

LAMPIRAN

Lampiran 1.1 Hasil pengujian kain *raw denim cotton 100% unsanforized*



Pengujian Kekakuan

Lusi - Pakan



Pengujian Sobek Elmendorf

Lusi



Pakan

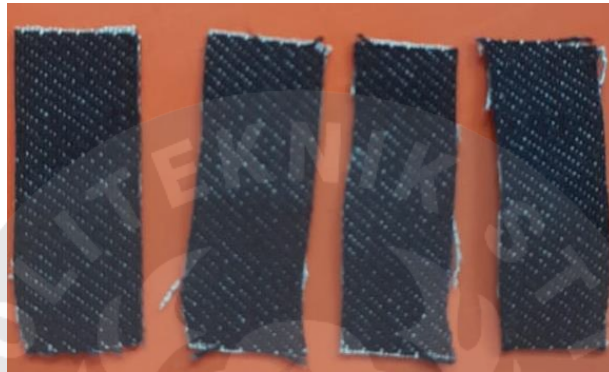


Pengujian Kembali dari Kekusutan

lusi



pakan



Lampiran 1. 2 Hasil pengujian berat kain dan dimensi pada kain *raw denim cotton* 100% *unsanforized*

- 20 g/l = $\frac{\text{Berat akhir (g)} - \text{Berat awal (g)}}{\text{Berat akhir (g)}} \times 100\% = \frac{18,0962 - 17,333}{18,092} \times 100\% = 4\%$
- 40 g/l = $\frac{\text{Berat akhir (g)} - \text{Berat awal (g)}}{\text{Berat akhir (g)}} \times 100\% = \frac{18,074 - 17,181}{18,074} \times 100\% = 5,2\%$
- 60 g/l = $\frac{\text{Berat akhir (g)} - \text{Berat awal (g)}}{\text{Berat akhir (g)}} \times 100\% = \frac{17,996 - 16,836}{17,996} \times 100\% = 6,7\%$

Lampiran 1. 3 Lampiran kekakuan arah lusi dan pakan *kain raw denim cotton 100% unsanforized* setelah pencucian berulang

Variasi Resin DMDHEU (lusi)	Kekakuan Kain setelah pencucian (lusi)	Σ	$\bar{x}$	Variasi Resin DMDHEU	Kekakuan Kain setelah pencucian (pakan)	Σ	$\bar{x}$
1). 20 g/l	D ₁ : 3.65	14.3	3.575	4). 20 g/l	D ₁ : 3.3	14,1	3.525
	D ₂ : 3.6				D ₂ : 3.5		
	B ₁ : 3.45				B ₁ : 3.6		
	B ₂ : 3.3.6				B ₂ : 3.7		
2). 40 g/l	D ₁ : 3,7	15.05	3.762	5). 40 g/l	D ₁ : 3.8	14,6	3.65
	D ₂ : 3,75				D ₂ : 3.3		
	B ₁ : 3,6				B ₁ : 3.4		
	B ₂ : 4				B ₂ : 4.1		
3). 60 g/l	D ₁ : 3.6	16.8	4.3	6). 60 g/l	D ₁ : 4	16,2	4.05
	D ₂ : 4.2				D ₂ : 4.3		
	B ₁ : 4.1				B ₁ : 3.8		
	B ₂ : 4.9				B ₂ : 3.7		

- Perhitungan total kekakuan pola lusi kain *raw denim cotton 100% unsanforized* setelah pencucian

$$\text{Diketahui gramasi kain} = \frac{100 \times 100}{10 \times 10} \times 17,1166$$

$$= 1711,66 \text{ g/cm}^2$$

$$\text{Diketahui tebal kain} = 0,84 \text{ mm}$$

Konsentrasi 20 g/l:

- Panjang lengkung rata-rata

$$\text{Pajang lengkung rata2} = \text{panjang} \times 0.5$$

$$= 3.575 \times 0.5$$

$$= 1.787$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 1.787 \\ &= 305,96 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(305,96) \times 10^{-6}}{0.084 \text{ cm}} \\ &= 0,043 \text{ kg / cm}^2 \end{aligned}$$

Konsentrasi 40 g/l:

- **Panjang lengkung rata-rata**

$$\begin{aligned} \text{Pajang lengkung rata2} &= \text{panjang} \times 0.5 \\ &= 3.762 \times 0.5 \\ &= 1,853 \end{aligned}$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 1,853 \\ &= 317,17 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(317,17) \times 10^{-6}}{0.084 \text{ cm}} \\ &= 0,045 \text{ Kg / cm}^2 \end{aligned}$$

Konsentrasi 60 g/l:

- **Panjang lengkung rata-rata**

$$\begin{aligned} \text{Pajang lengkung rata2} &= \text{panjang} \times 0.5 \\ &= 4.3 \times 0.5 \\ &= 2,15 \end{aligned}$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 2,15 \\ &= 368,006 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(368,006) \times 10^{-6}}{0.084 \text{ cm}} \\ &= 0,052 \text{ kg / cm}^2 \end{aligned}$$

2. Perhitungan total kekakuan pola pakan kain *raw denim cotton 100% unsanforized* setelah pencucian

$$\begin{aligned} \text{Diketahui gramasi kain} &= \frac{100 \times 100}{10 \times 10} \times 17,1166 \\ &= 1711,66 \text{ g/cm}^2 \end{aligned}$$

Diketahui tebal kain = 0,84 mm

Konsentrasi 20 g/l:

- **Panjang lengkung rata-rata**

$$\begin{aligned} \text{Pajang lengkung rata2} &= \text{panjang} \times 0.5 \\ &= 3.525 \times 0.5 \\ &= 1.762 \end{aligned}$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 1.762 \\ &= 301,680 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(301,680) \times 10^{-6}}{0.084 \text{ cm}} \\ &= 0,043 \text{ kg / cm}^2 \end{aligned}$$

Konsentrasi 40 g/l:

- **Panjang lengkung rata-rata**

$$\begin{aligned} \text{Pajang lengkung rata2} &= \text{panjang} \times 0.5 \\ &= 3.65 \times 0.5 \\ &= 1,825 \end{aligned}$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 1,825 \\ &= 312,377 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(312,377) \times 6}{0.084 \text{ cm}} \\ &= 0,045 \text{ kg / cm}^2 \end{aligned}$$

Konsentrasi 60 g/l:

- **Panjang lengkung rata-rata**

$$\begin{aligned} \text{Pajang lengkung rata2} &= \text{panjang} \times 0.5 \\ &= 4.05 \times 0.5 \\ &= 2,025 \end{aligned}$$

- **Kekakuan lentur**

$$\begin{aligned} G_L &= 0.1 W (C_L^3) \\ &= 0.1 \times 1711.66 \times 2,025 \\ &= 346,611 \text{ mg.cm} \end{aligned}$$

- **Bending modulus**

$$\begin{aligned} Q_l &= \frac{12G_l \times 10^{-6}}{g^3} \\ &= \frac{12(346,611) \times 10^{-6}}{0.84 \text{ mm}} \\ &= 0,049 \text{ kg / cm}^2 \end{aligned}$$

3. Kekakuan total

$$\begin{aligned}\text{Konsentrasi 20 g/l :} \quad (GT) &= \sqrt{GL \times GP} \\ &= \sqrt{305,96 \times 301,96} \\ &= 303,94 \text{ mgCm}\end{aligned}$$

$$\begin{aligned}\text{Konsentrasi 40 g/l :} \quad (GT) &= \sqrt{GL \times GP} \\ &= \sqrt{317,17 \times 312,377} \\ &= 314,764 \text{ mgCm}\end{aligned}$$

$$\begin{aligned}\text{Konsentrasi 60 g/l :} \quad (GT) &= \sqrt{GL \times GP} \\ &= \sqrt{368,006 \times 312,377} \\ &= 339,052 \text{ mgCm}\end{aligned}$$

Lampiran 1. 4 Pengujian ketahanan sobek cara elmendorf

Variasi Resin DMDHEU	Kekuatan sobek pakan (%) $\bar{x}$	Kekuatan Sobek (gram)	$(x - \bar{x})^2$
20 g/l	73	$\frac{73}{100} \times 3200 = 2336$	10,24
40 g/l	71	$\frac{71}{100} \times 3200 = 2272$	12,25
60 g/l	61,5	$\frac{61,5}{100} \times 3200 = 1968$	49

- Konsentrasi 20 g/l

$$\begin{aligned}SD &= \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{\frac{10,24}{1}} = 3,2 \\ CV &= \frac{SD}{\bar{x}} \times 100 \% = \frac{3,04}{2336} \times 100 \% = 0,13\%\end{aligned}$$

- Konsentrasi 40 g/l

$$\begin{aligned}SD &= \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{\frac{12,25}{1}} = 3,5 \\ CV &= \frac{SD}{\bar{x}} \times 100 \% = \frac{3,5}{2272} \times 100 \% = 0,15 \%\end{aligned}$$

- Konsentrasi 60 g/l

$$SD = \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{\frac{49}{1}} = 7$$

$$CV = \frac{SD}{x} \times 100 \% = \frac{7}{1360} \times 100 \% = 0,51 \%$$

Tabel 3. 4 Pengujian ketahanan kekuatan sobek arah pakan cara elmendorf pada kain *raw denim cotton 100% unsanforized* setelah pencucian berulang

Variasi Resin DMDHEU	Kekuatan sobek (%) lusi $\bar{x}$	Kekuatan Sobek (gram)	$(x - \bar{x})^2$
20 g/l	61	$\frac{61}{100} \times 3200 = 1952$	4
40 g/l	46	$\frac{46}{100} \times 3200 = 1472$	7,29
60 g/l	42,5	$\frac{42,5}{100} \times 3200 = 1360$	14,44

- Konsentrasi 20 g/l

$$SD = \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{\frac{4}{1}} = 2$$

$$CV = \frac{SD}{x} \times 100 \% = \frac{2}{1952} \times 100 \% = 0,43\%$$

- Konsentrasi 40 g/l

$$SD = \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{\frac{7,29}{1}} = 2,7$$

$$CV = \frac{SD}{x} \times 100 \% = \frac{2,7}{1472} \times 100 \% = 0,18\%$$

- Konsentrasi 60 g/l

$$SD = \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} = \sqrt{14,44} = 3,8$$

$$CV = \frac{SD}{x} \times 100 \% = \frac{3,8}{1360} \times 100 \% = 0,27 \%$$

Lampiran 1. 5 Spesifikasi kain *raw denim cotton 100% unsanforized* dari distributor

Bahan:	100% COTTON
Menenun:	3/1 kepar arah kanan
Warna:	biru tua
Bobot:	15.6 oz
Lebar:	58/59"
Konstruksi:	6X6
Menyelesaikan:	Unsanforizin