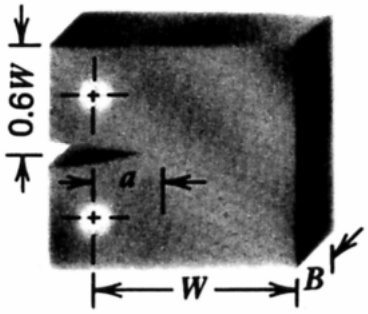
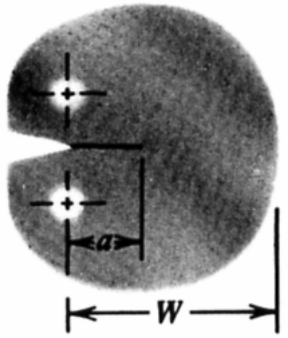
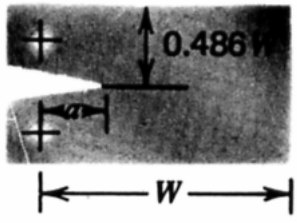
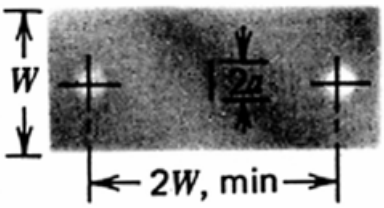
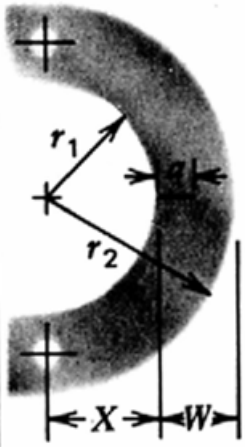
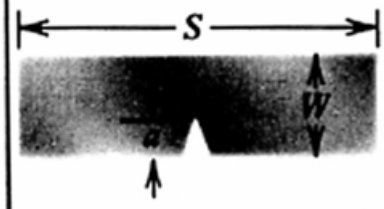
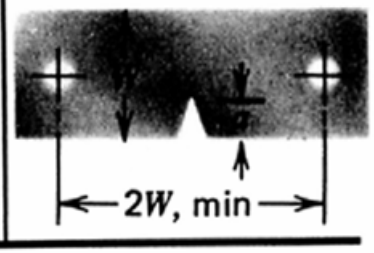
APPENDIX B

K CALIBRATIONS FOR TYPICAL FRACTURE TOUGHNESS AND FATIGUE CRACK PROPAGATION TEST SPECIMENS

Type	Stress Intensity Formulation	Configuration
1. Compact specimen[a] C(T)	$K = \frac{P}{BW^{1/2}} f(a/W)$ where $f(a/W) = \frac{(2 + a/W)}{(1 - a/W)^{3/2}} [0.886 + 4.64a/W - 13.32(a/W)^2 + 14.72(a/W)^3 - 5.6(a/W)^4]$	
2. Disk-shaped compact specimen[a] DC(T)	$K = \frac{P}{BW^{1/2}} f(a/W)$ where $f(a/W) = \frac{(2 + a/W)}{(1 - a/W)^{3/2}} [0.76 + 4.8a/W - 11.58(a/W)^2 + 11.43(a/W)^3 - 4.08(a/W)^4]$	
3. Wedge opening loaded specimen[b] (WOL)	$K = \frac{P}{BW^{1/2}} f(a/W)$ where $f(a/W) = \frac{(2 + a/W)}{(1 - a/W)^{3/2}} [0.8072 + 8.858(a/W) - 30.23(a/W)^2 + 41.088(a/W)^3 - 24.15(a/W)^4 + 4.951(a/W)^5]$	

4. Center-cracked tension specimen[c] (CCT)	$K = \frac{P\sqrt{\pi a}}{BW} f(a/W)$ where $f(a/W) = \sqrt{\sec \frac{\pi a}{W}}$	
5. Arc-shaped specimen A(T)	$K = \frac{P}{BW^{1/2}}\left(3\frac{X}{W} + 1.9 + 1.1a/W\right)$ $\times[1 + 0.25(1 - a/W)^2(1 - r_1/r_2)]\, f(a/W)$ where $f(a/W) = [(a/W)^{1/2}/(1 - a/W)^{3/2}]$ $\times[3.74 - 6.3(a/W) + 6.32(a/W)^2 - 2.43(a/W)^3]$	
6. Bend specimen[a] SE(B)	$K = \frac{PS}{BW^{3/2}} f(a/W)$ where $f(a/W) = \frac{3(a/W)^{1/2}}{2(1 + 2a/W)(1 - a/W)^{3/2}}$ $\times[1.99 - (a/W)(1 - a/W)(2.15 - 3.93a/W + 2.7a^2/W^2)]$	
7. Single edge-notched specimen[d] SE(T)	$K = \sigma\sqrt{a}[1.99 - 0.41(a/W) + 18.7(a/W)^2 - 38.48(a/W)^3 + 53.85(a/W)^4$	

[a] ASTM Standard E 399-81, *Annual Book of ASTM Standards,* Part 10, 1981.

[b] A. Saxena and S. Hudak, *Int. J. Fract.* **14,** 453 (1978).

[c] C. E. Feddersen, ASTM *STP 410,* 1976, p. 77.

[d] B. Gross, J. Srawley, and W. F. Brown, Jr., *NASA Tech. Note D-2395,* NASA, Aug. 1964.