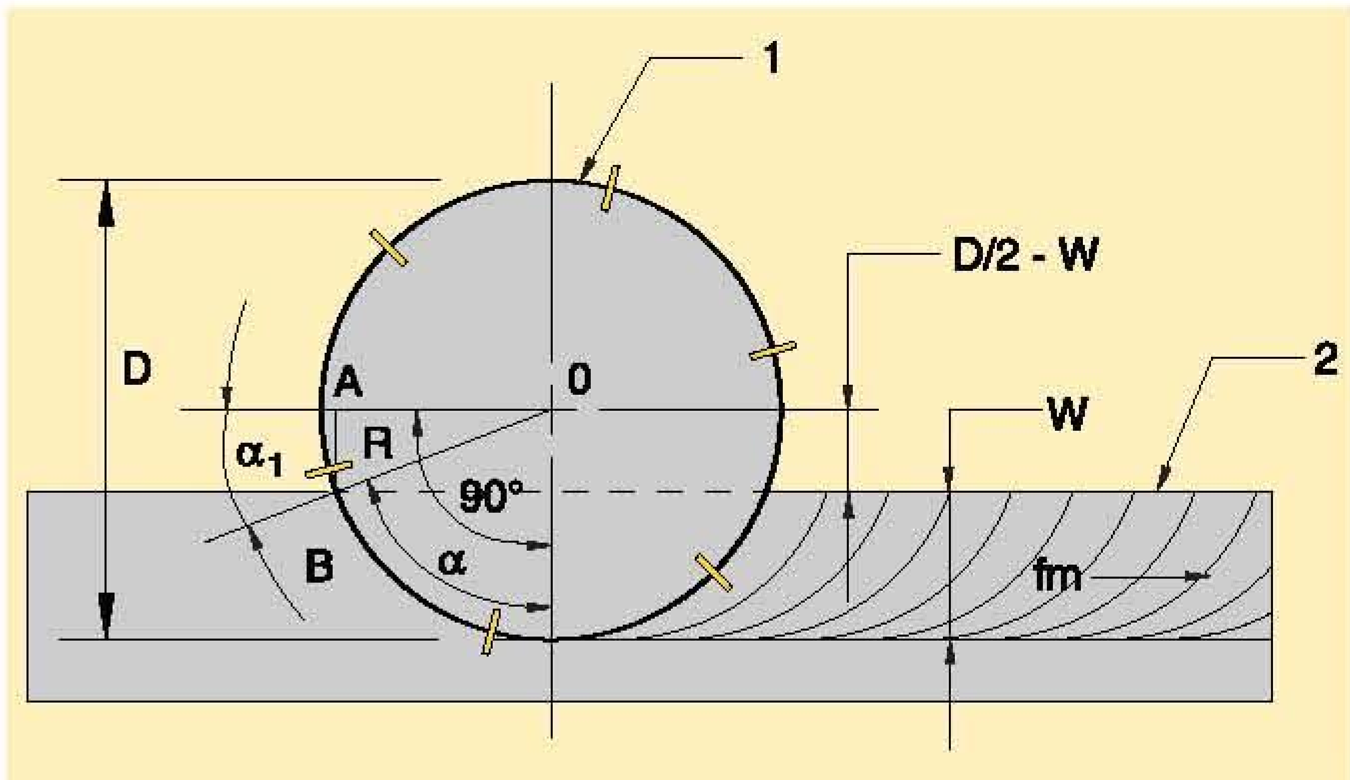
$D/2 < W < D$

$$Z_c = \frac{Z \times \alpha^\circ}{360^\circ} \qquad \alpha = 90^\circ + \alpha_1$$

$$\sin \alpha_1 = \frac{AB}{OB} = \frac{W - D/2}{D/2} = \frac{2(W - D/2)}{D} = \frac{2W - D}{D};$$

$$\alpha_1 = \text{arc sin}\,\frac{2W - D}{D};$$

$$Z_c = \frac{Z\left(90^\circ + \text{arc sin}\,\frac{2W - D}{D}\right)}{360^\circ}$$



$W < D/2$

$$Z_c = \frac{Z \times \alpha^\circ}{360^\circ} \qquad \alpha = 90^\circ - \alpha_1$$

$$\sin \alpha_1 = \frac{AB}{OB} = \frac{D/2 - W}{D/2} = \frac{2(D/2 - W)}{D} = \frac{D - 2W}{D};$$

$$\alpha_1 = \text{arc sin}\,\frac{D - 2W}{D}$$

$$Z_c = \frac{Z\left(90^\circ - \text{arc sin}\,\frac{D - 2W}{D}\right)}{360^\circ}$$

D = cutter diameter

W = width of cut (woc)

α = engagement angle

α_1 = angle between cutter centerline and cutter radius to the peripheral point of exit or entry

Z = number of inserts in cutter

Z_c = number of inserts in cut