## LAMPIRAN

### 1. Menentukan Fraksi Volume komposit

Massa jenis serat e-glass = 2,3 gr/cm³

Massa jenis epoksi = 1,1 gr/ cm³

Perbandingan fraksi volume serat dan matriks 15%:85%.

Volume cetakan, $V_c$ = 65 cm³

Volume matriks, $V_m$ = $\frac{85\%}{100\%} x 65$ cm³

= 55 cm³

Massa matriks, $M_m$ = $V_m x \rho_m$

= 55 cm³ x 1.1 gr/ cm³

= 60 gr

Volume serat, $V_f$ = $\frac{15\%}{100\%} x 65$ cm³

= 9 cm³

Massa serat, $M_f$ = $V_f x \rho_f$

= 9 cm³ x 2.3 gr/ cm³

= 20 gr

### 2. Perhitungan Pengujian Tarik

Variasi temperatur *curing* 110ºC

- Tegangan tarik ($\sigma = \frac{F}{A_0} = \frac{2173\ N}{2{,}6\ x\ 6\ mm^2} = 139{,}29\ Mpa$ )
- Regangan ($\varepsilon = \frac{\Delta l}{l_0} = \frac{2{,}40}{100\ x\ 100} = 2{,}40\%$)
- Modulus tekan ($\epsilon = \frac{\sigma}{\varepsilon} = \frac{139{,}29\ N/mm^2}{2{,}40} = 5{,}80\ Gpa$)

### 3. Perhitungan Pengujian Tekan

Variasi temperatur *curing* 110ºC

- pipe stiffness ($P_s = \frac{F}{\Delta_y} = \frac{1800\ N}{10\ mm^2} = 180\ Mpa$ )
- pipe deflection ($P_d = \frac{\Delta y}{dx100} = \frac{10}{30\ x\ 100} = 33\%$)

- Modulus tekan $(\epsilon = \frac{(P_s}{(P_d} = \frac{180\ MPa}{33} = 5{,}45\ Mpa)$