

## **LAMPIRAN**

Perhitungan kekerasan *vickers* dengan beban indentor 100 gf (0,1 kgf) dan lama waktu pembebanan 10 detik.

- Suhu 250°C
- Distribusi 1 :

Diketahui :  $d_1 : 39,5 \mu = 0,00395 \text{ mm}$

$d_2 : 38,5 \mu = 0,00385 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{2P \sin\left(\frac{\theta}{2}\right)}{D^2} = \frac{(1,854)P}{D^2} \\ &= \frac{(1,854).0,1\text{kg}}{\left(\frac{39,5\mu+38,5\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0015\text{mm}} \\ &= 123,6 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 2 :

Diketahui :  $d_1 : 37\mu = 0,0037 \text{ mm}$

$d_2 : 38\mu = 0,0038 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854).0,1\text{kg}}{\left(\frac{37\mu+38\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0014 \text{ mm}} \\ &= 132,4 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 3 :

Diketahui :  $d_1 : 41\mu = 0,0041 \text{ mm}$

$d_2 : 39,5\mu = 0,00395 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854) \cdot 0,1 \text{kg}}{\left(\frac{41\mu + 39,5\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0016 \text{ mm}} \\ &= 115,8 \text{ kg/mm}^2 \end{aligned}$$

$$\begin{aligned} \text{Rata-rata} &= \frac{123,6 + 132,4 + 115,8}{3} \\ &= 123,9 \text{ kg/mm}^2 \end{aligned}$$

- Suhu 350°C

- Distribusi 1:  $d_1 : 39\mu = 0,0039 \text{ mm}$   
 $d_2 : 40\mu = 0,0040 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854) \cdot 0,1 \text{kg}}{\left(\frac{39\mu + 40\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0015 \text{ mm}} \\ &= 123,6 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 2 :  $d_1 : 44\mu = 0,0044 \text{ mm}$   
 $d_2 : 40\mu = 0,0040 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854) \cdot 0,1 \text{kg}}{\left(\frac{44\mu + 40\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0017 \text{ mm}} \\ &= 109,05 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 3 :  $d_1 : 41\mu = 0,0041 \text{ mm}$   
 $d_2 : 41,2 = 0,00412 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854) \cdot 0,1 \text{ kg}}{\left(\frac{41\mu + 41,2\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0016 \text{ mm}} \\ &= 110,8 \text{ kg/mm}^2 \end{aligned}$$

$$\begin{aligned} \text{Rata-rata} &= \frac{123,6 + 109,05 + 115,8}{3} \\ &= 116,15 \text{ kg/mm}^2 \end{aligned}$$

- Suhu 450°C
- Distribusi 1 :  $d_1 : 46,5\mu = 0,00465 \text{ mm}$   
 $d_2 : 42\mu = 0,0042 \text{ mm}$

$$\begin{aligned} \text{Jawab: } HVN &= \frac{(1,854) \cdot 0,1 \text{ kg}}{\left(\frac{46,5\mu + 42\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0019 \text{ mm}} \\ &= 97,57 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 2 :  $d_1 : 43\mu = 0,0043 \text{ mm}$   
 $d_2 : 42 \mu = 0,0042 \text{ mm}$

$$\begin{aligned} \text{Jawab : } HVN &= \frac{(1,854) \cdot 0,1 \text{ kg}}{\left(\frac{43\mu + 42\mu}{2}\right)^2} \\ &= \frac{0,1854}{0,0018 \text{ mm}} \\ &= 103 \text{ kg/mm}^2 \end{aligned}$$

- Distribusi 3 :  $d_1 : 40,3 \mu = 0,00403 \text{ mm}$   
 $d_2 : 40 \mu = 0,0040 \text{ mm}$

$$\text{Jawab : } HVN = \frac{(0,1854) \cdot 0,1 \text{ kg}}{\left(\frac{40,3\mu + 40\mu}{2}\right)^2}$$

$$\begin{aligned} &= \frac{0,1854}{0.0016 \text{ mm}} \\ &= 115,8 \text{ kg/mm}^2 \end{aligned}$$

$$\begin{aligned} \text{Rata-rata} &= \frac{103+115,8+97,57}{3} \\ &= 105,45 \text{ kg/mm}^2 \end{aligned}$$