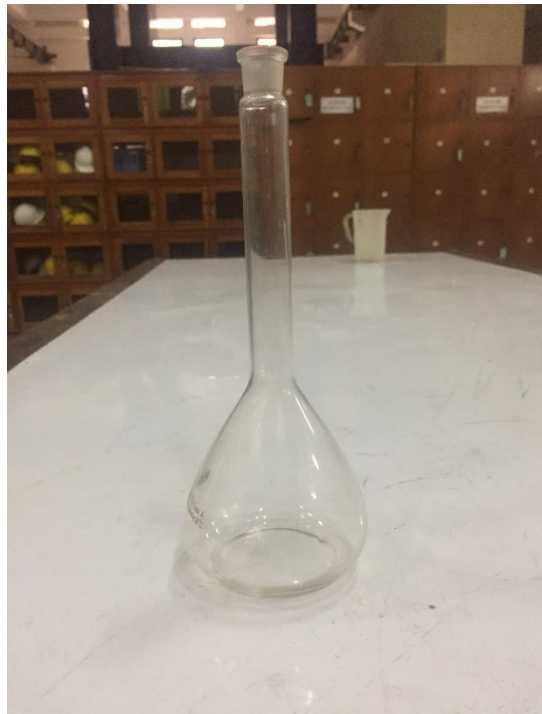


**Lampiran 1. Gambar Alat yang Digunakan****Gambar L-1.1 Piknometer****Gambar L-1.2 Saringan**



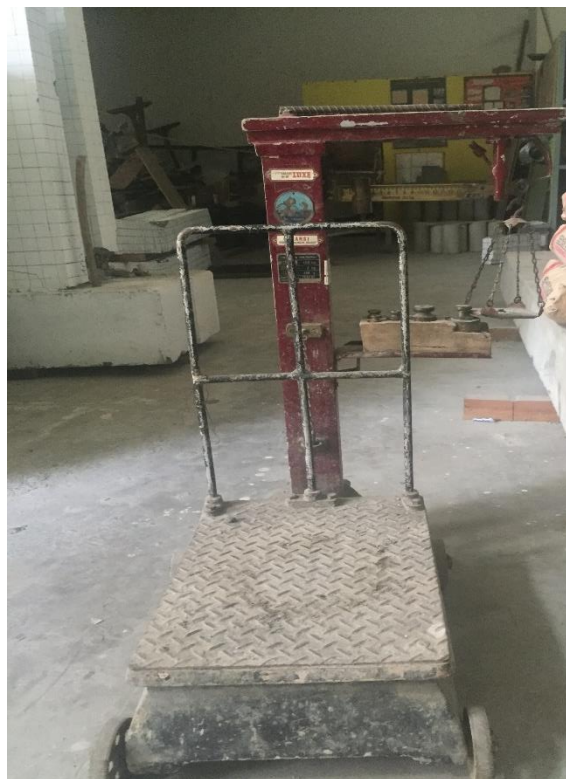
**Gambar L-1.3 Mesin Saringan**



**Gambar L-1.4 Timbangan Kapasitas 2500 gram**



**Gambar L-1.5 Timbangan Kapasitas 20000 gram**



**Gambar L-1.6 Timbangan Duduk Kapasitas 150 kg**



**Gambar L-1.7 Oven**



**Gambar L-1.8 Cetakan Benda Uji**





**Gambar L-1.9 Mesin Pengaduk Beton**



**Gambar L-1.10 Dial Gauge**



**Gambar L-1.11 Alat Pengujian Slump**



**Gambar L-1.12 Cetakan Capping Silinder**



**Gambar L-1.13 Compressing Testing Machine (CTM)**



**Gambar L-1.16 Troli Barang**



**Lampiran 2. Gambar Bahan yang Digunakan**



**Gambar L-2.1 Agregat Kasar dari Clereng, Kulon progo**



**Gambar L-2.2 Agregat Halus dari Clereng, Kulon progo**





**Gambar L-2.3 Pasir Besi**



**Gambar L-2.4 Semen Portland Merek Tiga Roda Tipe PCC**



**Gambar L-2.5 Air**



**Gambar L-2.6 Belerang**

### Lampiran 3. Gambar Hasil Pengujian Benda Uji



**Gambar L-3.1 Hasil Pengujian Kuat Tekan dan Modulus Elastisitas Beton**



**Gambar L-3.1 Hasil Pengujian Kuat Tarik Beton**



#### Lampiran 4. Data Hasil Pengujian Pemeriksaan Bahan



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#### PEMERIKSAAN BERAT JENIS DAN PENYERAPAN AIR AGREGAT HALUS (SNI 03-1970-1990)

| Uraian  | Hasil Pengamatan |          |           |
|---|------------------|----------|-----------|
|   | Sampel 1         | Sampel 2 | Rata-rata |
| Berat pasir kering mutlak, gram (Bk)              | 488,7            | 485,4    | 487,05    |
| Berat pasir kondisi jenuh kering muka (SSD), gram | 500              | 500      | 500       |
| Berat piknometer berisi pasir dan air, gram (Bt)  | 1124,7           | 1182,9   | 1153,8    |
| Berat piknometer berisi air, gram (B)             | 813,8            | 872,3    | 843,05    |
| Berat jenis curah (Bk/(B +500- Bt))               | 2,584            | 2,563    | 2,574     |
| Berat jenis kering muka (500/(B +500- Bt))        | 2,644            | 2,640    | 2,642     |
| Berat jenis semu, Bk/(B +Bk- Bt)                  | 2,749            | 2,777    | 2,763     |
| Penyerapan air, (500 - Bk)/Bk x 100%              | 2,31%            | 3,01%    | 2,66%     |

Diperiksa Oleh  
Laboran

*Darussalam*  
(Darussalam, A.Md.)



Yogyakarta, 26 Juli 2018

Dikerjakan Oleh

*Ridho Pratama*

(Ridho Pratama)



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**MODULUS HALUS BUTIR (MHB) / ANALISIS SARINGAN AGREGAT HALUS  
( SNI 03-1968-1990)**

| Lubang Ayakan (mm) | Berat Tertinggal (gram) | Berat Tertinggal (%) | Berat Tertinggal Kumulatif (%) | Persen Lolos Kumulatif (%) |
|--------------------|-------------------------|----------------------|--------------------------------|----------------------------|
| 40                 |                         |                      |                                |                            |
| 20                 |                         |                      |                                |                            |
| 10                 | 0                       | 0,00                 | 0,00                           | 100                        |
| 4.8                | 11,5                    | 0,58                 | 0,58                           | 99,42                      |
| 2.4                | 109,1                   | 5,46                 | 6,03                           | 93,97                      |
| 1.2                | 258,2                   | 12,91                | 18,94                          | 81,06                      |
| 0.6                | 658,4                   | 32,92                | 51,87                          | 48,13                      |
| 0.3                | 601                     | 30,05                | 81,92                          | 18,08                      |
| 0.15               | 293,4                   | 14,67                | 96,59                          | 3,41                       |
| Pan                | 68,2                    | 3,41                 |                                |                            |
| Jumlah             | 1999,8                  | 100                  | 255,92                         |                            |

Modulus Halus Butir = 2,559

**GRADASI PASIR**

| Lubang Ayakan (mm) | Persen Butir Agregat yang Lolos Ayakan |           |            |           |
|--------------------|--|-----------|------------|-----------|
|                    | Daerah I                               | Daerah II | Daerah III | Daerah IV |
| 10                 | 100                                    | 100       | 100        | 100       |
| 4.8                | 90-100                                 | 90-100    | 90-100     | 95-100    |
| 2.4                | 60-95                                  | 75-100    | 85-100     | 95-100    |
| 1.2                | 30-70                                  | 55-90     | 75-100     | 90-100    |
| 0.6                | 15-34                                  | 35-59     | 60-79      | 80-100    |
| 0.3                | 5-20                                   | 8-30      | 12-40      | 15-50     |
| 0.15               | 0-10                                   | 0-10      | 0-10       | 0-15      |

Keterangan:

Daerah I Pasir Kasar  
Daerah II Pasir Agak Kasar  
Daerah III Pasir Agak Halus  
Daerah IV Pasir Halus



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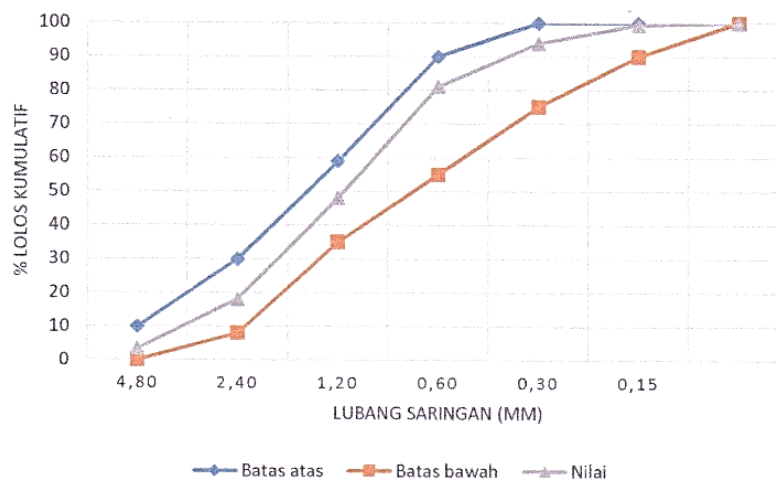
**MODULUS HALUS BUTIR (MHB) / ANALISIS SARINGAN AGREGAT HALUS**  
**( SNI 03-1968-1990)**

Hasil Analisis Saringan :

Pasir Masuk Daerah = II

Jenis Pasir = Pasir Agak Kasar

**GAMBAR ANALISA SARINGAN AGREGAT HALUS**



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(Darussalam, A.Md.)

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*(Signature)*

(Ridho Pratama)





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**PEMERIKSAAN BERAT ISI PADAT AGREGAT HALUS**  
**( SNI 03-4804-1998)**

| Uraian  | Hasil    |
|---|----------|
| Berat tabung, gram (W1)                               | 10900    |
| Berat tabung + Agregat halus kondisi jenuh, gram (W2) | 19800    |
| Berat agregat halus, gram (W3)                        | 8900     |
| Volume Tabung   | 5287,160 |
| Berat isi padat, gram/cm <sup>3</sup>                 | 1,683    |

Diperiksa Oleh

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(Darussalam, A.Md.)

Yogyakarta, 26 Juli 2018

Dikerjakan Oleh

(Ridho Pratama)



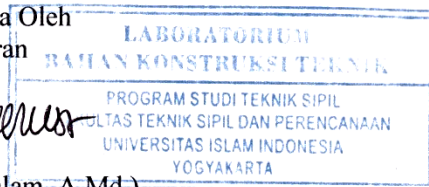
**LABORATORIUM BAHAN KONSTRUKSI TEKNIK**  
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**PEMERIKSAAN BERAT ISI GEMBUR AGREGAT HALUS**  
**( SNI 03-4804-1998)**

| Uraian  | Hasil    |
|---|----------|
| Berat tabung, gram (W1)                               | 10900    |
| Berat tabung + Agregat halus kondisi jenuh, gram (W2) | 18400    |
| Berat agregat halus, gram (W3)                        | 7500     |
| Volume Tabung   | 5287,160 |
| Berat isi padat, gram/cm <sup>3</sup>                 | 1,419    |

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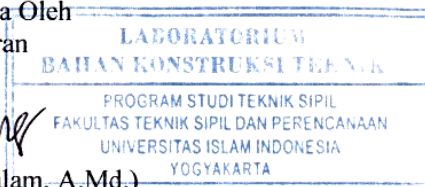
**PEMERIKSAAN BUTIRAN YANG LOLOS AYAKAN NO 200**  
**/ UJI KANDUNGAN LUMPUR DALAM PASIR**  
**( SNI 03-4142-1996)**

| Ukuran Butir Maksimum | Berat Minimum | Keterangan |
|-----------------------|---------------|------------|
| 4,80 mm               | 500 gram      | Pasir      |
| 9,60 mm               | 1000 gram     | Kerikil    |
| 19,20 mm              | 1500 gram     | Kerikil    |
| 38,00 mm              | 2500 gram     | Kerikil    |

| Uraian  | Sampel 1 | Sampel 2 | Rata-rata |
|---|----------|----------|-----------|
| Berat Agregat Kering Oven, gram (w1)                                    | 500      | 500      | 500       |
| Berat Agregat Kering Oven setelah dicuci, gram (w2)                     | 494,4    | 480,1    | 487,3     |
| Berat yang lolos saringan no. 200, %<br>$[(w1 - w2) / w1] \times 100\%$ | 1,12     | 3,98     | 2,55      |

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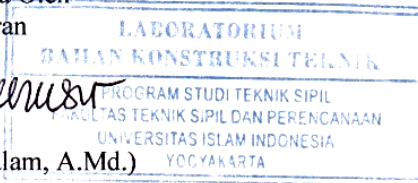
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PEMERIKSAAN BERAT JENIS DAN PENYERAPAN AIR AGREGAT KASAR  
 ( SNI 03-1969-1990)

| Uraian   | Hasil Pengamatan |          |           |
|--|------------------|----------|-----------|
|  | Sampel 1         | Sampel 2 | Rata-rata |
| Berat kerikil kering mutlak, gram (Bk)                   | 4943,1           | 4939     | 4941,1    |
| Berat kerikil kondisi jenuh kering muka (SSD), gram (Bj) | 5000             | 5000     | 5000      |
| Berat kerikil dalam air, gram (Ba)                       | 3074             | 3053     | 3063,5    |
| Berat jenis curah, (Bk/Bj- Ba)                           | 2,567            | 2,537    | 2,552     |
| Berat jenis jenuh kering muka, (Bj/Bj- Ba)               | 2,596            | 2,568    | 2,582     |
| Berat jenis semu, (Bk/Bk- Ba)                            | 2,645            | 2,619    | 2,632     |
| Penyerapan air, (Bj - Bk)/Bk x 100%                      | 1,15%            | 1,24%    | 1,19%     |

Diperiksa Oleh  
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*darussalam*  
 (Darussalam, A.Md.)



Yogyakarta, 26 Juli 2018  
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**MODULUS HALUS BUTIR (MHB) / ANALISIS SARINGAN AGREGAT KASAR**  
**( SNI 03-1968-1990)**

| Lubang Ayakan (mm) | Berat Tertinggal (gram) | Berat Tertinggal (%) | Berat Tertinggal Kumulatif (%) | Persen Lolos Kumulatif (%) |
|--------------------|-------------------------|----------------------|--------------------------------|----------------------------|
| 40                 | 0                       | 0,00                 | 0,00                           | 100                        |
| 20                 | 204,4                   | 4,09                 | 4,09                           | 95,91                      |
| 10                 | 2022,7                  | 40,46                | 44,54                          | 55,46                      |
| 4.8                | 2645,7                  | 52,92                | 97,46                          | 2,54                       |
| 2.4                | 15,1                    | 0,30                 | 97,46                          |                            |
| 1.2                | 0,00                    | 0,00                 | 97,46                          |                            |
| 0.6                | 0,00                    | 0,00                 | 97,46                          |                            |
| 0.3                | 0,00                    | 0,00                 | 97,46                          |                            |
| 0.15               | 0,00                    | 0,00                 | 97,46                          |                            |
| Pan                | 111,9                   | 2,24                 |                                | 0,00                       |
| Jumlah             | 4999,8                  | 100                  | 634,90                         |                            |

Modulus Halus Butir = 6,349

**GRADASI KRIKIL**

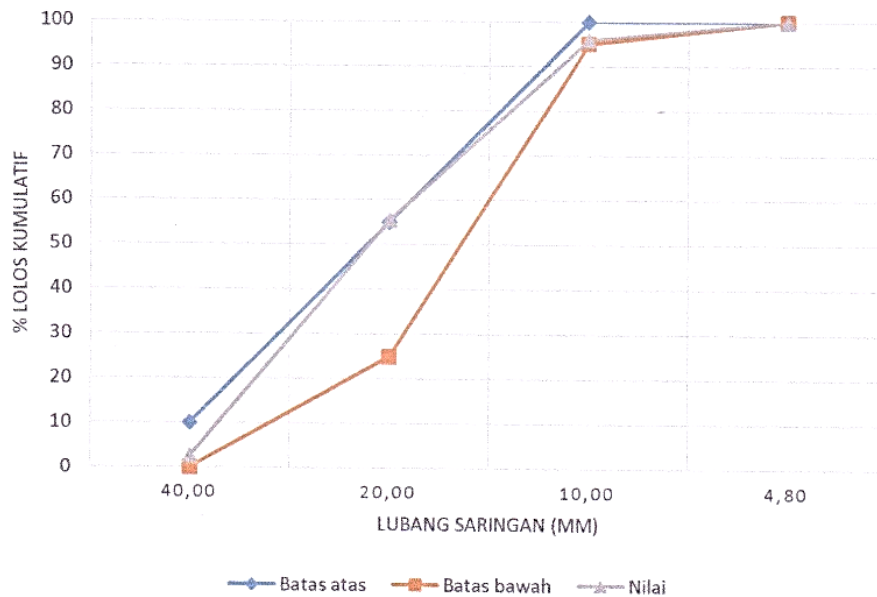
| Lubang Ayakan (mm) | Persen Butir Agregat yang Lolos Ayakan /Besar Butiran Maksimum |        |       |
|--------------------|--|--------|-------|
|                    | 40 mm  | 20 mm  | 10 mm |
| 40                 | 95-100   | 100    | -     |
| 20                 | 30-70  | 95-100 | 100   |
| 10                 | 10-35  | 25-55  | 50-85 |
| 4,8                | 0-5  | 0-10   | 0-10  |



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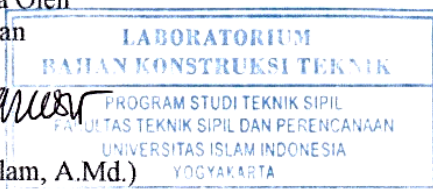
**MODULUS HALUS BUTIR (MHB) / ANALISIS SARINGAN AGREGAT KASAR**  
**( SNI 03-1968-1990)**

**GAMBAR ANALISA SARINGAN AGREGAT KASAR**



Diperiksa Oleh  
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 (Darussalam, A.Md.)



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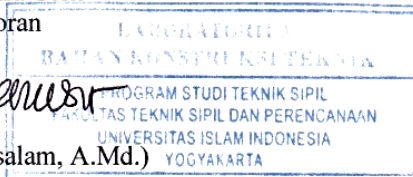


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**PEMERIKSAAN BERAT ISI PADAT AGREGAT KASAR  
( SNI 03-4804-1998)**

| Uraian  | Hasil    |
|---|----------|
| Berat tabung, gram (W1)                               | 11100    |
| Berat tabung + Agregat halus kondisi jenuh, gram (W2) | 19100    |
| Berat agregat halus, gram (W3)                        | 8000     |
| Volume Tabung   | 5287,160 |
| Berat isi padat, gram/cm <sup>3</sup>                 | 1,513    |

Diperiksa Oleh  
Laboran

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 (Darussalam, A.Md.)

Yogyakarta, 26 Juli 2018  
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*Ridho Pratama*  
(Ridho Pratama)

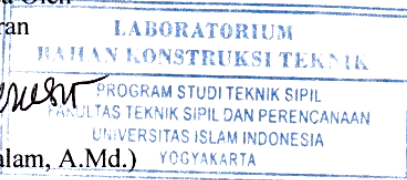


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**PEMERIKSAAN BERAT ISI GEMBUR AGREGAT KASAR**  
**( SNI 03-4804-1998)**

| Uraian  | Hasil    |
|---|----------|
| Berat tabung, gram (W1)                               | 11100    |
| Berat tabung + Agregat halus kondisi jenuh, gram (W2) | 18200    |
| Berat agregat halus, gram (W3)                        | 7100     |
| Volume Tabung   | 5287,160 |
| Berat isi padat, gram/cm <sup>3</sup>                 | 1,343    |

Diperiksa Oleh  
 Laboran

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Yogyakarta, 26 Juli 2018  
 Dikerjakan Oleh

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 (Ridho Pratama)

### Lampiran 5. Data Hasil Perencanaan dan Pengadukan Beton



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#### Formulir Perencanaan Campuran Beton Metode SNI (SNI 03-2834-2000)

| No | Uraian  | Nilai       | Satuan            | Tabel/ Grafik/ Hitungan       |
|----|---|-------------|-------------------|-------------------------------|
| 1  | Kuat tekan beton                              | 25          | Mpa               | Ditetapkan                    |
| 2  | Deviasi standar (Sd)                          | -           |                   |                               |
| 3  | Nilai tambah / Margin (m)                     | 12          |                   | $M = 1,64 \times Sd$          |
| 4  | Kuat tekan rata-rata                          | 37          | Mpa               | (1) + (3)                     |
| 5  | Jenis semen                                   | PC tipe I   |                   | Ditetapkan                    |
| 6  | Jenis gregat kasar                            | Batu pecah  |                   | Ditetapkan                    |
|    | Jenis agregat halus                           | Pasir alami |                   | Ditetapkan                    |
| 7  | FAS bebas                                     | 0,5         |                   | Tabel 2 dan Grafik 1 dan 2    |
|    | FAS maksimum                                  | 0,6         |                   |                               |
| 8  | FAS digunakan                                 | 0,5         |                   |                               |
| 9  | Slump   | 60-180      | mm                | Ditetapkan                    |
| 10 | Ukuran agregat maks                           | 20          | mm                | Ditetapkan                    |
| 11 | Kadar air bebas                               | 205         | Kg/m <sup>3</sup> | Tabel 3                       |
| 12 | Kadar semen                                   | 410         | Kg/m <sup>3</sup> | (11) : (8)                    |
| 13 | Kadar semen maksimum                          | -           | Kg/m <sup>3</sup> |                               |
| 14 | Kadar semen minimum                           | 325         | Kg/m <sup>3</sup> | Tabel 4                       |
| 15 | Kadar semen digunakan                         | 410         | Kg/m <sup>3</sup> |                               |
| 16 | FAS disesuaikan                               | 0,5         |                   |                               |
| 17 | Susunan besar agregat halus                   | 2           |                   | Daerah Gradasi                |
| 18 | Berat jenis agregat kasar (kerikil)           | 2,582       |                   |                               |
|    | Berat jenis agregat halus                     | 2,642       |                   |                               |
| 19 | Persen agregat halus                          | 41,5        |                   | grafik 13/ 14/ 15             |
| 20 | Berat jenis relatif agregat gabungan          | 2,607       |                   |                               |
| 21 | Berat isi beton                               | 2350        | Kg/m <sup>3</sup> | grafik 16                     |
| 22 | Kadar agregat gabungan                        | 1735        | Kg/m <sup>3</sup> | 21- 15- 11                    |
| 23 | Kadar agregat halus                           | 720,025     | Kg/m <sup>3</sup> | 19 x 21                       |
| 24 | Kadar agregat kasar                           | 1014,975    | Kg/m <sup>3</sup> | 22- 23                        |
|    |   | Semen (kg)  | Air (kg)          | Agregat Halus (kg) Kasar (kg) |
| 25 | Proporsi campuran teoritis (SSD)              |             |                   |                               |
|    | setiap m <sup>3</sup>                         | 410         | 205               | 720,025 1014,975              |
|    | setiap campuran uji :                         | 21,736      | 10,868            | 38,172 53,808                 |
| 26 | Proporsi campuran dengan angka penyusutan 20% |             |                   |                               |
|    | setiap m <sup>3</sup>                         | 492         | 246               | 864,03 1217,97                |
|    | setiap campuran uji :                         | 26,086      | 13,042            | 45,806 64,57                  |



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**Komposisi Perencanaan Campuran Beton Metode SNI  
(SNI 03-2834-2000)**

| Kode Benda Uji | Semen (kg) | Air (kg) | Agregat Halus (kg) | Agregat Kasar (kg) | Pasir Besi (kg) |
|----------------|------------|----------|--------------------|--------------------|-----------------|
| R0             | 26,086     | 13,042   | 45,806             | 64,570             | 0,000           |
| R60            | 26,086     | 13,042   | 18,322             | 64,570             | 27,484          |
| R70            | 26,086     | 13,042   | 13,742             | 64,570             | 32,064          |
| R80            | 26,086     | 13,042   | 9,161              | 64,570             | 36,645          |
| R90            | 26,086     | 13,042   | 4,581              | 64,570             | 41,225          |



## Lampiran 6. Data Hasil Pengujian Penyerapan Air Beton



LABORATORIUM BAHAN KONSTRUKSI TEKNIK  
PROGRAM STUDI TEKNIK SIPIL  
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN  
UNIVERSITAS ISLAM INDONESIA  
Jalan Kaliurang Km 14,4 Telpon (0274)858444 eks 3250 &3259 Yogyakarta

### LAPORAN SEMENTARA PENGAMATAN UJI PENYERAPAN AIR (SNI 03-6433-2000)

#### I. Data Benda Uji

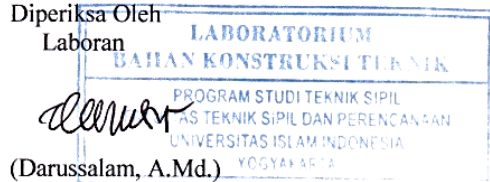
Mutu Beton Rencana ( $f_c$ ) : 25 MPa

Umur Benda Uji : 28 Hari

#### II. Data Pengujian

| No | Kode Benda Uji | Diameter (m) | Tinggi (m) | Berat Basah (kg) | Berat Kering (kg) | Berat Volume Basah (kg/m <sup>3</sup> ) | Berat Volume Kering (kg/m <sup>3</sup> ) | Serapan Air (%) | Serapan Air Rata-Rata (%) |       |
|----|----------------|--------------|------------|------------------|-------------------|---|--|-----------------|---------------------------|-------|
| 1  | R0             | R1           | 0.1498     | 0.303            | 11.9              | 11.4                                    | 2228.388                                 | 2134.758        | 4.386                     | 4.941 |
|    |                | R5           | 0.1459     | 0.3037           | 12                | 11.4                                    | 2363.393                                 | 2245.224        | 5.263                     |       |
|    |                | R7           | 0.1501     | 0.3016           | 12.2              | 11.6                                    | 2286.005                                 | 2173.579        | 5.172                     |       |
| 2  | R60            | R12          | 0.1508     | 0.301            | 13.2              | 12.9                                    | 2455.358                                 | 2399.555        | 2.326                     | 2.623 |
|    |                | R16          | 0.1501     | 0.3017           | 12.9              | 12.5                                    | 2416.368                                 | 2341.442        | 3.200                     |       |
|    |                | R17          | 0.1494     | 0.2998           | 13.1              | 12.8                                    | 2492.577                                 | 2435.495        | 2.344                     |       |
| 3  | R70            | R2           | 0.1516     | 0.3025           | 13.6              | 13.3                                    | 2490.722                                 | 2435.780        | 2.256                     | 1.999 |
|    |                | R6           | 0.1506     | 0.3              | 13.5              | 13.3                                    | 2526.229                                 | 2488.803        | 1.504                     |       |
|    |                | R10          | 0.1507     | 0.3014           | 13.7              | 13.4                                    | 2548.361                                 | 2492.557        | 2.239                     |       |
| 4  | R80            | R16          | 0.1504     | 0.3025           | 13.6              | 13.4                                    | 2530.626                                 | 2493.411        | 1.493                     | 1.502 |
|    |                | R17          | 0.1503     | 0.291            | 13.3              | 13.2                                    | 2576.029                                 | 2556.661        | 0.758                     |       |
|    |                | R20          | 0.1498     | 0.3003           | 13.6              | 13.3                                    | 2569.627                                 | 2512.944        | 2.256                     |       |
| 5  | R90            | R26          | 0.1505     | 0.2986           | 13.6              | 13.5                                    | 2560.273                                 | 2541.447        | 0.741                     | 1.233 |
|    |                | R28          | 0.1512     | 0.3015           | 13.7              | 13.6                                    | 2530.695                                 | 2512.223        | 0.735                     |       |
|    |                | R30          | 0.1499     | 0.3017           | 13.8              | 13.5                                    | 2591.855                                 | 2535.510        | 2.222                     |       |

Diperiksa Oleh  
Laboran



(Darussalam, A.Md.)

Yogyakarta, 4 September 2018

Dikerjakan Oleh

(Ridho Pratama)

## Lampiran 7. Data Hasil Pengujian Kuat Tekan Beton



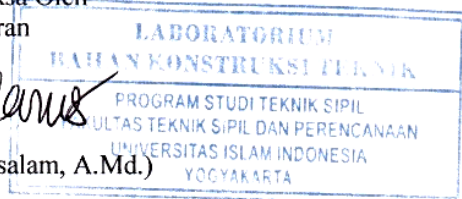
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UNIVERSITAS ISLAM INDONESIA**  
**Jalan Kaliurang Km 14,4 Telpn (0274)858444 eks 3250 &3259 Yogyakarta**

### LAPORAN SEMENTARA PENGAMATAN UJI DESAK SILINDER BETON (SNI 03-1974-2011)

| Benda Uji        |      | Dimensi Benda Uji |             | Beban Maksimum (N) | Kuat Tekan Beton (f <sub>c</sub> ) (MPa) | Kuat Tekan Beton Rerata (MPa) |
|------------------|------|-------------------|-------------|--------------------|--|-------------------------------|
| Kadar Pasir Besi | Kode | Diameter (mm)     | Tinggi (mm) |                    |  |                               |
| 0%               | R2   | 151,050           | 301,90      | 400000             | 22,322                                   | 25,170                        |
|                  | R3   | 151,325           | 304,00      | 500000             | 27,801                                   |                               |
|                  | R4   | 150,750           | 305,30      | 420000             | 23,531                                   |                               |
|                  | R8   | 150,750           | 301,00      | 450000             | 25,212                                   |                               |
|                  | R9   | 150,500           | 303,00      | 480000             | 26,982                                   |                               |
| 60%              | R11  | 150,750           | 300,30      | 425000             | 23,811                                   | 29,771                        |
|                  | R13  | 149,700           | 302,30      | 500000             | 28,408                                   |                               |
|                  | R15  | 150,100           | 301,00      | 470000             | 26,561                                   |                               |
|                  | R18  | 150,900           | 304,50      | 640000             | 35,786                                   |                               |
| 70%              | R1   | 150,350           | 305,00      | 610000             | 34,358                                   | 30,270                        |
|                  | R3   | 151,525           | 303,60      | 605000             | 33,550                                   |                               |
|                  | R4   | 150,300           | 305,00      | 570000             | 32,127                                   |                               |
|                  | R8   | 150,025           | 301,80      | 450000             | 25,456                                   |                               |
|                  | R9   | 150,500           | 300,50      | 460000             | 25,858                                   |                               |
| 80%              | R11  | 150,575           | 301,40      | 550000             | 30,886                                   | 32,942                        |
|                  | R12  | 150,725           | 302,60      | 620000             | 34,748                                   |                               |
|                  | R14  | 151,000           | 302,00      | 520000             | 29,038                                   |                               |
|                  | R18  | 150,975           | 303,80      | 620000             | 34,633                                   |                               |
|                  | R19  | 150,525           | 302,50      | 630000             | 35,402                                   |                               |
| 90%              | R21  | 150,175           | 302,10      | 630000             | 35,568                                   | 29,517                        |
|                  | R22  | 151,150           | 302,70      | 520000             | 28,980                                   |                               |
|                  | R23  | 151,550           | 301,50      | 520000             | 28,827                                   |                               |
|                  | R24  | 150,175           | 301,00      | 450000             | 25,406                                   |                               |
|                  | R29  | 150,150           | 302,50      | 510000             | 28,803                                   |                               |

Diperiksa Oleh  
Laboran

*(Signature)*  
(Darussalam, A.Md.)



Yogyakarta, 4 September 2018  
Dikerjakan Oleh

*(Signature)*  
(Ridho Pratama)

## Lampiran 8. Data Hasil Pengujian Kuat Tarik Belah Beton



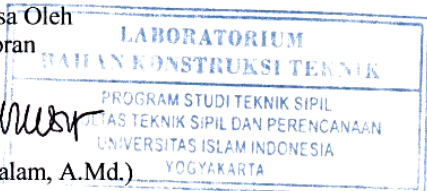
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### LAPORAN SEMENTARA PENGAMATAN UJI TARIK/BELAH SILINDER BETON (SNI 03-2491-2002)

| Benda Uji        |      | Dimensi Benda Uji |             | Beban Maksimum (N) | Kuat Tarik Belah (MPa) | Kuat Tarik Belah Rerata (MPa) |
|------------------|------|-------------------|-------------|--------------------|------------------------|-------------------------------|
| Kadar Pasir Besi | Kode | Diameter (mm)     | Tinggi (mm) |                    |                        |                               |
| 0%               | R1   | 149,775           | 303,00      | 127000             | 1,782                  | 2,362                         |
|                  | R5   | 145,900           | 303,70      | 119000             | 1,710                  |                               |
|                  | R6   | 150,250           | 302,40      | 218000             | 3,055                  |                               |
|                  | R7   | 150,050           | 301,60      | 155000             | 2,180                  |                               |
|                  | R10  | 150,000           | 303,00      | 220000             | 3,082                  |                               |
| 60%              | R12  | 150,750           | 301,00      | 220000             | 3,087                  | 2,785                         |
|                  | R14  | 152,150           | 304,20      | 200000             | 2,751                  |                               |
|                  | R16  | 150,050           | 301,65      | 157000             | 2,208                  |                               |
|                  | R17  | 149,350           | 299,80      | 191000             | 2,716                  |                               |
| 70%              | R20  | 150,150           | 301,70      | 225000             | 3,162                  | 2,173                         |
|                  | R2   | 151,600           | 302,50      | 145000             | 2,013                  |                               |
|                  | R5   | 150,425           | 303,00      | 139000             | 1,941                  |                               |
|                  | R6   | 150,575           | 300,00      | 172000             | 2,424                  |                               |
|                  | R7   | 149,600           | 301,30      | 123000             | 1,737                  |                               |
| 80%              | R10  | 150,700           | 301,40      | 196000             | 2,747                  | 2,348                         |
|                  | R13  | 150,350           | 303,70      | 160000             | 2,231                  |                               |
|                  | R15  | 150,700           | 301,40      | 196000             | 2,747                  |                               |
|                  | R16  | 150,375           | 302,50      | 147000             | 2,057                  |                               |
|                  | R17  | 150,275           | 291,00      | 153000             | 2,227                  |                               |
| 90%              | R20  | 149,775           | 300,30      | 175000             | 2,477                  | 2,418                         |
|                  | R25  | 151,225           | 301,30      | 144000             | 2,012                  |                               |
|                  | R26  | 150,500           | 298,60      | 168000             | 2,340                  |                               |
|                  | R27  | 151,400           | 302,70      | 210000             | 2,917                  |                               |
|                  | R28  | 151,200           | 301,50      | 186000             | 2,597                  |                               |
|                  | R30  | 149,925           | 301,70      | 158000             | 2,224                  |                               |

Diperiksa Oleh  
 Laboran

*(Signature)*  
 (Darussalam, A.Md.)



Yogyakarta, 4 September 2018  
 Dikerjakan Oleh

*(Signature)*  
 (Ridho Pratama)

## Lampiran 9. Data Hasil Pengujian Modulus Elastisitas Beton



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### LAPORAN SEMENTARA PENGAMATAN UJI DESAK DAN REGANGAN SILINDER BETON (SNI 03-4169-1996)

| Beton Rencana |                           | 25 Mpa<br>255 kg/cm <sup>2</sup>         |  | BENDA UJI                          | R2                     |                             |
|---------------|---------------------------|--|--|------------------------------------|------------------------|-----------------------------|
| Uraian        |                           | Silinder                                 |  |                                    |                        |                             |
| Diameter      | 151.05 mm                 |  |  |                                    |                        |                             |
| Tinggi        | 301.9 mm                  |  |  |                                    |                        |                             |
| Luas          | 17919.725 mm <sup>2</sup> |  |  |                                    |                        |                             |
| Lo            | 200 mm                    |  |  |                                    |                        |                             |
| Beban         |                           | Pembacaan Dial<br>.....x10 <sup>-3</sup> | $\Delta L$ Sebenarnya<br>(1/2 $\Delta L$ )(mm) | Regangan<br>( $\Delta L/L_0$ )(mm) | Tegangan<br>(P/A)(MPa) | Regangan terkoreksi<br>(mm) |
| KN            | N                         |  |  |                                    |                        |                             |
| 10            | 10000                     | 4  | 0.002  | 0.00001                            | 0.5580                 | 0.0000283                   |
| 20            | 20000                     | 11                                       | 0.0055   | 0.0000275                          | 1.1161                 | 0.0000565                   |
| 30            | 30000                     | 22                                       | 0.011  | 0.000055                           | 1.6741                 | 0.0000848                   |
| 40            | 40000                     | 28                                       | 0.014  | 0.00007                            | 2.2322                 | 0.0001131                   |
| 50            | 50000                     | 35                                       | 0.0175   | 0.0000875                          | 2.7902                 | 0.0001413                   |
| 60            | 60000                     | 43                                       | 0.0215   | 0.0001075                          | 3.3483                 | 0.0001696                   |
| 70            | 70000                     | 52                                       | 0.026  | 0.00013                            | 3.9063                 | 0.0001979                   |
| 80            | 80000                     | 63                                       | 0.0315   | 0.0001575                          | 4.4644                 | 0.0002262                   |
| 90            | 90000                     | 74                                       | 0.037  | 0.000185                           | 5.0224                 | 0.0002544                   |
| 100           | 100000                    | 86                                       | 0.043  | 0.000215                           | 5.5804                 | 0.0002827                   |
| 110           | 110000                    | 99                                       | 0.0495   | 0.0002475                          | 6.1385                 | 0.0003110                   |
| 120           | 120000                    | 111                                      | 0.0555   | 0.0002775                          | 6.6965                 | 0.0003392                   |
| 130           | 130000                    | 128                                      | 0.064  | 0.00032                            | 7.2546                 | 0.0003675                   |
| 140           | 140000                    | 140                                      | 0.07   | 0.00035                            | 7.8126                 | 0.0003958                   |
| 150           | 150000                    | 154                                      | 0.077  | 0.000385                           | 8.3707                 | 0.0004240                   |
| 160           | 160000                    | 169                                      | 0.0845   | 0.0004225                          | 8.9287084              | 0.0004523                   |
| 170           | 170000                    | 184                                      | 0.092  | 0.00046                            | 9.4868                 | 0.0004898                   |
| 180           | 180000                    | 190                                      | 0.095  | 0.000475                           | 10.0448                | 0.0005048                   |
| 190           | 190000                    | 215                                      | 0.1075   | 0.0005375                          | 10.6028                | 0.0005673                   |
| 200           | 200000                    | 239                                      | 0.1195   | 0.0005975                          | 11.1609                | 0.0006273                   |
| 210           | 210000                    | 246                                      | 0.123  | 0.000615                           | 11.7189                | 0.0006448                   |
| 220           | 220000                    | 264                                      | 0.132  | 0.00066                            | 12.2770                | 0.0006898                   |
| 230           | 230000                    | 275                                      | 0.1375   | 0.0006875                          | 12.8350                | 0.0007173                   |
| 240           | 240000                    | 287                                      | 0.1435   | 0.0007175                          | 13.3931                | 0.0007473                   |
| 250           | 250000                    | 306                                      | 0.153  | 0.000765                           | 13.9511                | 0.0007948                   |
| 260           | 260000                    | 315                                      | 0.1575   | 0.0007875                          | 14.5092                | 0.0008173                   |
| 270           | 270000                    | 338                                      | 0.169  | 0.000845                           | 15.0672                | 0.0008748                   |
| 280           | 280000                    | 361                                      | 0.1805   | 0.0009025                          | 15.6252                | 0.0009323                   |
| 290           | 290000                    | 389                                      | 0.1945   | 0.0009725                          | 16.1833                | 0.0010023                   |
| 300           | 300000                    | 398                                      | 0.199  | 0.000995                           | 16.7413                | 0.0010248                   |
| 310           | 310000                    | 406                                      | 0.203  | 0.001015                           | 17.2994                | 0.0010448                   |
| 320           | 320000                    | 424                                      | 0.212  | 0.00106                            | 17.8574                | 0.0010898                   |
| 330           | 330000                    | 454                                      | 0.227  | 0.001135                           | 18.4155                | 0.0011648                   |
| 340           | 340000                    | 482                                      | 0.241  | 0.001205                           | 18.9735                | 0.0012348                   |
| 350           | 350000                    | 509                                      | 0.2545   | 0.0012725                          | 19.5315                | 0.0013023                   |
| 360           | 360000                    | 524                                      | 0.262  | 0.00131                            | 20.0896                | 0.0013398                   |
| 370           | 370000                    | 558                                      | 0.279  | 0.001395                           | 20.6476                | 0.0014248                   |
| 380           | 380000                    | 569                                      | 0.2845   | 0.0014225                          | 21.2057                | 0.0014523                   |
| 390           | 390000                    | 608                                      | 0.304  | 0.00152                            | 21.7637                | 0.0015498                   |
| 400           | 400000                    | 735                                      | 0.3675   | 0.0018375                          | 22.3218                | 0.0018673                   |
| 390           | 390000                    | 920                                      | 0.46   | 0.0023                             | 21.7637                | 0.0023298                   |

|               |                                  |   |                                      |                                 |                                |   |
|---------------|----------------------------------|---|--------------------------------------|---------------------------------|--------------------------------|---|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |   |                                      | <b>BENDA UJI</b>                | <b>R3</b>                      |   |
| <b>Uraian</b> | <b>Silinder</b>                  |   |                                      |                                 |                                |   |
| Diameter      | 151.325 mm                       |   |                                      |                                 |                                |   |
| Tinggi        | 304 mm                           |   |                                      |                                 |                                |   |
| Luas          | 17985.033 mm <sup>2</sup>        |   |                                      |                                 |                                |   |
| Lo            | 200 mm                           |   |                                      |                                 |                                |   |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial<br/>.....x10<sup>-3</sup></b> | <b>ΔL Sebenarnya<br/>(1/2ΔL)(mm)</b> | <b>Regangan<br/>(ΔL/Lo)(mm)</b> | <b>Tegangan<br/>(P/A)(MPa)</b> | <b>Regangan<br/>terkoreksi<br/>(mm)</b> |
| <b>KN</b>     | <b>N</b>                         |   |                                      |                                 |                                |   |
| 10            | 10000                            | 11  | 0.0055                               | 0.0000275                       | 0.5560                         | 0.0000264                               |
| 20            | 20000                            | 19  | 0.0095                               | 0.0000475                       | 1.1120                         | 0.0000528                               |
| 30            | 30000                            | 26  | 0.013                                | 0.000065                        | 1.6681                         | 0.0000792                               |
| 40            | 40000                            | 37  | 0.0185                               | 0.0000925                       | 2.2241                         | 0.0001056                               |
| 50            | 50000                            | 44  | 0.022                                | 0.00011                         | 2.7801                         | 0.0001319                               |
| 60            | 60000                            | 55  | 0.0275                               | 0.0001375                       | 3.3361                         | 0.0001583                               |
| 70            | 70000                            | 63  | 0.0315                               | 0.0001575                       | 3.8921                         | 0.0001847                               |
| 80            | 80000                            | 76  | 0.038                                | 0.00019                         | 4.4481                         | 0.0002111                               |
| 90            | 90000                            | 83  | 0.0415                               | 0.0002075                       | 5.0042                         | 0.0002375                               |
| 100           | 100000                           | 94  | 0.047                                | 0.000235                        | 5.5602                         | 0.0002639                               |
| 110           | 110000                           | 102   | 0.051                                | 0.000255                        | 6.1162                         | 0.0002903                               |
| 120           | 120000                           | 115   | 0.0575                               | 0.0002875                       | 6.6722                         | 0.0003167                               |
| 130           | 130000                           | 120   | 0.06                                 | 0.0003                          | 7.2282                         | 0.0003431                               |
| 140           | 140000                           | 141   | 0.0705                               | 0.0003525                       | 7.7843                         | 0.0003694                               |
| 150           | 150000                           | 152   | 0.076                                | 0.00038                         | 8.3403                         | 0.0003958                               |
| 160           | 160000                           | 162   | 0.081                                | 0.000405                        | 8.8963                         | 0.0004222                               |
| 170           | 170000                           | 174   | 0.087                                | 0.000435                        | 9.4523                         | 0.0004486                               |
| 180           | 180000                           | 182   | 0.091                                | 0.000455                        | 10.0083                        | 0.0004750                               |
| 190           | 190000                           | 199   | 0.0995                               | 0.0004975                       | 10.5643                        | 0.0005014                               |
| 200           | 200000                           | 209   | 0.1045                               | 0.0005225                       | 11.1204                        | 0.0005278                               |
| 210           | 210000                           | 224   | 0.112                                | 0.00056                         | 11.6764                        | 0.0005542                               |
| 220           | 220000                           | 236   | 0.118                                | 0.00059                         | 12.2324                        | 0.0005806                               |
| 230           | 230000                           | 249   | 0.1245                               | 0.0006225                       | 12.7884                        | 0.0006070                               |
| 240           | 240000                           | 266   | 0.133                                | 0.000665                        | 13.3444                        | 0.0006334                               |
| 250           | 250000                           | 279   | 0.1395                               | 0.0006975                       | 13.9004                        | 0.0006598                               |
| 260           | 260000                           | 298   | 0.149                                | 0.000745                        | 14.4565                        | 0.0006862                               |
| 270           | 270000                           | 311   | 0.1555                               | 0.0007775                       | 15.0125                        | 0.0007126                               |
| 280           | 280000                           | 326   | 0.163                                | 0.000815                        | 15.5685                        | 0.0007390                               |
| 290           | 290000                           | 345   | 0.1725                               | 0.0008625                       | 16.1245                        | 0.0007654                               |
| 300           | 300000                           | 354   | 0.177                                | 0.000885                        | 16.6805                        | 0.0007918                               |
| 310           | 310000                           | 349   | 0.1745                               | 0.0008725                       | 17.2366                        | 0.0008182                               |
| 320           | 320000                           | 389   | 0.1945                               | 0.0009725                       | 17.7926                        | 0.0008446                               |
| 330           | 330000                           | 403   | 0.2015                               | 0.0010075                       | 18.3486                        | 0.0008710                               |
| 340           | 340000                           | 424   | 0.212                                | 0.00106                         | 18.9046                        | 0.0008974                               |
| 350           | 350000                           | 434   | 0.217                                | 0.001085                        | 19.4606                        | 0.0009238                               |
| 360           | 360000                           | 459   | 0.2295                               | 0.0011475                       | 20.0166                        | 0.0009502                               |
| 370           | 370000                           | 482   | 0.241                                | 0.001205                        | 20.5727                        | 0.0009766                               |
| 380           | 380000                           | 503   | 0.2515                               | 0.0012575                       | 21.1287                        | 0.0010030                               |
| 390           | 390000                           | 519   | 0.2595                               | 0.0012975                       | 21.6847                        | 0.0010294                               |
| 400           | 400000                           | 532   | 0.266                                | 0.00133                         | 22.2407                        | 0.0010558                               |
| 410           | 410000                           | 554   | 0.277                                | 0.001385                        | 22.7967                        | 0.0010822                               |
| 420           | 420000                           | 572   | 0.286                                | 0.00143                         | 23.3528                        | 0.0011086                               |
| 430           | 430000                           | 598   | 0.299                                | 0.001495                        | 23.9088                        | 0.0011350                               |
| 440           | 440000                           | 623   | 0.3115                               | 0.0015575                       | 24.4648                        | 0.0011614                               |
| 450           | 450000                           | 646   | 0.323                                | 0.001615                        | 25.0208                        | 0.0011878                               |
| 460           | 460000                           | 672   | 0.336                                | 0.00168                         | 25.5768                        | 0.0012142                               |
| 470           | 470000                           | 698   | 0.349                                | 0.001745                        | 26.1328                        | 0.0012406                               |
| 480           | 480000                           | 739   | 0.3695                               | 0.0018475                       | 26.6889                        | 0.0012670                               |
| 490           | 490000                           | 784   | 0.392                                | 0.00196                         | 27.2449                        | 0.0012934                               |
| 500           | 500000                           | 824   | 0.412                                | 0.00206                         | 27.8009                        | 0.0013198                               |
| 490           | 490000                           | 903   | 0.4515                               | 0.0022575                       | 27.2449                        | 0.0012628                               |
| 480           | 480000                           | 1102  | 0.551                                | 0.002755                        | 26.6889                        | 0.0012162                               |





|               |                                  |                              |   |                                       |                   |                        |
|---------------|----------------------------------|------------------------------|---|---------------------------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              | <b>BENDA UJI</b>                        | <b>R8</b>                             |                   |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |   |                                       |                   |                        |
| Diameter      | 150.75 mm                        |                              |   |                                       |                   |                        |
| Tinggi        | 301 mm                           |                              |   |                                       |                   |                        |
| Luas          | 17848.615 mm <sup>2</sup>        |                              |   |                                       |                   |                        |
| Lo            | 200 mm                           |                              |   |                                       |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b><math>\Delta L</math> Sebenarnya</b> | <b>Regangan</b>                       | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2<math>\Delta L</math>)(mm)</b>   | <b>(<math>\Delta L</math>/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 5                            | 0.0025                                  | 0.0000125                             | 0.5603            | 0.0000333              |
| 20            | 20000                            | 12                           | 0.006                                   | 0.00003                               | 1.1205            | 0.0000667              |
| 30            | 30000                            | 19                           | 0.0095                                  | 0.0000475                             | 1.6808            | 0.0001000              |
| 40            | 40000                            | 29                           | 0.0145                                  | 0.0000725                             | 2.2411            | 0.0001333              |
| 50            | 50000                            | 38                           | 0.019                                   | 0.000095                              | 2.8013            | 0.0001667              |
| 60            | 60000                            | 49                           | 0.0245                                  | 0.0001225                             | 3.3616            | 0.0002000              |
| 70            | 70000                            | 58                           | 0.029                                   | 0.000145                              | 3.9219            | 0.0002333              |
| 80            | 80000                            | 73                           | 0.0365                                  | 0.0001825                             | 4.4821            | 0.0002667              |
| 90            | 90000                            | 86                           | 0.043                                   | 0.000215                              | 5.0424            | 0.0003000              |
| 100           | 100000                           | 94                           | 0.047                                   | 0.000235                              | 5.6027            | 0.0003333              |
| 110           | 110000                           | 101                          | 0.0505                                  | 0.0002525                             | 6.1629            | 0.0003667              |
| 120           | 120000                           | 126                          | 0.063                                   | 0.000315                              | 6.7232            | 0.0004000              |
| 130           | 130000                           | 140                          | 0.07                                    | 0.00035                               | 7.2835            | 0.0004333              |
| 140           | 140000                           | 156                          | 0.078                                   | 0.00039                               | 7.8437            | 0.0004667              |
| 150           | 150000                           | 168                          | 0.084                                   | 0.00042                               | 8.4040            | 0.0005000              |
| 160           | 160000                           | 182                          | 0.091                                   | 0.000455                              | 8.9643            | 0.0005333              |
| 170           | 170000                           | 202                          | 0.101                                   | 0.000505                              | 9.5245            | 0.0005667              |
| 180           | 180000                           | 219                          | 0.1095                                  | 0.0005475                             | 10.0848           | 0.0006000              |
| 190           | 190000                           | 236                          | 0.118                                   | 0.00059                               | 10.6451           | 0.0006425              |
| 200           | 200000                           | 256                          | 0.128                                   | 0.00064                               | 11.2054           | 0.0006925              |
| 210           | 210000                           | 271                          | 0.1355                                  | 0.0006775                             | 11.7656           | 0.0007300              |
| 220           | 220000                           | 296                          | 0.148                                   | 0.00074                               | 12.3259           | 0.0007925              |
| 230           | 230000                           | 309                          | 0.1545                                  | 0.0007725                             | 12.8862           | 0.0008250              |
| 240           | 240000                           | 326                          | 0.163                                   | 0.000815                              | 13.4464           | 0.0008675              |
| 250           | 250000                           | 341                          | 0.1705                                  | 0.0008525                             | 14.0067           | 0.0009050              |
| 260           | 260000                           | 363                          | 0.1815                                  | 0.0009075                             | 14.5670           | 0.0009600              |
| 270           | 270000                           | 382                          | 0.191                                   | 0.000955                              | 15.1272           | 0.0010075              |
| 280           | 280000                           | 405                          | 0.2025                                  | 0.0010125                             | 15.6875           | 0.0010650              |
| 290           | 290000                           | 430                          | 0.215                                   | 0.001075                              | 16.2478           | 0.0011275              |
| 300           | 300000                           | 449                          | 0.2245                                  | 0.0011225                             | 16.8080           | 0.0011750              |
| 310           | 310000                           | 481                          | 0.2405                                  | 0.0012025                             | 17.3683           | 0.0012550              |
| 320           | 320000                           | 511                          | 0.2555                                  | 0.0012775                             | 17.9286           | 0.0013300              |
| 330           | 330000                           | 556                          | 0.278                                   | 0.00139                               | 18.4888           | 0.0014425              |
| 340           | 340000                           | 611                          | 0.3055                                  | 0.0015275                             | 19.0491           | 0.0015800              |
| 350           | 350000                           | 662                          | 0.331                                   | 0.001655                              | 19.6094           | 0.0017075              |
| 360           | 360000                           | 772                          | 0.386                                   | 0.00193                               | 20.1696           | 0.0019825              |
| 370           | 370000                           | 811                          | 0.4055                                  | 0.0020275                             | 20.7299           | 0.0020800              |
| 380           | 380000                           | 836                          | 0.418                                   | 0.00209                               | 21.2902           | 0.0021425              |
| 390           | 390000                           | 879                          | 0.4395                                  | 0.0021975                             | 21.8504           | 0.0022500              |
| 400           | 400000                           | 899                          | 0.4495                                  | 0.0022475                             | 22.4107           | 0.0023000              |
| 410           | 410000                           | 916                          | 0.458                                   | 0.00229                               | 22.9710           | 0.0023425              |
| 420           | 420000                           | 937                          | 0.4685                                  | 0.0023425                             | 23.5312           | 0.0023950              |
| 430           | 430000                           | 961                          | 0.4805                                  | 0.0024025                             | 24.0915           | 0.0024550              |
| 440           | 440000                           | 989                          | 0.4945                                  | 0.0024725                             | 24.6518           | 0.0025250              |
| 450           | 450000                           | 1123                         | 0.5615                                  | 0.0028075                             | 25.2120           | 0.0028600              |
| 440           | 440000                           | 1178                         | 0.589                                   | 0.002945                              | 24.6518           | 0.0029975              |
| 430           | 430000                           | 1286                         | 0.643                                   | 0.003215                              | 24.0915           | 0.0032675              |









|               |                                  |   |                                      |                                 |                                |   |
|---------------|----------------------------------|---|--------------------------------------|---------------------------------|--------------------------------|---|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |   |                                      | <b>BENDA UJI</b>                | <b>R15</b>                     |   |
| <b>Uraian</b> | <b>Silinder</b>                  |   |                                      |                                 |                                |   |
| Diameter      | 150.1 mm                         |   |                                      |                                 |                                |   |
| Tinggi        | 301 mm                           |   |                                      |                                 |                                |   |
| Luas          | 17695.028 mm <sup>2</sup>        |   |                                      |                                 |                                |   |
| Lo            | 200 mm                           |   |                                      |                                 |                                |   |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial<br/>.....x10<sup>-3</sup></b> | <b>ΔL Sebenarnya<br/>(1/2ΔL)(mm)</b> | <b>Regangan<br/>(ΔL/Lo)(mm)</b> | <b>Tegangan<br/>(P/A)(MPa)</b> | <b>Regangan<br/>terkoreksi<br/>(mm)</b> |
| <b>KN</b>     | <b>N</b>                         |   |                                      |                                 |                                |   |
| 10            | 10000                            | 6   | 0.003                                | 0.000015                        | 0.5651                         | 0.0000262                               |
| 20            | 20000                            | 18  | 0.009                                | 0.000045                        | 1.1303                         | 0.0000524                               |
| 30            | 30000                            | 26  | 0.013                                | 0.000065                        | 1.6954                         | 0.0000785                               |
| 40            | 40000                            | 37  | 0.0185                               | 0.0000925                       | 2.2605                         | 0.0001047                               |
| 50            | 50000                            | 48  | 0.024                                | 0.00012                         | 2.8257                         | 0.0001309                               |
| 60            | 60000                            | 54  | 0.027                                | 0.000135                        | 3.3908                         | 0.0001571                               |
| 70            | 70000                            | 69  | 0.0345                               | 0.0001725                       | 3.9559                         | 0.0001832                               |
| 80            | 80000                            | 78  | 0.039                                | 0.000195                        | 4.5210                         | 0.0002094                               |
| 90            | 90000                            | 86  | 0.043                                | 0.000215                        | 5.0862                         | 0.0002356                               |
| 100           | 100000                           | 97  | 0.0485                               | 0.0002425                       | 5.6513                         | 0.0002618                               |
| 110           | 110000                           | 109   | 0.0545                               | 0.0002725                       | 6.2164                         | 0.0002879                               |
| 120           | 120000                           | 118   | 0.059                                | 0.000295                        | 6.7816                         | 0.0003141                               |
| 130           | 130000                           | 132   | 0.066                                | 0.00033                         | 7.3467                         | 0.0003403                               |
| 140           | 140000                           | 141   | 0.0705                               | 0.0003525                       | 7.9118                         | 0.0003665                               |
| 150           | 150000                           | 151   | 0.0755                               | 0.0003775                       | 8.4770                         | 0.0003927                               |
| 160           | 160000                           | 162   | 0.081                                | 0.000405                        | 9.0421                         | 0.0004188                               |
| 170           | 170000                           | 173   | 0.0865                               | 0.0004325                       | 9.6072                         | 0.0004450                               |
| 180           | 180000                           | 178   | 0.089                                | 0.000445                        | 10.1723                        | 0.0004712                               |
| 190           | 190000                           | 196   | 0.098                                | 0.00049                         | 10.7375                        | 0.0004974                               |
| 200           | 200000                           | 206   | 0.103                                | 0.000515                        | 11.3026                        | 0.0005224                               |
| 210           | 210000                           | 219   | 0.1095                               | 0.0005475                       | 11.8677                        | 0.0005549                               |
| 220           | 220000                           | 229   | 0.1145                               | 0.0005725                       | 12.4329                        | 0.0005799                               |
| 230           | 230000                           | 238   | 0.119                                | 0.000595                        | 12.9980                        | 0.0006024                               |
| 240           | 240000                           | 252   | 0.126                                | 0.00063                         | 13.5631                        | 0.0006374                               |
| 250           | 250000                           | 264   | 0.132                                | 0.00066                         | 14.1283                        | 0.0006674                               |
| 260           | 260000                           | 274   | 0.137                                | 0.000685                        | 14.6934                        | 0.0006924                               |
| 270           | 270000                           | 288   | 0.144                                | 0.00072                         | 15.2585                        | 0.0007274                               |
| 280           | 280000                           | 298   | 0.149                                | 0.000745                        | 15.8237                        | 0.0007524                               |
| 290           | 290000                           | 311   | 0.1555                               | 0.0007775                       | 16.3888                        | 0.0007849                               |
| 300           | 300000                           | 326   | 0.163                                | 0.000815                        | 16.9539                        | 0.0008224                               |
| 310           | 310000                           | 342   | 0.171                                | 0.000855                        | 17.5190                        | 0.0008624                               |
| 320           | 320000                           | 348   | 0.174                                | 0.00087                         | 18.0842                        | 0.0008774                               |
| 330           | 330000                           | 361   | 0.1805                               | 0.0009025                       | 18.6493                        | 0.0009099                               |
| 340           | 340000                           | 374   | 0.187                                | 0.000935                        | 19.2144                        | 0.0009424                               |
| 350           | 350000                           | 389   | 0.1945                               | 0.0009725                       | 19.7796                        | 0.0009799                               |
| 360           | 360000                           | 397   | 0.1985                               | 0.0009925                       | 20.3447                        | 0.0009999                               |
| 370           | 370000                           | 408   | 0.204                                | 0.00102                         | 20.9098                        | 0.0010274                               |
| 380           | 380000                           | 424   | 0.212                                | 0.00106                         | 21.4750                        | 0.0010674                               |
| 390           | 390000                           | 437   | 0.2185                               | 0.0010925                       | 22.0401                        | 0.0010999                               |
| 400           | 400000                           | 448   | 0.224                                | 0.00112                         | 22.6052                        | 0.0011274                               |
| 410           | 410000                           | 458   | 0.229                                | 0.001145                        | 23.1703                        | 0.0011524                               |
| 420           | 420000                           | 474   | 0.237                                | 0.001185                        | 23.7355                        | 0.0011924                               |
| 430           | 430000                           | 484   | 0.242                                | 0.00121                         | 24.3006                        | 0.0012174                               |
| 440           | 440000                           | 502   | 0.251                                | 0.001255                        | 24.8657                        | 0.0012624                               |
| 450           | 450000                           | 515   | 0.2575                               | 0.0012875                       | 25.4309                        | 0.0012949                               |
| 460           | 460000                           | 538   | 0.269                                | 0.001345                        | 25.9960                        | 0.0013524                               |
| 470           | 470000                           | 610   | 0.305                                | 0.001525                        | 26.5611                        | 0.0015324                               |
| 460           | 460000                           | 720   | 0.36                                 | 0.0018                          | 25.9960                        | 0.0018074                               |

|               |                                  |                              |                      |                    |                   |                        |
|---------------|----------------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              |                      | <b>BENDA UJI</b>   | <b>R18</b>        |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |                      |                    |                   |                        |
| Diameter      | 150.9 mm                         |                              |                      |                    |                   |                        |
| Tinggi        | 304.5 mm                         |                              |                      |                    |                   |                        |
| Luas          | 17884.152 mm <sup>2</sup>        |                              |                      |                    |                   |                        |
| Lo            | 200 mm                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 11                           | 0.0055               | 0.0000275          | 0.5592            | 0.0000236              |
| 20            | 20000                            | 21                           | 0.0105               | 0.0000525          | 1.1183            | 0.0000473              |
| 30            | 30000                            | 32                           | 0.016                | 0.00008            | 1.6775            | 0.0000709              |
| 40            | 40000                            | 39                           | 0.0195               | 0.0000975          | 2.2366            | 0.0000946              |
| 50            | 50000                            | 48                           | 0.024                | 0.00012            | 2.7958            | 0.0001182              |
| 60            | 60000                            | 58                           | 0.029                | 0.000145           | 3.3549            | 0.0001419              |
| 70            | 70000                            | 69                           | 0.0345               | 0.0001725          | 3.9141            | 0.0001655              |
| 80            | 80000                            | 77                           | 0.0385               | 0.0001925          | 4.4732            | 0.0001892              |
| 90            | 90000                            | 88                           | 0.044                | 0.00022            | 5.0324            | 0.0002128              |
| 100           | 100000                           | 98                           | 0.049                | 0.000245           | 5.5915            | 0.0002365              |
| 110           | 110000                           | 108                          | 0.054                | 0.00027            | 6.1507            | 0.0002601              |
| 120           | 120000                           | 113                          | 0.0565               | 0.0002825          | 6.7099            | 0.0002838              |
| 130           | 130000                           | 124                          | 0.062                | 0.00031            | 7.2690            | 0.0003074              |
| 140           | 140000                           | 131                          | 0.0655               | 0.0003275          | 7.8282            | 0.0003310              |
| 150           | 150000                           | 144                          | 0.072                | 0.00036            | 8.3873            | 0.0003547              |
| 160           | 160000                           | 149                          | 0.0745               | 0.0003725          | 8.9465            | 0.0003783              |
| 170           | 170000                           | 159                          | 0.0795               | 0.0003975          | 9.5056            | 0.0004020              |
| 180           | 180000                           | 168                          | 0.084                | 0.00042            | 10.0648           | 0.0004256              |
| 190           | 190000                           | 177                          | 0.0885               | 0.0004425          | 10.6239           | 0.0004493              |
| 200           | 200000                           | 182                          | 0.091                | 0.000455           | 11.1831           | 0.0004729              |
| 210           | 210000                           | 198                          | 0.099                | 0.000495           | 11.7422           | 0.0004966              |
| 220           | 220000                           | 209                          | 0.1045               | 0.0005225          | 12.3014           | 0.0005202              |
| 230           | 230000                           | 215                          | 0.1075               | 0.0005375          | 12.8605           | 0.0005439              |
| 240           | 240000                           | 227                          | 0.1135               | 0.0005675          | 13.4197           | 0.0005675              |
| 250           | 250000                           | 239                          | 0.1195               | 0.0005975          | 13.9789           | 0.0005911              |
| 260           | 260000                           | 248                          | 0.124                | 0.00062            | 14.5380           | 0.0006148              |
| 270           | 270000                           | 258                          | 0.129                | 0.000645           | 15.0972           | 0.0006398              |
| 280           | 280000                           | 269                          | 0.1345               | 0.0006725          | 15.6563           | 0.0006673              |
| 290           | 290000                           | 278                          | 0.139                | 0.000695           | 16.2155           | 0.0006898              |
| 300           | 300000                           | 288                          | 0.144                | 0.00072            | 16.7746           | 0.0007148              |
| 310           | 310000                           | 296                          | 0.148                | 0.00074            | 17.3338           | 0.0007348              |
| 320           | 320000                           | 310                          | 0.155                | 0.000775           | 17.8929           | 0.0007698              |
| 330           | 330000                           | 321                          | 0.1605               | 0.0008025          | 18.4521           | 0.0007973              |
| 340           | 340000                           | 332                          | 0.166                | 0.00083            | 19.0112           | 0.0008248              |
| 350           | 350000                           | 349                          | 0.1745               | 0.0008725          | 19.5704           | 0.0008673              |
| 360           | 360000                           | 358                          | 0.179                | 0.000895           | 20.1296           | 0.0008898              |
| 370           | 370000                           | 376                          | 0.188                | 0.00094            | 20.6887           | 0.0009348              |
| 380           | 380000                           | 384                          | 0.192                | 0.00096            | 21.2479           | 0.0009548              |
| 390           | 390000                           | 398                          | 0.199                | 0.000995           | 21.8070           | 0.0009898              |
| 400           | 400000                           | 409                          | 0.2045               | 0.0010225          | 22.3662           | 0.0010173              |
| 410           | 410000                           | 424                          | 0.212                | 0.00106            | 22.9253           | 0.0010548              |
| 420           | 420000                           | 437                          | 0.2185               | 0.0010925          | 23.4845           | 0.0010873              |
| 430           | 430000                           | 452                          | 0.226                | 0.00113            | 24.0436           | 0.0011248              |
| 440           | 440000                           | 461                          | 0.2305               | 0.0011525          | 24.6028           | 0.0011473              |
| 450           | 450000                           | 478                          | 0.239                | 0.001195           | 25.1619           | 0.0011898              |
| 460           | 460000                           | 493                          | 0.2465               | 0.0012325          | 25.7211           | 0.0012273              |
| 470           | 470000                           | 515                          | 0.2575               | 0.0012875          | 26.2803           | 0.0012823              |
| 480           | 480000                           | 528                          | 0.264                | 0.00132            | 26.8394           | 0.0013148              |
| 490           | 490000                           | 542                          | 0.271                | 0.001355           | 27.3986           | 0.0013498              |
| 500           | 500000                           | 563                          | 0.2815               | 0.0014075          | 27.9577           | 0.0014023              |
| 510           | 510000                           | 581                          | 0.2905               | 0.0014525          | 28.5169           | 0.0014473              |
| 520           | 520000                           | 598                          | 0.299                | 0.001495           | 29.0760           | 0.0014898              |
| 530           | 530000                           | 614                          | 0.307                | 0.001535           | 29.6352           | 0.0015298              |
| 540           | 540000                           | 631                          | 0.3155               | 0.0015775          | 30.1943           | 0.0015723              |
| 550           | 550000                           | 648                          | 0.324                | 0.00162            | 30.7535           | 0.0016148              |
| 560           | 560000                           | 662                          | 0.331                | 0.001655           | 31.3126           | 0.0016498              |
| 570           | 570000                           | 678                          | 0.339                | 0.001695           | 31.8718           | 0.0016898              |
| 580           | 580000                           | 697                          | 0.3485               | 0.0017425          | 32.4309           | 0.0017373              |
| 590           | 590000                           | 714                          | 0.357                | 0.001785           | 32.9901           | 0.0017798              |
| 600           | 600000                           | 737                          | 0.3685               | 0.0018425          | 33.5493           | 0.0018373              |
| 610           | 610000                           | 754                          | 0.377                | 0.001885           | 34.1084           | 0.0018798              |
| 620           | 620000                           | 782                          | 0.391                | 0.001955           | 34.6676           | 0.0019498              |
| 630           | 630000                           | 798                          | 0.399                | 0.001995           | 35.2267           | 0.0019898              |
| 640           | 640000                           | 826                          | 0.413                | 0.002065           | 35.7859           | 0.0020598              |
| 630           | 630000                           | 869                          | 0.4345               | 0.0021725          | 35.2267           | 0.0021673              |
| 620           | 620000                           | 920                          | 0.46                 | 0.0023             | 34.6676           | 0.0022948              |

|               |                           |                              |                      |                    |                   |                        |
|---------------|---------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton         | 25 Mpa                    |                              |                      | BENDA UJI          | R19               |                        |
| Rencana f'c   | 255 kg/cm <sup>2</sup>    |                              |                      |                    |                   |                        |
| <b>Uraian</b> | <b>Silinder</b>           |                              |                      |                    |                   |                        |
| Diameter      | 150.5 mm                  |                              |                      |                    |                   |                        |
| Tinggi        | 303 mm                    |                              |                      |                    |                   |                        |
| Luas          | 17789.465 mm <sup>2</sup> |                              |                      |                    |                   |                        |
| Lo            | 200 mm                    |                              |                      |                    |                   |                        |
|               |                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                           | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                  | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                     | 5                            | 0.0025               | 0.0000125          | 0.5621            | 0.0000251              |
| 20            | 20000                     | 12                           | 0.006                | 0.00003            | 1.1243            | 0.0000502              |
| 30            | 30000                     | 18                           | 0.009                | 0.000045           | 1.6864            | 0.0000754              |
| 40            | 40000                     | 26                           | 0.013                | 0.000065           | 2.2485            | 0.0001005              |
| 50            | 50000                     | 34                           | 0.017                | 0.000085           | 2.8107            | 0.0001256              |
| 60            | 60000                     | 44                           | 0.022                | 0.00011            | 3.3728            | 0.0001507              |
| 70            | 70000                     | 52                           | 0.026                | 0.00013            | 3.9349            | 0.0001758              |
| 80            | 80000                     | 63                           | 0.0315               | 0.0001575          | 4.4970            | 0.0002009              |
| 90            | 90000                     | 78                           | 0.039                | 0.000195           | 5.0592            | 0.0002261              |
| 100           | 100000                    | 82                           | 0.041                | 0.000205           | 5.6213            | 0.0002512              |
| 110           | 110000                    | 94                           | 0.047                | 0.000235           | 6.1834            | 0.0002763              |
| 120           | 120000                    | 103                          | 0.0515               | 0.0002575          | 6.7456            | 0.0003014              |
| 130           | 130000                    | 115                          | 0.0575               | 0.0002875          | 7.3077            | 0.0003265              |
| 140           | 140000                    | 124                          | 0.062                | 0.00031            | 7.8698            | 0.0003517              |
| 150           | 150000                    | 131                          | 0.0655               | 0.0003275          | 8.4320            | 0.0003768              |
| 160           | 160000                    | 142                          | 0.071                | 0.000355           | 8.9941            | 0.0004019              |
| 170           | 170000                    | 153                          | 0.0765               | 0.0003825          | 9.5562            | 0.0004270              |
| 180           | 180000                    | 164                          | 0.082                | 0.00041            | 10.1183           | 0.0004521              |
| 190           | 190000                    | 173                          | 0.0865               | 0.0004325          | 10.6805           | 0.0004773              |
| 200           | 200000                    | 182                          | 0.091                | 0.000455           | 11.2426           | 0.0005024              |
| 210           | 210000                    | 193                          | 0.0965               | 0.0004825          | 11.8047           | 0.0005275              |
| 220           | 220000                    | 206                          | 0.103                | 0.000515           | 12.3669           | 0.0005526              |
| 230           | 230000                    | 214                          | 0.107                | 0.000535           | 12.9290           | 0.0005777              |
| 240           | 240000                    | 229                          | 0.1145               | 0.0005725          | 13.4911           | 0.0006028              |
| 250           | 250000                    | 241                          | 0.1205               | 0.0006025          | 14.0533           | 0.0006329              |
| 260           | 260000                    | 252                          | 0.126                | 0.00063            | 14.6154           | 0.0006604              |
| 270           | 270000                    | 264                          | 0.132                | 0.00066            | 15.1775           | 0.0006904              |
| 280           | 280000                    | 278                          | 0.139                | 0.000695           | 15.7397           | 0.0007254              |
| 290           | 290000                    | 289                          | 0.1445               | 0.0007225          | 16.3018           | 0.0007529              |
| 300           | 300000                    | 303                          | 0.1515               | 0.0007575          | 16.8639           | 0.0007879              |
| 310           | 310000                    | 315                          | 0.1575               | 0.0007875          | 17.4260           | 0.0008179              |
| 320           | 320000                    | 321                          | 0.1605               | 0.0008025          | 17.9882           | 0.0008329              |
| 330           | 330000                    | 339                          | 0.1695               | 0.0008475          | 18.5503           | 0.0008779              |
| 340           | 340000                    | 354                          | 0.177                | 0.000885           | 19.1124           | 0.0009154              |
| 350           | 350000                    | 371                          | 0.1855               | 0.0009275          | 19.6746           | 0.0009579              |
| 360           | 360000                    | 382                          | 0.191                | 0.000955           | 20.2367           | 0.0009854              |
| 370           | 370000                    | 399                          | 0.1995               | 0.0009975          | 20.7988           | 0.0010279              |
| 380           | 380000                    | 406                          | 0.203                | 0.001015           | 21.3610           | 0.0010454              |
| 390           | 390000                    | 423                          | 0.2115               | 0.0010575          | 21.9231           | 0.0010879              |
| 400           | 400000                    | 434                          | 0.217                | 0.001085           | 22.4852           | 0.0011154              |
| 410           | 410000                    | 441                          | 0.2205               | 0.0011025          | 23.0473           | 0.0011329              |
| 420           | 420000                    | 456                          | 0.228                | 0.00114            | 23.6095           | 0.0011704              |
| 430           | 430000                    | 468                          | 0.234                | 0.00117            | 24.1716           | 0.0012004              |
| 440           | 440000                    | 482                          | 0.241                | 0.001205           | 24.7337           | 0.0012354              |
| 450           | 450000                    | 499                          | 0.2495               | 0.0012475          | 25.2959           | 0.0012779              |
| 460           | 460000                    | 512                          | 0.256                | 0.00128            | 25.8580           | 0.0013104              |
| 470           | 470000                    | 531                          | 0.2655               | 0.0013275          | 26.4201           | 0.0013579              |
| 480           | 480000                    | 549                          | 0.2745               | 0.0013725          | 26.9823           | 0.0014029              |
| 490           | 490000                    | 568                          | 0.284                | 0.00142            | 27.5444           | 0.0014504              |
| 500           | 500000                    | 579                          | 0.2895               | 0.0014475          | 28.1065           | 0.0014779              |
| 510           | 510000                    | 606                          | 0.303                | 0.001515           | 28.6687           | 0.0015454              |
| 520           | 520000                    | 631                          | 0.3155               | 0.0015775          | 29.2308           | 0.0016079              |
| 530           | 530000                    | 652                          | 0.326                | 0.00163            | 29.7929           | 0.0016604              |
| 540           | 540000                    | 663                          | 0.3315               | 0.0016575          | 30.3550           | 0.0016879              |
| 550           | 550000                    | 684                          | 0.342                | 0.00171            | 30.9172           | 0.0017404              |
| 560           | 560000                    | 708                          | 0.354                | 0.00177            | 31.4793           | 0.0018004              |
| 570           | 570000                    | 737                          | 0.3685               | 0.0018425          | 32.0414           | 0.0018729              |
| 580           | 580000                    | 768                          | 0.384                | 0.00192            | 32.6036           | 0.0019504              |
| 590           | 590000                    | 799                          | 0.3995               | 0.0019975          | 33.1657           | 0.0020279              |
| 600           | 600000                    | 850                          | 0.425                | 0.002125           | 33.7278           | 0.0021554              |
| 610           | 610000                    | 866                          | 0.433                | 0.002165           | 34.2900           | 0.0021954              |
| 600           | 600000                    | 980                          | 0.49                 | 0.00245            | 33.7278           | 0.0024804              |
| 590           | 590000                    | 1000                         | 0.5                  | 0.0025             | 33.1657           | 0.0025304              |
| 580           | 580000                    | 1160                         | 0.58                 | 0.0029             | 32.6036           | 0.0029304              |

|               |                                  |                              |                      |                    |                   |                        |
|---------------|----------------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              |                      | <b>BENDA UJI</b>   | <b>R1</b>         |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |                      |                    |                   |                        |
| Diameter      | 150.35 mm                        |                              |                      |                    |                   |                        |
| Tinggi        | 305 mm                           |                              |                      |                    |                   |                        |
| Luas          | 17754.022 mm <sup>2</sup>        |                              |                      |                    |                   |                        |
| Lo            | 200 mm                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 15                           | 0.0075               | 0.0000375          | 0.5633            | 0.0000311              |
| 20            | 20000                            | 28                           | 0.014                | 0.00007            | 1.1265            | 0.0000622              |
| 30            | 30000                            | 41                           | 0.0205               | 0.0001025          | 1.6898            | 0.0000933              |
| 40            | 40000                            | 52                           | 0.026                | 0.00013            | 2.2530            | 0.0001243              |
| 50            | 50000                            | 65                           | 0.0325               | 0.0001625          | 2.8163            | 0.0001554              |
| 60            | 60000                            | 78                           | 0.039                | 0.000195           | 3.3795            | 0.0001865              |
| 70            | 70000                            | 88                           | 0.044                | 0.00022            | 3.9428            | 0.0002176              |
| 80            | 80000                            | 101                          | 0.0505               | 0.0002525          | 4.5060            | 0.0002487              |
| 90            | 90000                            | 116                          | 0.058                | 0.00029            | 5.0693            | 0.0002798              |
| 100           | 100000                           | 128                          | 0.064                | 0.00032            | 5.6325            | 0.0003109              |
| 110           | 110000                           | 139                          | 0.0695               | 0.0003475          | 6.1958            | 0.0003419              |
| 120           | 120000                           | 151                          | 0.0755               | 0.0003775          | 6.7590            | 0.0003730              |
| 130           | 130000                           | 168                          | 0.084                | 0.00042            | 7.3223            | 0.0004041              |
| 140           | 140000                           | 176                          | 0.088                | 0.00044            | 7.8855            | 0.0004352              |
| 150           | 150000                           | 190                          | 0.095                | 0.000475           | 8.4488            | 0.0004663              |
| 160           | 160000                           | 201                          | 0.1005               | 0.0005025          | 9.0120            | 0.0004974              |
| 170           | 170000                           | 215                          | 0.1075               | 0.0005375          | 9.5753            | 0.0005285              |
| 180           | 180000                           | 228                          | 0.114                | 0.00057            | 10.1385           | 0.0005596              |
| 190           | 190000                           | 246                          | 0.123                | 0.000615           | 10.7018           | 0.0005906              |
| 200           | 200000                           | 256                          | 0.128                | 0.00064            | 11.2651           | 0.0006217              |
| 210           | 210000                           | 268                          | 0.134                | 0.00067            | 11.8283           | 0.0006528              |
| 220           | 220000                           | 283                          | 0.1415               | 0.0007075          | 12.3916           | 0.0006839              |
| 230           | 230000                           | 296                          | 0.148                | 0.00074            | 12.9548           | 0.0007150              |
| 240           | 240000                           | 301                          | 0.1505               | 0.0007525          | 13.5181           | 0.0007461              |
| 250           | 250000                           | 323                          | 0.1615               | 0.0008075          | 14.0813           | 0.0008011              |
| 260           | 260000                           | 338                          | 0.169                | 0.000845           | 14.6446           | 0.0008386              |
| 270           | 270000                           | 351                          | 0.1755               | 0.0008775          | 15.2078           | 0.0008711              |
| 280           | 280000                           | 368                          | 0.184                | 0.00092            | 15.7711           | 0.0009136              |
| 290           | 290000                           | 382                          | 0.191                | 0.000955           | 16.3343           | 0.0009486              |
| 300           | 300000                           | 393                          | 0.1965               | 0.0009825          | 16.8976           | 0.0009761              |
| 310           | 310000                           | 415                          | 0.2075               | 0.0010375          | 17.4608           | 0.0010311              |
| 320           | 320000                           | 428                          | 0.214                | 0.00107            | 18.0241           | 0.0010636              |
| 330           | 330000                           | 445                          | 0.2225               | 0.0011125          | 18.5873           | 0.0011061              |
| 340           | 340000                           | 463                          | 0.2315               | 0.0011575          | 19.1506           | 0.0011511              |
| 350           | 350000                           | 476                          | 0.238                | 0.00119            | 19.7138           | 0.0011836              |
| 360           | 360000                           | 489                          | 0.2445               | 0.0012225          | 20.2771           | 0.0012161              |
| 370           | 370000                           | 501                          | 0.2505               | 0.0012525          | 20.8403           | 0.0012461              |
| 380           | 380000                           | 525                          | 0.2625               | 0.0013125          | 21.4036           | 0.0013061              |
| 390           | 390000                           | 537                          | 0.2685               | 0.0013425          | 21.9669           | 0.0013361              |
| 400           | 400000                           | 554                          | 0.277                | 0.001385           | 22.5301           | 0.0013786              |
| 410           | 410000                           | 572                          | 0.286                | 0.00143            | 23.0934           | 0.0014236              |
| 420           | 420000                           | 583                          | 0.2915               | 0.0014575          | 23.6566           | 0.0014511              |
| 430           | 430000                           | 602                          | 0.301                | 0.001505           | 24.2199           | 0.0014986              |
| 440           | 440000                           | 622                          | 0.311                | 0.001555           | 24.7831           | 0.0015486              |
| 450           | 450000                           | 643                          | 0.3215               | 0.0016075          | 25.3464           | 0.0016011              |
| 460           | 460000                           | 656                          | 0.328                | 0.00164            | 25.9096           | 0.0016336              |
| 470           | 470000                           | 676                          | 0.338                | 0.00169            | 26.4729           | 0.0016836              |
| 480           | 480000                           | 702                          | 0.351                | 0.001755           | 27.0361           | 0.0017486              |
| 490           | 490000                           | 722                          | 0.361                | 0.001805           | 27.5994           | 0.0017986              |
| 500           | 500000                           | 745                          | 0.3725               | 0.0018625          | 28.1626           | 0.0018561              |
| 510           | 510000                           | 767                          | 0.3835               | 0.0019175          | 28.7259           | 0.0019111              |
| 520           | 520000                           | 790                          | 0.395                | 0.001975           | 29.2891           | 0.0019686              |
| 530           | 530000                           | 815                          | 0.4075               | 0.0020375          | 29.8524           | 0.0020311              |
| 540           | 540000                           | 843                          | 0.4215               | 0.0021075          | 30.4156           | 0.0021011              |
| 550           | 550000                           | 875                          | 0.4375               | 0.0021875          | 30.9789           | 0.0021811              |
| 560           | 560000                           | 898                          | 0.449                | 0.002245           | 31.5421           | 0.0022386              |
| 570           | 570000                           | 940                          | 0.47                 | 0.00235            | 32.1054           | 0.0023436              |
| 580           | 580000                           | 970                          | 0.485                | 0.002425           | 32.6687           | 0.0024186              |
| 590           | 590000                           | 1002                         | 0.501                | 0.002505           | 33.2319           | 0.0024986              |
| 600           | 600000                           | 1053                         | 0.5265               | 0.0026325          | 33.7952           | 0.0026261              |
| 610           | 610000                           | 1110                         | 0.555                | 0.002775           | 34.3584           | 0.0027686              |
| 600           | 600000                           | 1201                         | 0.6005               | 0.0030025          | 33.7952           | 0.0029961              |

|               |                           |                              |                      |                    |                   |                        |
|---------------|---------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton         | 25 Mpa                    |                              |                      | BENDA UJI          | R3                |                        |
| Rencana       | 255 kg/cm <sup>2</sup>    |                              |                      |                    |                   |                        |
| <b>Uraian</b> | <b>Silinder</b>           |                              |                      |                    |                   |                        |
| Diameter      | 151.525 mm                |                              |                      |                    |                   |                        |
| Tinggi        | 303.6 mm                  |                              |                      |                    |                   |                        |
| Luas          | 18032.605 mm <sup>2</sup> |                              |                      |                    |                   |                        |
| Lo            | 200 mm                    |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                           | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                  | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                     | 10                           | 0.005                | 0.000025           | 0.5546            | 0.0000297              |
| 20            | 20000                     | 22                           | 0.011                | 0.000055           | 1.1091            | 0.0000593              |
| 30            | 30000                     | 32                           | 0.016                | 0.00008            | 1.6637            | 0.0000890              |
| 40            | 40000                     | 44                           | 0.022                | 0.00011            | 2.2182            | 0.0001186              |
| 50            | 50000                     | 53                           | 0.0265               | 0.0001325          | 2.7728            | 0.0001483              |
| 60            | 60000                     | 64                           | 0.032                | 0.00016            | 3.3273            | 0.0001780              |
| 70            | 70000                     | 76                           | 0.038                | 0.00019            | 3.8819            | 0.0002076              |
| 80            | 80000                     | 89                           | 0.0445               | 0.0002225          | 4.4364            | 0.0002373              |
| 90            | 90000                     | 96                           | 0.048                | 0.00024            | 4.9910            | 0.0002669              |
| 100           | 100000                    | 110                          | 0.055                | 0.000275           | 5.5455            | 0.0002966              |
| 110           | 110000                    | 124                          | 0.062                | 0.00031            | 6.1001            | 0.0003262              |
| 120           | 120000                    | 135                          | 0.0675               | 0.0003375          | 6.6546            | 0.0003559              |
| 130           | 130000                    | 146                          | 0.073                | 0.000365           | 7.2092            | 0.0003856              |
| 140           | 140000                    | 155                          | 0.0775               | 0.0003875          | 7.7637            | 0.0004152              |
| 150           | 150000                    | 168                          | 0.084                | 0.00042            | 8.3183            | 0.0004449              |
| 160           | 160000                    | 182                          | 0.091                | 0.000455           | 8.8728            | 0.0004745              |
| 170           | 170000                    | 193                          | 0.0965               | 0.0004825          | 9.4274            | 0.0005042              |
| 180           | 180000                    | 205                          | 0.1025               | 0.0005125          | 9.9819            | 0.0005339              |
| 190           | 190000                    | 219                          | 0.1095               | 0.0005475          | 10.5365           | 0.0005635              |
| 200           | 200000                    | 230                          | 0.115                | 0.000575           | 11.0910           | 0.0005932              |
| 210           | 210000                    | 245                          | 0.1225               | 0.0006125          | 11.6456           | 0.0006228              |
| 220           | 220000                    | 256                          | 0.128                | 0.00064            | 12.2001           | 0.0006525              |
| 230           | 230000                    | 268                          | 0.134                | 0.00067            | 12.7547           | 0.0006821              |
| 240           | 240000                    | 283                          | 0.1415               | 0.0007075          | 13.3092           | 0.0007118              |
| 250           | 250000                    | 296                          | 0.148                | 0.00074            | 13.8638           | 0.0007443              |
| 260           | 260000                    | 310                          | 0.155                | 0.000775           | 14.4183           | 0.0007793              |
| 270           | 270000                    | 323                          | 0.1615               | 0.0008075          | 14.9729           | 0.0008118              |
| 280           | 280000                    | 337                          | 0.1685               | 0.0008425          | 15.5274           | 0.0008468              |
| 290           | 290000                    | 346                          | 0.173                | 0.000865           | 16.0820           | 0.0008693              |
| 300           | 300000                    | 363                          | 0.1815               | 0.0009075          | 16.6365           | 0.0009118              |
| 310           | 310000                    | 374                          | 0.187                | 0.000935           | 17.1911           | 0.0009393              |
| 320           | 320000                    | 389                          | 0.1945               | 0.0009725          | 17.7456           | 0.0009768              |
| 330           | 330000                    | 402                          | 0.201                | 0.001005           | 18.3002           | 0.0010093              |
| 340           | 340000                    | 416                          | 0.208                | 0.00104            | 18.8547           | 0.0010443              |
| 350           | 350000                    | 431                          | 0.2155               | 0.0010775          | 19.4093           | 0.0010818              |
| 360           | 360000                    | 456                          | 0.228                | 0.00114            | 19.9638           | 0.0011443              |
| 370           | 370000                    | 468                          | 0.234                | 0.00117            | 20.5184           | 0.0011743              |
| 380           | 380000                    | 489                          | 0.2445               | 0.0012225          | 21.0729           | 0.0012268              |
| 390           | 390000                    | 497                          | 0.2485               | 0.0012425          | 21.6275           | 0.0012468              |
| 400           | 400000                    | 510                          | 0.255                | 0.001275           | 22.1820           | 0.0012793              |
| 410           | 410000                    | 529                          | 0.2645               | 0.0013225          | 22.7366           | 0.0013268              |
| 420           | 420000                    | 548                          | 0.274                | 0.00137            | 23.2911           | 0.0013743              |
| 430           | 430000                    | 553                          | 0.2765               | 0.0013825          | 23.8457           | 0.0013868              |
| 440           | 440000                    | 578                          | 0.289                | 0.001445           | 24.4002           | 0.0014493              |
| 450           | 450000                    | 594                          | 0.297                | 0.001485           | 24.9548           | 0.0014893              |
| 460           | 460000                    | 610                          | 0.305                | 0.001525           | 25.5093           | 0.0015293              |
| 470           | 470000                    | 635                          | 0.3175               | 0.0015875          | 26.0639           | 0.0015918              |
| 480           | 480000                    | 656                          | 0.328                | 0.00164            | 26.6185           | 0.0016443              |
| 490           | 490000                    | 668                          | 0.334                | 0.00167            | 27.1730           | 0.0016743              |
| 500           | 500000                    | 689                          | 0.3445               | 0.0017225          | 27.7276           | 0.0017268              |
| 510           | 510000                    | 710                          | 0.355                | 0.001775           | 28.2821           | 0.0017793              |
| 520           | 520000                    | 731                          | 0.3655               | 0.0018275          | 28.8367           | 0.0018318              |
| 530           | 530000                    | 754                          | 0.377                | 0.001885           | 29.3912           | 0.0018893              |
| 540           | 540000                    | 791                          | 0.3955               | 0.0019775          | 29.9458           | 0.0019818              |
| 550           | 550000                    | 820                          | 0.41                 | 0.00205            | 30.5003           | 0.0020543              |
| 560           | 560000                    | 825                          | 0.4125               | 0.0020625          | 31.0549           | 0.0020668              |
| 570           | 570000                    | 865                          | 0.4325               | 0.0021625          | 31.6094           | 0.0021668              |
| 580           | 580000                    | 898                          | 0.449                | 0.002245           | 32.1640           | 0.0022493              |
| 590           | 590000                    | 930                          | 0.465                | 0.002325           | 32.7185           | 0.0023293              |
| 605           | 605000                    | 980                          | 0.49                 | 0.00245            | 33.5503           | 0.0024543              |
| 600           | 600000                    | 1010                         | 0.505                | 0.002525           | 33.2731           | 0.0025293              |







|                   |                                  |                              |   |                                       |                   |                        |
|-------------------|----------------------------------|------------------------------|---|---------------------------------------|-------------------|------------------------|
| Beton Rencana f'c | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              | <b>BENDA UJI</b>                        | <b>R9</b>                             |                   |                        |
| <b>Uraian</b>     | <b>Silinder</b>                  |                              |   |                                       |                   |                        |
| Diameter          | 150.5 mm                         |                              |   |                                       |                   |                        |
| Tinggi            | 300.5 mm                         |                              |   |                                       |                   |                        |
| Luas              | 17789.465 mm <sup>2</sup>        |                              |   |                                       |                   |                        |
| Lo                | 200 mm                           |                              |   |                                       |                   |                        |
| <b>Beban</b>      |                                  | <b>Pembacaan Dial</b>        | <b><math>\Delta L</math> Sebenarnya</b> | <b>Regangan</b>                       | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>         | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2<math>\Delta L</math>)(mm)</b>   | <b>(<math>\Delta L</math>/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10                | 10000                            | 12                           | 0.006                                   | 0.00003                               | 0.5621            | 0.0000284              |
| 20                | 20000                            | 24                           | 0.012                                   | 0.00006                               | 1.1243            | 0.0000569              |
| 30                | 30000                            | 32                           | 0.016                                   | 0.00008                               | 1.6864            | 0.0000853              |
| 40                | 40000                            | 42                           | 0.021                                   | 0.000105                              | 2.2485            | 0.0001138              |
| 50                | 50000                            | 52                           | 0.026                                   | 0.00013                               | 2.8107            | 0.0001422              |
| 60                | 60000                            | 64                           | 0.032                                   | 0.00016                               | 3.3728            | 0.0001706              |
| 70                | 70000                            | 75                           | 0.0375                                  | 0.0001875                             | 3.9349            | 0.0001991              |
| 80                | 80000                            | 86                           | 0.043                                   | 0.000215                              | 4.4970            | 0.0002275              |
| 90                | 90000                            | 94                           | 0.047                                   | 0.000235                              | 5.0592            | 0.0002559              |
| 100               | 100000                           | 105                          | 0.0525                                  | 0.0002625                             | 5.6213            | 0.0002844              |
| 110               | 110000                           | 118                          | 0.059                                   | 0.000295                              | 6.1834            | 0.0003128              |
| 120               | 120000                           | 131                          | 0.0655                                  | 0.0003275                             | 6.7456            | 0.0003413              |
| 130               | 130000                           | 145                          | 0.0725                                  | 0.0003625                             | 7.3077            | 0.0003697              |
| 140               | 140000                           | 154                          | 0.077                                   | 0.000385                              | 7.8698            | 0.0003981              |
| 150               | 150000                           | 166                          | 0.083                                   | 0.000415                              | 8.4320            | 0.0004266              |
| 160               | 160000                           | 181                          | 0.0905                                  | 0.0004525                             | 8.9941            | 0.0004550              |
| 170               | 170000                           | 196                          | 0.098                                   | 0.00049                               | 9.5562            | 0.0004834              |
| 180               | 180000                           | 206                          | 0.103                                   | 0.000515                              | 10.1183           | 0.0005119              |
| 190               | 190000                           | 222                          | 0.111                                   | 0.000555                              | 10.6805           | 0.0005519              |
| 200               | 200000                           | 236                          | 0.118                                   | 0.00059                               | 11.2426           | 0.0005869              |
| 210               | 210000                           | 249                          | 0.1245                                  | 0.0006225                             | 11.8047           | 0.0006194              |
| 220               | 220000                           | 263                          | 0.1315                                  | 0.0006575                             | 12.3669           | 0.0006544              |
| 230               | 230000                           | 278                          | 0.139                                   | 0.000695                              | 12.9290           | 0.0006919              |
| 240               | 240000                           | 298                          | 0.149                                   | 0.000745                              | 13.4911           | 0.0007419              |
| 250               | 250000                           | 302                          | 0.151                                   | 0.000755                              | 14.0533           | 0.0007519              |
| 260               | 260000                           | 318                          | 0.159                                   | 0.000795                              | 14.6154           | 0.0007919              |
| 270               | 270000                           | 335                          | 0.1675                                  | 0.0008375                             | 15.1775           | 0.0008344              |
| 280               | 280000                           | 354                          | 0.177                                   | 0.000885                              | 15.7397           | 0.0008819              |
| 290               | 290000                           | 370                          | 0.185                                   | 0.000925                              | 16.3018           | 0.0009219              |
| 300               | 300000                           | 386                          | 0.193                                   | 0.000965                              | 16.8639           | 0.0009619              |
| 310               | 310000                           | 405                          | 0.2025                                  | 0.0010125                             | 17.4260           | 0.0010094              |
| 320               | 320000                           | 428                          | 0.214                                   | 0.00107                               | 17.9882           | 0.0010669              |
| 330               | 330000                           | 451                          | 0.2255                                  | 0.0011275                             | 18.5503           | 0.0011244              |
| 340               | 340000                           | 482                          | 0.241                                   | 0.001205                              | 19.1124           | 0.0012019              |
| 350               | 350000                           | 517                          | 0.2585                                  | 0.0012925                             | 19.6746           | 0.0012894              |
| 360               | 360000                           | 536                          | 0.268                                   | 0.00134                               | 20.2367           | 0.0013369              |
| 370               | 370000                           | 564                          | 0.282                                   | 0.00141                               | 20.7988           | 0.0014069              |
| 380               | 380000                           | 585                          | 0.2925                                  | 0.0014625                             | 21.3610           | 0.0014594              |
| 390               | 390000                           | 618                          | 0.309                                   | 0.001545                              | 21.9231           | 0.0015419              |
| 400               | 400000                           | 648                          | 0.324                                   | 0.00162                               | 22.4852           | 0.0016169              |
| 410               | 410000                           | 662                          | 0.331                                   | 0.001655                              | 23.0473           | 0.0016519              |
| 420               | 420000                           | 687                          | 0.3435                                  | 0.0017175                             | 23.6095           | 0.0017144              |
| 430               | 430000                           | 703                          | 0.3515                                  | 0.0017575                             | 24.1716           | 0.0017544              |
| 440               | 440000                           | 724                          | 0.362                                   | 0.00181                               | 24.7337           | 0.0018069              |
| 450               | 450000                           | 759                          | 0.3795                                  | 0.0018975                             | 25.2959           | 0.0018944              |
| 460               | 460000                           | 782                          | 0.391                                   | 0.001955                              | 25.8580           | 0.0019519              |
| 450               | 450000                           | 810                          | 0.405                                   | 0.002025                              | 25.2959           | 0.0020219              |

|               |                         |                              |   |                                       |                   |                        |
|---------------|-------------------------|------------------------------|---|---------------------------------------|-------------------|------------------------|
| Beton         | 25 Mpa                  |                              |   |                                       |                   |                        |
| Rencana       | 255 kg/cm <sup>2</sup>  |                              |   | <b>BENDA UJI</b>                      | <b>R11</b>        |                        |
| <b>Uraian</b> | <b>Silinder</b>         |                              |   |                                       |                   |                        |
| Diameter      | 150.575 mm              |                              |   |                                       |                   |                        |
| Tinggi        | 301.4 mm                |                              |   |                                       |                   |                        |
| Luas          | 17807.2 mm <sup>2</sup> |                              |   |                                       |                   |                        |
| Lo            | 200 mm                  |                              |   |                                       |                   |                        |
| <b>Beban</b>  |                         | <b>Pembacaan Dial</b>        | <b><math>\Delta L</math> Sebenarnya</b> | <b>Regangan</b>                       | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                | <b>.....x10<sup>-3</sup></b> | <b>(1/2<math>\Delta L</math>)(mm)</b>   | <b>(<math>\Delta L</math>/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                   | 8                            | 0.004                                   | 0.00002                               | 0.5616            | 0.0000251              |
| 20            | 20000                   | 15                           | 0.0075                                  | 0.0000375                             | 1.1231            | 0.0000503              |
| 30            | 30000                   | 21                           | 0.0105                                  | 0.0000525                             | 1.6847            | 0.0000754              |
| 40            | 40000                   | 31                           | 0.0155                                  | 0.0000775                             | 2.2463            | 0.0001005              |
| 50            | 50000                   | 38                           | 0.019                                   | 0.000095                              | 2.8079            | 0.0001257              |
| 60            | 60000                   | 49                           | 0.0245                                  | 0.0001225                             | 3.3694            | 0.0001508              |
| 70            | 70000                   | 58                           | 0.029                                   | 0.000145                              | 3.9310            | 0.0001759              |
| 80            | 80000                   | 69                           | 0.0345                                  | 0.0001725                             | 4.4926            | 0.0002011              |
| 90            | 90000                   | 78                           | 0.039                                   | 0.000195                              | 5.0541            | 0.0002262              |
| 100           | 100000                  | 88                           | 0.044                                   | 0.00022                               | 5.6157            | 0.0002513              |
| 110           | 110000                  | 100                          | 0.05                                    | 0.00025                               | 6.1773            | 0.0002764              |
| 120           | 120000                  | 111                          | 0.0555                                  | 0.0002775                             | 6.7388            | 0.0003016              |
| 130           | 130000                  | 121                          | 0.0605                                  | 0.0003025                             | 7.3004            | 0.0003267              |
| 140           | 140000                  | 130                          | 0.065                                   | 0.000325                              | 7.8620            | 0.0003518              |
| 150           | 150000                  | 141                          | 0.0705                                  | 0.0003525                             | 8.4236            | 0.0003770              |
| 160           | 160000                  | 150                          | 0.075                                   | 0.000375                              | 8.9851            | 0.0004021              |
| 170           | 170000                  | 160                          | 0.08                                    | 0.0004                                | 9.5467            | 0.0004272              |
| 180           | 180000                  | 169                          | 0.0845                                  | 0.0004225                             | 10.1083           | 0.0004524              |
| 190           | 190000                  | 180                          | 0.09                                    | 0.00045                               | 10.6698           | 0.0004775              |
| 200           | 200000                  | 189                          | 0.0945                                  | 0.0004725                             | 11.2314           | 0.0005026              |
| 210           | 210000                  | 201                          | 0.1005                                  | 0.0005025                             | 11.7930           | 0.0005278              |
| 220           | 220000                  | 212                          | 0.106                                   | 0.00053                               | 12.3546           | 0.0005529              |
| 230           | 230000                  | 222                          | 0.111                                   | 0.000555                              | 12.9161           | 0.0005779              |
| 240           | 240000                  | 231                          | 0.1155                                  | 0.0005775                             | 13.4777           | 0.0006004              |
| 250           | 250000                  | 244                          | 0.122                                   | 0.00061                               | 14.0393           | 0.0006329              |
| 260           | 260000                  | 256                          | 0.128                                   | 0.00064                               | 14.6008           | 0.0006629              |
| 270           | 270000                  | 268                          | 0.134                                   | 0.00067                               | 15.1624           | 0.0006929              |
| 280           | 280000                  | 278                          | 0.139                                   | 0.000695                              | 15.7240           | 0.0007179              |
| 290           | 290000                  | 290                          | 0.145                                   | 0.000725                              | 16.2855           | 0.0007479              |
| 300           | 300000                  | 302                          | 0.151                                   | 0.000755                              | 16.8471           | 0.0007779              |
| 310           | 310000                  | 318                          | 0.159                                   | 0.000795                              | 17.4087           | 0.0008179              |
| 320           | 320000                  | 329                          | 0.1645                                  | 0.0008225                             | 17.9703           | 0.0008454              |
| 330           | 330000                  | 340                          | 0.17                                    | 0.00085                               | 18.5318           | 0.0008729              |
| 340           | 340000                  | 354                          | 0.177                                   | 0.000885                              | 19.0934           | 0.0009079              |
| 350           | 350000                  | 361                          | 0.1805                                  | 0.0009025                             | 19.6550           | 0.0009254              |
| 360           | 360000                  | 370                          | 0.185                                   | 0.000925                              | 20.2165           | 0.0009479              |
| 370           | 370000                  | 379                          | 0.1895                                  | 0.0009475                             | 20.7781           | 0.0009704              |
| 380           | 380000                  | 385                          | 0.1925                                  | 0.0009625                             | 21.3397           | 0.0009854              |
| 390           | 390000                  | 391                          | 0.1955                                  | 0.0009775                             | 21.9013           | 0.0010004              |
| 400           | 400000                  | 398                          | 0.199                                   | 0.000995                              | 22.4628           | 0.0010179              |
| 410           | 410000                  | 406                          | 0.203                                   | 0.001015                              | 23.0244           | 0.0010379              |
| 420           | 420000                  | 416                          | 0.208                                   | 0.00104                               | 23.5860           | 0.0010629              |
| 430           | 430000                  | 421                          | 0.2105                                  | 0.0010525                             | 24.1475           | 0.0010754              |
| 440           | 440000                  | 430                          | 0.215                                   | 0.001075                              | 24.7091           | 0.0010979              |
| 450           | 450000                  | 439                          | 0.2195                                  | 0.0010975                             | 25.2707           | 0.0011204              |
| 460           | 460000                  | 448                          | 0.224                                   | 0.00112                               | 25.8322           | 0.0011429              |
| 470           | 470000                  | 460                          | 0.23                                    | 0.00115                               | 26.3938           | 0.0011729              |
| 480           | 480000                  | 473                          | 0.2365                                  | 0.0011825                             | 26.9554           | 0.0012054              |
| 490           | 490000                  | 486                          | 0.243                                   | 0.001215                              | 27.5170           | 0.0012379              |
| 500           | 500000                  | 495                          | 0.2475                                  | 0.0012375                             | 28.0785           | 0.0012604              |
| 510           | 510000                  | 510                          | 0.255                                   | 0.001275                              | 28.6401           | 0.0012979              |
| 520           | 520000                  | 515                          | 0.2575                                  | 0.0012875                             | 29.2017           | 0.0013104              |
| 530           | 530000                  | 525                          | 0.2625                                  | 0.0013125                             | 29.7632           | 0.0013354              |
| 540           | 540000                  | 558                          | 0.279                                   | 0.001395                              | 30.3248           | 0.0014179              |
| 550           | 550000                  | 573                          | 0.2865                                  | 0.0014325                             | 30.8864           | 0.0014554              |
| 540           | 540000                  | 602                          | 0.301                                   | 0.001505                              | 30.3248           | 0.0015279              |
| 530           | 530000                  | 650                          | 0.325                                   | 0.001625                              | 29.7632           | 0.0016479              |

|               |                                  |                              |                      |                    |                   |                        |
|---------------|----------------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              |                      | <b>BENDA UJI</b>   | <b>R12</b>        |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |                      |                    |                   |                        |
| Diameter      | 150.725 mm                       |                              |                      |                    |                   |                        |
| Tinggi        | 302.6 mm                         |                              |                      |                    |                   |                        |
| Luas          | 17842.696 mm <sup>2</sup>        |                              |                      |                    |                   |                        |
| Lo            | 200 mm                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 5                            | 0.0025               | 0.0000125          | 0.5605            | 0.0000282              |
| 20            | 20000                            | 15                           | 0.0075               | 0.0000375          | 1.1209            | 0.0000563              |
| 30            | 30000                            | 26                           | 0.013                | 0.000065           | 1.6814            | 0.0000845              |
| 40            | 40000                            | 34                           | 0.017                | 0.000085           | 2.2418            | 0.0001126              |
| 50            | 50000                            | 43                           | 0.0215               | 0.0001075          | 2.8023            | 0.0001408              |
| 60            | 60000                            | 53                           | 0.0265               | 0.0001325          | 3.3627            | 0.0001689              |
| 70            | 70000                            | 73                           | 0.0365               | 0.0001825          | 3.9232            | 0.0001971              |
| 80            | 80000                            | 86                           | 0.043                | 0.000215           | 4.4836            | 0.0002252              |
| 90            | 90000                            | 96                           | 0.048                | 0.00024            | 5.0441            | 0.0002534              |
| 100           | 100000                           | 105                          | 0.0525               | 0.0002625          | 5.6045            | 0.0002815              |
| 110           | 110000                           | 115                          | 0.0575               | 0.0002875          | 6.1650            | 0.0003097              |
| 120           | 120000                           | 126                          | 0.063                | 0.000315           | 6.7254            | 0.0003378              |
| 130           | 130000                           | 134                          | 0.067                | 0.000335           | 7.2859            | 0.0003660              |
| 140           | 140000                           | 143                          | 0.0715               | 0.0003575          | 7.8463            | 0.0003941              |
| 150           | 150000                           | 156                          | 0.078                | 0.00039            | 8.4068            | 0.0004223              |
| 160           | 160000                           | 174                          | 0.087                | 0.000435           | 8.9673            | 0.0004504              |
| 170           | 170000                           | 180                          | 0.09                 | 0.00045            | 9.5277            | 0.0004786              |
| 180           | 180000                           | 190                          | 0.095                | 0.000475           | 10.0882           | 0.0005067              |
| 190           | 190000                           | 202                          | 0.101                | 0.000505           | 10.6486           | 0.0005349              |
| 200           | 200000                           | 215                          | 0.1075               | 0.0005375          | 11.2091           | 0.0005630              |
| 210           | 210000                           | 226                          | 0.113                | 0.000565           | 11.7695           | 0.0005912              |
| 220           | 220000                           | 234                          | 0.117                | 0.000585           | 12.3300           | 0.0006193              |
| 230           | 230000                           | 249                          | 0.1245               | 0.0006225          | 12.8904           | 0.0006475              |
| 240           | 240000                           | 262                          | 0.131                | 0.000655           | 13.4509           | 0.0006756              |
| 250           | 250000                           | 274                          | 0.137                | 0.000685           | 14.0113           | 0.0007038              |
| 260           | 260000                           | 284                          | 0.142                | 0.00071            | 14.5718           | 0.0007288              |
| 270           | 270000                           | 296                          | 0.148                | 0.00074            | 15.1322           | 0.0007588              |
| 280           | 280000                           | 305                          | 0.1525               | 0.0007625          | 15.6927           | 0.0007813              |
| 290           | 290000                           | 318                          | 0.159                | 0.000795           | 16.2531           | 0.0008138              |
| 300           | 300000                           | 335                          | 0.1675               | 0.0008375          | 16.8136           | 0.0008563              |
| 310           | 310000                           | 354                          | 0.177                | 0.000885           | 17.3741           | 0.0009038              |
| 320           | 320000                           | 365                          | 0.1825               | 0.0009125          | 17.9345           | 0.0009313              |
| 330           | 330000                           | 373                          | 0.1865               | 0.0009325          | 18.4950           | 0.0009513              |
| 340           | 340000                           | 392                          | 0.196                | 0.00098            | 19.0554           | 0.0009988              |
| 350           | 350000                           | 404                          | 0.202                | 0.00101            | 19.6159           | 0.0010288              |
| 360           | 360000                           | 416                          | 0.208                | 0.00104            | 20.1763           | 0.0010588              |
| 370           | 370000                           | 427                          | 0.2135               | 0.0010675          | 20.7368           | 0.0010863              |
| 380           | 380000                           | 448                          | 0.224                | 0.00112            | 21.2972           | 0.0011388              |
| 390           | 390000                           | 449                          | 0.2245               | 0.0011225          | 21.8577           | 0.0011413              |
| 400           | 400000                           | 468                          | 0.234                | 0.00117            | 22.4181           | 0.0011888              |
| 410           | 410000                           | 478                          | 0.239                | 0.001195           | 22.9786           | 0.0012138              |
| 420           | 420000                           | 492                          | 0.246                | 0.00123            | 23.5390           | 0.0012488              |
| 430           | 430000                           | 505                          | 0.2525               | 0.0012625          | 24.0995           | 0.0012813              |
| 440           | 440000                           | 521                          | 0.2605               | 0.0013025          | 24.6600           | 0.0013213              |
| 450           | 450000                           | 535                          | 0.2675               | 0.0013375          | 25.2204           | 0.0013563              |
| 460           | 460000                           | 549                          | 0.2745               | 0.0013725          | 25.7809           | 0.0013913              |
| 470           | 470000                           | 564                          | 0.282                | 0.00141            | 26.3413           | 0.0014288              |
| 480           | 480000                           | 578                          | 0.289                | 0.001445           | 26.9018           | 0.0014638              |
| 490           | 490000                           | 598                          | 0.299                | 0.001495           | 27.4622           | 0.0015138              |
| 500           | 500000                           | 615                          | 0.3075               | 0.0015375          | 28.0227           | 0.0015563              |
| 510           | 510000                           | 630                          | 0.315                | 0.001575           | 28.5831           | 0.0015938              |
| 520           | 520000                           | 656                          | 0.328                | 0.00164            | 29.1436           | 0.0016588              |
| 530           | 530000                           | 675                          | 0.3375               | 0.0016875          | 29.7040           | 0.0017063              |
| 540           | 540000                           | 686                          | 0.343                | 0.001715           | 30.2645           | 0.0017338              |
| 550           | 550000                           | 705                          | 0.3525               | 0.0017625          | 30.8249           | 0.0017813              |
| 560           | 560000                           | 725                          | 0.3625               | 0.0018125          | 31.3854           | 0.0018313              |
| 570           | 570000                           | 744                          | 0.372                | 0.00186            | 31.9458           | 0.0018788              |
| 580           | 580000                           | 758                          | 0.379                | 0.001895           | 32.5063           | 0.0019138              |
| 590           | 590000                           | 788                          | 0.394                | 0.00197            | 33.0668           | 0.0019888              |
| 600           | 600000                           | 798                          | 0.399                | 0.001995           | 33.6272           | 0.0020138              |
| 610           | 610000                           | 815                          | 0.4075               | 0.0020375          | 34.1877           | 0.0020563              |
| 620           | 620000                           | 848                          | 0.424                | 0.00212            | 34.7481           | 0.0021388              |





|               |                                  |                              |                      |                    |                   |                        |
|---------------|----------------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              |                      | <b>BENDA UJI</b>   | <b>R18</b>        |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |                      |                    |                   |                        |
| Diameter      | 150.975 mm                       |                              |                      |                    |                   |                        |
| Tinggi        | 303.8 mm                         |                              |                      |                    |                   |                        |
| Luas          | 17901.934 mm <sup>2</sup>        |                              |                      |                    |                   |                        |
| Lo            | 200 mm                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 5                            | 0.0025               | 0.0000125          | 0.5586            | 0.0000200              |
| 20            | 20000                            | 15                           | 0.0075               | 0.0000375          | 1.1172            | 0.0000400              |
| 30            | 30000                            | 23                           | 0.0115               | 0.0000575          | 1.6758            | 0.0000600              |
| 40            | 40000                            | 29                           | 0.0145               | 0.0000725          | 2.2344            | 0.0000800              |
| 50            | 50000                            | 38                           | 0.019                | 0.000095           | 2.7930            | 0.0001000              |
| 60            | 60000                            | 45                           | 0.0225               | 0.0001125          | 3.3516            | 0.0001200              |
| 70            | 70000                            | 56                           | 0.028                | 0.00014            | 3.9102            | 0.0001400              |
| 80            | 80000                            | 59                           | 0.0295               | 0.0001475          | 4.4688            | 0.0001600              |
| 90            | 90000                            | 68                           | 0.034                | 0.00017            | 5.0274            | 0.0001800              |
| 100           | 100000                           | 76                           | 0.038                | 0.00019            | 5.5860            | 0.0002000              |
| 110           | 110000                           | 82                           | 0.041                | 0.000205           | 6.1446            | 0.0002200              |
| 120           | 120000                           | 88                           | 0.044                | 0.00022            | 6.7032            | 0.0002400              |
| 130           | 130000                           | 98                           | 0.049                | 0.000245           | 7.2618            | 0.0002600              |
| 140           | 140000                           | 105                          | 0.0525               | 0.0002625          | 7.8204            | 0.0002800              |
| 150           | 150000                           | 112                          | 0.056                | 0.00028            | 8.3790            | 0.0003000              |
| 160           | 160000                           | 122                          | 0.061                | 0.000305           | 8.9376            | 0.0003200              |
| 170           | 170000                           | 131                          | 0.0655               | 0.0003275          | 9.4962            | 0.0003400              |
| 180           | 180000                           | 143                          | 0.0715               | 0.0003575          | 10.0548           | 0.0003600              |
| 190           | 190000                           | 148                          | 0.074                | 0.00037            | 10.6134           | 0.0003800              |
| 200           | 200000                           | 155                          | 0.0775               | 0.0003875          | 11.1720           | 0.0004000              |
| 210           | 210000                           | 164                          | 0.082                | 0.00041            | 11.7306           | 0.0004200              |
| 220           | 220000                           | 173                          | 0.0865               | 0.0004325          | 12.2892           | 0.0004400              |
| 230           | 230000                           | 182                          | 0.091                | 0.000455           | 12.8478           | 0.0004600              |
| 240           | 240000                           | 190                          | 0.095                | 0.000475           | 13.4064           | 0.0004800              |
| 250           | 250000                           | 199                          | 0.0995               | 0.0004975          | 13.9650           | 0.0005000              |
| 260           | 260000                           | 210                          | 0.105                | 0.000525           | 14.5236           | 0.0005200              |
| 270           | 270000                           | 222                          | 0.111                | 0.000555           | 15.0822           | 0.0005400              |
| 280           | 280000                           | 231                          | 0.1155               | 0.0005775          | 15.6408           | 0.0005600              |
| 290           | 290000                           | 240                          | 0.12                 | 0.0006             | 16.1994           | 0.0005800              |
| 300           | 300000                           | 252                          | 0.126                | 0.00063            | 16.7580           | 0.0006000              |
| 310           | 310000                           | 263                          | 0.1315               | 0.0006575          | 17.3166           | 0.0006200              |
| 320           | 320000                           | 276                          | 0.138                | 0.00069            | 17.8752           | 0.0006400              |
| 330           | 330000                           | 288                          | 0.144                | 0.00072            | 18.4338           | 0.0006600              |
| 340           | 340000                           | 296                          | 0.148                | 0.00074            | 18.9924           | 0.0006800              |
| 350           | 350000                           | 308                          | 0.154                | 0.00077            | 19.5510           | 0.0007000              |
| 360           | 360000                           | 315                          | 0.1575               | 0.0007875          | 20.1096           | 0.0007200              |
| 370           | 370000                           | 338                          | 0.169                | 0.000845           | 20.6682           | 0.0007400              |
| 380           | 380000                           | 349                          | 0.1745               | 0.0008725          | 21.2268           | 0.0007600              |
| 390           | 390000                           | 359                          | 0.1795               | 0.0008975          | 21.7854           | 0.0007800              |
| 400           | 400000                           | 371                          | 0.1855               | 0.0009275          | 22.3440           | 0.0008000              |
| 410           | 410000                           | 386                          | 0.193                | 0.000965           | 22.9026           | 0.0008200              |
| 420           | 420000                           | 398                          | 0.199                | 0.000995           | 23.4612           | 0.0008400              |
| 430           | 430000                           | 410                          | 0.205                | 0.001025           | 24.0198           | 0.0008600              |
| 440           | 440000                           | 420                          | 0.21                 | 0.00105            | 24.5784           | 0.0008800              |
| 450           | 450000                           | 439                          | 0.2195               | 0.0010975          | 25.1370           | 0.0009000              |
| 460           | 460000                           | 462                          | 0.231                | 0.001155           | 25.6956           | 0.0009200              |
| 470           | 470000                           | 473                          | 0.2365               | 0.0011825          | 26.2542           | 0.0009400              |
| 480           | 480000                           | 486                          | 0.243                | 0.001215           | 26.8128           | 0.0009600              |
| 490           | 490000                           | 500                          | 0.25                 | 0.00125            | 27.3714           | 0.0009800              |
| 500           | 500000                           | 515                          | 0.2575               | 0.0012875          | 27.9300           | 0.0010000              |
| 510           | 510000                           | 531                          | 0.2655               | 0.0013275          | 28.4886           | 0.0010200              |
| 520           | 520000                           | 542                          | 0.271                | 0.001355           | 29.0472           | 0.0010400              |
| 530           | 530000                           | 561                          | 0.2805               | 0.0014025          | 29.6058           | 0.0010600              |
| 540           | 540000                           | 582                          | 0.291                | 0.001455           | 30.1644           | 0.0010800              |
| 550           | 550000                           | 610                          | 0.305                | 0.001525           | 30.7230           | 0.0011000              |
| 560           | 560000                           | 645                          | 0.3225               | 0.0016125          | 31.2816           | 0.0011200              |
| 570           | 570000                           | 656                          | 0.328                | 0.00164            | 31.8402           | 0.0011400              |
| 580           | 580000                           | 668                          | 0.334                | 0.00167            | 32.3988           | 0.0011600              |
| 590           | 590000                           | 683                          | 0.3415               | 0.0017075          | 32.9574           | 0.0011800              |
| 600           | 600000                           | 710                          | 0.355                | 0.001775           | 33.5160           | 0.0012000              |
| 610           | 610000                           | 736                          | 0.368                | 0.00184            | 34.0746           | 0.0012200              |
| 620           | 620000                           | 780                          | 0.39                 | 0.00195            | 34.6332           | 0.0012400              |
| 610           | 610000                           | 790                          | 0.395                | 0.001975           | 34.0745           | 0.0011975              |







| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |  | <b>BENDA UJI</b>             | <b>R23</b>              |                        |                                |
|---------------|----------------------------------|--|------------------------------|-------------------------|------------------------|--------------------------------|
| <b>Uraian</b> | <b>Silinder</b>                  |  |                              |                         |                        |                                |
| Diameter      | 151.55 mm                        |  |                              |                         |                        |                                |
| Tinggi        | 301.5 mm                         |  |                              |                         |                        |                                |
| Luas          | 18038.556 mm <sup>2</sup>        |  |                              |                         |                        |                                |
| Lo            | 200 mm                           |  |                              |                         |                        |                                |
| Beban         |                                  | Pembacaan Dial<br>.....x10 <sup>-3</sup> | ΔL Sebenarnya<br>(1/2ΔL)(mm) | Regangan<br>(ΔL/Lo)(mm) | Tegangan<br>(P/A)(MPa) | Regangan<br>terkoreksi<br>(mm) |
| KN            | N                                |  |                              |                         |                        |                                |
| 10            | 10000                            | 8  | 0.004                        | 0.00002                 | 0.5544                 | 0.0000303                      |
| 20            | 20000                            | 24                                       | 0.012                        | 0.00006                 | 1.1087                 | 0.0000605                      |
| 30            | 30000                            | 39                                       | 0.0195                       | 0.0000975               | 1.6631                 | 0.0000908                      |
| 40            | 40000                            | 55                                       | 0.0275                       | 0.0001375               | 2.2175                 | 0.0001211                      |
| 50            | 50000                            | 65                                       | 0.0325                       | 0.0001625               | 2.7718                 | 0.0001513                      |
| 60            | 60000                            | 74                                       | 0.037                        | 0.000185                | 3.3262                 | 0.0001816                      |
| 70            | 70000                            | 92                                       | 0.046                        | 0.00023                 | 3.8806                 | 0.0002118                      |
| 80            | 80000                            | 102                                      | 0.051                        | 0.000255                | 4.4349                 | 0.0002421                      |
| 90            | 90000                            | 116                                      | 0.058                        | 0.00029                 | 4.9893                 | 0.0002724                      |
| 100           | 100000                           | 124                                      | 0.062                        | 0.00031                 | 5.5437                 | 0.0003026                      |
| 110           | 110000                           | 136                                      | 0.068                        | 0.00034                 | 6.0980                 | 0.0003329                      |
| 120           | 120000                           | 149                                      | 0.0745                       | 0.0003725               | 6.6524                 | 0.0003632                      |
| 130           | 130000                           | 160                                      | 0.08                         | 0.0004                  | 7.2068                 | 0.0003934                      |
| 140           | 140000                           | 172                                      | 0.086                        | 0.00043                 | 7.7612                 | 0.0004237                      |
| 150           | 150000                           | 182                                      | 0.091                        | 0.000455                | 8.3155                 | 0.0004540                      |
| 160           | 160000                           | 193                                      | 0.0965                       | 0.0004825               | 8.8699                 | 0.0004842                      |
| 170           | 170000                           | 206                                      | 0.103                        | 0.000515                | 9.4243                 | 0.0005145                      |
| 180           | 180000                           | 217                                      | 0.1085                       | 0.0005425               | 9.9786                 | 0.0005447                      |
| 190           | 190000                           | 229                                      | 0.1145                       | 0.0005725               | 10.5330                | 0.0005750                      |
| 200           | 200000                           | 241                                      | 0.1205                       | 0.0006025               | 11.0874                | 0.0006053                      |
| 210           | 210000                           | 254                                      | 0.127                        | 0.000635                | 11.6417                | 0.0006355                      |
| 220           | 220000                           | 266                                      | 0.133                        | 0.000665                | 12.1961                | 0.0006655                      |
| 230           | 230000                           | 276                                      | 0.138                        | 0.00069                 | 12.7505                | 0.0006905                      |
| 240           | 240000                           | 290                                      | 0.145                        | 0.000725                | 13.3048                | 0.0007255                      |
| 250           | 250000                           | 304                                      | 0.152                        | 0.00076                 | 13.8592                | 0.0007605                      |
| 260           | 260000                           | 316                                      | 0.158                        | 0.00079                 | 14.4136                | 0.0007905                      |
| 270           | 270000                           | 328                                      | 0.164                        | 0.00082                 | 14.9679                | 0.0008205                      |
| 280           | 280000                           | 341                                      | 0.1705                       | 0.0008525               | 15.5223                | 0.0008530                      |
| 290           | 290000                           | 356                                      | 0.178                        | 0.00089                 | 16.0767                | 0.0008905                      |
| 300           | 300000                           | 374                                      | 0.187                        | 0.000935                | 16.6310                | 0.0009355                      |
| 310           | 310000                           | 386                                      | 0.193                        | 0.000965                | 17.1854                | 0.0009655                      |
| 320           | 320000                           | 402                                      | 0.201                        | 0.001005                | 17.7398                | 0.0010055                      |
| 330           | 330000                           | 416                                      | 0.208                        | 0.00104                 | 18.2941                | 0.0010405                      |
| 340           | 340000                           | 432                                      | 0.216                        | 0.00108                 | 18.8485                | 0.0010805                      |
| 350           | 350000                           | 446                                      | 0.223                        | 0.001115                | 19.4029                | 0.0011155                      |
| 360           | 360000                           | 470                                      | 0.235                        | 0.001175                | 19.9573                | 0.0011755                      |
| 370           | 370000                           | 486                                      | 0.243                        | 0.001215                | 20.5116                | 0.0012155                      |
| 380           | 380000                           | 502                                      | 0.251                        | 0.001255                | 21.0660                | 0.0012555                      |
| 390           | 390000                           | 520                                      | 0.26                         | 0.0013                  | 21.6204                | 0.0013005                      |
| 400           | 400000                           | 535                                      | 0.2675                       | 0.0013375               | 22.1747                | 0.0013380                      |
| 410           | 410000                           | 554                                      | 0.277                        | 0.001385                | 22.7291                | 0.0013855                      |
| 420           | 420000                           | 570                                      | 0.285                        | 0.001425                | 23.2835                | 0.0014255                      |
| 430           | 430000                           | 593                                      | 0.2965                       | 0.0014825               | 23.8378                | 0.0014830                      |
| 440           | 440000                           | 615                                      | 0.3075                       | 0.0015375               | 24.3922                | 0.0015380                      |
| 450           | 450000                           | 631                                      | 0.3155                       | 0.0015775               | 24.9466                | 0.0015780                      |
| 460           | 460000                           | 649                                      | 0.3245                       | 0.0016225               | 25.5009                | 0.0016230                      |
| 470           | 470000                           | 673                                      | 0.3365                       | 0.0016825               | 26.0553                | 0.0016830                      |
| 480           | 480000                           | 686                                      | 0.343                        | 0.001715                | 26.6097                | 0.0017155                      |
| 490           | 490000                           | 710                                      | 0.355                        | 0.001775                | 27.1640                | 0.0017755                      |
| 500           | 500000                           | 729                                      | 0.3645                       | 0.0018225               | 27.7184                | 0.0018230                      |
| 510           | 510000                           | 759                                      | 0.3795                       | 0.0018975               | 28.2728                | 0.0018980                      |
| 520           | 520000                           | 785                                      | 0.3925                       | 0.0019625               | 28.8271                | 0.0019630                      |



|               |                                  |                              |                      |                    |                   |                        |
|---------------|----------------------------------|------------------------------|----------------------|--------------------|-------------------|------------------------|
| Beton Rencana | 25 Mpa<br>255 kg/cm <sup>2</sup> |                              |                      | <b>BENDA UJI</b>   | <b>R24</b>        |                        |
| <b>Uraian</b> | <b>Silinder</b>                  |                              |                      |                    |                   |                        |
| Diameter      | 150.175 mm                       |                              |                      |                    |                   |                        |
| Tinggi        | 301 mm                           |                              |                      |                    |                   |                        |
| Luas          | 17712.716 mm <sup>2</sup>        |                              |                      |                    |                   |                        |
| Lo            | 200 mm                           |                              |                      |                    |                   |                        |
| <b>Beban</b>  |                                  | <b>Pembacaan Dial</b>        | <b>ΔL Sebenarnya</b> | <b>Regangan</b>    | <b>Tegangan</b>   | <b>Regangan</b>        |
| <b>KN</b>     | <b>N</b>                         | <b>.....x10<sup>-3</sup></b> | <b>(1/2ΔL)(mm)</b>   | <b>(ΔL/Lo)(mm)</b> | <b>(P/A)(MPa)</b> | <b>terkoreksi (mm)</b> |
| 10            | 10000                            | 8                            | 0.004                | 0.00002            | 0.5646            | 0.0000270              |
| 20            | 20000                            | 19                           | 0.0095               | 0.0000475          | 1.1291            | 0.0000541              |
| 30            | 30000                            | 26                           | 0.013                | 0.000065           | 1.6937            | 0.0000811              |
| 40            | 40000                            | 37                           | 0.0185               | 0.0000925          | 2.2583            | 0.0001081              |
| 50            | 50000                            | 46                           | 0.023                | 0.000115           | 2.8228            | 0.0001352              |
| 60            | 60000                            | 59                           | 0.0295               | 0.0001475          | 3.3874            | 0.0001622              |
| 70            | 70000                            | 68                           | 0.034                | 0.00017            | 3.9520            | 0.0001892              |
| 80            | 80000                            | 78                           | 0.039                | 0.000195           | 4.5165            | 0.0002162              |
| 90            | 90000                            | 91                           | 0.0455               | 0.0002275          | 5.0811            | 0.0002433              |
| 100           | 100000                           | 112                          | 0.056                | 0.00028            | 5.6457            | 0.0002703              |
| 110           | 110000                           | 115                          | 0.0575               | 0.0002875          | 6.2102            | 0.0002973              |
| 120           | 120000                           | 125                          | 0.0625               | 0.0003125          | 6.7748            | 0.0003244              |
| 130           | 130000                           | 136                          | 0.068                | 0.00034            | 7.3394            | 0.0003514              |
| 140           | 140000                           | 148                          | 0.074                | 0.00037            | 7.9039            | 0.0003784              |
| 150           | 150000                           | 158                          | 0.079                | 0.000395           | 8.4685            | 0.0004055              |
| 160           | 160000                           | 169                          | 0.0845               | 0.0004225          | 9.0331            | 0.0004325              |
| 170           | 170000                           | 180                          | 0.09                 | 0.00045            | 9.5976            | 0.0004595              |
| 180           | 180000                           | 192                          | 0.096                | 0.00048            | 10.1622           | 0.0004866              |
| 190           | 190000                           | 204                          | 0.102                | 0.00051            | 10.7268           | 0.0005166              |
| 200           | 200000                           | 219                          | 0.1095               | 0.0005475          | 11.2913           | 0.0005541              |
| 210           | 210000                           | 229                          | 0.1145               | 0.0005725          | 11.8559           | 0.0005791              |
| 220           | 220000                           | 242                          | 0.121                | 0.000605           | 12.4205           | 0.0006116              |
| 230           | 230000                           | 253                          | 0.1265               | 0.0006325          | 12.9850           | 0.0006391              |
| 240           | 240000                           | 266                          | 0.133                | 0.000665           | 13.5496           | 0.0006716              |
| 250           | 250000                           | 279                          | 0.1395               | 0.0006975          | 14.1142           | 0.0007041              |
| 260           | 260000                           | 293                          | 0.1465               | 0.0007325          | 14.6787           | 0.0007391              |
| 270           | 270000                           | 305                          | 0.1525               | 0.0007625          | 15.2433           | 0.0007691              |
| 280           | 280000                           | 319                          | 0.1595               | 0.0007975          | 15.8079           | 0.0008041              |
| 290           | 290000                           | 331                          | 0.1655               | 0.0008275          | 16.3724           | 0.0008341              |
| 300           | 300000                           | 352                          | 0.176                | 0.00088            | 16.9370           | 0.0008866              |
| 310           | 310000                           | 354                          | 0.177                | 0.000885           | 17.5016           | 0.0008916              |
| 320           | 320000                           | 383                          | 0.1915               | 0.0009575          | 18.0661           | 0.0009641              |
| 330           | 330000                           | 391                          | 0.1955               | 0.0009775          | 18.6307           | 0.0009841              |
| 340           | 340000                           | 413                          | 0.2065               | 0.0010325          | 19.1952           | 0.0010391              |
| 350           | 350000                           | 426                          | 0.213                | 0.001065           | 19.7598           | 0.0010716              |
| 360           | 360000                           | 442                          | 0.221                | 0.001105           | 20.3244           | 0.0011116              |
| 370           | 370000                           | 459                          | 0.2295               | 0.0011475          | 20.8889           | 0.0011541              |
| 380           | 380000                           | 476                          | 0.238                | 0.00119            | 21.4535           | 0.0011966              |
| 390           | 390000                           | 493                          | 0.2465               | 0.0012325          | 22.0181           | 0.0012391              |
| 400           | 400000                           | 510                          | 0.255                | 0.001275           | 22.5826           | 0.0012816              |
| 410           | 410000                           | 533                          | 0.2665               | 0.0013325          | 23.1472           | 0.0013391              |
| 420           | 420000                           | 549                          | 0.2745               | 0.0013725          | 23.7118           | 0.0013791              |
| 430           | 430000                           | 568                          | 0.284                | 0.00142            | 24.2763           | 0.0014266              |
| 440           | 440000                           | 582                          | 0.291                | 0.001455           | 24.8409           | 0.0014616              |
| 450           | 450000                           | 615                          | 0.3075               | 0.0015375          | 25.4055           | 0.0015441              |
| 440           | 440000                           | 652                          | 0.326                | 0.00163            | 24.8409           | 0.0016366              |
| 430           | 430000                           | 715                          | 0.3575               | 0.0017875          | 24.2763           | 0.0017941              |

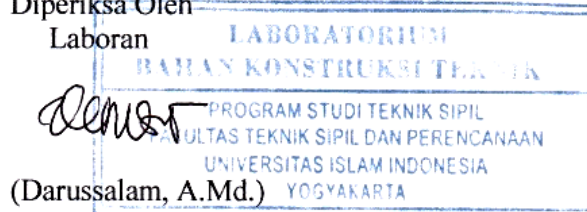
Beton 25 Mpa  
Rencana f'c 255 kg/cm<sup>2</sup>

BENDA UJI R29

| Uraian   | Silinder                  |
|----------|---------------------------|
| Diameter | 150.15 mm                 |
| Tinggi   | 302.5 mm                  |
| Luas     | 17706.819 mm <sup>2</sup> |
| Lo       | 200 mm                    |

| Beban |        | Pembacaan Dial<br>.....x10 <sup>-3</sup> | $\Delta L$ Sebenarnya<br>(1/2 $\Delta L$ )(mm) | Regangan<br>( $\Delta L/L_0$ )(mm) | Tegangan<br>(P/A)(MPa) | Regangan<br>terkoreksi<br>(mm) |
|-------|--------|--|--|------------------------------------|------------------------|--------------------------------|
| KN    | N      |  |  |                                    |                        |                                |
| 10    | 10000  | 5  | 0.0025   | 0.0000125                          | 0.5648                 | 0.0000197                      |
| 20    | 20000  | 12                                       | 0.006  | 0.00003                            | 1.1295                 | 0.0000394                      |
| 30    | 30000  | 19                                       | 0.0095   | 0.0000475                          | 1.6943                 | 0.0000591                      |
| 40    | 40000  | 25                                       | 0.0125   | 0.0000625                          | 2.2590                 | 0.0000788                      |
| 50    | 50000  | 33                                       | 0.0165   | 0.0000825                          | 2.8238                 | 0.0000985                      |
| 60    | 60000  | 39                                       | 0.0195   | 0.0000975                          | 3.3885                 | 0.0001182                      |
| 70    | 70000  | 46                                       | 0.023  | 0.000115                           | 3.9533                 | 0.0001379                      |
| 80    | 80000  | 59                                       | 0.0295   | 0.0001475                          | 4.5180                 | 0.0001576                      |
| 90    | 90000  | 62                                       | 0.031  | 0.000155                           | 5.0828                 | 0.0001774                      |
| 100   | 100000 | 69                                       | 0.0345   | 0.0001725                          | 5.6475                 | 0.0001971                      |
| 110   | 110000 | 78                                       | 0.039  | 0.000195                           | 6.2123                 | 0.0002168                      |
| 120   | 120000 | 85                                       | 0.0425   | 0.0002125                          | 6.7771                 | 0.0002365                      |
| 130   | 130000 | 94                                       | 0.047  | 0.000235                           | 7.3418                 | 0.0002562                      |
| 140   | 140000 | 102                                      | 0.051  | 0.000255                           | 7.9066                 | 0.0002759                      |
| 150   | 150000 | 109                                      | 0.0545   | 0.0002725                          | 8.4713                 | 0.0002956                      |
| 160   | 160000 | 119                                      | 0.0595   | 0.0002975                          | 9.0361                 | 0.0003153                      |
| 170   | 170000 | 126                                      | 0.063  | 0.000315                           | 9.6008                 | 0.0003350                      |
| 180   | 180000 | 136                                      | 0.068  | 0.00034                            | 10.1656                | 0.0003547                      |
| 190   | 190000 | 145                                      | 0.0725   | 0.0003625                          | 10.7303                | 0.0003744                      |
| 200   | 200000 | 153                                      | 0.0765   | 0.0003825                          | 11.2951                | 0.0003941                      |
| 210   | 210000 | 164                                      | 0.082  | 0.00041                            | 11.8598                | 0.0004216                      |
| 220   | 220000 | 172                                      | 0.086  | 0.00043                            | 12.4246                | 0.0004416                      |
| 230   | 230000 | 182                                      | 0.091  | 0.000455                           | 12.9893                | 0.0004666                      |
| 240   | 240000 | 190                                      | 0.095  | 0.000475                           | 13.5541                | 0.0004866                      |
| 250   | 250000 | 201                                      | 0.1005   | 0.0005025                          | 14.1189                | 0.0005141                      |
| 260   | 260000 | 212                                      | 0.106  | 0.00053                            | 14.6836                | 0.0005416                      |
| 270   | 270000 | 224                                      | 0.112  | 0.00056                            | 15.2484                | 0.0005716                      |
| 280   | 280000 | 234                                      | 0.117  | 0.000585                           | 15.8131                | 0.0005966                      |
| 290   | 290000 | 246                                      | 0.123  | 0.000615                           | 16.3779                | 0.0006266                      |
| 300   | 300000 | 258                                      | 0.129  | 0.000645                           | 16.9426                | 0.0006566                      |
| 310   | 310000 | 270                                      | 0.135  | 0.000675                           | 17.5074                | 0.0006866                      |
| 320   | 320000 | 286                                      | 0.143  | 0.000715                           | 18.0721                | 0.0007266                      |
| 330   | 330000 | 296                                      | 0.148  | 0.00074                            | 18.6369                | 0.0007516                      |
| 340   | 340000 | 312                                      | 0.156  | 0.00078                            | 19.2016                | 0.0007916                      |
| 350   | 350000 | 323                                      | 0.1615   | 0.0008075                          | 19.7664                | 0.0008191                      |
| 360   | 360000 | 338                                      | 0.169  | 0.000845                           | 20.3312                | 0.0008566                      |
| 370   | 370000 | 354                                      | 0.177  | 0.000885                           | 20.8959                | 0.0008966                      |
| 380   | 380000 | 365                                      | 0.1825   | 0.0009125                          | 21.4607                | 0.0009241                      |
| 390   | 390000 | 383                                      | 0.1915   | 0.0009575                          | 22.0254                | 0.0009691                      |
| 400   | 400000 | 398                                      | 0.199  | 0.000995                           | 22.5902                | 0.0010066                      |
| 410   | 410000 | 412                                      | 0.206  | 0.00103                            | 23.1549                | 0.0010416                      |
| 420   | 420000 | 428                                      | 0.214  | 0.00107                            | 23.7197                | 0.0010816                      |
| 430   | 430000 | 442                                      | 0.221  | 0.001105                           | 24.2844                | 0.0011166                      |
| 440   | 440000 | 458                                      | 0.229  | 0.001145                           | 24.8492                | 0.0011566                      |
| 450   | 450000 | 473                                      | 0.2365   | 0.0011825                          | 25.4139                | 0.0011941                      |
| 460   | 460000 | 488                                      | 0.244  | 0.00122                            | 25.9787                | 0.0012316                      |
| 470   | 470000 | 508                                      | 0.254  | 0.00127                            | 26.5434                | 0.0012816                      |
| 480   | 480000 | 528                                      | 0.264  | 0.00132                            | 27.1082                | 0.0013316                      |
| 490   | 490000 | 568                                      | 0.284  | 0.00142                            | 27.6730                | 0.0014316                      |
| 500   | 500000 | 588                                      | 0.294  | 0.00147                            | 28.2377                | 0.0014816                      |
| 510   | 510000 | 625                                      | 0.3125   | 0.0015625                          | 28.8025                | 0.0015741                      |
| 500   | 500000 | 656                                      | 0.328  | 0.00164                            | 28.2377                | 0.0016516                      |

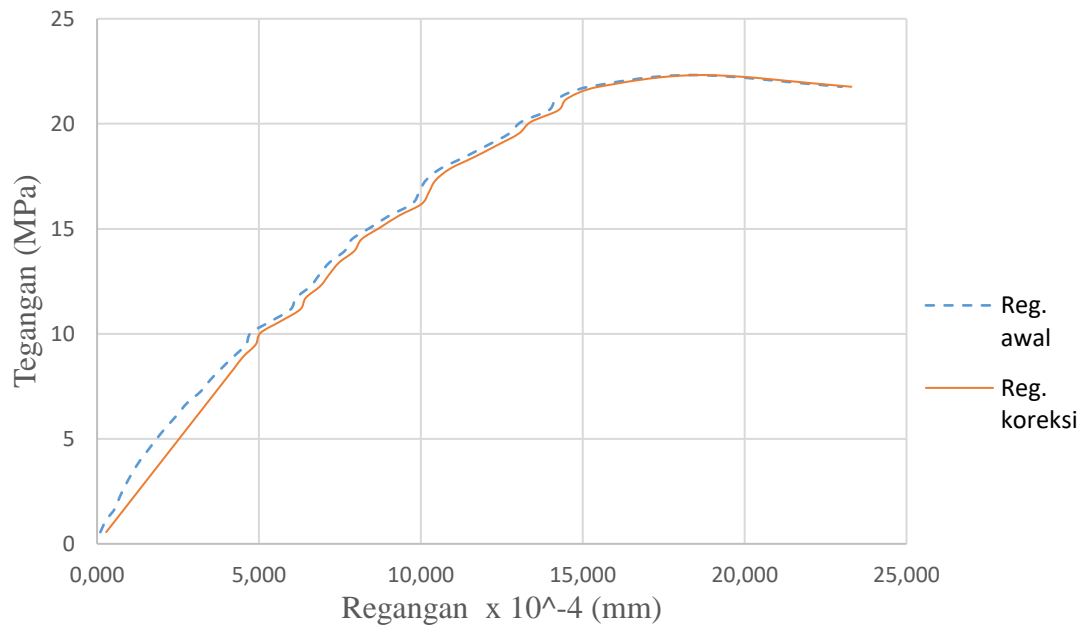
Diperiksa Oleh  
Laboran



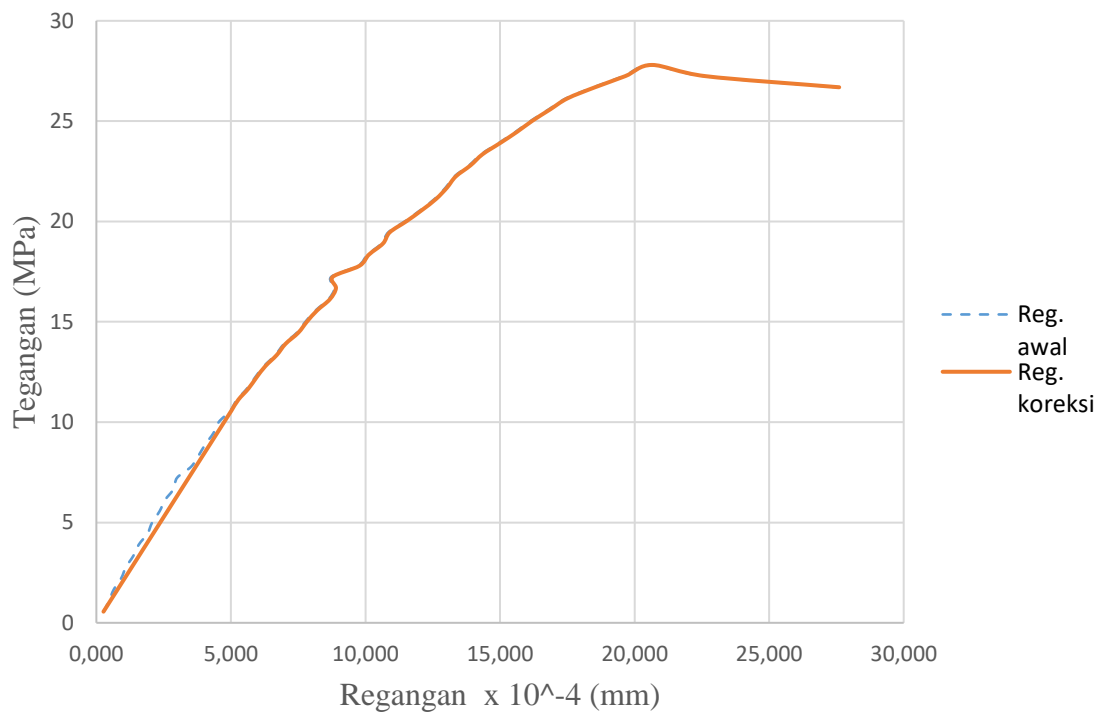
Yogyakarta, 4 September 2018  
Dikerjakan Oleh

*Ridho Pratama*  
(Ridho Pratama)

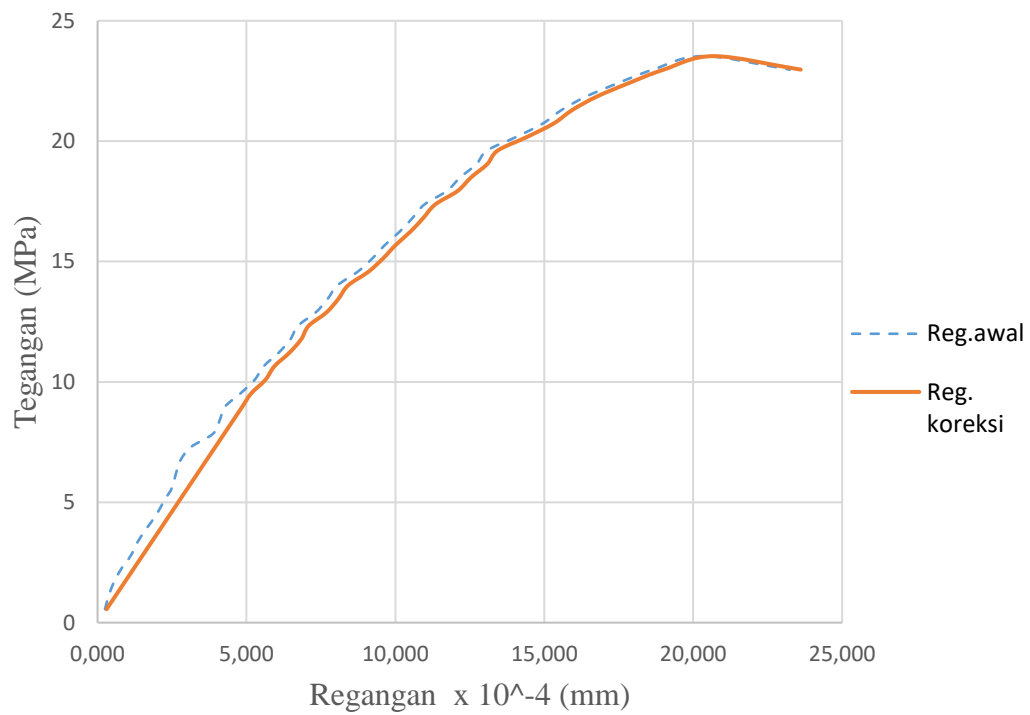
### Lampiran 10. Grafik Hasil Modulus Elastisitas Beton



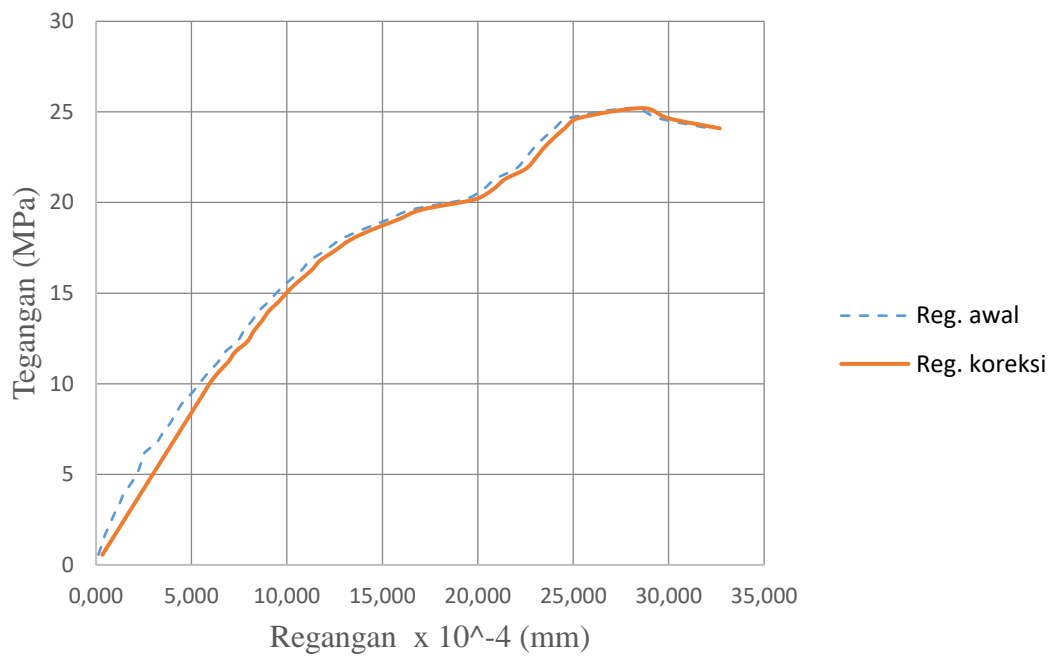
**Gambar L-7.1 Beton Silinder R2 Kombinasi R0**



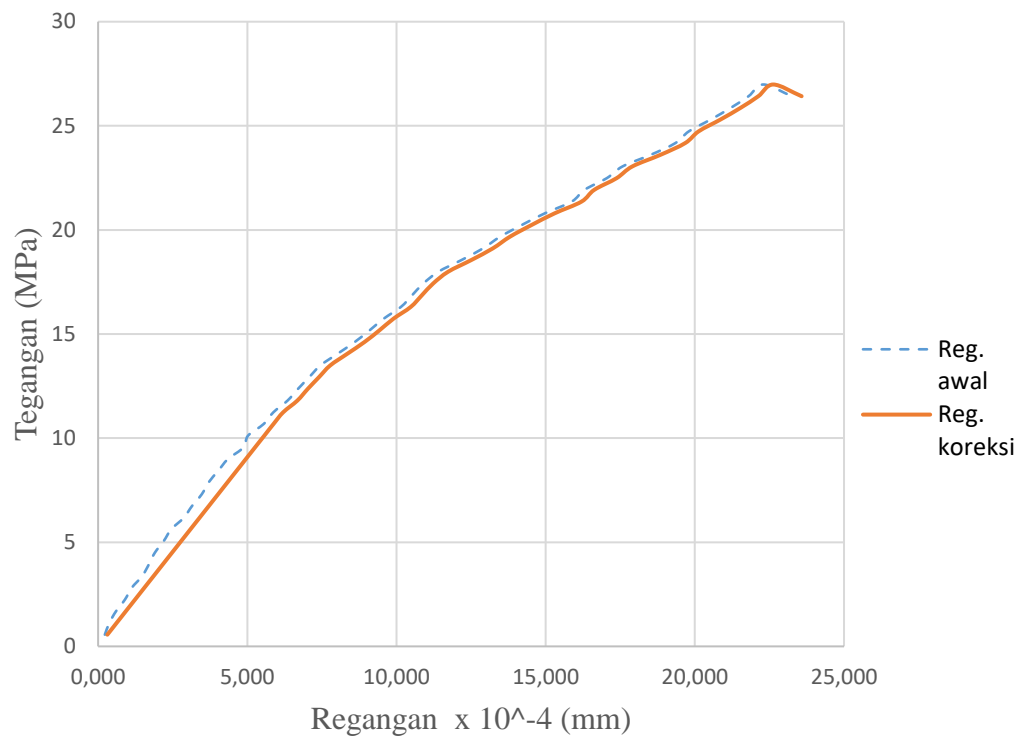
**Gambar L-7.2 Beton Silinder R3 Kombinasi R0**



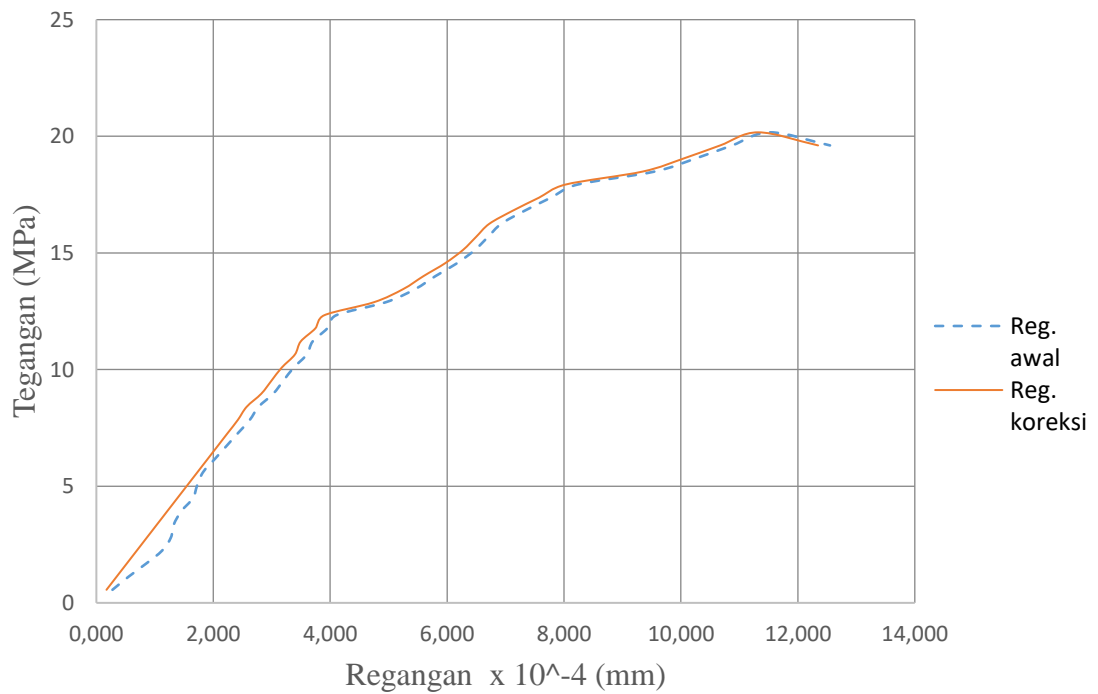
**Gambar L-7.3 Beton Silinder R4 Kombinasi R0**



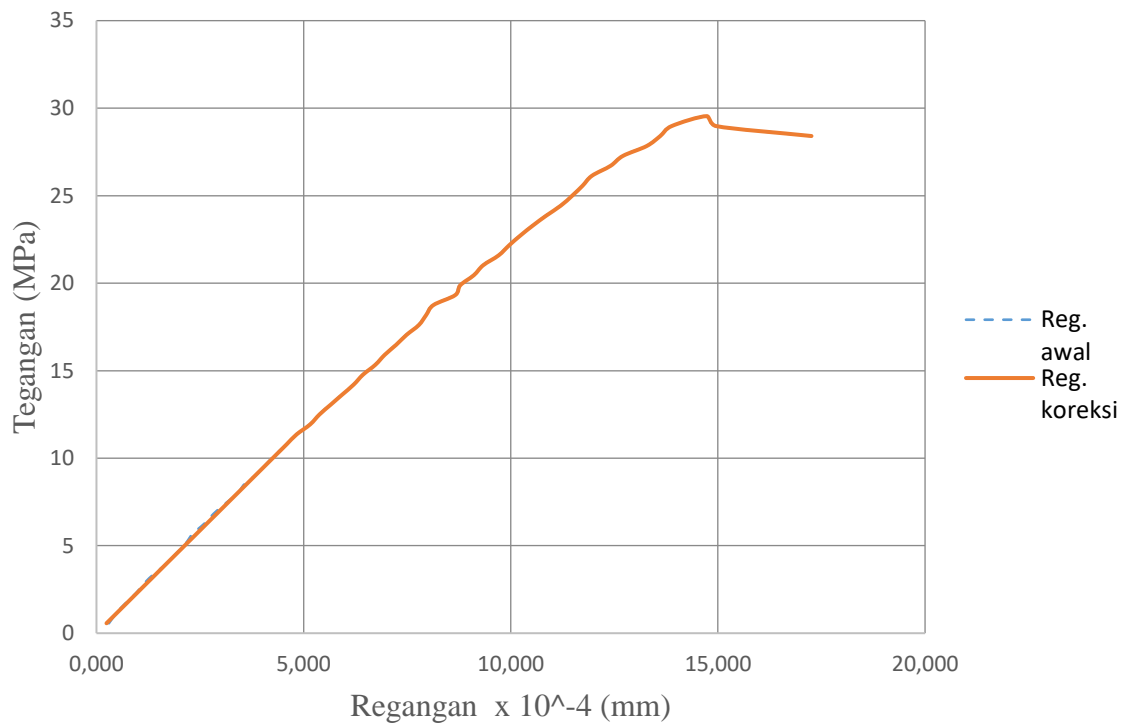
**Gambar L-7.4 Beton Silinder R8 Kombinasi R0**



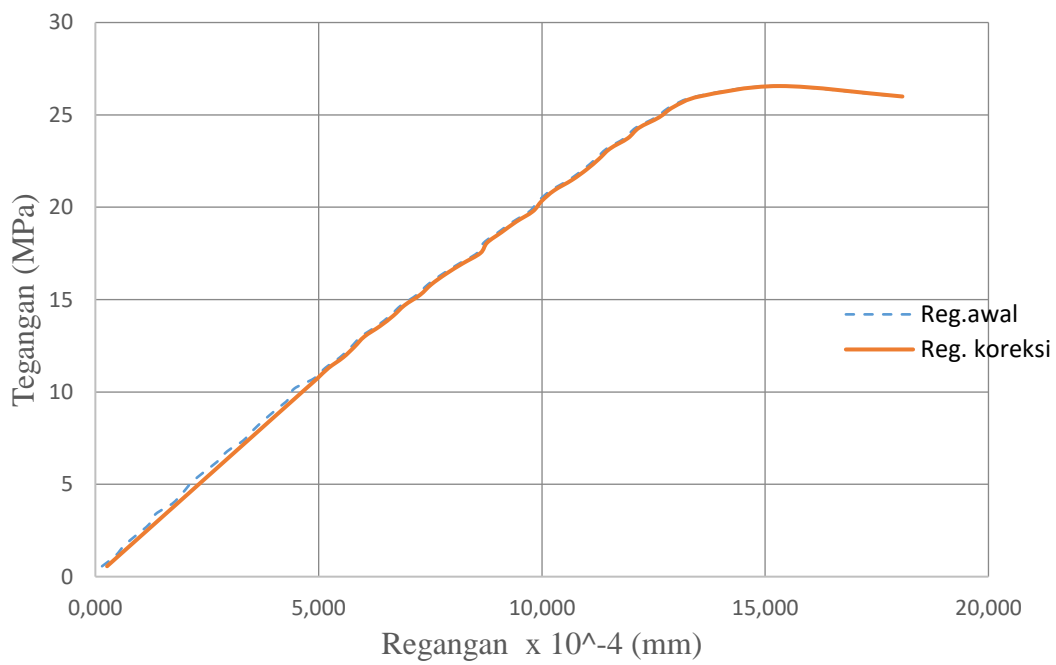
**Gambar L-7.5 Beton Silinder R9 Kombinasi R0**



**Gambar L-7.6 Beton Silinder R11 Kombinasi R60**

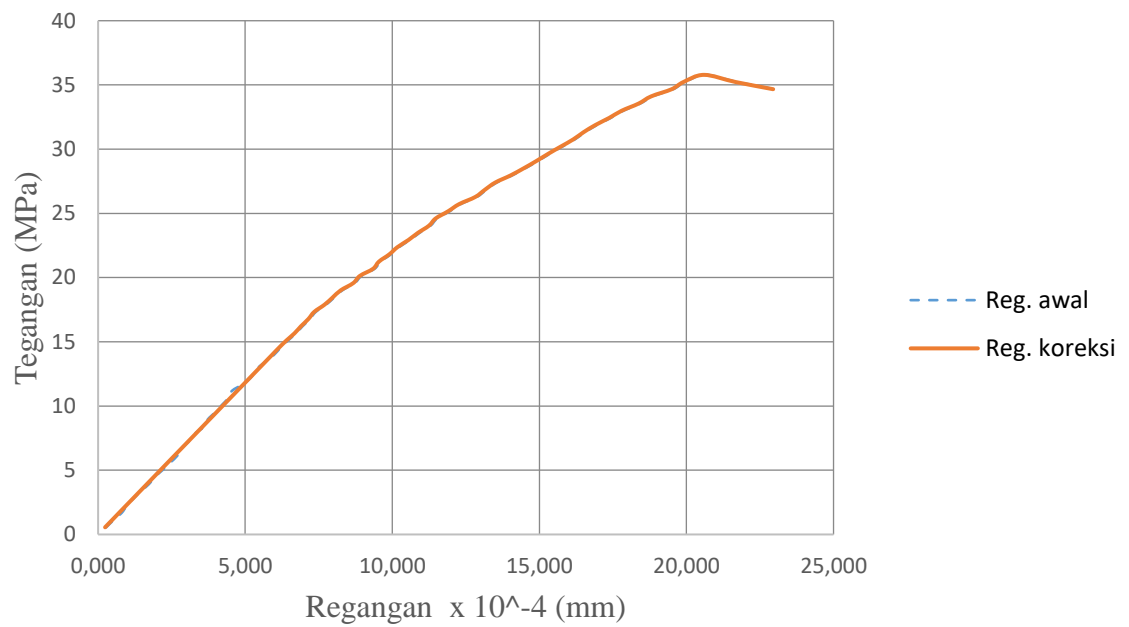


**Gambar L-7.7 Beton Silinder R13 Kombinasi R0**

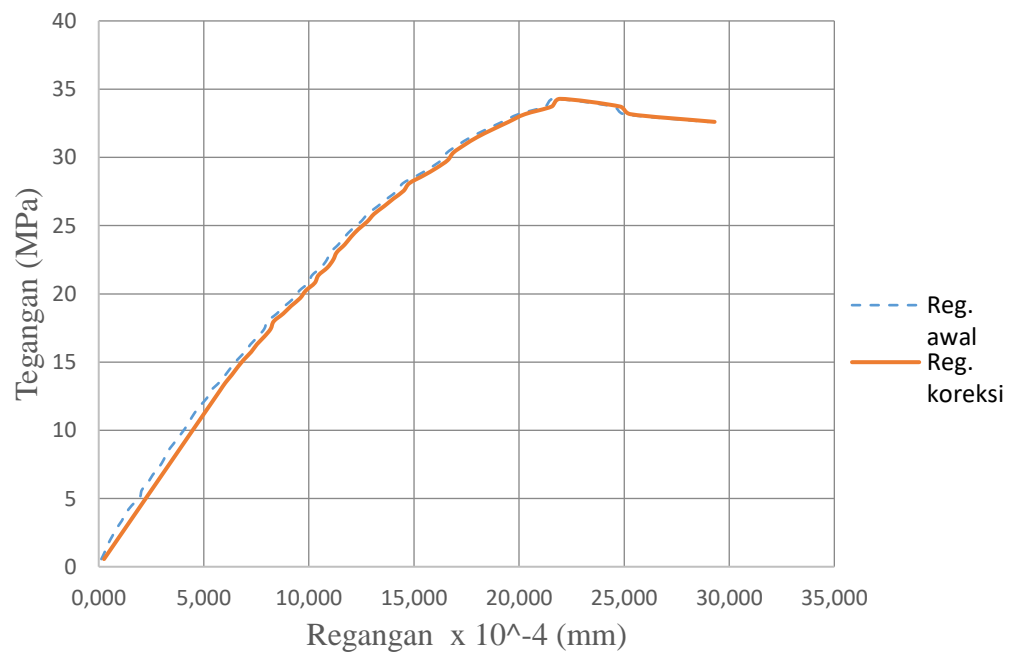


**Gambar L-7.8 Beton Silinder R15 Kombinasi R60**

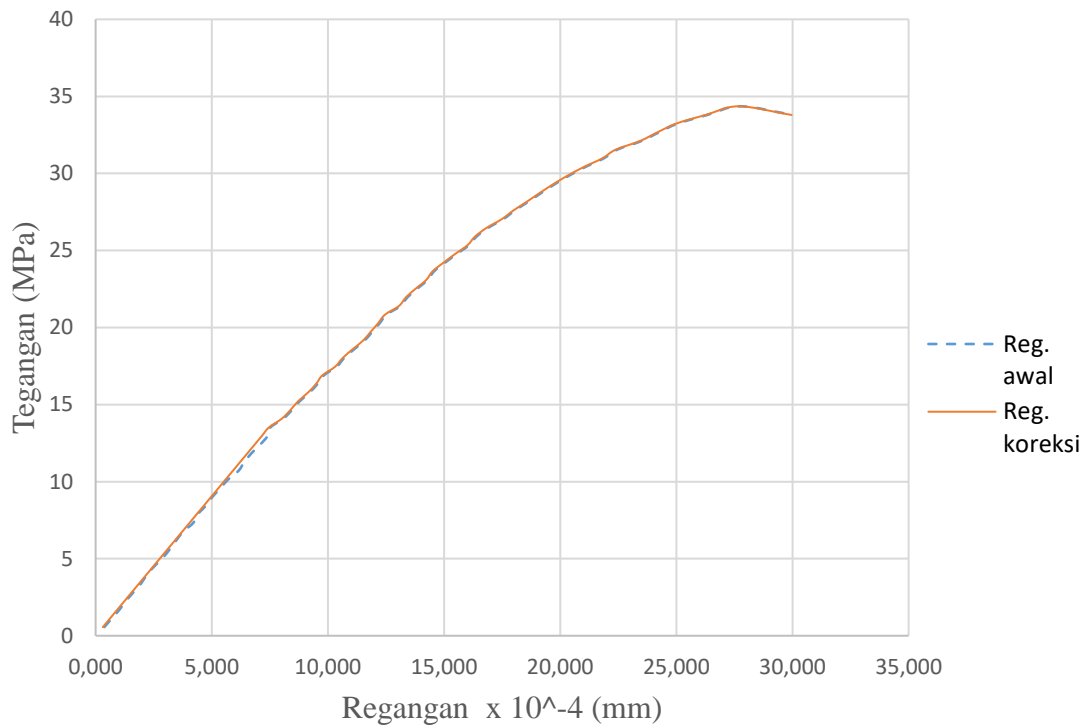




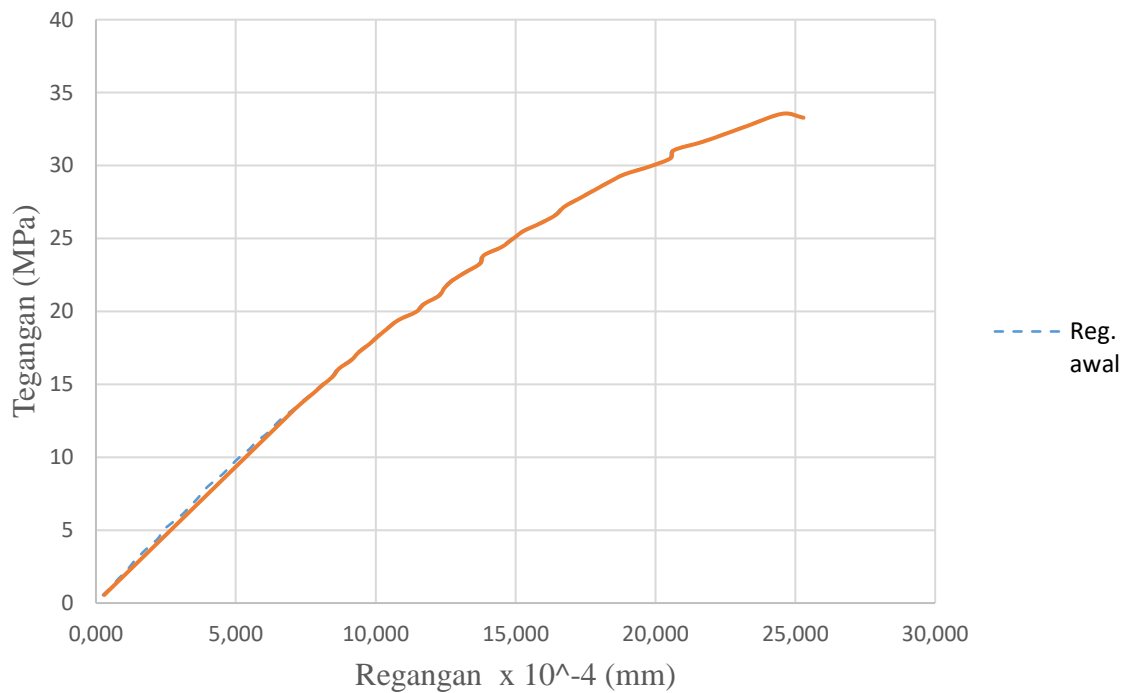
**Gambar L-7.9 Beton Silinder R18 Kombinasi R0**



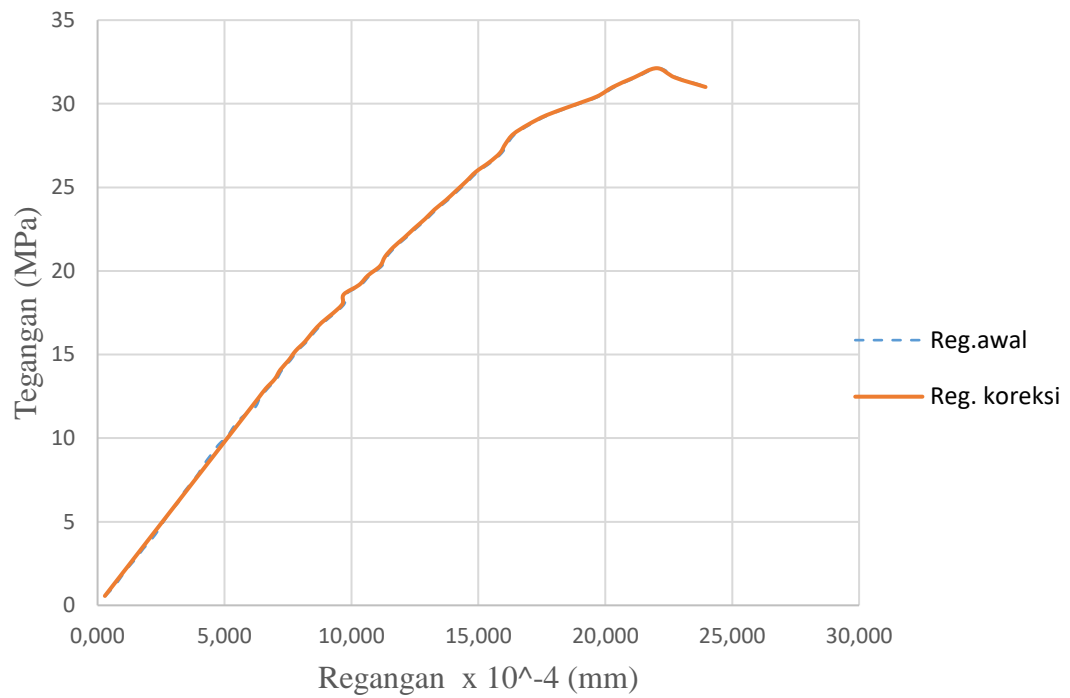
**Gambar L-7.10 Beton Silinder R19 Kombinasi R60**



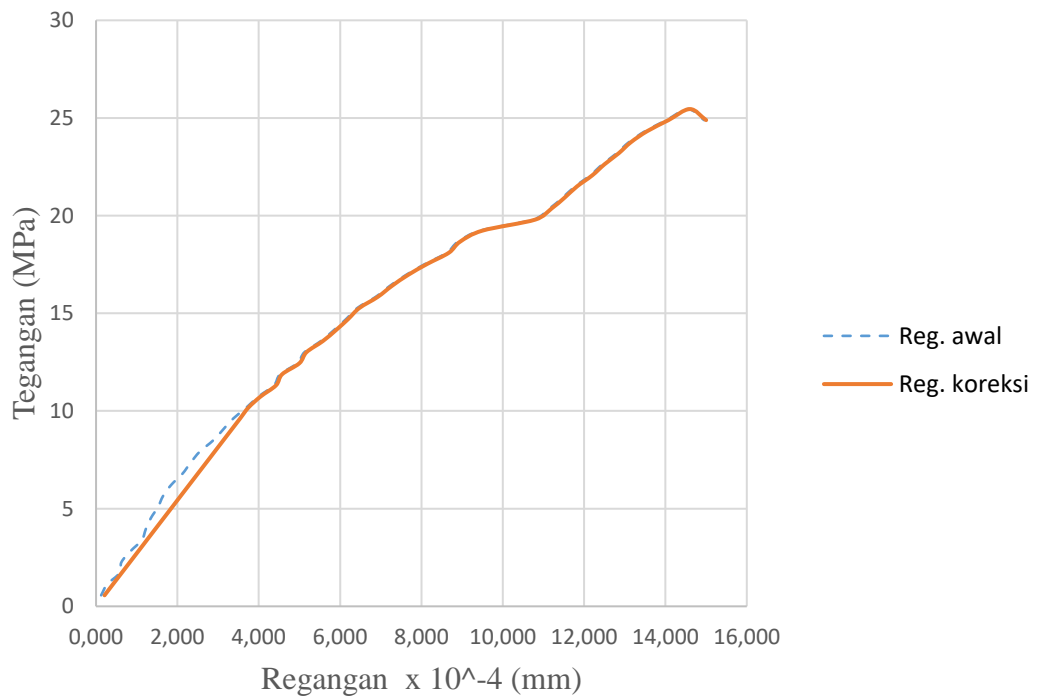
**Gambar L-7.11 Beton Silinder R1 Kombinasi R70**



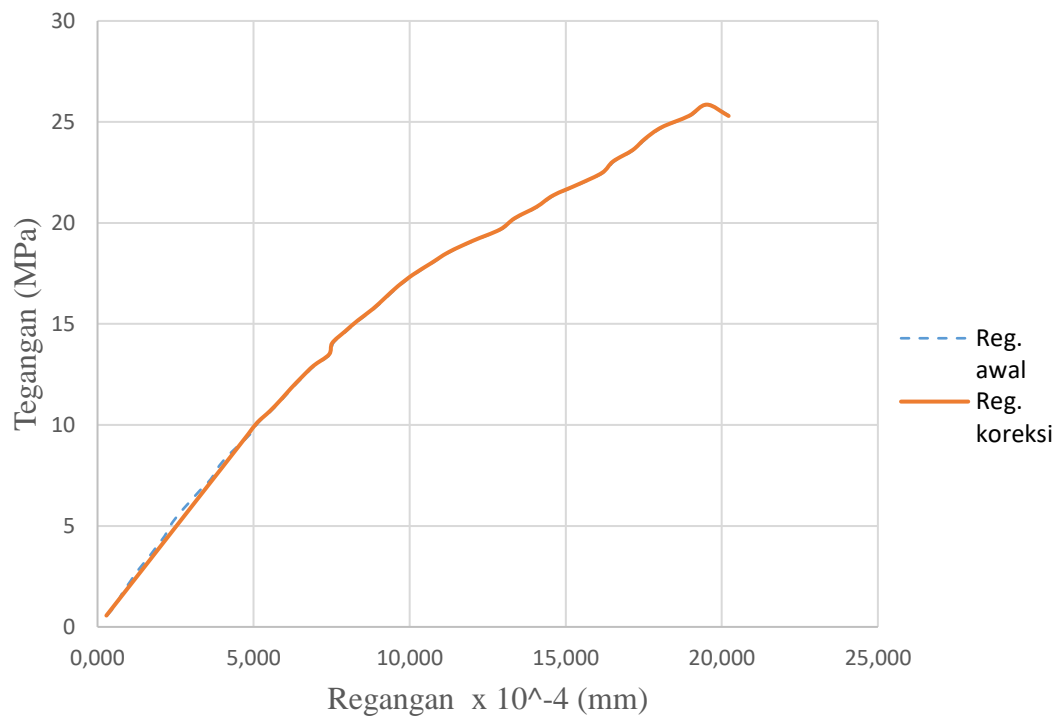
**Gambar L-7.12 Beton Silinder R3 Kombinasi R70**



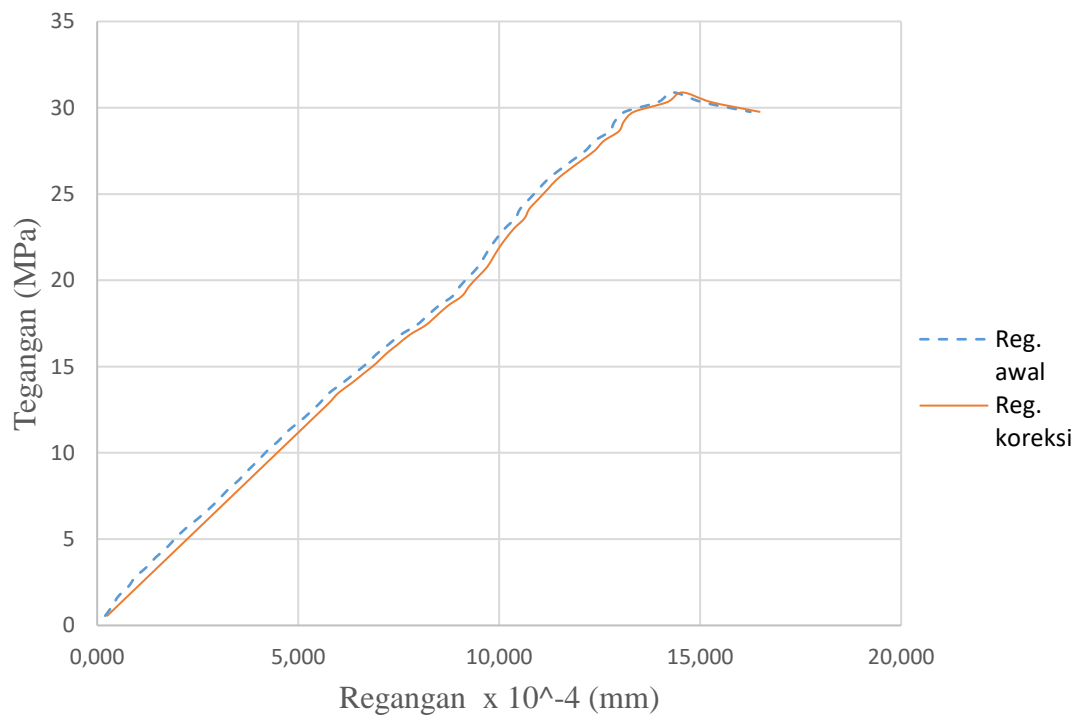
**Gambar L-7.13 Beton Silinder R4 Kombinasi R70**



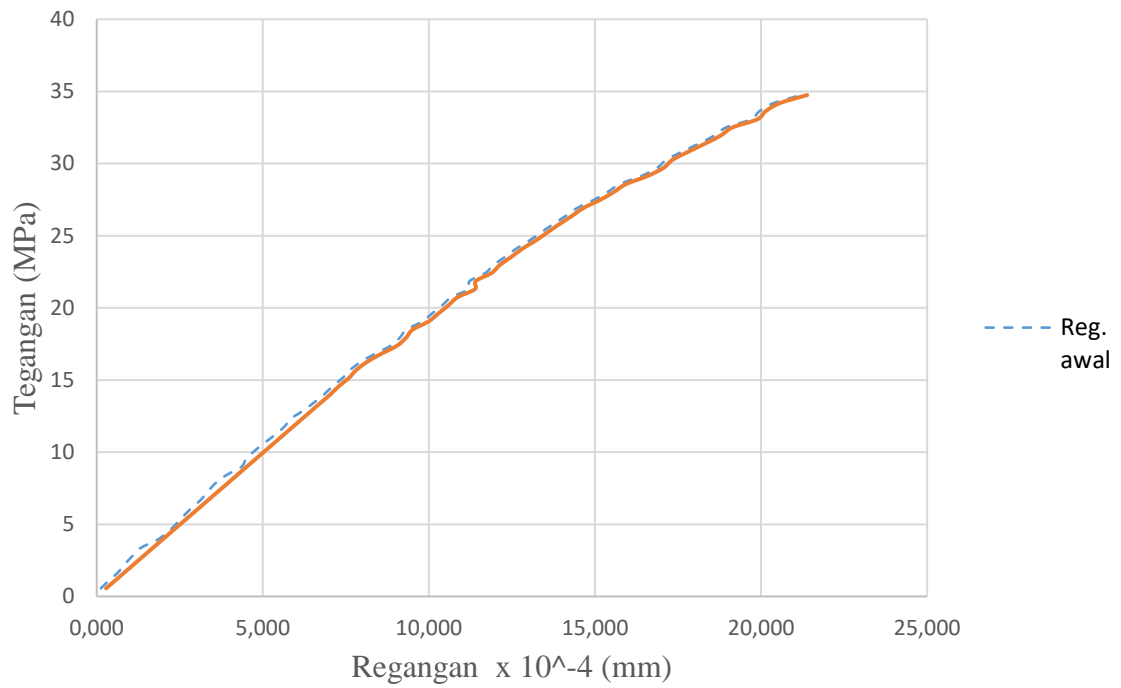
**Gambar L-7.14 Beton Silinder R8 Kombinasi R70**



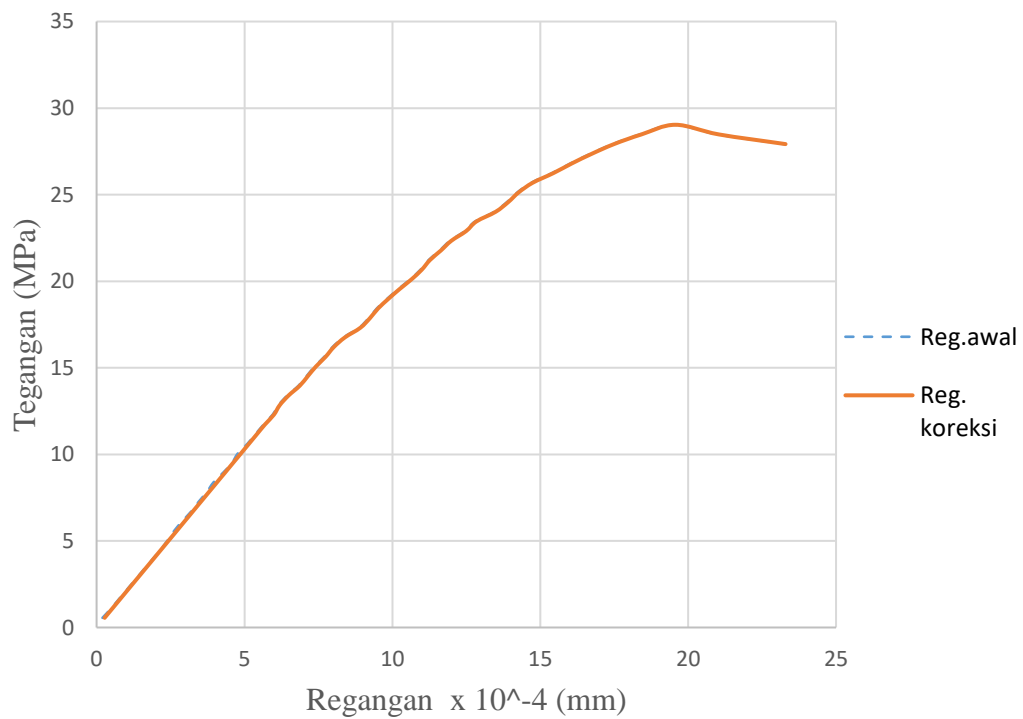
**Gambar L-7.15 Beton Silinder R9 Kombinasi R70**



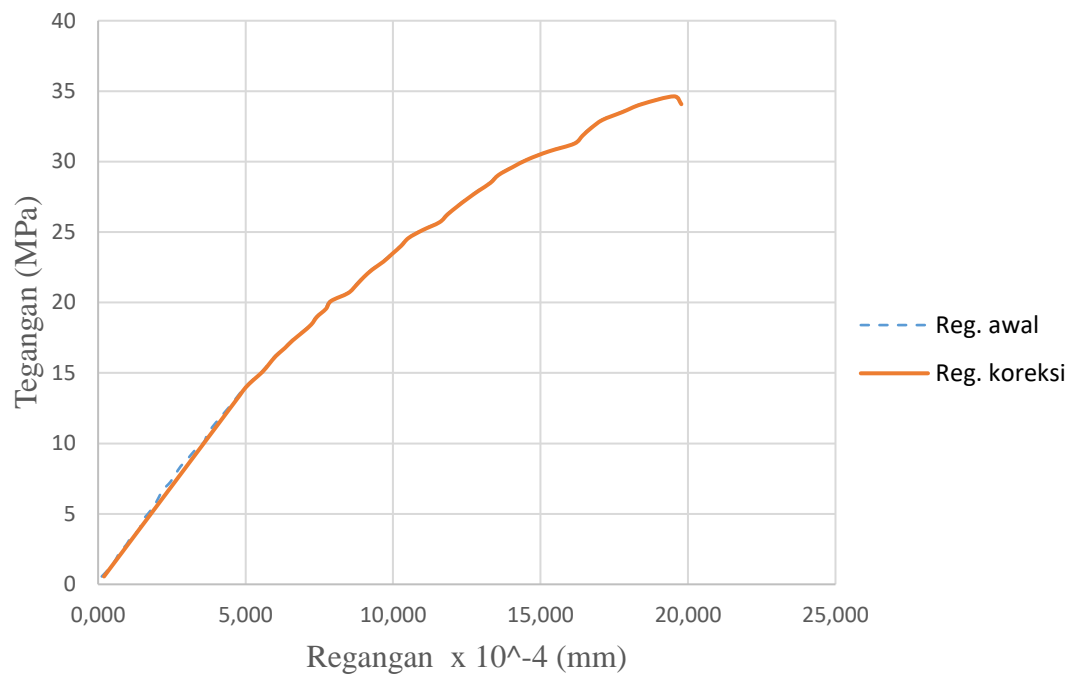
**Gambar L-7.16 Beton Silinder R11 Kombinasi R80**



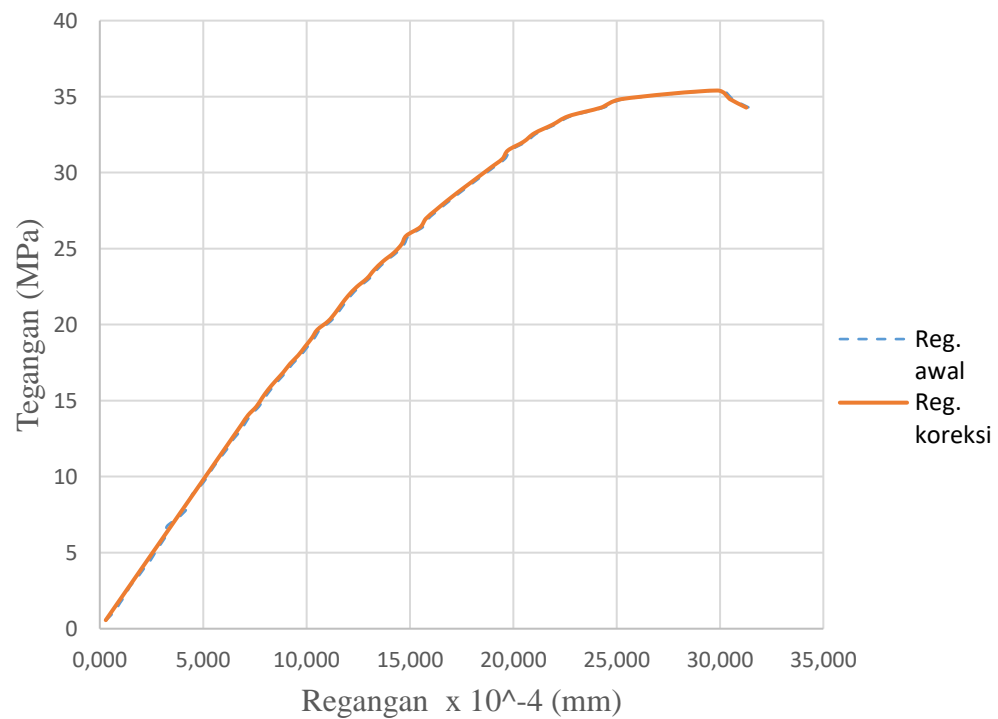
**Gambar L-7.17 Beton Silinder R12 Kombinasi R80**



**Gambar L-7.18 Beton Silinder R14 Kombinasi R80**

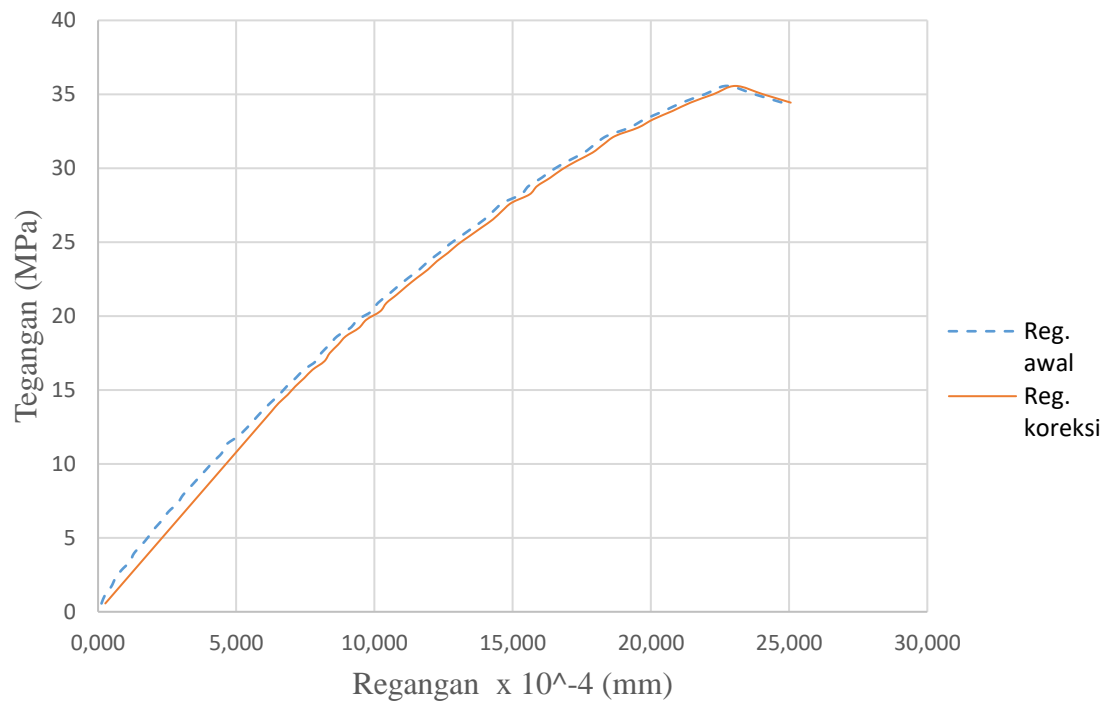


**Gambar L-7.19 Beton Silinder R18 Kombinasi R80**

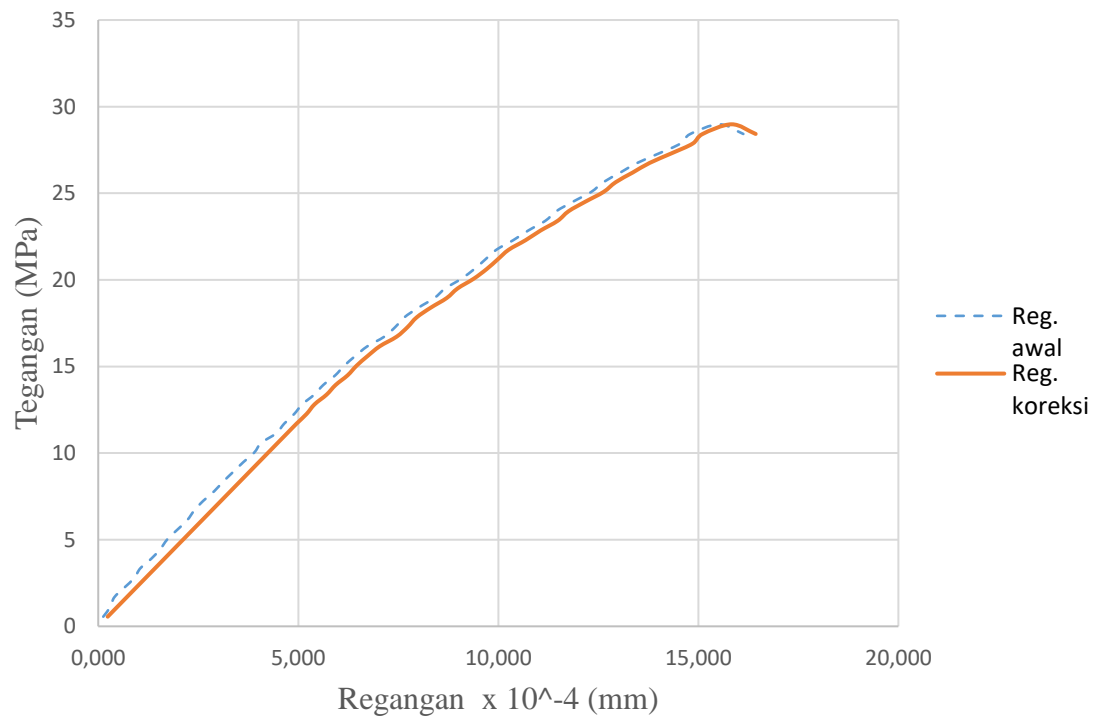


**Gambar L-7.20 Beton Silinder R19 Kombinasi R80**

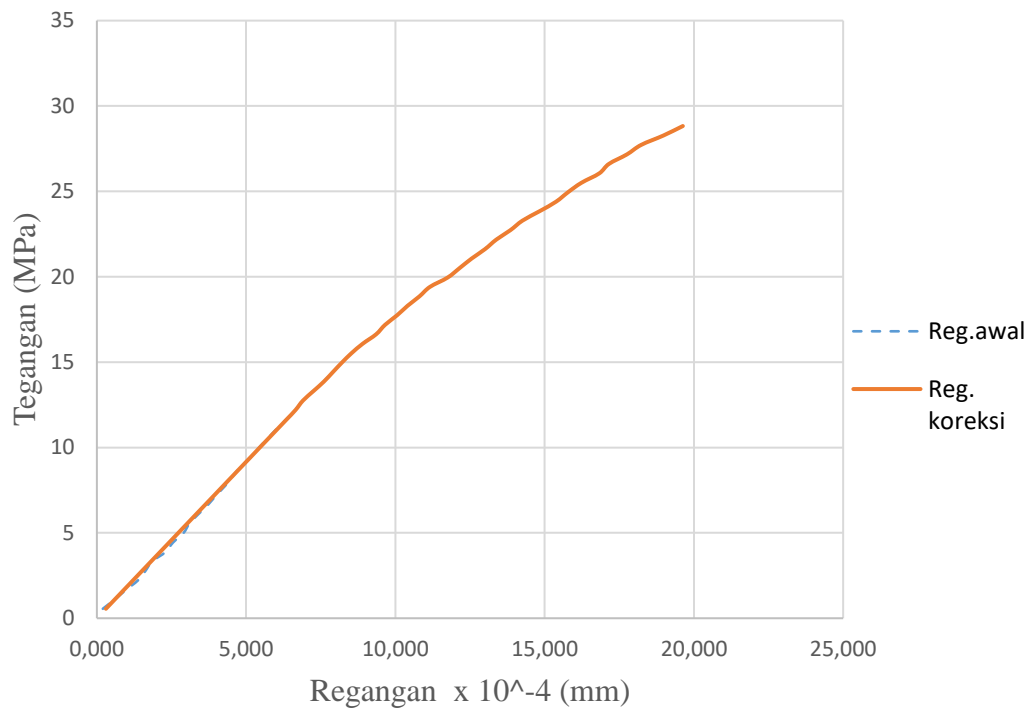




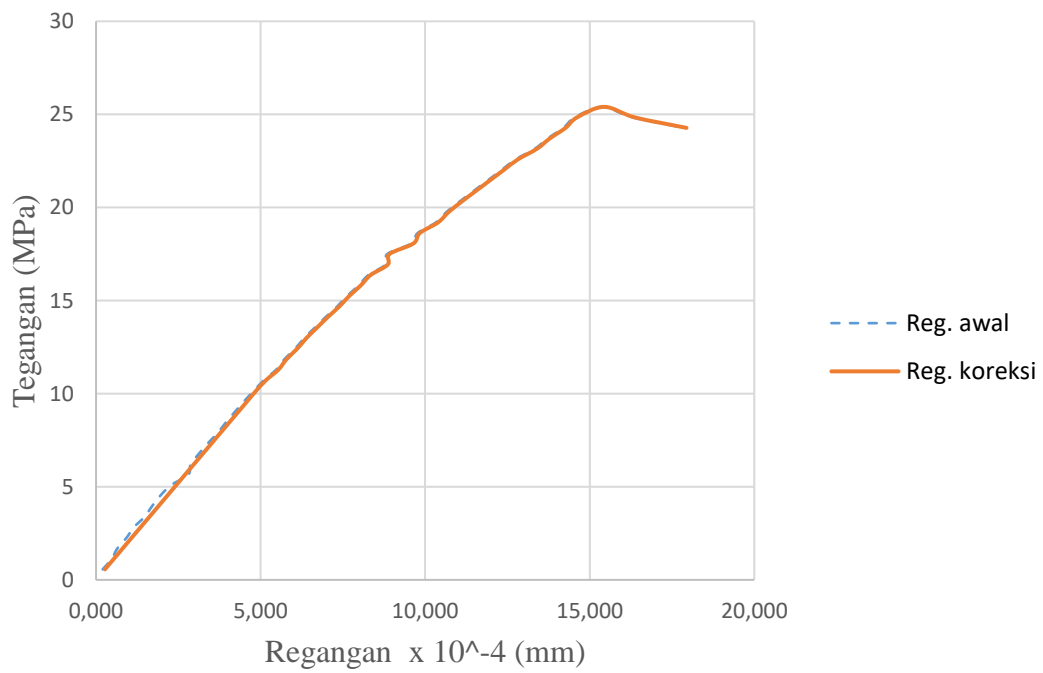
**Gambar L-7.21 Beton Silinder R21 Kombinasi R90**



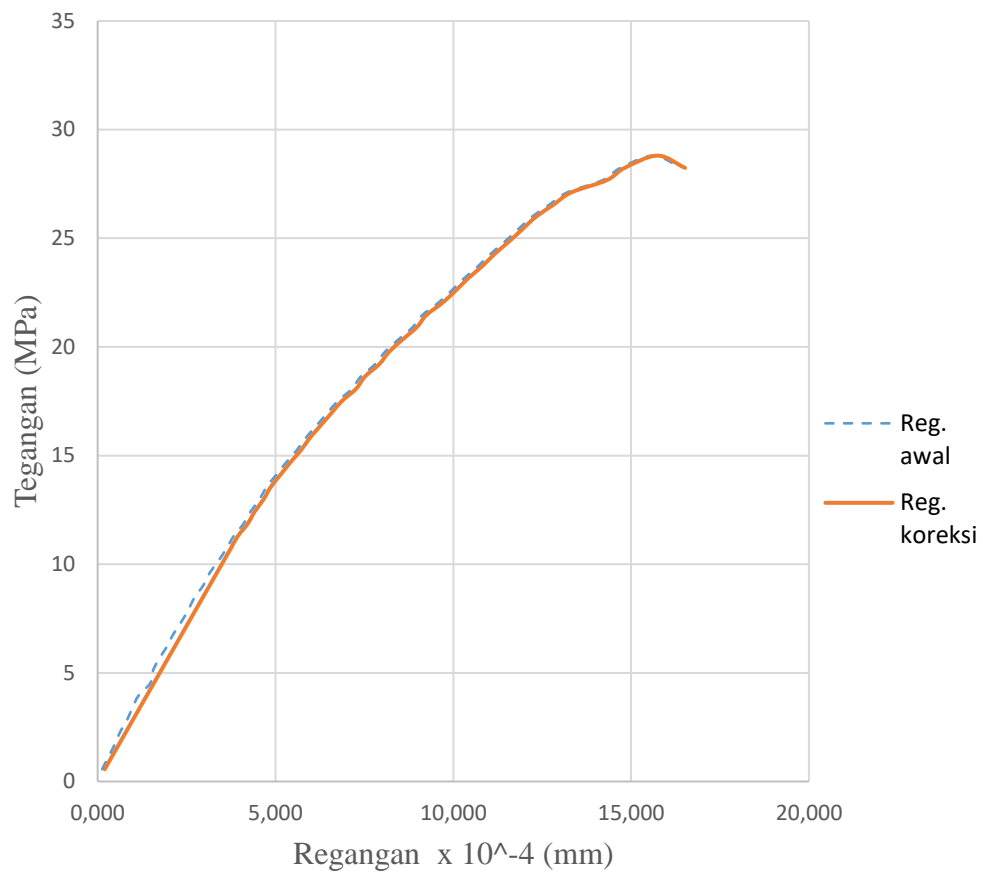
**Gambar L-7.22 Beton Silinder R22 Kombinasi R90**



**Gambar L-7.23 Beton Silinder R23 Kombinasi R90**



**Gambar L-7.24 Beton Silinder R24 Kombinasi R90**



**Gambar L-7.25 Beton Silinder R29 Kombinasi R90**