Solutions

2.1

- Mean 18.5000 mm; sd 0.1309 mm.
- se $= 0.1309/\sqrt{8} = 0.0463$ mm.

2.2

- Resolution $0.02/\sqrt{12} = 0.0058$; calibration $0.01/\sqrt{3} = 0.0058$ mm.

2.3

- $u_c = \sqrt{0.0463^2 + 0.0058^2 + 0.0058^2} = 0.047$ mm; $U = 0.094$ mm.
- Report 18.50 ± 0.09 mm ($k = 2$) - here Type A dominates: more readings WOULD help (contrast the shaft case).

2.4

- $A = \pi(18.5)^2/4 = 268.8$ mm2.
- $u_A = \frac{\pi d}{2} u_c = \frac{\pi \times 18.5}{2}(0.047) = 1.367$ mm2; report 268.8 ± 2.7 mm2 ($k = 2$).

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