b) Wyznacz średnią wartość zmierzonej średnicy przedmiotu. Obliczyć jej niepewność pomiarową, Tuleja

Lp.	h[mm]	"h"$(x_i - \bar{x})^2$ $[mm]$	d[mm]wew	"d_wew"$(x_i - \bar{x})^2$ $[mm]$	d[mm]zew	"d_zew"$(x_i - \bar{x})^2$ $[mm]$
1	34.15	0.0004	12	0.046225	15.18	0.459684
2	34	0.0289	11.95	0.070225	15.75	0.011664
3	34.1	0.0049	12	0.046225	15.8	0.003364
4	34.1	0.0049	12	0.046225	15.85	0.000064
5	34.1	0.0049	12	0.046225	15.8	0.003364
6	34.45	0.0784	12.75	0.286225	16.1	0.058564
7	34.2	0.0009	12.9	0.469225	16	0.020164
8	34.2	0.0009	11.8	0.172225	16	0.020164
9	34.4	0.0529	11.8	0.172225	16	0.020164
10	34	0.0289	12.95	0.540225	16.1	0.058564
$\bar{x}$	34.17		12.215		15.858	
suma		0.206	1.89525		0.65576	

Tuleja Wysokosc

Niep. Stand. Ocena Typu A - Obliczenie

$u_A(x) = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n(n-1)}} = \sqrt{\frac{0.206}{10*9}} = 0.002288889 \approx 0.0023$

Niep. Stand. Ocena Typu B - Obliczenie

$u_B(x) = \sqrt{\frac{(\Delta_p x)^2}{3} + \frac{(\Delta_e x)^2}{3}} = \sqrt{\frac{(0.05)^2}{3} + \frac{(0)^2}{3}} = \sqrt{\frac{0.0025}{3}} = \sqrt{0.000833333} = 0.028867513 \approx 0.029$

Całkowita Niep. Stand.- Obliczenie - Wys

$u(x) = \sqrt{u_A^2(x) + u_B^2(x)} = \sqrt{0.0023^2 + 0.029^2} = \sqrt{0.00000529 + 0.000841} = \sqrt{0.00084629} = 0.029091064 \approx 0.029$

Tuleja Średnica Wew

Niep. Stand. Ocena Typu A - Obliczenie

$u_A(x) = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n(n-1)}} = \sqrt{\frac{1.89525}{10*9}} = 0.021058333 \approx 0.022$

Niep. Stand. Ocena Typu B - Obliczenie

$u_B(x) = \sqrt{\frac{(\Delta_p x)^2}{3} + \frac{(\Delta_e x)^2}{3}} = \sqrt{\frac{(0.05)^2}{3} + \frac{(0)^2}{3}} = \sqrt{\frac{0.0025}{3}} = \sqrt{0.000833333} = 0.028867513 \approx 0.029$

Całkowita Niep. Stand.- Obliczenie - Wew

$u(x) = \sqrt{u_A^2(x) + u_B^2(x)} = \sqrt{0.022^2 + 0.029^2} = \sqrt{0.000484 + 0.000841} = \sqrt{0.001325} = 0.036400549 \approx 0.037$

Tuleja Średnica Zew

Niep. Stand. Ocena Typu A - Obliczenie

$u_A(x) = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n(n-1)}} = \sqrt{\frac{0.65576}{10*9}} = 0.08536 \approx 0.086$

Niep. Stand. Ocena Typu B - Obliczenie

$u_B(x) = \sqrt{\frac{(\Delta_p x)^2}{3} + \frac{(\Delta_e x)^2}{3}} = \sqrt{\frac{(0.05)^2}{3} + \frac{(0)^2}{3}} = \sqrt{\frac{0.0025}{3}} = \sqrt{0.000833333} = 0.028867513 \approx 0.029$

Całkowita Niep. Stand.- Obliczenie - Zew

$u(x) = \sqrt{u_A^2(x) + u_B^2(x)} = \sqrt{0.086^2 + 0.029^2} = \sqrt{0.007396 + 0.000841} = \sqrt{0.008237} = 0.09075792 \approx 0.0908$

Dane	Wyniki [mm]
$\Delta_p x$	0.05