



**LAMPIRAN-LAMPIRAN**

## Lampiran 0 1. Surat Keterangan Pengambilan Data ke SMK PGRI 2 Badung



**KEMENTERIAN PENDIDIKAN TINGGI, SAINS DAN TEKNOLOGI**  
**UNIVERSITAS PENDIDIKAN GANESHA**  
**FAKULTAS TEKNIK DAN KEJURUAN**  
**JURUSAN TEKNOLOGI INDUSTRI**  
 Alamat Jalan Udayana Nomor 11, Singaraja 81116 Telepon (0362) 25571 Laman <http://fk.undiksha.ac.id>

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Nomor : 46/UN48.11.6/D103.00/2026      Singaraja, 23 Februari 2026  
 Perihal : Surat Ijin Pengambilan Data Penelitian

Yth. Kepala Sekolah SMK PGRI 2 BADUNG  
 Di Tempat

Dengan hormat,  
 Schubungan dengan proses penyelesaian Skripsi yang dilaksanakan oleh saudara mahasiswa:

|                         |                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------|
| Nama                    | : Putu Agus Hendrawan                                                                                   |
| NIM                     | : 2215071002                                                                                            |
| Semester                | : 8 ( delapan)                                                                                          |
| Program Studi           | : Pendidikan Teknik Mesin                                                                               |
| Jurusan                 | : Teknologi Industri                                                                                    |
| Fakultas                | : Teknik dan Kejuruan                                                                                   |
| Tempat Pengambilan Data | : SMK PGRI 2 BADUNG                                                                                     |
| Judul Penelitian        | : PERBEDAAN TORSI, DAYA, DAN KONSUMSI<br>BAHAN BAKAR SEPEDA MOTOR DENGAN<br>BERBAGAI BAHAN FILTER UDARA |
| Data yang diperlukan    | : Dyno Test.                                                                                            |

Bersama ini kami mohonkan kepada Bapak untuk berkenan memfasilitasi kebutuhan data untuk **Skripsi** mahasiswa yang bersangkutan.  
 Demikian surat keterangan ini dibuat dengan sebenarnya untuk dapat dipergunakan sebagaimana mestinya.

Mengetahui,  
 Ketua Jurusan Teknologi Industri



Ketut Udy Ariawan  
 NIP 197901232010121001

Sekretaris Jurusan Teknologi Industri



Gede Widayana  
 NIP 197301102006041002

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**Catatan :**

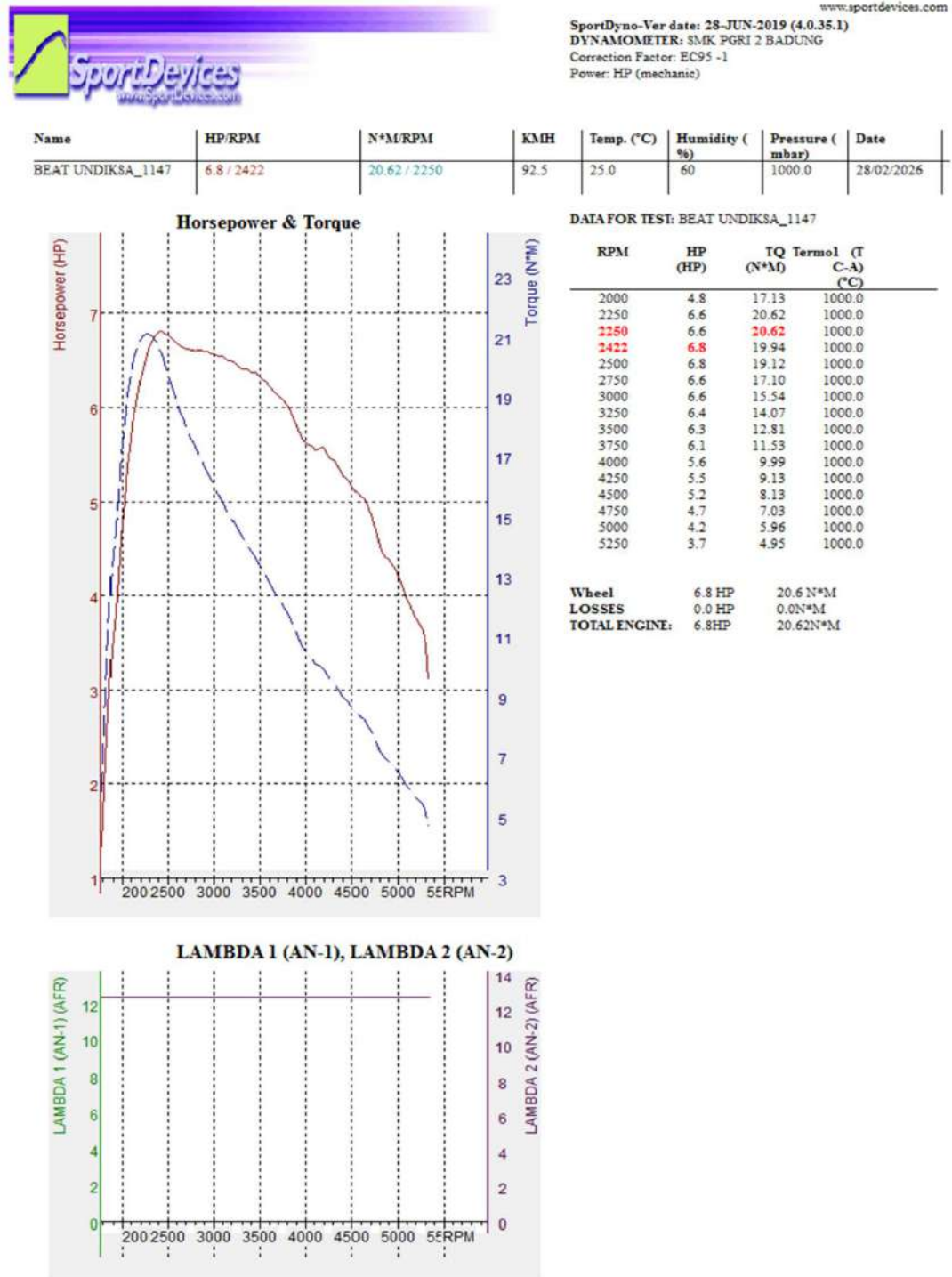
- UU ITE No. 11 Tahun 2008 Pasal 5 ayat 1 "Informasi Elektronik dan/atau Dokumen Elektronik dan/atau hasil cetaknya merupakan alat bukti hukum yang sah"
- Dokumen ini tertanda diandatangani secara elektronik menggunakan sertifikat elektronik yang diterbitkan BsrE
- Surat ini dapat dibuktikan keasliannya dengan menggunakan *qr code* yang telah tersedia



**Balai Sertifikasi Elektronik**

## Lampiran 0 2. Lembar Hasil Pengujian Dynotest Filter Udara Standar

### Hasil Pengujian ke-1 dari Filter Udara Standar

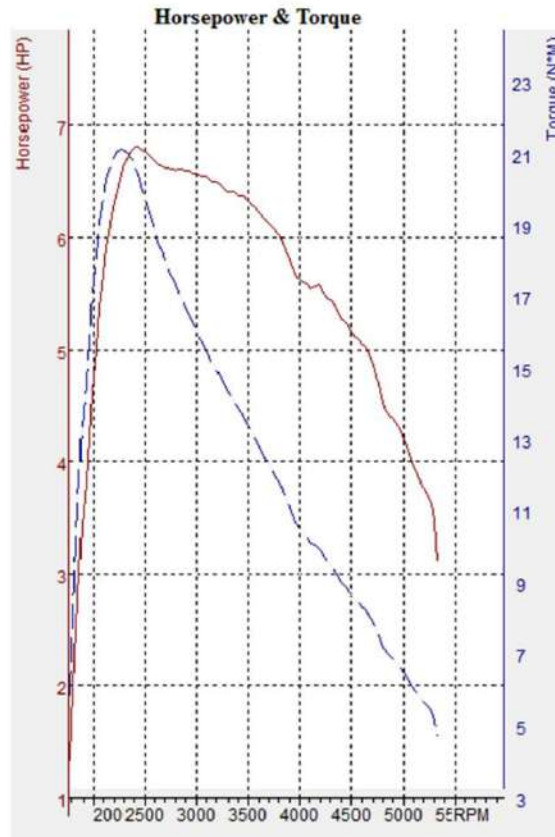


## Hasil Pengujian ke-2 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

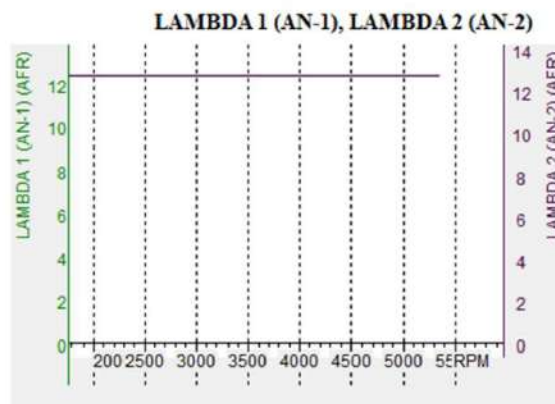
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1147 | 6.8 / 2422 | 20.62 / 2250 | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1147

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 4.8     | 17.13    | 1000.0              |
| 2250 | 6.6     | 20.62    | 1000.0              |
| 2280 | 6.6     | 20.62    | 1000.0              |
| 2422 | 6.8     | 19.94    | 1000.0              |
| 2500 | 6.8     | 19.12    | 1000.0              |
| 2750 | 6.6     | 17.10    | 1000.0              |
| 3000 | 6.6     | 15.54    | 1000.0              |
| 3250 | 6.4     | 14.07    | 1000.0              |
| 3500 | 6.3     | 12.81    | 1000.0              |
| 3750 | 6.1     | 11.53    | 1000.0              |
| 4000 | 5.6     | 9.99     | 1000.0              |
| 4250 | 5.5     | 9.13     | 1000.0              |
| 4500 | 5.2     | 8.13     | 1000.0              |
| 4750 | 4.7     | 7.03     | 1000.0              |
| 5000 | 4.2     | 5.96     | 1000.0              |
| 5250 | 3.7     | 4.95     | 1000.0              |

Wheel 6.8 HP 20.6 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 6.8 HP 20.62 N\*M

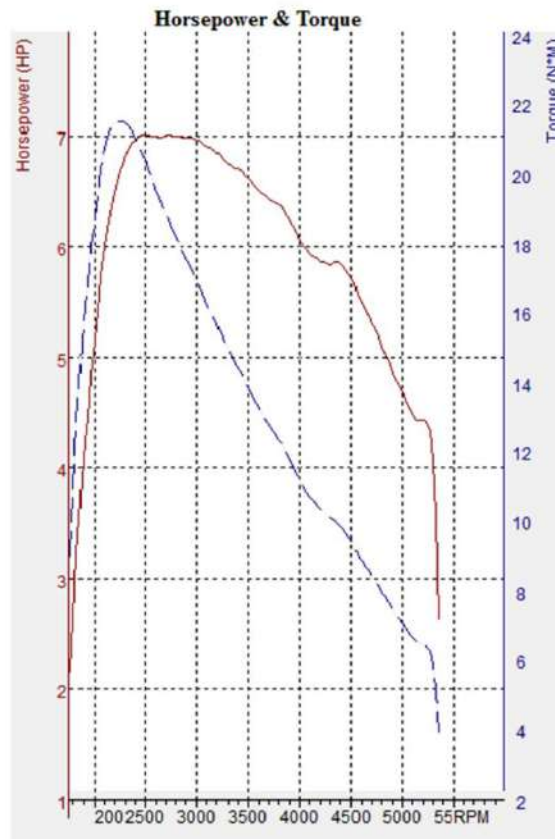


### Hasil Pengujian ke-3 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

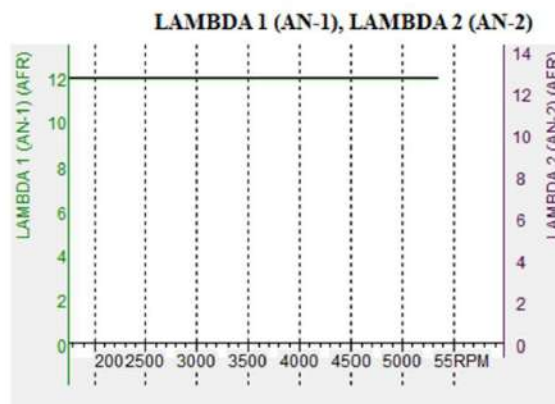
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1206 | 7.0 / 2474 | 21.11 / 2217 | 92.7 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1206

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.2     | 18.50    | 1000.0              |
| 2217 | 6.6     | 21.11    | 1000.0              |
| 2250 | 6.7     | 21.11    | 1000.0              |
| 2474 | 7.0     | 20.03    | 1000.0              |
| 2500 | 7.0     | 19.89    | 1000.0              |
| 2750 | 7.0     | 18.06    | 1000.0              |
| 3000 | 7.0     | 16.43    | 1000.0              |
| 3250 | 6.8     | 14.79    | 1000.0              |
| 3500 | 6.6     | 13.39    | 1000.0              |
| 3750 | 6.4     | 12.13    | 1000.0              |
| 4000 | 6.1     | 10.75    | 1000.0              |
| 4250 | 5.9     | 9.78     | 1000.0              |
| 4500 | 5.7     | 9.03     | 1000.0              |
| 4750 | 5.2     | 7.77     | 1000.0              |
| 5000 | 4.7     | 6.61     | 1000.0              |
| 5250 | 4.4     | 5.91     | 1000.0              |

Wheel 7.0 HP 21.1 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.0 HP 21.11 N\*M

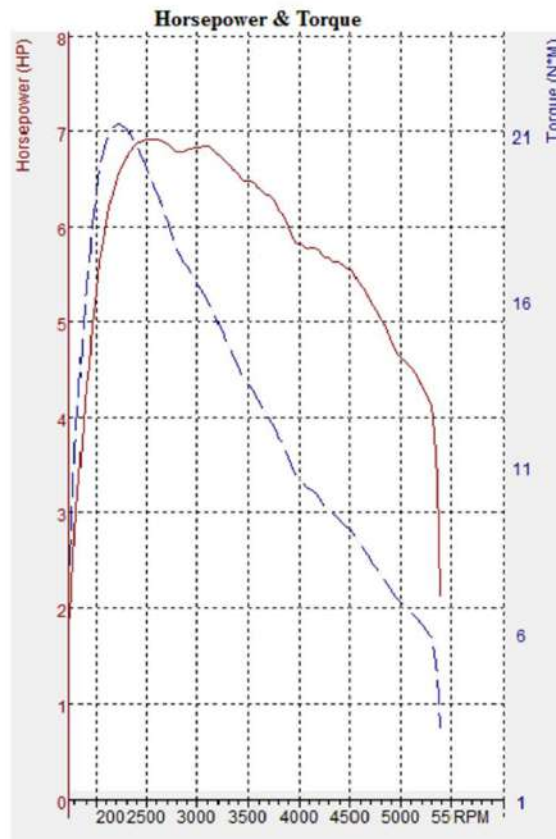


### Hasil Pengujian ke-4 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

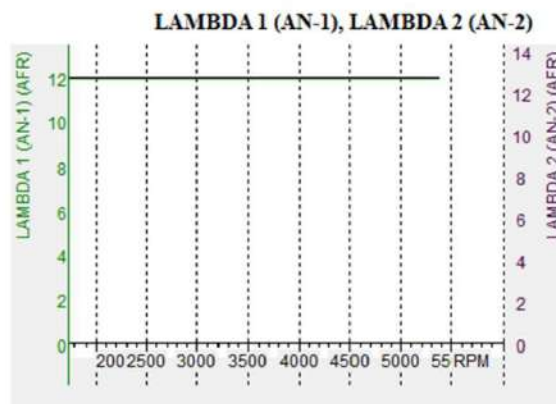
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1205 | 6.9 / 2522 | 20.97 / 2204 | 93.0 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1205

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.0     | 8.18     | 1000.0              |
| 2000 | 5.5     | 19.36    | 1000.0              |
| 2204 | 6.5     | 20.97    | 1000.0              |
| 2250 | 6.7     | 20.91    | 1000.0              |
| 2500 | 6.9     | 19.68    | 1000.0              |
| 2522 | 6.9     | 19.43    | 1000.0              |
| 2750 | 6.8     | 17.58    | 1000.0              |
| 3000 | 6.8     | 16.15    | 1000.0              |
| 3250 | 6.7     | 14.64    | 1000.0              |
| 3500 | 6.5     | 13.13    | 1000.0              |
| 3750 | 6.3     | 11.91    | 1000.0              |
| 4000 | 5.8     | 10.34    | 1000.0              |
| 4250 | 5.7     | 9.50     | 1000.0              |
| 4500 | 5.5     | 8.75     | 1000.0              |
| 4750 | 5.1     | 7.65     | 1000.0              |
| 5000 | 4.6     | 6.59     | 1000.0              |
| 5250 | 4.2     | 5.73     | 1000.0              |

Wheel 6.9 HP 21.0 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 6.9 HP 20.97 N\*M

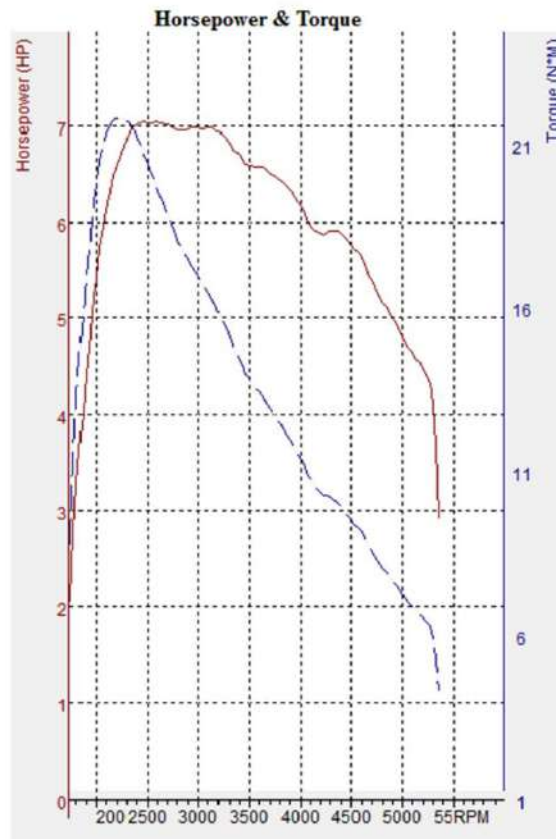


### Hasil Pengujian ke-5 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

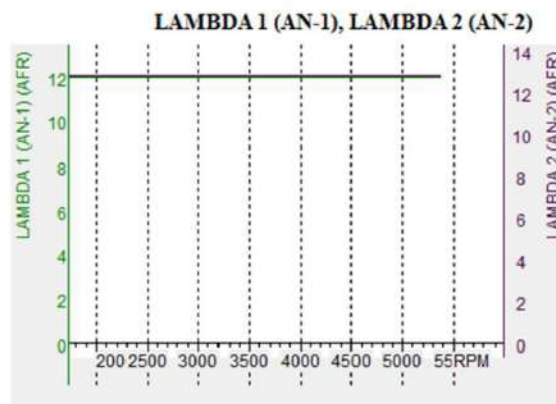
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1200 | 7.0 / 2562 | 21.36 / 2199 | 92.7 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1200

| RPM  | HP (HP) | TQ (N*M) | Tempol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.3     | 9.44     | 1000.0              |
| 2000 | 5.6     | 19.75    | 1000.0              |
| 2199 | 6.7     | 21.36    | 1000.0              |
| 2250 | 6.8     | 21.33    | 1000.0              |
| 2500 | 7.0     | 19.97    | 1000.0              |
| 2562 | 7.0     | 19.44    | 1000.0              |
| 2750 | 7.0     | 18.03    | 1000.0              |
| 3000 | 7.0     | 16.48    | 1000.0              |
| 3250 | 6.9     | 15.02    | 1000.0              |
| 3500 | 6.6     | 13.37    | 1000.0              |
| 3750 | 6.5     | 12.27    | 1000.0              |
| 4000 | 6.2     | 10.95    | 1000.0              |
| 4250 | 5.9     | 9.83     | 1000.0              |
| 4500 | 5.7     | 9.08     | 1000.0              |
| 4750 | 5.3     | 7.86     | 1000.0              |
| 5000 | 4.8     | 6.82     | 1000.0              |
| 5250 | 4.4     | 5.92     | 1000.0              |

Wheel 7.0 HP 21.4 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.0 HP 21.36 N\*M

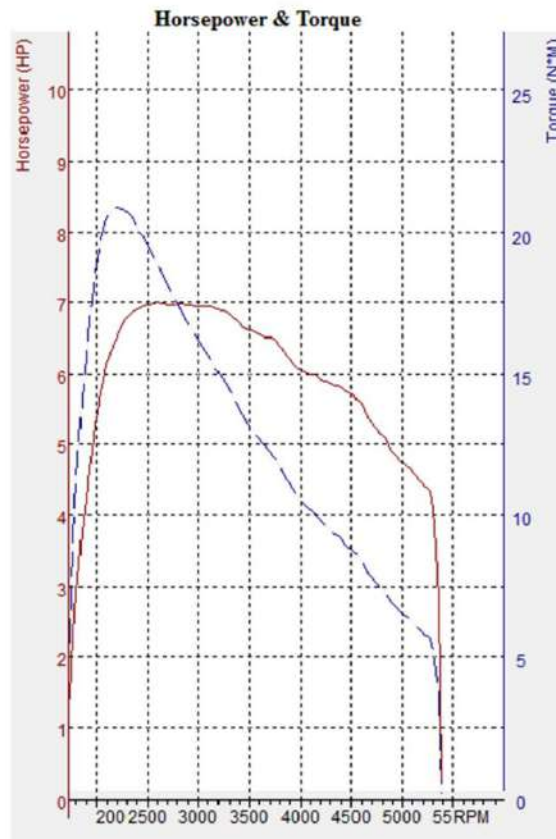


## Hasil Pengujian ke-6 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

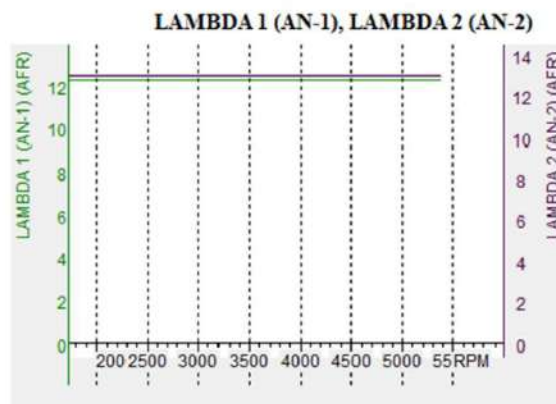
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1183 | 7.0 / 2578 | 21.14 / 2172 | 92.7 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1183

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 1.7     | 6.78     | 1000.0              |
| 2000 | 5.5     | 19.35    | 1000.0              |
| 2172 | 6.5     | 21.14    | 1000.0              |
| 2250 | 6.7     | 21.10    | 1000.0              |
| 2500 | 7.0     | 19.76    | 1000.0              |
| 2578 | 7.0     | 19.16    | 1000.0              |
| 2750 | 7.0     | 17.96    | 1000.0              |
| 3000 | 6.9     | 16.37    | 1000.0              |
| 3250 | 6.9     | 14.96    | 1000.0              |
| 3500 | 6.6     | 13.39    | 1000.0              |
| 3750 | 6.5     | 12.24    | 1000.0              |
| 4000 | 6.1     | 10.76    | 1000.0              |
| 4250 | 5.9     | 9.85     | 1000.0              |
| 4500 | 5.7     | 9.03     | 1000.0              |
| 4750 | 5.2     | 7.76     | 1000.0              |
| 5000 | 4.7     | 6.72     | 1000.0              |
| 5250 | 4.4     | 5.92     | 1000.0              |

Wheel 7.0 HP 21.1 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.0 HP 21.14 N\*M

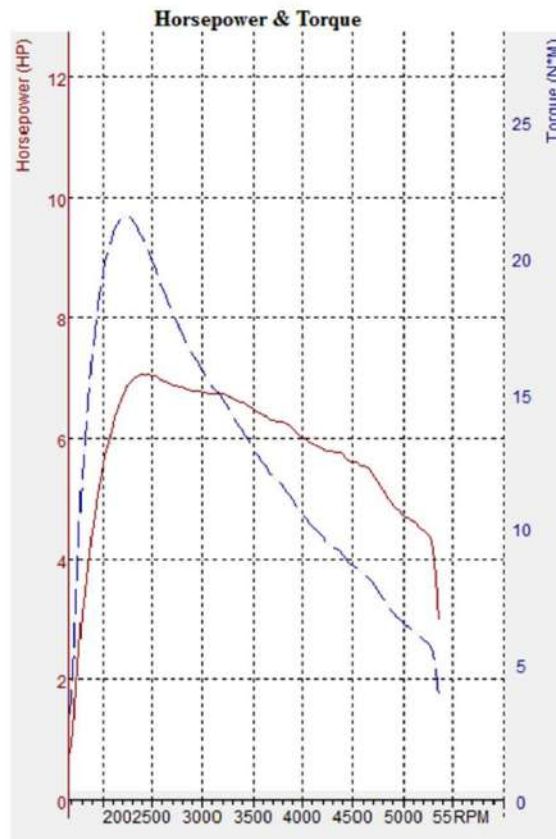


### Hasil Pengujian ke-7 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

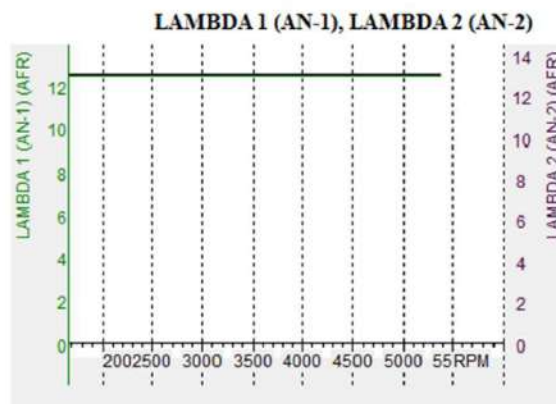
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1169 | 7.1 / 2431 | 21.74 / 2213 | 92.8 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1169

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.3     | 9.46     | 1000.0              |
| 2000 | 5.6     | 19.71    | 1000.0              |
| 2213 | 6.8     | 21.74    | 1000.0              |
| 2250 | 6.9     | 21.70    | 1000.0              |
| 2431 | 7.1     | 20.49    | 1000.0              |
| 2500 | 7.0     | 20.03    | 1000.0              |
| 2750 | 6.9     | 17.68    | 1000.0              |
| 3000 | 6.8     | 15.98    | 1000.0              |
| 3250 | 6.7     | 14.64    | 1000.0              |
| 3500 | 6.5     | 13.09    | 1000.0              |
| 3750 | 6.3     | 11.91    | 1000.0              |
| 4000 | 6.0     | 10.64    | 1000.0              |
| 4250 | 5.8     | 9.65     | 1000.0              |
| 4500 | 5.6     | 8.84     | 1000.0              |
| 4750 | 5.2     | 7.85     | 1000.0              |
| 5000 | 4.7     | 6.64     | 1000.0              |
| 5250 | 4.4     | 5.91     | 1000.0              |

Wheel 7.1 HP 21.7 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.74 N\*M

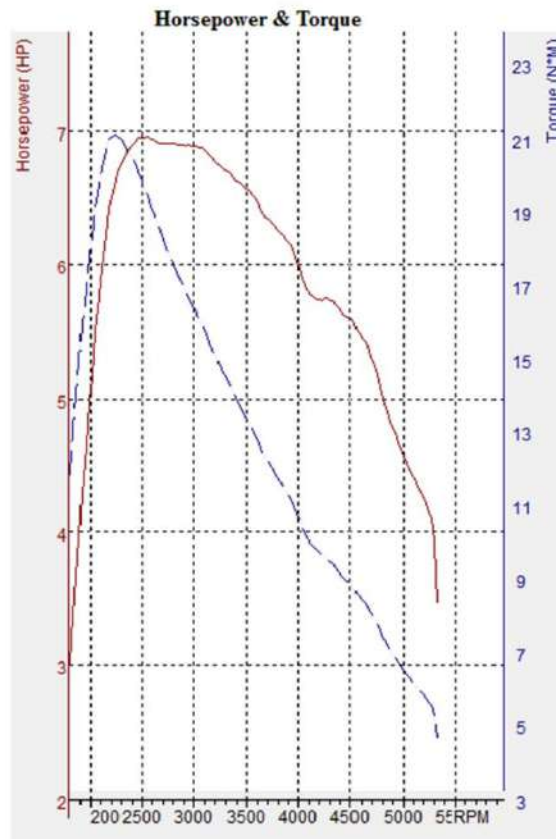


### Hasil Pengujian ke-8 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

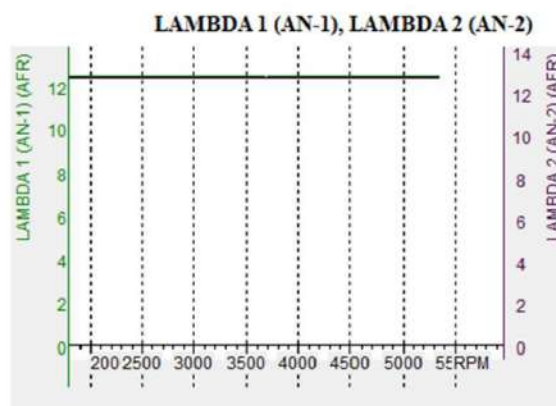
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1151 | 7.0 / 2523 | 21.12 / 2222 | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1151

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.2     | 18.27    | 1000.0              |
| 2222 | 6.6     | 21.12    | 1000.0              |
| 2250 | 6.7     | 21.09    | 1000.0              |
| 2500 | 7.0     | 19.70    | 1000.0              |
| 2523 | 7.0     | 19.43    | 1000.0              |
| 2750 | 6.9     | 17.81    | 1000.0              |
| 3000 | 6.9     | 16.33    | 1000.0              |
| 3250 | 6.7     | 14.74    | 1000.0              |
| 3500 | 6.6     | 13.31    | 1000.0              |
| 3750 | 6.3     | 11.98    | 1000.0              |
| 4000 | 6.0     | 10.59    | 1000.0              |
| 4250 | 5.8     | 9.62     | 1000.0              |
| 4500 | 5.6     | 8.86     | 1000.0              |
| 4750 | 5.1     | 7.70     | 1000.0              |
| 5000 | 4.6     | 6.50     | 1000.0              |
| 5250 | 4.1     | 5.58     | 1000.0              |

Wheel: 7.0 HP      21.1 N\*M  
 LOSSES: 0.0 HP      0.0 N\*M  
 TOTAL ENGINE: 7.0 HP      21.12 N\*M

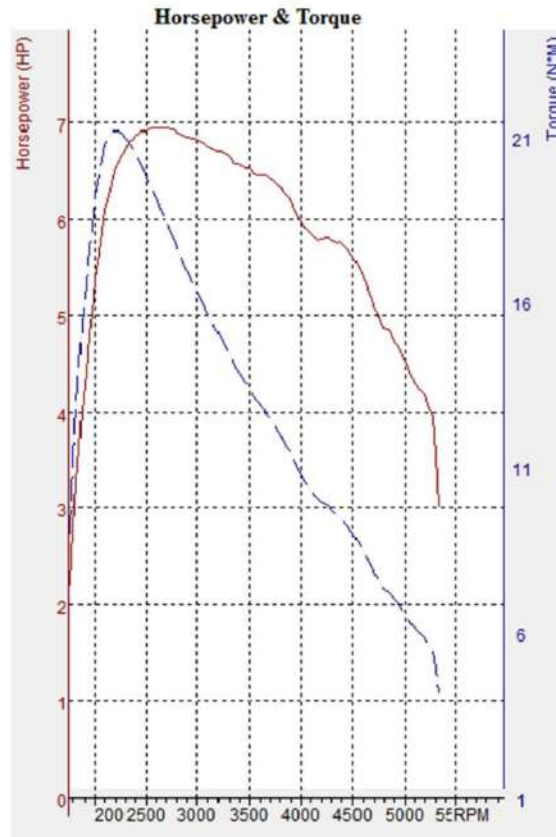


### Hasil Pengujian ke-9 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

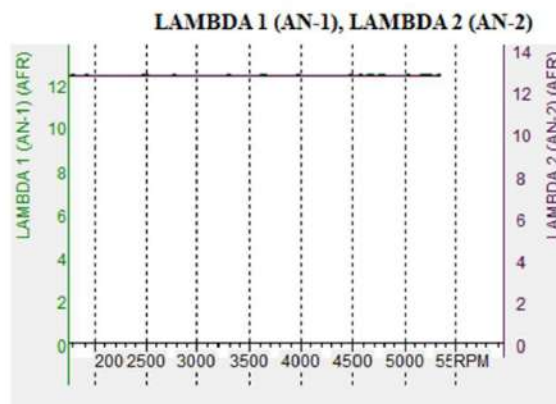
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1150 | 7.0 / 2664 | 21.08 / 2204 | 92.3 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1150

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.4     | 19.10    | 1000.0              |
| 2204 | 6.6     | 21.08    | 1000.0              |
| 2250 | 6.6     | 21.02    | 1000.0              |
| 2500 | 6.9     | 19.67    | 1000.0              |
| 2664 | 7.0     | 18.48    | 1000.0              |
| 2750 | 6.9     | 17.91    | 1000.0              |
| 3000 | 6.8     | 16.15    | 1000.0              |
| 3250 | 6.7     | 14.66    | 1000.0              |
| 3500 | 6.5     | 13.23    | 1000.0              |
| 3750 | 6.4     | 12.06    | 1000.0              |
| 4000 | 6.0     | 10.60    | 1000.0              |
| 4250 | 5.8     | 9.72     | 1000.0              |
| 4500 | 5.6     | 8.85     | 1000.0              |
| 4750 | 5.0     | 7.42     | 1000.0              |
| 5000 | 4.5     | 6.43     | 1000.0              |
| 5250 | 4.0     | 5.43     | 1000.0              |

Wheel: 7.0 HP    21.1 N\*M  
 LOSSES: 0.0 HP    0.0 N\*M  
 TOTAL ENGINE: 7.0 HP    21.08 N\*M

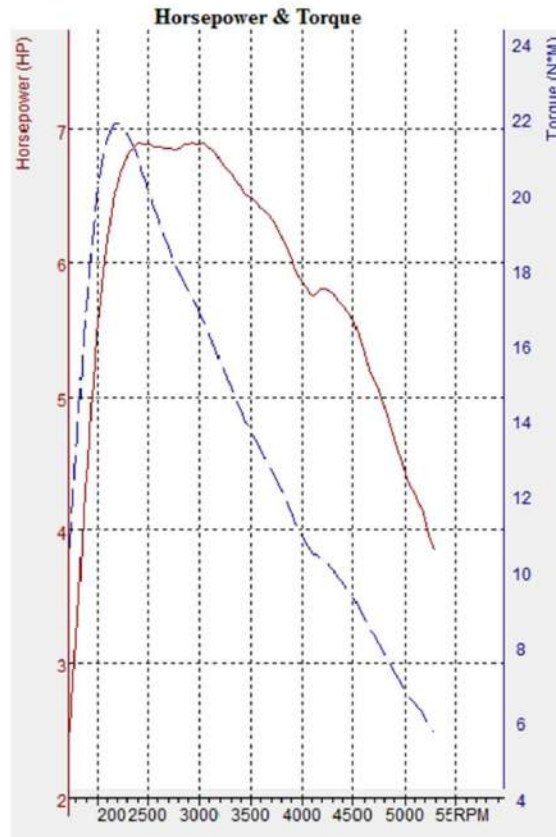


## Hasil Pengujian ke-10 dari Filter Udara Standar



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

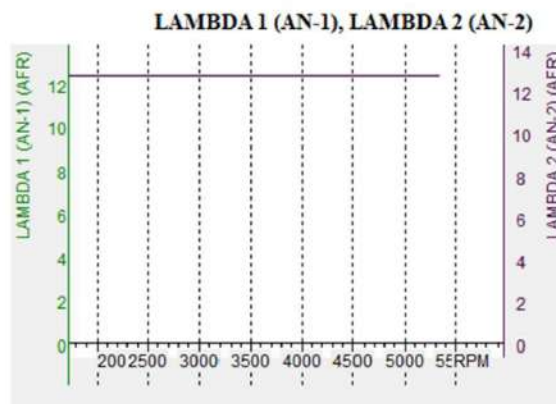
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1149 | 6.9 / 2400 | 21.36 / 2181 | 92.3 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1149

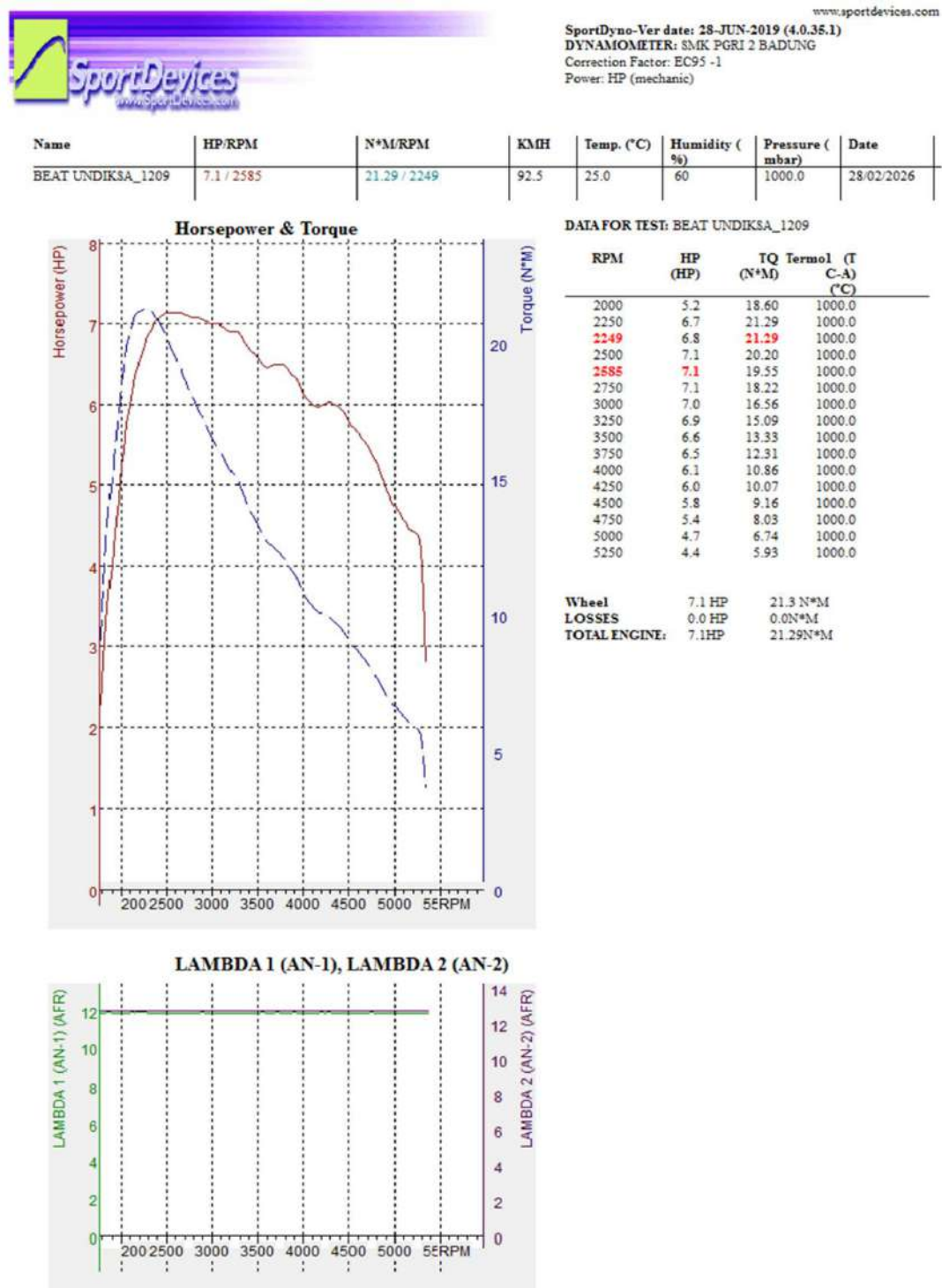
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.6     | 10.59    | 1000.0              |
| 2000 | 5.6     | 19.87    | 1000.0              |
| 2181 | 6.6     | 21.36    | 1000.0              |
| 2250 | 6.8     | 21.20    | 1000.0              |
| 2400 | 6.9     | 20.32    | 1000.0              |
| 2500 | 6.9     | 19.58    | 1000.0              |
| 2750 | 6.9     | 17.64    | 1000.0              |
| 3000 | 6.9     | 16.34    | 1000.0              |
| 3250 | 6.7     | 14.64    | 1000.0              |
| 3500 | 6.5     | 13.18    | 1000.0              |
| 3750 | 6.3     | 11.86    | 1000.0              |
| 4000 | 5.9     | 10.40    | 1000.0              |
| 4250 | 5.8     | 9.68     | 1000.0              |
| 4500 | 5.6     | 8.79     | 1000.0              |
| 4750 | 5.0     | 7.51     | 1000.0              |
| 5000 | 4.4     | 6.29     | 1000.0              |
| 5250 | 3.9     | 5.32     | 1000.0              |

Wheel 6.9 HP 21.4 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 6.9 HP 21.36 N\*M



### Lampiran 0 3. Lembar Pengujian Dynotest Filter Udara Modifikasi 1

#### Hasil Pengujian ke-1 dari Filter Udara Modifikasi 1



## Hasil Pengujian ke-2 dari Filter Udara Modifikasi 1



www.sportdevices.com

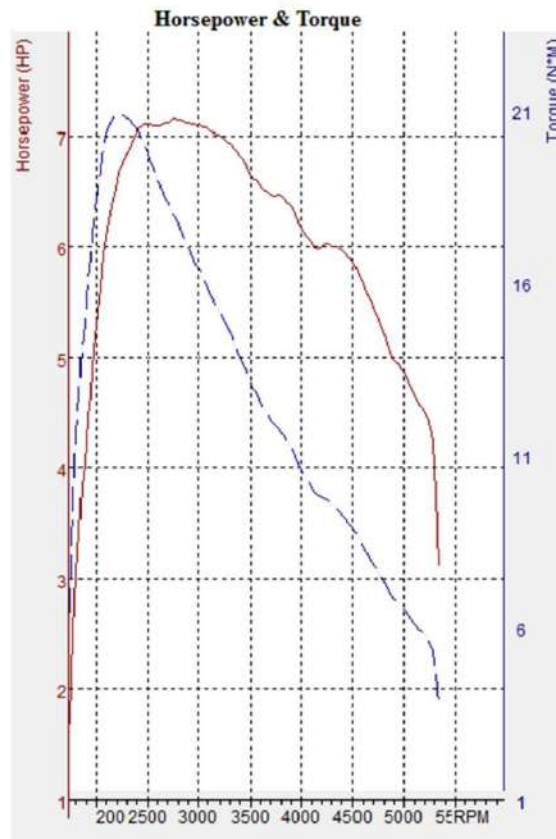
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

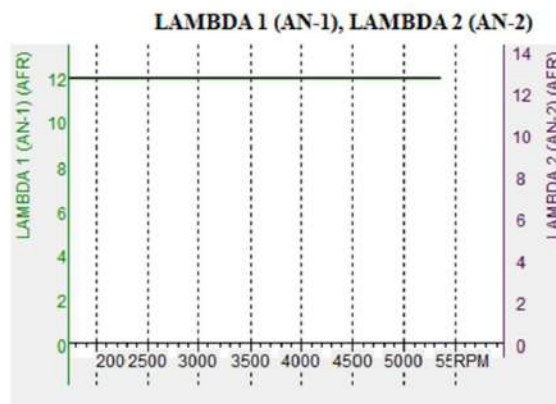
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1208 | 7.1 / 2755 | 21.32 / 2212 | 92.4 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1208

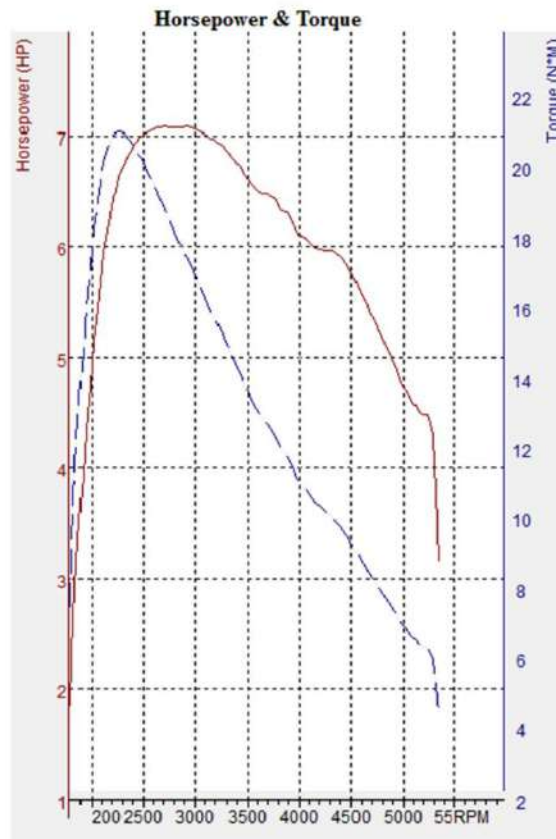
| RPM  | HP (HP) | TQ (N*M) | Tempol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 1.8     | 7.30     | 1000.0              |
| 2000 | 5.5     | 19.28    | 1000.0              |
| 2212 | 6.7     | 21.32    | 1000.0              |
| 2250 | 6.8     | 21.27    | 1000.0              |
| 2500 | 7.1     | 20.18    | 1000.0              |
| 2750 | 7.1     | 18.45    | 1000.0              |
| 2755 | 7.1     | 18.35    | 1000.0              |
| 3000 | 7.1     | 16.79    | 1000.0              |
| 3250 | 7.0     | 15.21    | 1000.0              |
| 3500 | 6.6     | 13.48    | 1000.0              |
| 3750 | 6.5     | 12.24    | 1000.0              |
| 4000 | 6.1     | 10.90    | 1000.0              |
| 4250 | 6.0     | 10.07    | 1000.0              |
| 4500 | 5.9     | 9.27     | 1000.0              |
| 4750 | 5.3     | 7.95     | 1000.0              |
| 5000 | 4.8     | 6.88     | 1000.0              |
| 5250 | 4.4     | 5.91     | 1000.0              |

Wheel 7.1 HP 21.3 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.32 N\*M



### Hasil Pengujian ke-3 dari Filter Udara Modifikasi 1

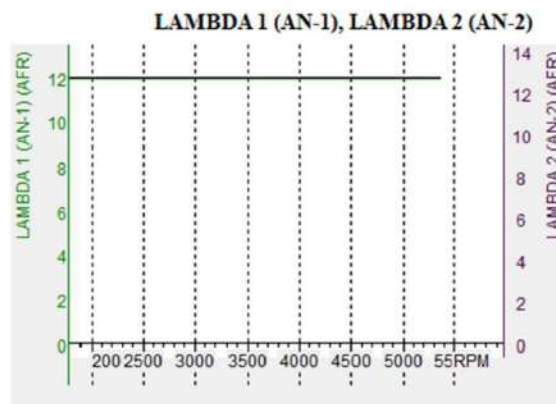
|  |            | www.sportdevices.com                                                                                                               |      |            |              |                 |            |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|------------|
|                                                                                   |            | SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |            |
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                            | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
| BEAT UNDIKSA_1207                                                                 | 7.1 / 2693 | 20.81 / 2241                                                                                                                       | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1207

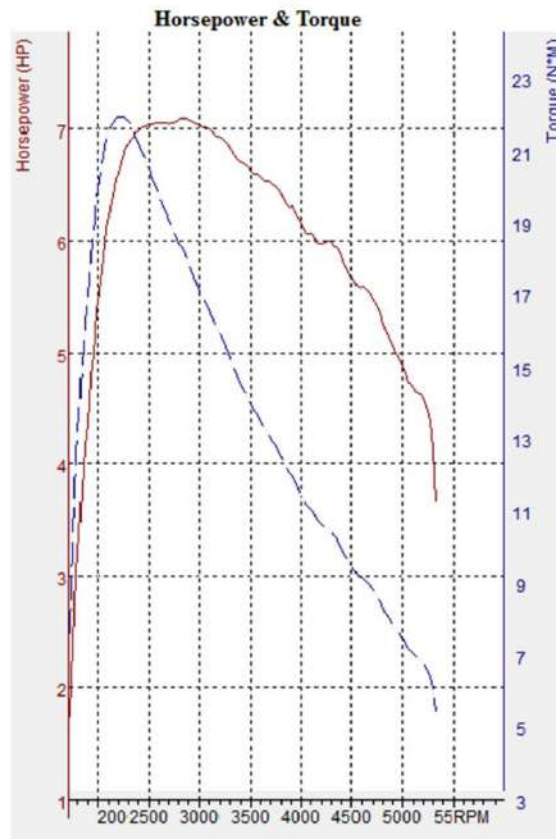
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 4.9     | 17.55    | 1000.0              |
| 2250 | 6.6     | 20.81    | 1000.0              |
| 2241 | 6.6     | 20.81    | 1000.0              |
| 2500 | 7.0     | 19.92    | 1000.0              |
| 2693 | 7.1     | 18.61    | 1000.0              |
| 2750 | 7.1     | 18.27    | 1000.0              |
| 3000 | 7.1     | 16.73    | 1000.0              |
| 3250 | 6.9     | 15.13    | 1000.0              |
| 3500 | 6.6     | 13.41    | 1000.0              |
| 3750 | 6.4     | 12.17    | 1000.0              |
| 4000 | 6.1     | 10.84    | 1000.0              |
| 4250 | 6.0     | 9.95     | 1000.0              |
| 4500 | 5.8     | 9.09     | 1000.0              |
| 4750 | 5.2     | 7.85     | 1000.0              |
| 5000 | 4.7     | 6.72     | 1000.0              |
| 5250 | 4.4     | 5.98     | 1000.0              |

Wheel: 7.1 HP    20.8 N\*M  
 LOSSES: 0.0 HP    0.0 N\*M  
 TOTAL ENGINE: 7.1 HP    20.81 N\*M



### Hasil Pengujian ke-4 dari Filter Udara Modifikasi 1

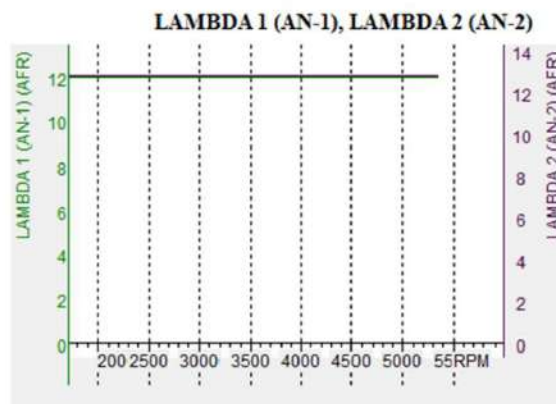
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1201                                                                 | 7.1 / 2835 | 21.42 / 2198                                                                                                                                               | 92.7 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1201

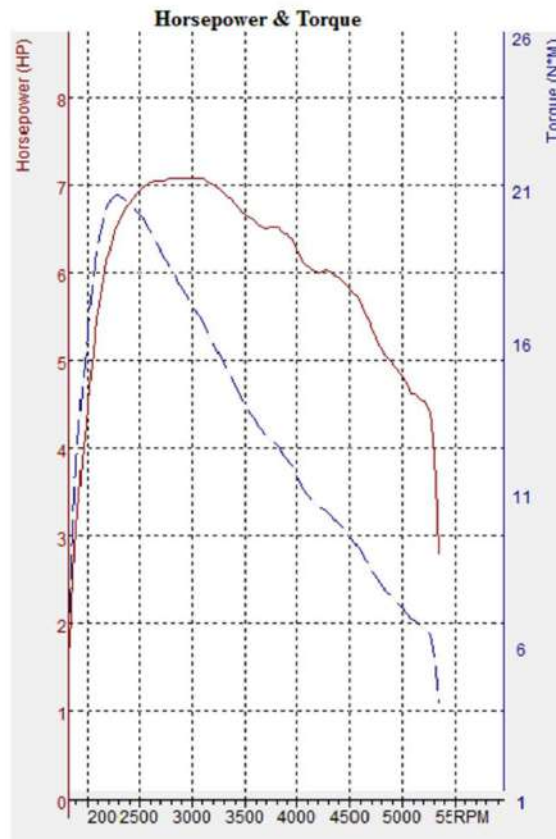
| RPM  | HP (HP) | TQ (N*M) | Tempol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.4     | 9.68     | 1000.0              |
| 2000 | 5.5     | 19.66    | 1000.0              |
| 2198 | 6.7     | 21.42    | 1000.0              |
| 2250 | 6.8     | 21.40    | 1000.0              |
| 2500 | 7.0     | 20.00    | 1000.0              |
| 2750 | 7.0     | 18.22    | 1000.0              |
| 2835 | 7.1     | 17.70    | 1000.0              |
| 3000 | 7.0     | 16.59    | 1000.0              |
| 3250 | 6.9     | 14.99    | 1000.0              |
| 3500 | 6.6     | 13.42    | 1000.0              |
| 3750 | 6.5     | 12.27    | 1000.0              |
| 4000 | 6.1     | 10.90    | 1000.0              |
| 4250 | 6.0     | 10.03    | 1000.0              |
| 4500 | 5.7     | 8.94     | 1000.0              |
| 4750 | 5.4     | 8.08     | 1000.0              |
| 5000 | 4.9     | 6.90     | 1000.0              |
| 5250 | 4.4     | 6.02     | 1000.0              |

Wheel 7.1 HP 21.4 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.42 N\*M



### Hasil Pengujian ke-5 dari Filter Udara Modifikasi 1

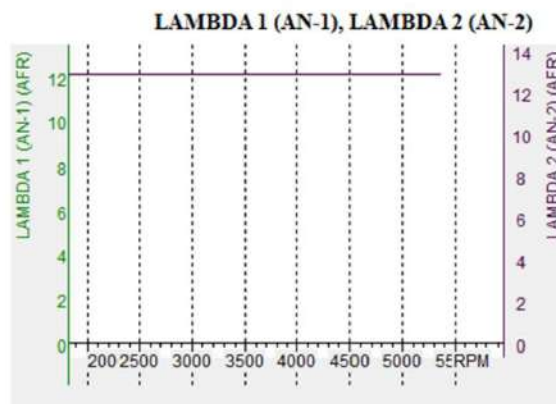
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1191                                                                 | 7.1 / 2816 | 20.41 / 2260                                                                                                                                               | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1191

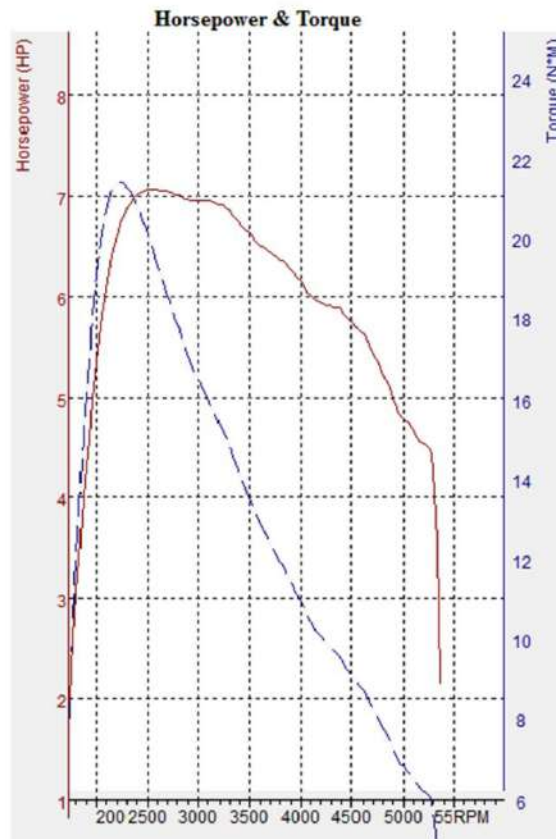
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 4.5     | 15.94    | 1000.0              |
| 2250 | 6.5     | 20.38    | 1000.0              |
| 2260 | 6.5     | 20.41    | 1000.0              |
| 2500 | 7.0     | 19.72    | 1000.0              |
| 2750 | 7.1     | 18.20    | 1000.0              |
| 2816 | 7.1     | 17.83    | 1000.0              |
| 3000 | 7.1     | 16.76    | 1000.0              |
| 3250 | 7.0     | 15.17    | 1000.0              |
| 3500 | 6.7     | 13.48    | 1000.0              |
| 3750 | 6.5     | 12.35    | 1000.0              |
| 4000 | 6.2     | 11.04    | 1000.0              |
| 4250 | 6.0     | 10.07    | 1000.0              |
| 4500 | 5.8     | 9.17     | 1000.0              |
| 4750 | 5.2     | 7.83     | 1000.0              |
| 5000 | 4.8     | 6.84     | 1000.0              |
| 5250 | 4.4     | 5.98     | 1000.0              |

Wheel: 7.1 HP      20.4 N\*M  
 LOSSES: 0.0 HP      0.0 N\*M  
 TOTAL ENGINE: 7.1 HP      20.41 N\*M



### Hasil Pengujian ke-6 dari Filter Udara Modifikasi 1

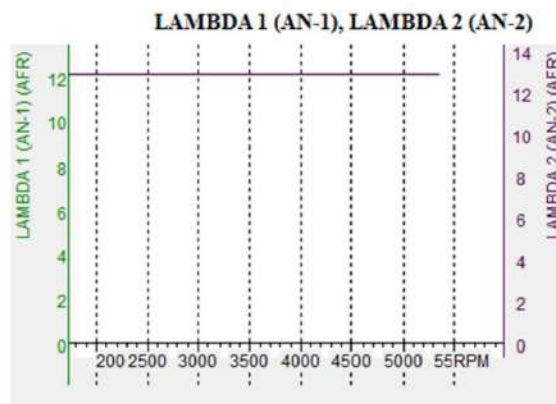
|  |            | www.sportdevices.com                                                                                                               |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
|                                                                                   |            | SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                            | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1188                                                                 | 7.1 / 2487 | 21.42 / 2215                                                                                                                       | 92.6 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1188

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.1     | 8.46     | 1000.0              |
| 2000 | 5.5     | 19.54    | 1000.0              |
| 2215 | 6.7     | 21.42    | 1000.0              |
| 2250 | 6.8     | 21.38    | 1000.0              |
| 2500 | 7.1     | 20.10    | 1000.0              |
| 2487 | 7.1     | 20.10    | 1000.0              |
| 2750 | 7.0     | 18.16    | 1000.0              |
| 3000 | 7.0     | 16.47    | 1000.0              |
| 3250 | 6.9     | 15.06    | 1000.0              |
| 3500 | 6.6     | 13.45    | 1000.0              |
| 3750 | 6.4     | 12.10    | 1000.0              |
| 4000 | 6.2     | 10.93    | 1000.0              |
| 4250 | 5.9     | 9.86     | 1000.0              |
| 4500 | 5.7     | 9.06     | 1000.0              |
| 4750 | 5.3     | 8.00     | 1000.0              |
| 5000 | 4.8     | 6.80     | 1000.0              |
| 5250 | 4.5     | 6.08     | 1000.0              |

Wheel 6.6 HP 20.8 N\*M  
 LOSSES -0.5 HP -0.6 N\*M  
 TOTAL ENGINE: 7.1 HP 21.42 N\*M

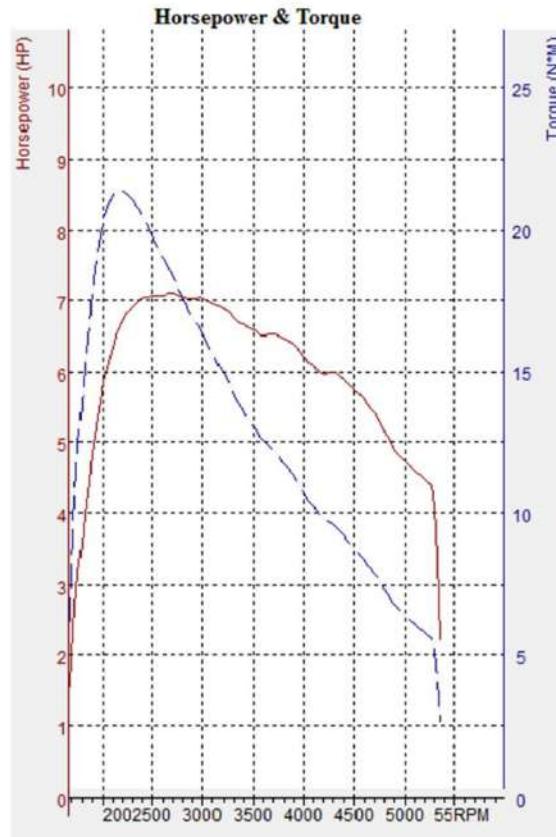


## Hasil Pengujian ke-7 dari Filter Udara Modifikasi 1



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

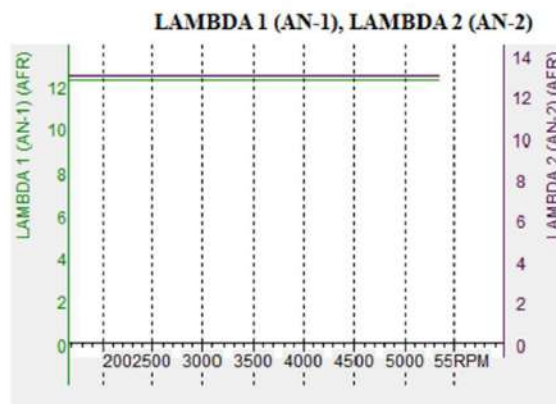
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1185 | 7.1 / 2653 | 21.74 / 2153 | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1185

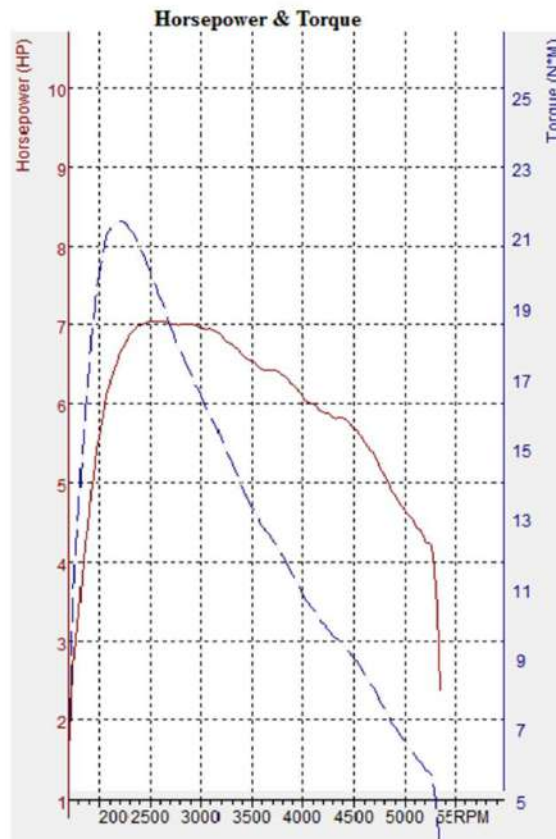
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 3.1     | 12.65    | 1000.0              |
| 2000 | 5.9     | 20.76    | 1000.0              |
| 2153 | 6.6     | 21.74    | 1000.0              |
| 2250 | 6.9     | 21.50    | 1000.0              |
| 2500 | 7.1     | 20.02    | 1000.0              |
| 2653 | 7.1     | 18.95    | 1000.0              |
| 2750 | 7.1     | 18.22    | 1000.0              |
| 3000 | 7.0     | 16.61    | 1000.0              |
| 3250 | 6.8     | 14.94    | 1000.0              |
| 3500 | 6.6     | 13.33    | 1000.0              |
| 3750 | 6.5     | 12.29    | 1000.0              |
| 4000 | 6.2     | 11.02    | 1000.0              |
| 4250 | 6.0     | 10.01    | 1000.0              |
| 4500 | 5.7     | 9.07     | 1000.0              |
| 4750 | 5.3     | 7.91     | 1000.0              |
| 5000 | 4.7     | 6.73     | 1000.0              |
| 5250 | 4.4     | 5.98     | 1000.0              |

Wheel 7.1 HP 21.7 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.74 N\*M



### Hasil Pengujian ke-8 dari Filter Udara Modifikasi 1

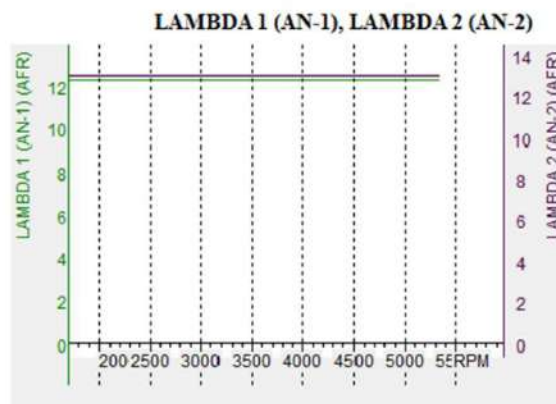
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1186                                                                 | 7.1 / 2574 | 21.56 / 2189                                                                                                                                               | 92.4 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1186

| RPM  | HP (HP) | TQ (N*M) | Tempol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.8     | 11.44    | 1000.0              |
| 2000 | 5.7     | 20.28    | 1000.0              |
| 2189 | 6.7     | 21.56    | 1000.0              |
| 2250 | 6.8     | 21.37    | 1000.0              |
| 2500 | 7.0     | 19.98    | 1000.0              |
| 2574 | 7.1     | 19.32    | 1000.0              |
| 2750 | 7.0     | 18.06    | 1000.0              |
| 3000 | 6.9     | 16.40    | 1000.0              |
| 3250 | 6.8     | 14.86    | 1000.0              |
| 3500 | 6.5     | 13.28    | 1000.0              |
| 3750 | 6.4     | 12.14    | 1000.0              |
| 4000 | 6.1     | 10.79    | 1000.0              |
| 4250 | 5.9     | 9.82     | 1000.0              |
| 4500 | 5.7     | 9.01     | 1000.0              |
| 4750 | 5.2     | 7.74     | 1000.0              |
| 5000 | 4.6     | 6.59     | 1000.0              |
| 5250 | 4.2     | 5.72     | 1000.0              |

Wheel 6.9 HP 21.3 N\*M  
 LOSSES -0.2 HP -0.2N\*M  
 TOTAL ENGINE: 7.1HP 21.56N\*M



### Hasil Pengujian ke-9 dari Filter Udara Modifikasi 1



www.sportdevices.com

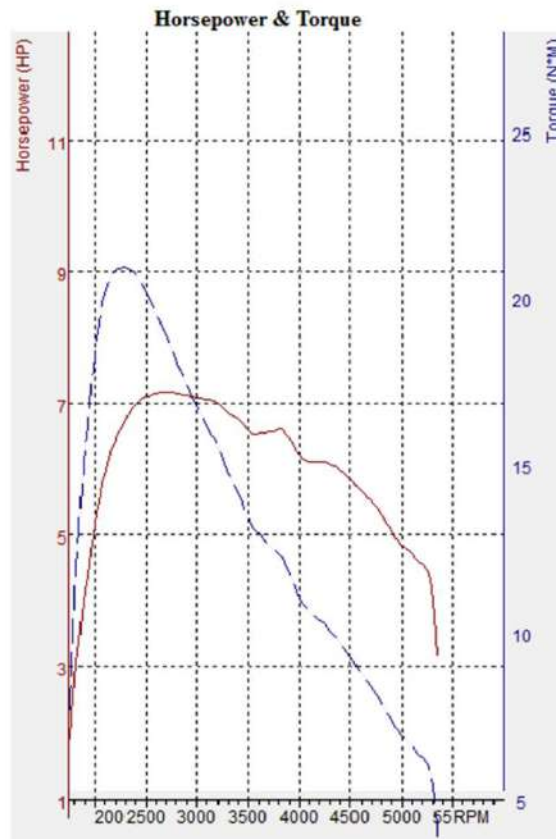
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

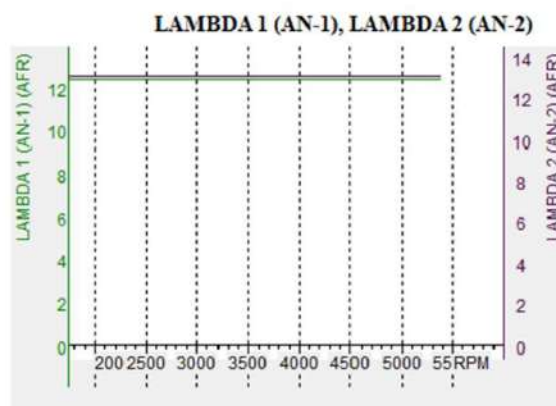
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1181 | 7.2 / 2704 | 21.06 / 2239 | 92.8 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1181

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.3     | 18.82    | 1000.0              |
| 2250 | 6.7     | 20.92    | 1000.0              |
| 2239 | 6.7     | 21.06    | 1000.0              |
| 2500 | 7.1     | 20.20    | 1000.0              |
| 2704 | 7.2     | 18.71    | 1000.0              |
| 2750 | 7.2     | 18.47    | 1000.0              |
| 3000 | 7.1     | 16.75    | 1000.0              |
| 3250 | 6.9     | 15.19    | 1000.0              |
| 3500 | 6.6     | 13.34    | 1000.0              |
| 3750 | 6.6     | 12.47    | 1000.0              |
| 4000 | 6.2     | 11.05    | 1000.0              |
| 4250 | 6.1     | 10.23    | 1000.0              |
| 4500 | 5.8     | 9.23     | 1000.0              |
| 4750 | 5.4     | 8.10     | 1000.0              |
| 5000 | 4.8     | 6.88     | 1000.0              |
| 5250 | 4.5     | 6.05     | 1000.0              |

Wheel: 6.9 HP    20.6 N\*M  
 LOSSES: -0.3 HP    -0.4N\*M  
 TOTAL ENGINE: 7.2HP    21.06N\*M



## Hasil Pengujian ke-10 dari Filter Udara Modifikasi 1



www.sportdevices.com

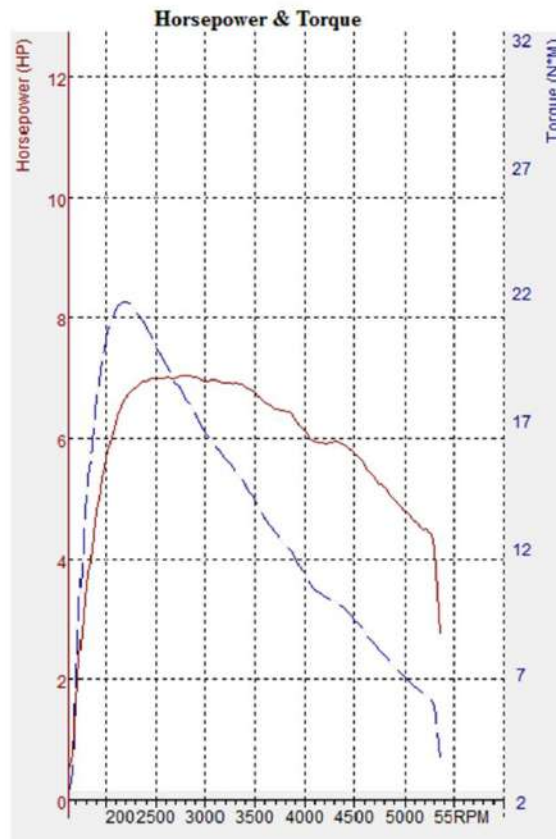
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

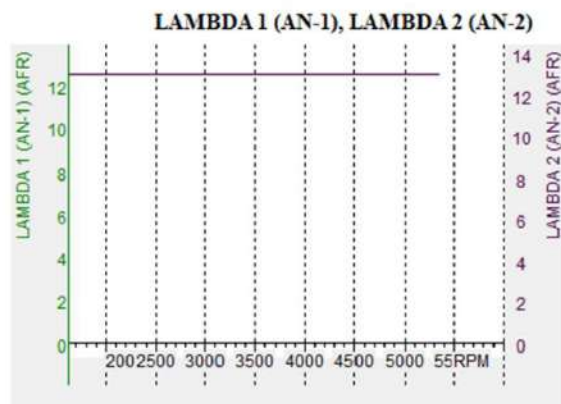
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1161 | 7.0 / 2787 | 21.61 / 2172 | 92.6 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1161

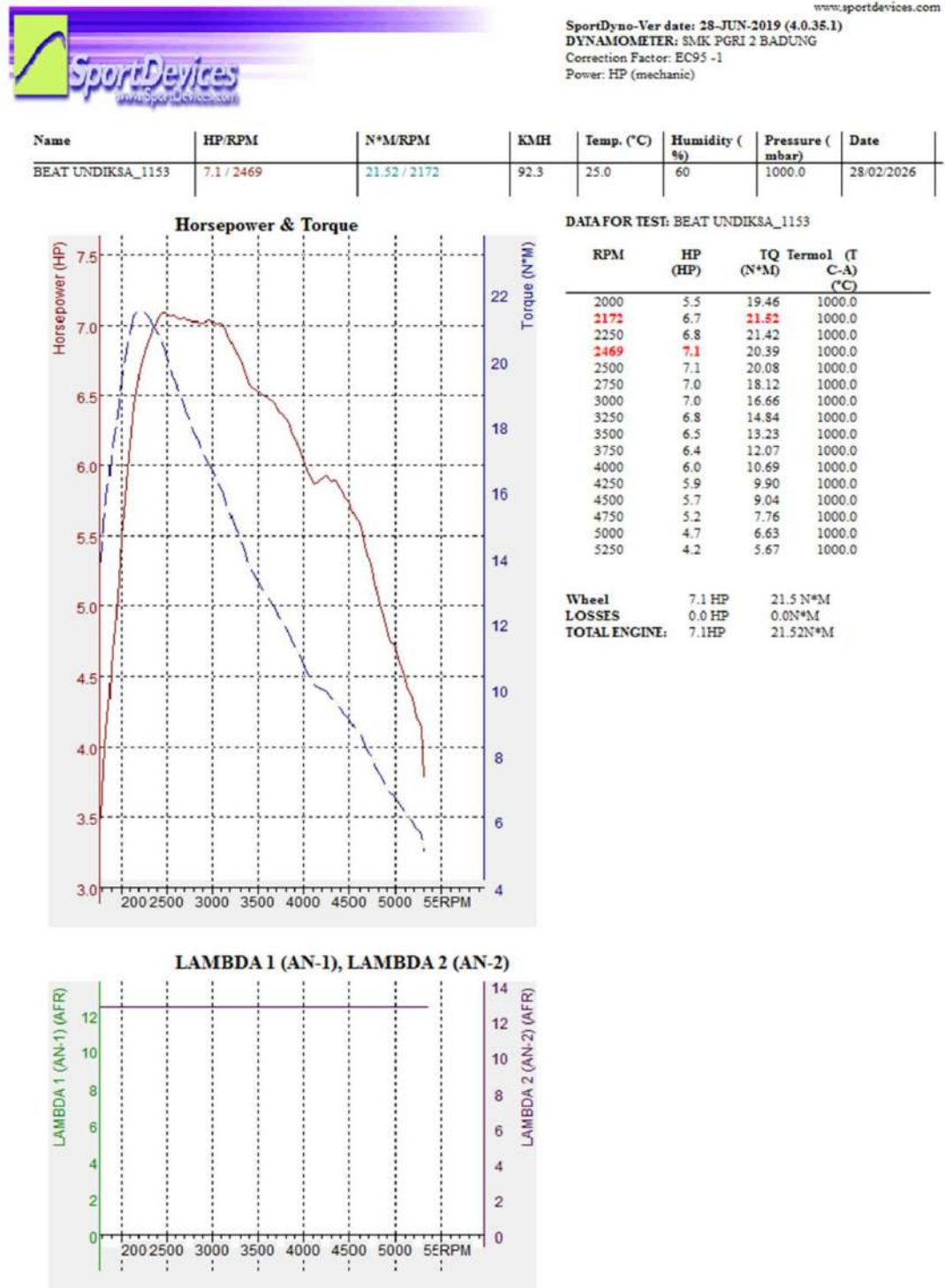
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.7     | 11.11    | 1000.0              |
| 2000 | 5.8     | 20.43    | 1000.0              |
| 2172 | 6.7     | 21.61    | 1000.0              |
| 2250 | 6.8     | 21.44    | 1000.0              |
| 2500 | 7.0     | 19.84    | 1000.0              |
| 2750 | 7.0     | 18.13    | 1000.0              |
| 2787 | 7.0     | 17.84    | 1000.0              |
| 3000 | 6.9     | 16.41    | 1000.0              |
| 3250 | 6.9     | 15.14    | 1000.0              |
| 3500 | 6.7     | 13.70    | 1000.0              |
| 3750 | 6.5     | 12.21    | 1000.0              |
| 4000 | 6.1     | 10.85    | 1000.0              |
| 4250 | 5.9     | 9.89     | 1000.0              |
| 4500 | 5.7     | 9.06     | 1000.0              |
| 4750 | 5.2     | 7.82     | 1000.0              |
| 5000 | 4.8     | 6.80     | 1000.0              |
| 5250 | 4.4     | 5.96     | 1000.0              |

Wheel 7.0 HP 21.6 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.0 HP 21.61 N\*M



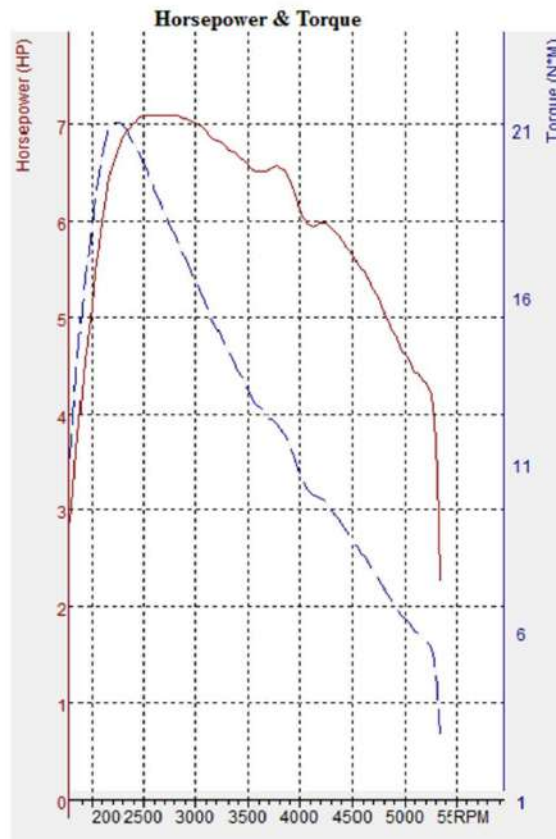
# Lampiran 0 4. Lembar Pengujian Dynotest Filter Udara Modifikasi 2

## Hasil Pengujian ke-1 dari Filter Udara Modifikasi 2



## Hasil Pengujian ke-2 dari Filter Udara Modifikasi 2

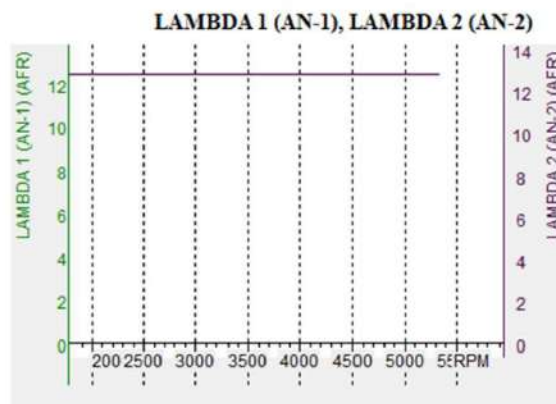
|  |            | www.sportdevices.com                                                                                                               |      |            |              |                 |            |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|------------|
|                                                                                   |            | SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |            |
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                            | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
| BEAT UNDIKSA_1154                                                                 | 7.1 / 2640 | 21.39 / 2218                                                                                                                       | 92.2 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1154

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.3     | 18.73    | 1000.0              |
| 2218 | 6.7     | 21.39    | 1000.0              |
| 2250 | 6.8     | 21.37    | 1000.0              |
| 2500 | 7.1     | 20.15    | 1000.0              |
| 2640 | 7.1     | 18.98    | 1000.0              |
| 2750 | 7.1     | 18.31    | 1000.0              |
| 3000 | 7.0     | 16.61    | 1000.0              |
| 3250 | 6.8     | 14.91    | 1000.0              |
| 3500 | 6.6     | 13.33    | 1000.0              |
| 3750 | 6.6     | 12.46    | 1000.0              |
| 4000 | 6.1     | 10.85    | 1000.0              |
| 4250 | 6.0     | 10.00    | 1000.0              |
| 4500 | 5.6     | 8.91     | 1000.0              |
| 4750 | 5.2     | 7.75     | 1000.0              |
| 5000 | 4.6     | 6.58     | 1000.0              |
| 5250 | 4.2     | 5.72     | 1000.0              |

Wheel: 7.1 HP      21.4 N\*M  
 LOSSES: 0.0 HP      0.0 N\*M  
 TOTAL ENGINE: 7.1 HP      21.39 N\*M



### Hasil Pengujian ke-3 dari Filter Udara Modifikasi 2



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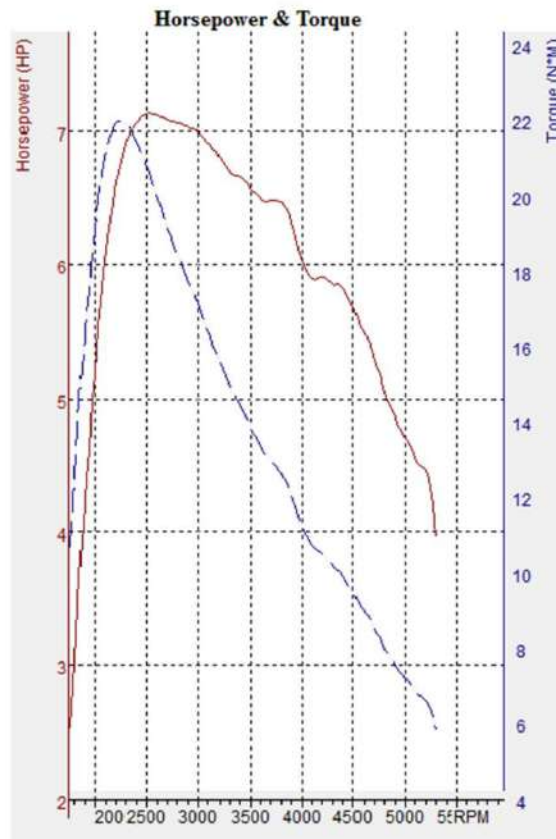
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

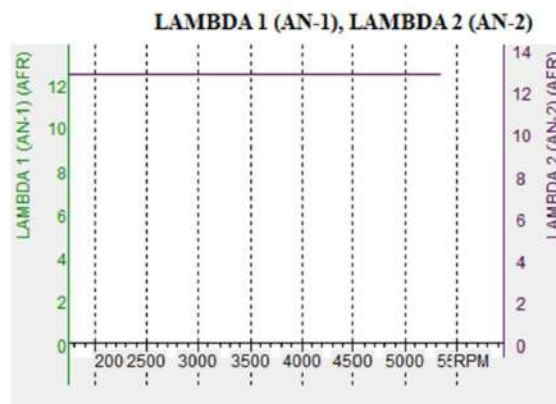
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1155 | 7.1 / 2502 | 21.48 / 2219 | 92.2 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1155

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.4     | 9.86     | 1000.0              |
| 2000 | 5.4     | 19.03    | 1000.0              |
| 2219 | 6.8     | 21.48    | 1000.0              |
| 2250 | 6.8     | 21.47    | 1000.0              |
| 2500 | 7.1     | 20.27    | 1000.0              |
| 2502 | 7.1     | 20.14    | 1000.0              |
| 2750 | 7.1     | 18.24    | 1000.0              |
| 3000 | 7.0     | 16.51    | 1000.0              |
| 3250 | 6.7     | 14.72    | 1000.0              |
| 3500 | 6.6     | 13.32    | 1000.0              |
| 3750 | 6.5     | 12.29    | 1000.0              |
| 4000 | 6.0     | 10.69    | 1000.0              |
| 4250 | 5.9     | 9.85     | 1000.0              |
| 4500 | 5.7     | 8.95     | 1000.0              |
| 4750 | 5.2     | 7.74     | 1000.0              |
| 5000 | 4.7     | 6.66     | 1000.0              |
| 5250 | 4.3     | 5.83     | 1000.0              |

|               |        |           |
|---------------|--------|-----------|
| Wheel         | 7.1 HP | 21.5 N*M  |
| LOSSES        | 0.0 HP | 0.0 N*M   |
| TOTAL ENGINE: | 7.1 HP | 21.48 N*M |



## Hasil Pengujian ke-4 dari Filter Udara Modifikasi 2



www.sportdevices.com

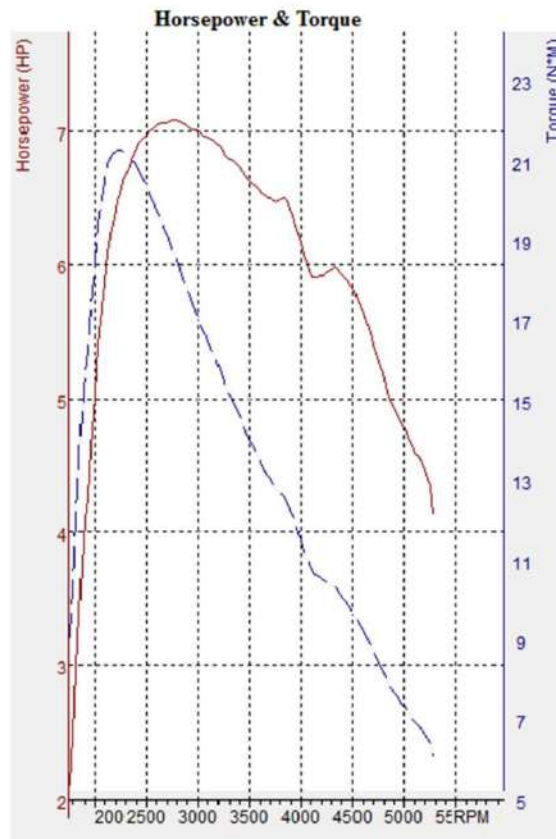
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

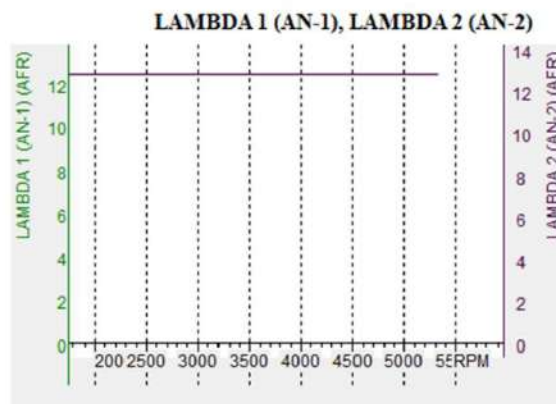
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1157 | 7.1 / 2731 | 20.77 / 2223 | 92.4 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1157

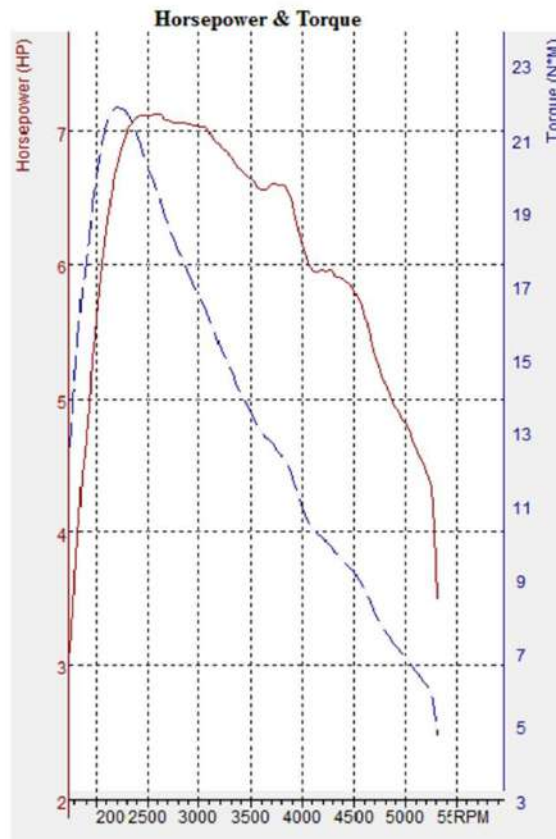
| RPM  | HP (HP) | TQ (N*M) | Tempol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.1     | 8.34     | 1000.0              |
| 2000 | 5.2     | 18.44    | 1000.0              |
| 2223 | 6.5     | 20.77    | 1000.0              |
| 2250 | 6.6     | 20.77    | 1000.0              |
| 2500 | 7.0     | 19.80    | 1000.0              |
| 2750 | 7.1     | 18.32    | 1000.0              |
| 2731 | 7.1     | 18.32    | 1000.0              |
| 3000 | 7.0     | 16.54    | 1000.0              |
| 3250 | 6.8     | 14.92    | 1000.0              |
| 3500 | 6.6     | 13.43    | 1000.0              |
| 3750 | 6.5     | 12.28    | 1000.0              |
| 4000 | 6.2     | 10.97    | 1000.0              |
| 4250 | 6.0     | 9.95     | 1000.0              |
| 4500 | 5.8     | 9.18     | 1000.0              |
| 4750 | 5.3     | 7.87     | 1000.0              |
| 5000 | 4.8     | 6.79     | 1000.0              |
| 5250 | 4.3     | 5.88     | 1000.0              |

|               |        |           |
|---------------|--------|-----------|
| Wheel         | 7.1 HP | 20.8 N*M  |
| LOSSES        | 0.0 HP | 0.0 N*M   |
| TOTAL ENGINE: | 7.1 HP | 20.77 N*M |



## Hasil Pengujian ke-5 dari Filter Udara Modifikasi 2

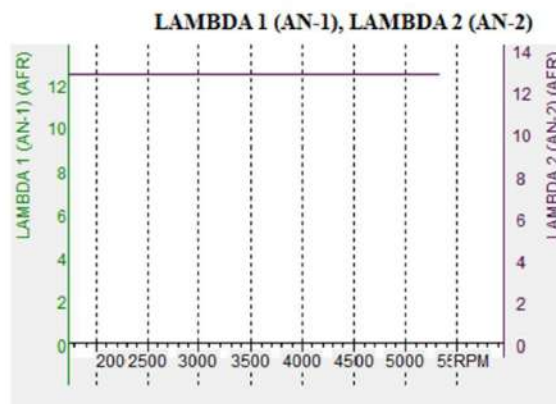
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1158                                                                 | 7.1 / 2594 | 21.82 / 2211                                                                                                                                               | 92.2 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1158

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 3.2     | 12.98    | 1000.0              |
| 2000 | 5.7     | 20.09    | 1000.0              |
| 2211 | 6.8     | 21.82    | 1000.0              |
| 2250 | 6.9     | 21.78    | 1000.0              |
| 2500 | 7.1     | 20.23    | 1000.0              |
| 2594 | 7.1     | 19.45    | 1000.0              |
| 2750 | 7.1     | 18.24    | 1000.0              |
| 3000 | 7.0     | 16.61    | 1000.0              |
| 3250 | 6.9     | 14.95    | 1000.0              |
| 3500 | 6.6     | 13.46    | 1000.0              |
| 3750 | 6.6     | 12.50    | 1000.0              |
| 4000 | 6.1     | 10.94    | 1000.0              |
| 4250 | 6.0     | 9.96     | 1000.0              |
| 4500 | 5.8     | 9.15     | 1000.0              |
| 4750 | 5.2     | 7.78     | 1000.0              |
| 5000 | 4.8     | 6.83     | 1000.0              |
| 5250 | 4.3     | 5.84     | 1000.0              |

Wheel 7.1 HP 21.8 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.82 N\*M

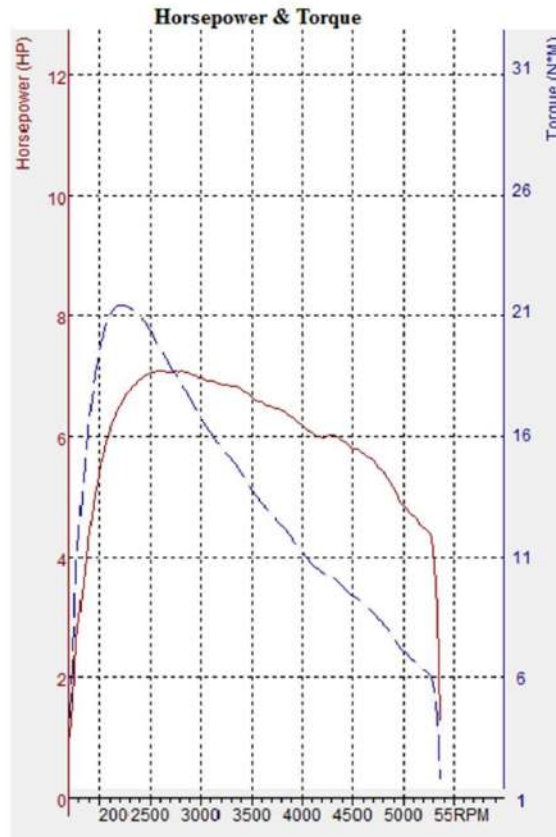


## Hasil Pengujian ke-6 dari Filter Udara Modifikasi 2



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

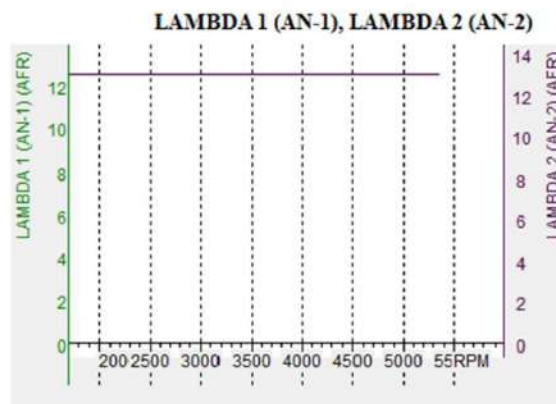
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1162 | 7.1 / 2578 | 21.06 / 2181 | 92.6 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1162

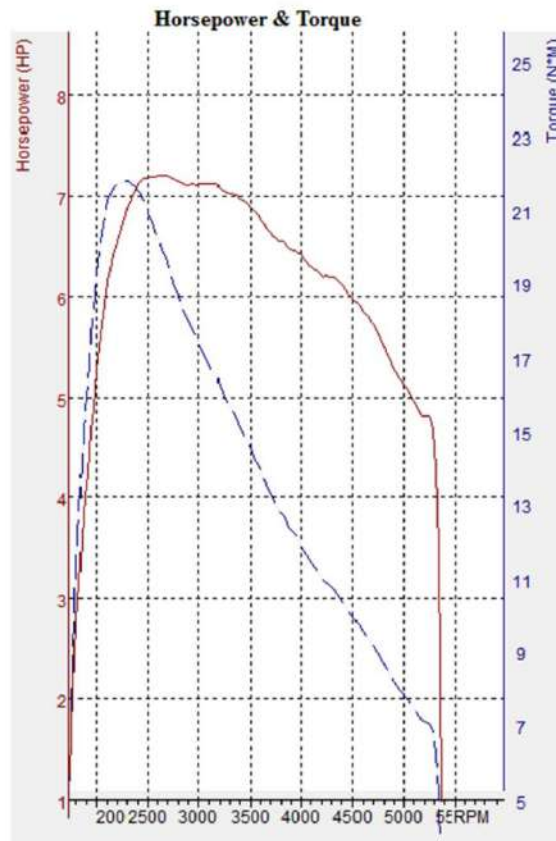
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.1     | 8.58     | 1000.0              |
| 2000 | 5.5     | 19.54    | 1000.0              |
| 2181 | 6.5     | 21.06    | 1000.0              |
| 2250 | 6.7     | 21.02    | 1000.0              |
| 2500 | 7.1     | 19.97    | 1000.0              |
| 2578 | 7.1     | 19.37    | 1000.0              |
| 2750 | 7.1     | 18.31    | 1000.0              |
| 3000 | 7.0     | 16.45    | 1000.0              |
| 3250 | 6.8     | 14.95    | 1000.0              |
| 3500 | 6.6     | 13.46    | 1000.0              |
| 3750 | 6.4     | 12.21    | 1000.0              |
| 4000 | 6.2     | 10.94    | 1000.0              |
| 4250 | 6.0     | 10.02    | 1000.0              |
| 4500 | 5.8     | 9.14     | 1000.0              |
| 4750 | 5.4     | 8.15     | 1000.0              |
| 5000 | 4.8     | 6.86     | 1000.0              |
| 5250 | 4.4     | 5.92     | 1000.0              |

Wheel 7.1 HP 21.1 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.06 N\*M



## Hasil Pengujian ke-7 dari Filter Udara Modifikasi 2

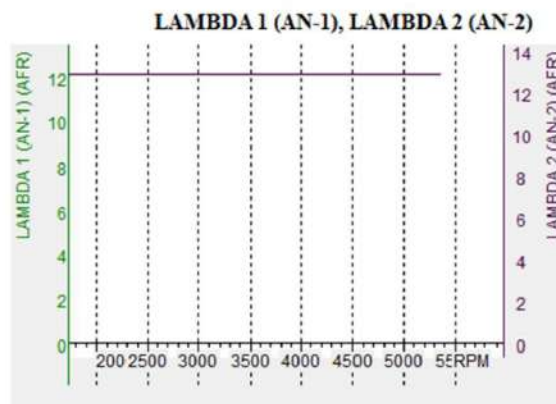
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1189                                                                 | 7.2 / 2614 | 21.29 / 2251                                                                                                                                               | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1189

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 1.4     | 5.74     | 1000.0              |
| 2000 | 5.5     | 19.24    | 1000.0              |
| 2250 | 6.8     | 21.29    | 1000.0              |
| 2251 | 6.8     | 21.29    | 1000.0              |
| 2500 | 7.2     | 20.46    | 1000.0              |
| 2614 | 7.2     | 19.56    | 1000.0              |
| 2750 | 7.2     | 18.53    | 1000.0              |
| 3000 | 7.1     | 16.83    | 1000.0              |
| 3250 | 7.0     | 15.37    | 1000.0              |
| 3500 | 6.9     | 13.95    | 1000.0              |
| 3750 | 6.6     | 12.44    | 1000.0              |
| 4000 | 6.4     | 11.36    | 1000.0              |
| 4250 | 6.2     | 10.37    | 1000.0              |
| 4500 | 6.0     | 9.43     | 1000.0              |
| 4750 | 5.6     | 8.39     | 1000.0              |
| 5000 | 5.1     | 7.28     | 1000.0              |
| 5250 | 4.8     | 6.50     | 1000.0              |

Wheel 6.3 HP 20.0 N\*M  
 LOSSES -0.9 HP -1.2N\*M  
 TOTAL ENGINE: 7.2HP 21.29N\*M

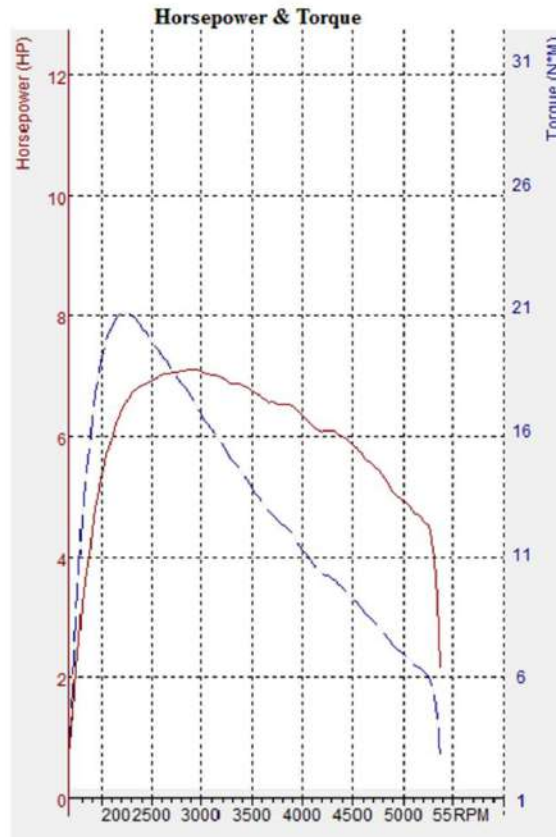


## Hasil Pengujian ke-8 dari Filter Udara Modifikasi 2



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

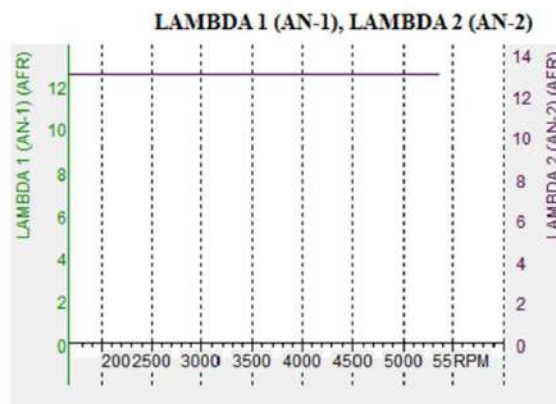
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1163 | 7.1 / 2881 | 20.83 / 2212 | 92.8 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1163

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.3     | 9.26     | 1000.0              |
| 2000 | 5.4     | 19.23    | 1000.0              |
| 2212 | 6.5     | 20.83    | 1000.0              |
| 2250 | 6.6     | 20.81    | 1000.0              |
| 2500 | 6.9     | 19.63    | 1000.0              |
| 2750 | 7.1     | 18.27    | 1000.0              |
| 2881 | 7.1     | 17.48    | 1000.0              |
| 3000 | 7.1     | 16.67    | 1000.0              |
| 3250 | 6.9     | 15.10    | 1000.0              |
| 3500 | 6.7     | 13.67    | 1000.0              |
| 3750 | 6.5     | 12.36    | 1000.0              |
| 4000 | 6.3     | 11.25    | 1000.0              |
| 4250 | 6.1     | 10.20    | 1000.0              |
| 4500 | 5.9     | 9.25     | 1000.0              |
| 4750 | 5.4     | 8.13     | 1000.0              |
| 5000 | 4.9     | 6.97     | 1000.0              |
| 5250 | 4.5     | 6.09     | 1000.0              |

Wheel 7.1 HP 20.8 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 20.83 N\*M

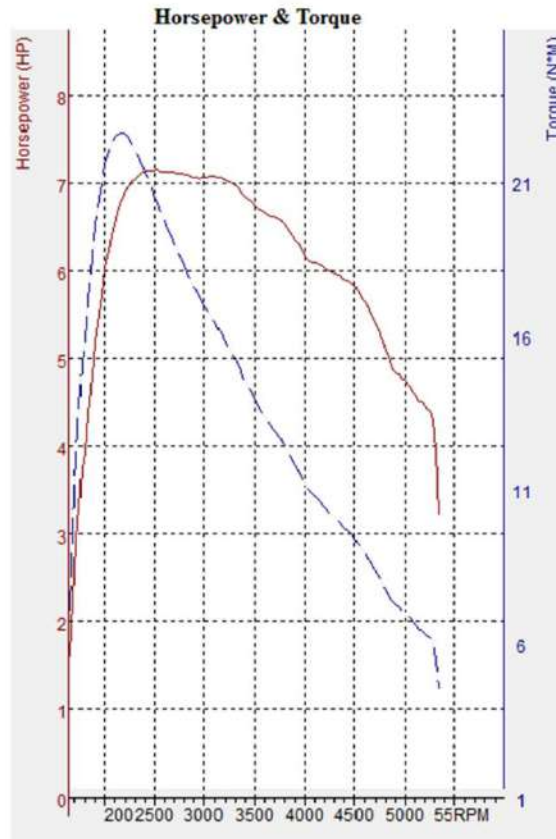


## Hasil Pengujian ke-9 dari Filter Udara Modifikasi 2



www.sportdevices.com  
 SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)  
 DYNAMOMETER: SMK PGRI 2 BADUNG  
 Correction Factor: EC95 -1  
 Power: HP (mechanic)

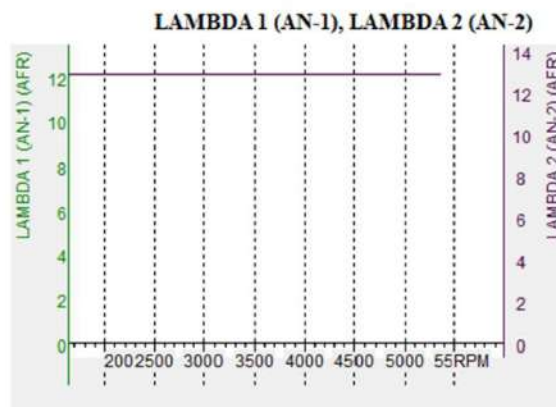
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1190 | 7.2 / 2510 | 22.42 / 2143 | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1190

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 3.5     | 14.19    | 1000.0              |
| 2000 | 6.0     | 21.41    | 1000.0              |
| 2143 | 6.8     | 22.42    | 1000.0              |
| 2250 | 7.0     | 22.04    | 1000.0              |
| 2500 | 7.1     | 20.27    | 1000.0              |
| 2510 | 7.2     | 20.13    | 1000.0              |
| 2750 | 7.1     | 18.32    | 1000.0              |
| 3000 | 7.1     | 16.72    | 1000.0              |
| 3250 | 7.0     | 15.29    | 1000.0              |
| 3500 | 6.8     | 13.72    | 1000.0              |
| 3750 | 6.6     | 12.48    | 1000.0              |
| 4000 | 6.2     | 10.93    | 1000.0              |
| 4250 | 6.0     | 10.02    | 1000.0              |
| 4500 | 5.8     | 9.14     | 1000.0              |
| 4750 | 5.3     | 7.87     | 1000.0              |
| 5000 | 4.7     | 6.75     | 1000.0              |
| 5250 | 4.4     | 5.95     | 1000.0              |

Wheel 7.2 HP 22.4 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.2HP 22.42 N\*M



## Hasil Pengujian ke-10 dari Filter Udara Modifikasi 2



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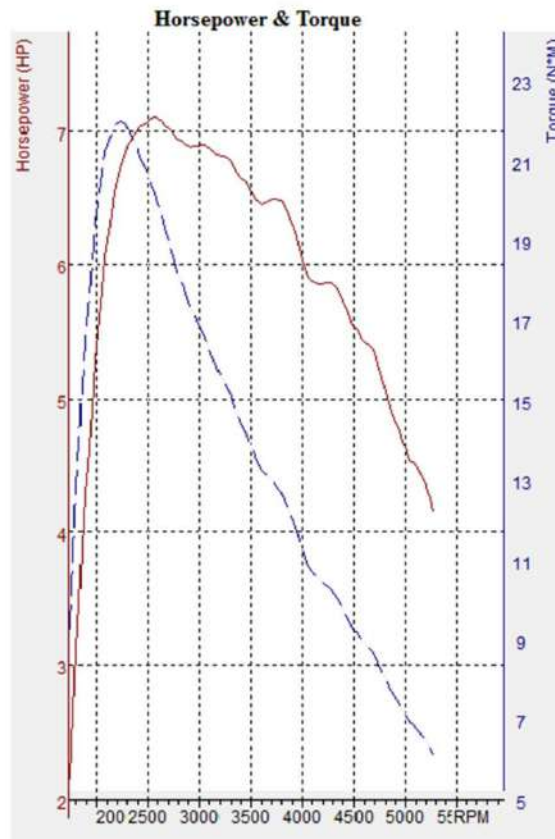
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

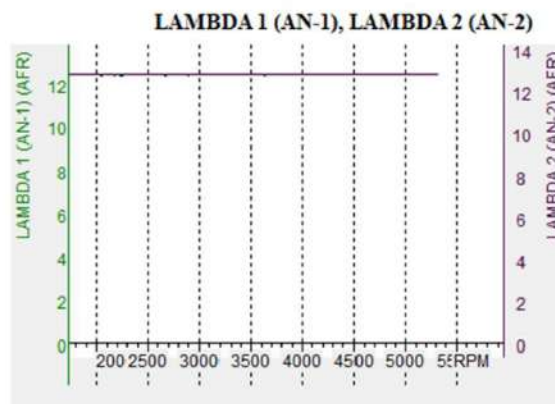
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1152 | 7.1 / 2561 | 21.47 / 2212 | 92.2 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1152

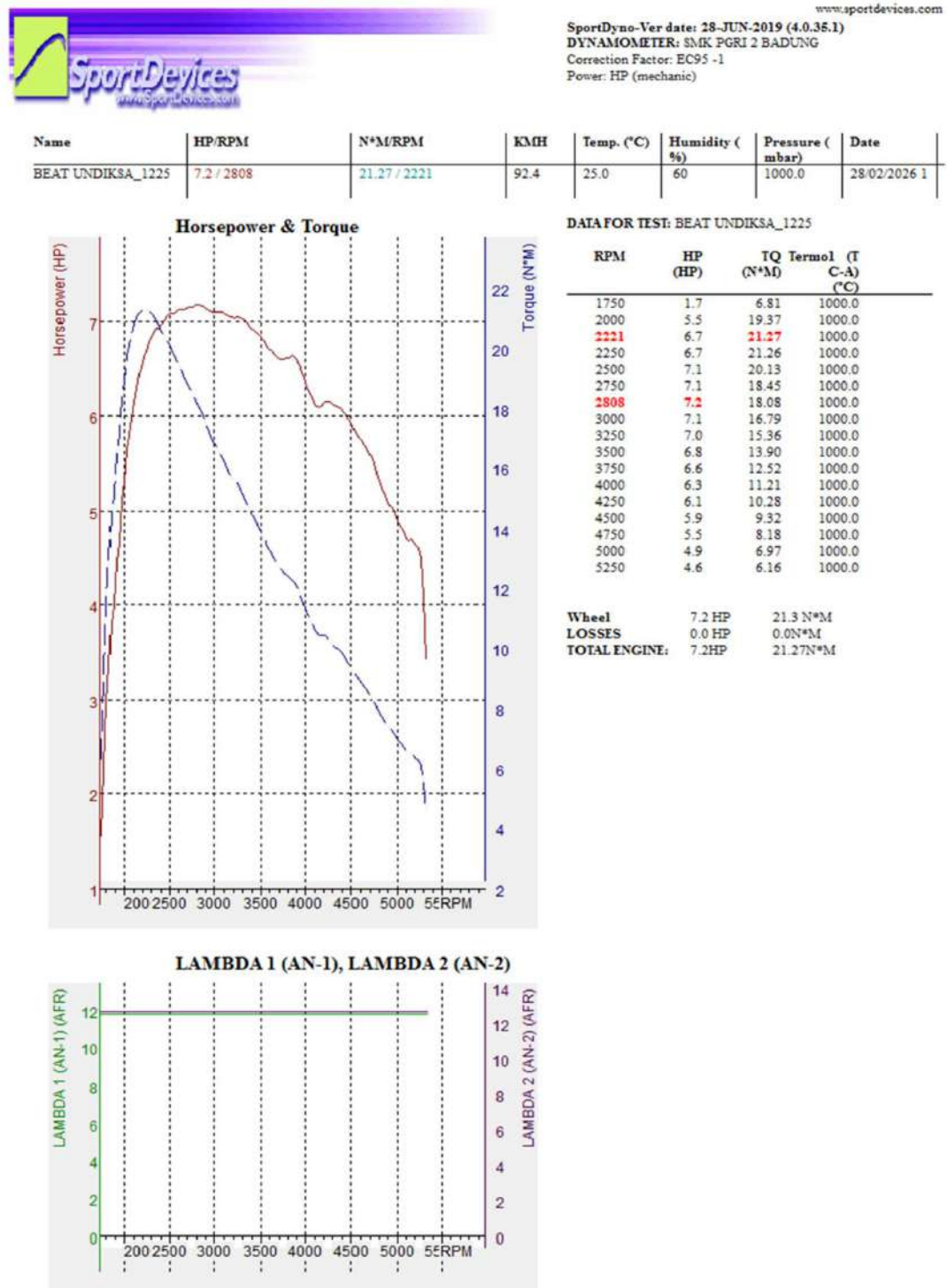
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.3     | 9.18     | 1000.0              |
| 2000 | 5.5     | 19.46    | 1000.0              |
| 2212 | 6.8     | 21.47    | 1000.0              |
| 2250 | 6.8     | 21.45    | 1000.0              |
| 2500 | 7.1     | 20.05    | 1000.0              |
| 2561 | 7.1     | 19.58    | 1000.0              |
| 2750 | 7.0     | 17.98    | 1000.0              |
| 3000 | 6.9     | 16.29    | 1000.0              |
| 3250 | 6.8     | 14.85    | 1000.0              |
| 3500 | 6.6     | 13.29    | 1000.0              |
| 3750 | 6.5     | 12.31    | 1000.0              |
| 4000 | 6.0     | 10.72    | 1000.0              |
| 4250 | 5.9     | 9.81     | 1000.0              |
| 4500 | 5.5     | 8.73     | 1000.0              |
| 4750 | 5.2     | 7.78     | 1000.0              |
| 5000 | 4.6     | 6.56     | 1000.0              |
| 5250 | 4.2     | 5.75     | 1000.0              |

Wheel 7.1 HP 21.5 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.1 HP 21.47 N\*M



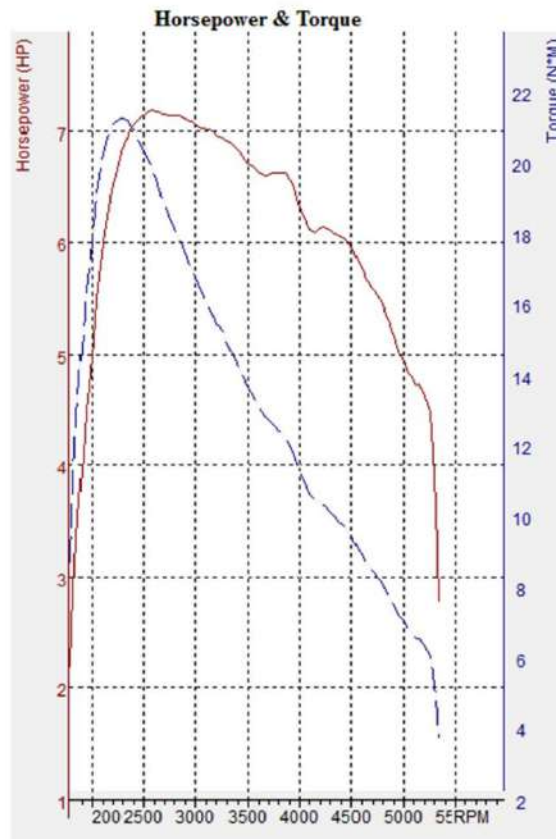
# Lampiran 0 5. Lembar Pengujian Dynotest Filter Udara Modifikasi 3

## Hasil Pengujian ke-1 dari Filter Udara Modifikasi 3



### Hasil Pengujian ke-2 dari Filter Udara Modifikasi 3

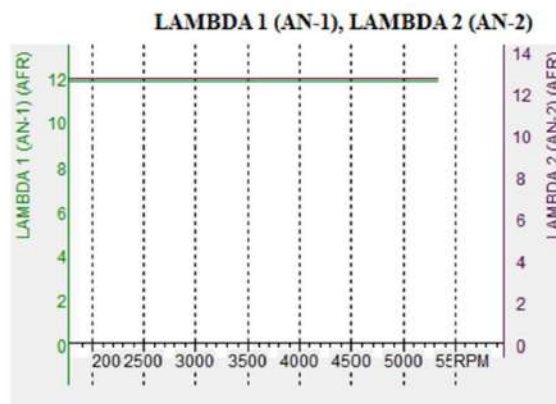
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1223                                                                 | 7.2 / 2553 | 21.24 / 2273                                                                                                                                               | 92.4 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1223

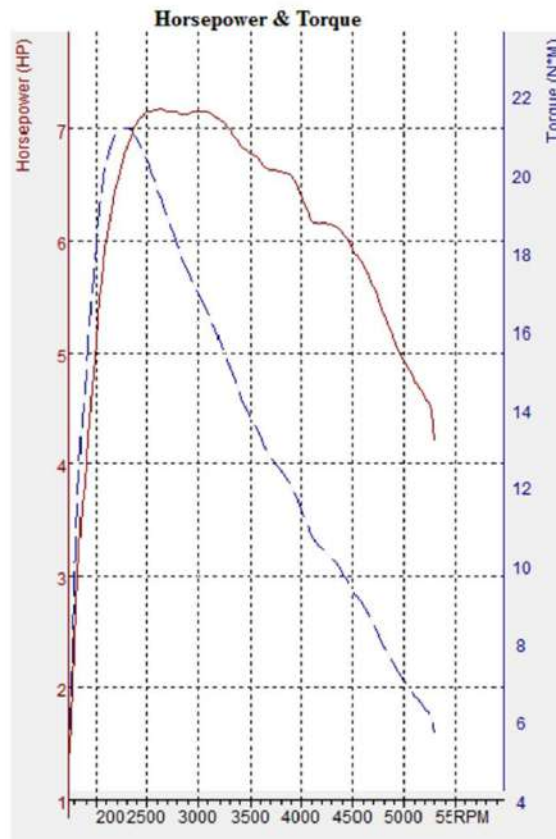
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.1     | 18.15    | 1000.0              |
| 2250 | 6.7     | 21.20    | 1000.0              |
| 2273 | 6.8     | 21.24    | 1000.0              |
| 2500 | 7.2     | 20.27    | 1000.0              |
| 2553 | 7.2     | 19.92    | 1000.0              |
| 2750 | 7.1     | 18.38    | 1000.0              |
| 3000 | 7.0     | 16.65    | 1000.0              |
| 3250 | 6.9     | 15.14    | 1000.0              |
| 3500 | 6.7     | 13.62    | 1000.0              |
| 3750 | 6.6     | 12.57    | 1000.0              |
| 4000 | 6.3     | 11.20    | 1000.0              |
| 4250 | 6.1     | 10.25    | 1000.0              |
| 4500 | 5.9     | 9.38     | 1000.0              |
| 4750 | 5.5     | 8.25     | 1000.0              |
| 5000 | 4.9     | 6.99     | 1000.0              |
| 5250 | 4.5     | 6.06     | 1000.0              |

Wheel 7.2 HP 21.2 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.2HP 21.24N\*M



### Hasil Pengujian ke-3 dari Filter Udara Modifikasi 3

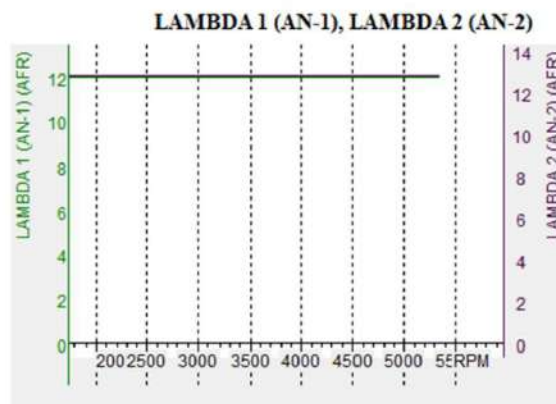
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1204                                                                 | 7.2 / 2573 | 21.16 / 2261                                                                                                                                               | 92.4 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1204

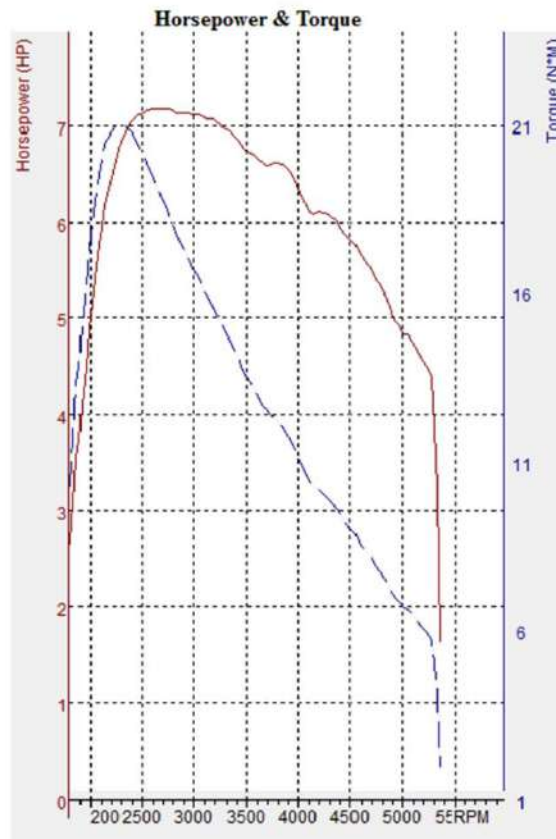
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.3     | 18.68    | 1000.0              |
| 2250 | 6.7     | 21.16    | 1000.0              |
| 2261 | 6.8     | 21.16    | 1000.0              |
| 2500 | 7.1     | 20.32    | 1000.0              |
| 2573 | 7.2     | 19.68    | 1000.0              |
| 2750 | 7.1     | 18.43    | 1000.0              |
| 3000 | 7.1     | 16.93    | 1000.0              |
| 3250 | 7.0     | 15.35    | 1000.0              |
| 3500 | 6.8     | 13.78    | 1000.0              |
| 3750 | 6.6     | 12.55    | 1000.0              |
| 4000 | 6.4     | 11.36    | 1000.0              |
| 4250 | 6.1     | 10.29    | 1000.0              |
| 4500 | 5.9     | 9.32     | 1000.0              |
| 4750 | 5.4     | 8.14     | 1000.0              |
| 5000 | 4.9     | 6.98     | 1000.0              |
| 5250 | 4.5     | 6.15     | 1000.0              |

Wheel: 7.2 HP      21.2 N\*M  
 LOSSES: 0.0 HP      0.0 N\*M  
 TOTAL ENGINE: 7.2 HP      21.16 N\*M



### Hasil Pengujian ke-4 dari Filter Udara Modifikasi 3

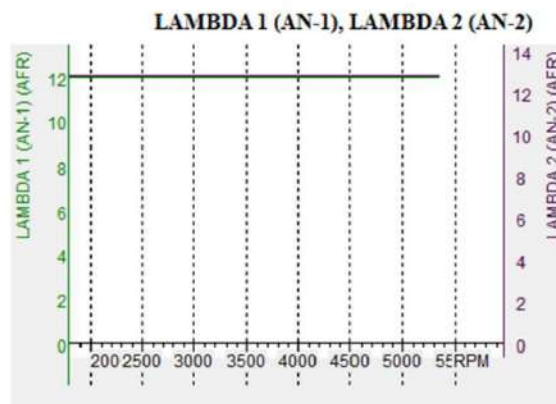
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1203                                                                 | 7.2 / 2689 | 21.18 / 2277                                                                                                                                               | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1203

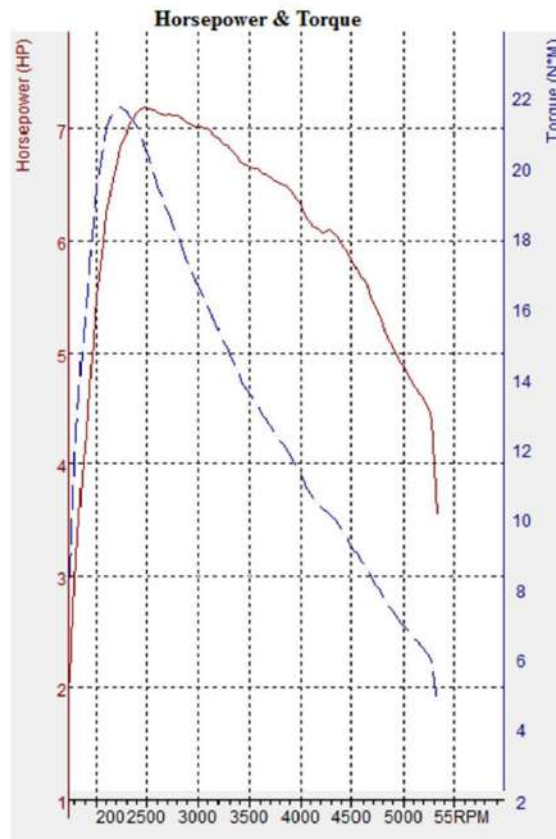
| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.1     | 18.08    | 1000.0              |
| 2250 | 6.7     | 21.17    | 1000.0              |
| 2277 | 6.8     | 21.18    | 1000.0              |
| 2500 | 7.1     | 20.19    | 1000.0              |
| 2689 | 7.2     | 18.89    | 1000.0              |
| 2750 | 7.2     | 18.52    | 1000.0              |
| 3000 | 7.1     | 16.87    | 1000.0              |
| 3250 | 7.0     | 15.28    | 1000.0              |
| 3500 | 6.7     | 13.66    | 1000.0              |
| 3750 | 6.6     | 12.52    | 1000.0              |
| 4000 | 6.3     | 11.27    | 1000.0              |
| 4250 | 6.1     | 10.21    | 1000.0              |
| 4500 | 5.8     | 9.15     | 1000.0              |
| 4750 | 5.4     | 8.03     | 1000.0              |
| 5000 | 4.8     | 6.87     | 1000.0              |
| 5250 | 4.4     | 6.02     | 1000.0              |

Wheel: 7.2 HP      21.2 N\*M  
 LOSSES: 0.0 HP      0.0 N\*M  
 TOTAL ENGINE: 7.2 HP      21.18 N\*M



### Hasil Pengujian ke-5 dari Filter Udara Modifikasi 3

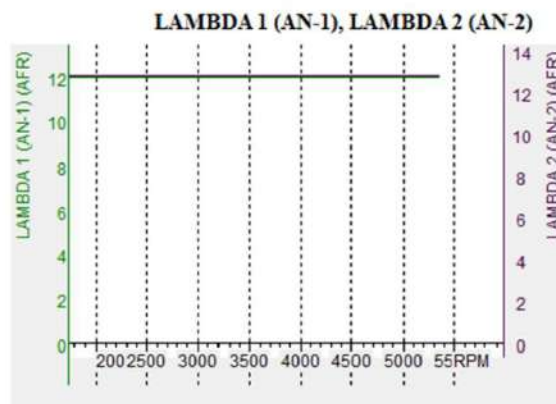
|  |            | www.sportdevices.com<br>SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)<br>DYNAMOMETER: SMK PGRI 2 BADUNG<br>Correction Factor: EC95 -1<br>Power: HP (mechanic) |      |            |              |                 |              |
|-----------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|--------------|-----------------|--------------|
| Name                                                                              | HP/RPM     | N*M/RPM                                                                                                                                                    | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
| BEAT UNDIKSA_1202                                                                 | 7.2 / 2475 | 21.68 / 2194                                                                                                                                               | 92.6 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1202

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.1     | 8.33     | 1000.0              |
| 2000 | 5.5     | 19.44    | 1000.0              |
| 2194 | 6.8     | 21.68    | 1000.0              |
| 2250 | 6.9     | 21.65    | 1000.0              |
| 2475 | 7.2     | 20.55    | 1000.0              |
| 2500 | 7.2     | 20.41    | 1000.0              |
| 2750 | 7.1     | 18.35    | 1000.0              |
| 3000 | 7.0     | 16.62    | 1000.0              |
| 3250 | 6.9     | 15.00    | 1000.0              |
| 3500 | 6.7     | 13.51    | 1000.0              |
| 3750 | 6.5     | 12.37    | 1000.0              |
| 4000 | 6.3     | 11.21    | 1000.0              |
| 4250 | 6.1     | 10.16    | 1000.0              |
| 4500 | 5.8     | 9.17     | 1000.0              |
| 4750 | 5.3     | 7.99     | 1000.0              |
| 5000 | 4.9     | 6.94     | 1000.0              |
| 5250 | 4.5     | 6.05     | 1000.0              |

|               |        |          |
|---------------|--------|----------|
| Wheel         | 7.2 HP | 21.7 N*M |
| LOSSES        | 0.0 HP | 0.0 N*M  |
| TOTAL ENGINE: | 7.2HP  | 21.68N*M |



### Hasil Pengujian ke-6 dari Filter Udara Modifikasi 3



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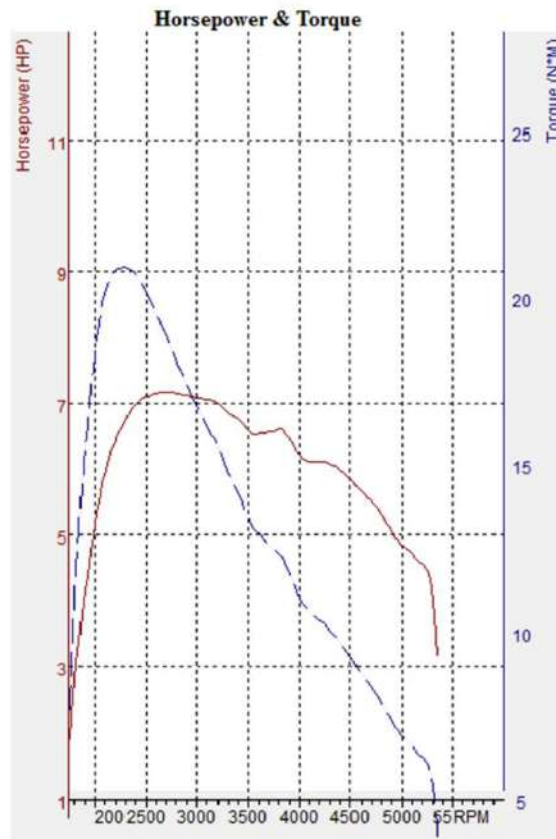
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

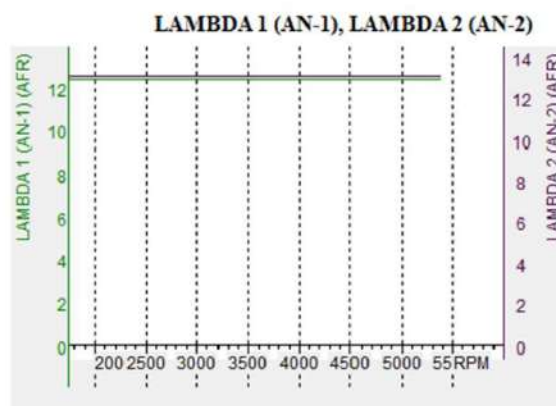
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1181 | 7.2 / 2704 | 21.06 / 2239 | 92.8 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1181

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.3     | 18.82    | 1000.0              |
| 2250 | 6.7     | 20.92    | 1000.0              |
| 2239 | 6.7     | 21.06    | 1000.0              |
| 2500 | 7.1     | 20.20    | 1000.0              |
| 2704 | 7.2     | 18.71    | 1000.0              |
| 2750 | 7.2     | 18.47    | 1000.0              |
| 3000 | 7.1     | 16.75    | 1000.0              |
| 3250 | 6.9     | 15.19    | 1000.0              |
| 3500 | 6.6     | 13.34    | 1000.0              |
| 3750 | 6.6     | 12.47    | 1000.0              |
| 4000 | 6.2     | 11.05    | 1000.0              |
| 4250 | 6.1     | 10.23    | 1000.0              |
| 4500 | 5.8     | 9.23     | 1000.0              |
| 4750 | 5.4     | 8.10     | 1000.0              |
| 5000 | 4.8     | 6.88     | 1000.0              |
| 5250 | 4.5     | 6.05     | 1000.0              |

Wheel: 6.9 HP    20.6 N\*M  
 LOSSES: -0.3 HP    -0.4N\*M  
 TOTAL ENGINE: 7.2HP    21.06N\*M



### Hasil Pengujian ke-7 dari Filter Udara Modifikasi 3



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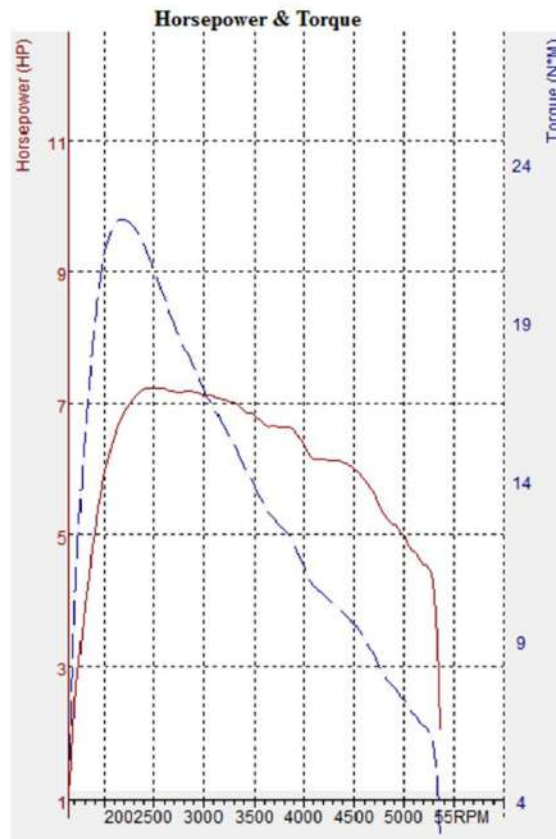
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

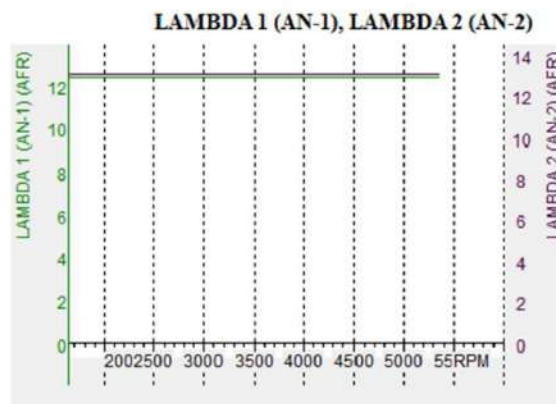
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1180 | 7.2 / 2474 | 22.24 / 2144 | 92.6 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1180

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 3.3     | 13.35    | 1000.0              |
| 2000 | 6.0     | 21.35    | 1000.0              |
| 2144 | 6.8     | 22.24    | 1000.0              |
| 2250 | 7.0     | 22.10    | 1000.0              |
| 2474 | 7.2     | 20.61    | 1000.0              |
| 2500 | 7.2     | 20.46    | 1000.0              |
| 2750 | 7.2     | 18.51    | 1000.0              |
| 3000 | 7.1     | 16.90    | 1000.0              |
| 3250 | 7.0     | 15.35    | 1000.0              |
| 3500 | 6.8     | 13.79    | 1000.0              |
| 3750 | 6.6     | 12.59    | 1000.0              |
| 4000 | 6.3     | 11.26    | 1000.0              |
| 4250 | 6.1     | 10.26    | 1000.0              |
| 4500 | 6.0     | 9.47     | 1000.0              |
| 4750 | 5.4     | 8.13     | 1000.0              |
| 5000 | 4.9     | 7.03     | 1000.0              |
| 5250 | 4.5     | 6.09     | 1000.0              |

Wheel 7.1 HP 22.0 N\*M  
 LOSSES -0.1 HP -0.2N\*M  
 TOTAL ENGINE: 7.2HP 22.24N\*M



### Hasil Pengujian ke-8 dari Filter Udara Modifikasi 3



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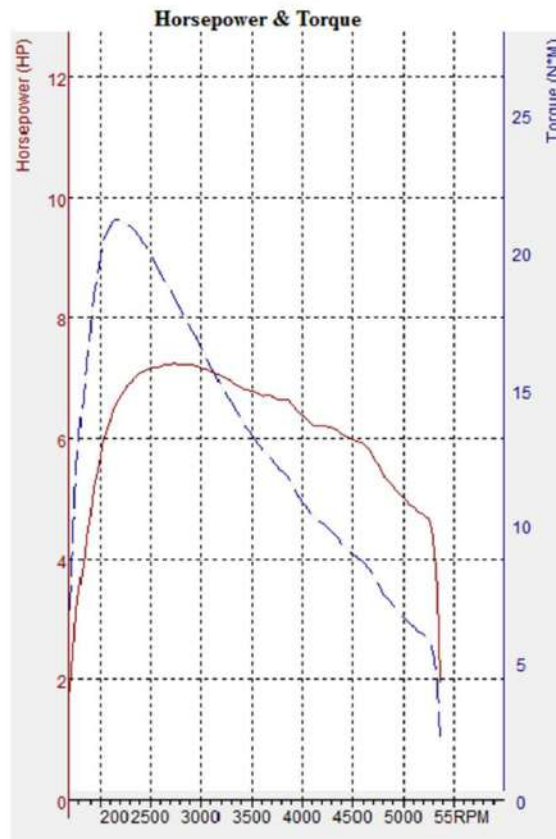
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

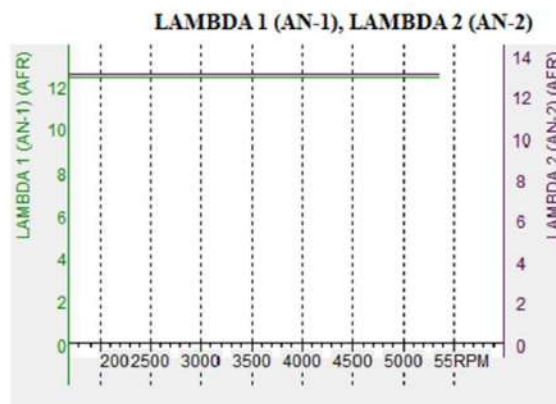
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1179 | 7.2 / 2723 | 21.62 / 2150 | 92.7 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1179

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 2.9     | 11.87    | 1000.0              |
| 2000 | 5.8     | 20.57    | 1000.0              |
| 2150 | 6.6     | 21.62    | 1000.0              |
| 2250 | 6.9     | 21.48    | 1000.0              |
| 2500 | 7.2     | 20.30    | 1000.0              |
| 2723 | 7.2     | 18.82    | 1000.0              |
| 2750 | 7.2     | 18.72    | 1000.0              |
| 3000 | 7.2     | 16.92    | 1000.0              |
| 3250 | 7.0     | 15.24    | 1000.0              |
| 3500 | 6.8     | 13.75    | 1000.0              |
| 3750 | 6.7     | 12.62    | 1000.0              |
| 4000 | 6.4     | 11.29    | 1000.0              |
| 4250 | 6.2     | 10.34    | 1000.0              |
| 4500 | 6.0     | 9.41     | 1000.0              |
| 4750 | 5.5     | 8.26     | 1000.0              |
| 5000 | 5.0     | 7.10     | 1000.0              |
| 5250 | 4.6     | 6.28     | 1000.0              |

Wheel 7.2 HP 21.6 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.2HP 21.62 N\*M



### Hasil Pengujian ke-9 dari Filter Udara Modifikasi 3



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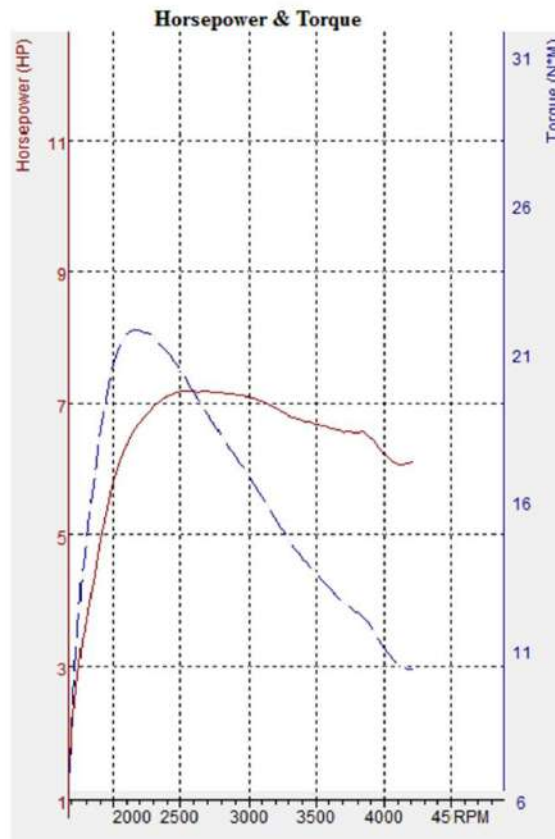
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

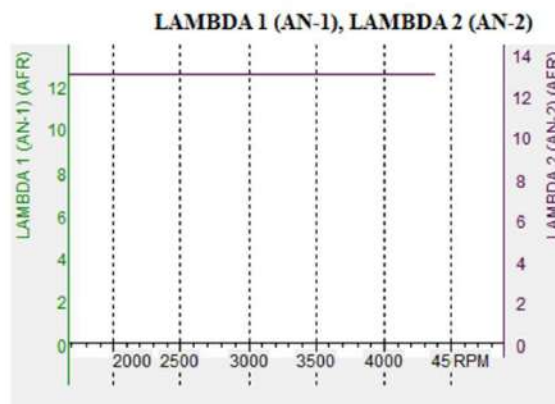
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date         |
|-------------------|------------|--------------|------|------------|--------------|-----------------|--------------|
| BEAT UNDIKSA_1166 | 7.2 / 2560 | 21.76 / 2155 | 76.2 | 25.0       | 60           | 1000.0          | 28/02/2026 1 |



DATA FOR TEST: BEAT UNDIKSA\_1166

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 1750 | 3.2     | 12.97    | 1000.0              |
| 2000 | 5.9     | 20.79    | 1000.0              |
| 2155 | 6.6     | 21.76    | 1000.0              |
| 2250 | 6.9     | 21.61    | 1000.0              |
| 2500 | 7.2     | 20.38    | 1000.0              |
| 2560 | 7.2     | 19.83    | 1000.0              |
| 2750 | 7.2     | 18.45    | 1000.0              |
| 3000 | 7.1     | 16.77    | 1000.0              |
| 3250 | 6.9     | 14.97    | 1000.0              |
| 3500 | 6.7     | 13.55    | 1000.0              |
| 3750 | 6.6     | 12.47    | 1000.0              |
| 4000 | 6.2     | 11.01    | 1000.0              |
| 4250 | 6.2     | 10.28    | 1000.0              |

Wheel 7.2 HP 21.8 N\*M  
 LOSSES 0.0 HP 0.0 N\*M  
 TOTAL ENGINE: 7.2HP 21.76 N\*M



### Hasil Pengujian ke-10 dari Filter Udara Modifikasi 3



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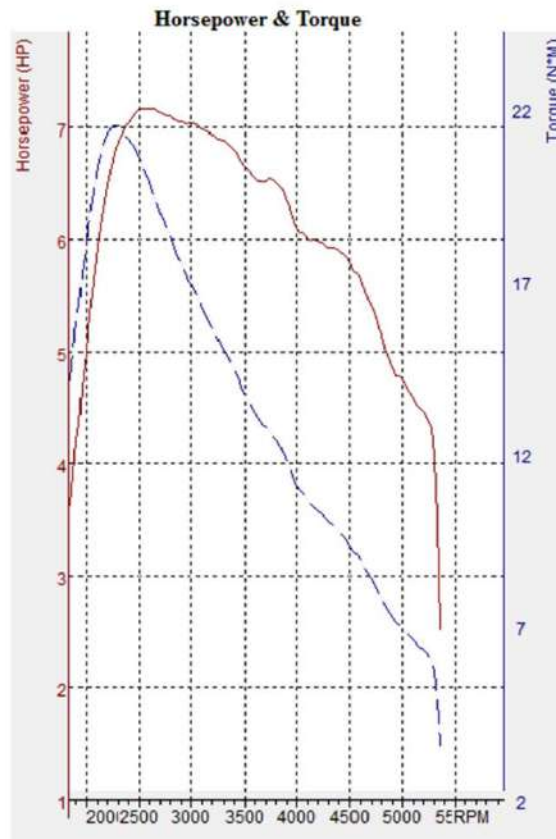
SportDyno-Ver date: 28-JUN-2019 (4.0.35.1)

DYNAMOMETER: SMK PGRI 2 BADUNG

Correction Factor: EC95 -1

Power: HP (mechanic)

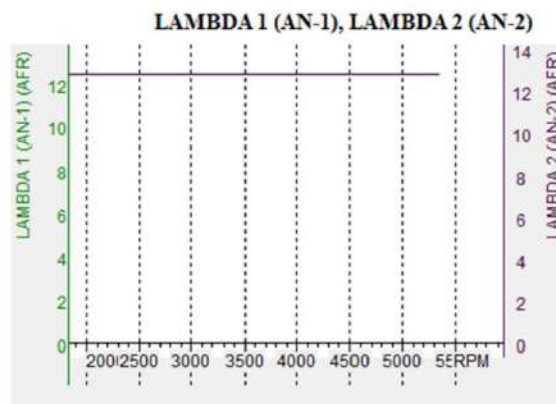
| Name              | HP/RPM     | N*M/RPM      | KMH  | Temp. (°C) | Humidity (%) | Pressure (mbar) | Date       |
|-------------------|------------|--------------|------|------------|--------------|-----------------|------------|
| BEAT UNDIKSA_1156 | 7.2 / 2594 | 21.32 / 2245 | 92.5 | 25.0       | 60           | 1000.0          | 28/02/2026 |



DATA FOR TEST: BEAT UNDIKSA\_1156

| RPM  | HP (HP) | TQ (N*M) | Termol (T C-A) (°C) |
|------|---------|----------|---------------------|
| 2000 | 5.2     | 18.31    | 1000.0              |
| 2250 | 6.8     | 21.32    | 1000.0              |
| 2245 | 6.8     | 21.32    | 1000.0              |
| 2500 | 7.2     | 20.35    | 1000.0              |
| 2594 | 7.2     | 19.56    | 1000.0              |
| 2750 | 7.1     | 18.36    | 1000.0              |
| 3000 | 7.0     | 16.68    | 1000.0              |
| 3250 | 6.9     | 15.12    | 1000.0              |
| 3500 | 6.7     | 13.51    | 1000.0              |
| 3750 | 6.5     | 12.41    | 1000.0              |
| 4000 | 6.1     | 10.81    | 1000.0              |
| 4250 | 6.0     | 9.94     | 1000.0              |
| 4500 | 5.8     | 9.13     | 1000.0              |
| 4750 | 5.3     | 7.88     | 1000.0              |
| 5000 | 4.8     | 6.77     | 1000.0              |
| 5250 | 4.4     | 5.91     | 1000.0              |

Wheel: 7.2 HP    21.3 N\*M  
 LOSSES: 0.0 HP    0.0 N\*M  
 TOTAL ENGINE: 7.2 HP    21.32 N\*M



Lampiran 0 6 Lembar Hasil Pengujian konsumsi bahan bakar

| PENGUJIAN KONSUMSI BAHAN BAKAR SATUAN WAKTU(s) |                       |                 |              |              |              |
|------------------------------------------------|-----------------------|-----------------|--------------|--------------|--------------|
| Putaran Mesin (RPM)                            | Pengulangan Pengujian | Kondisi Standar | Modifikasi 1 | Modifikasi 2 | Modifikasi 3 |
| 2000                                           | 1                     | 226             | 227          | 224          | 222          |
|                                                | 2                     | 225             | 226          | 223          | 221          |
|                                                | 3                     | 226             | 226          | 225          | 224          |
|                                                | 4                     | 225             | 224          | 224          | 221          |
|                                                | 5                     | 226             | 225          | 226          | 223          |
|                                                | 6                     | 227             | 226          | 224          | 224          |
|                                                | 7                     | 224             | 224          | 223          | 222          |
|                                                | 8                     | 225             | 223          | 222          | 221          |
|                                                | 9                     | 226             | 225          | 225          | 224          |
|                                                | 10                    | 224             | 224          | 226          | 221          |
| RATA RATA                                      |                       | 222             | 225          | 224          | 222          |
| 2500                                           | 1                     | 200             | 199          | 198          | 196          |
|                                                | 2                     | 199             | 198          | 198          | 195          |
|                                                | 3                     | 198             | 199          | 196          | 196          |
|                                                | 4                     | 199             | 197          | 198          | 197          |
|                                                | 5                     | 197             | 198          | 197          | 198          |
|                                                | 6                     | 198             | 199          | 197          | 196          |
|                                                | 7                     | 199             | 200          | 196          | 195          |
|                                                | 8                     | 200             | 199          | 199          | 196          |
|                                                | 9                     | 198             | 198          | 198          | 195          |
|                                                | 10                    | 199             | 197          | 196          | 196          |
| RATA RATA                                      |                       | 199             | 198          | 197          | 196          |
| 3000                                           | 1                     | 184             | 183          | 182          | 180          |
|                                                | 2                     | 185             | 184          | 182          | 179          |
|                                                | 3                     | 184             | 183          | 183          | 179          |
|                                                | 4                     | 185             | 182          | 184          | 181          |
|                                                | 5                     | 184             | 184          | 182          | 180          |
|                                                | 6                     | 185             | 182          | 183          | 182          |
|                                                | 7                     | 183             | 182          | 182          | 178          |
|                                                | 8                     | 184             | 184          | 181          | 177          |
|                                                | 9                     | 184             | 183          | 180          | 179          |
|                                                | 10                    | 186             | 183          | 183          | 180          |
| RATA RATA                                      |                       | 184             | 183          | 182          | 180          |
| 3500                                           | 1                     | 166             | 165          | 163          | 160          |
|                                                | 2                     | 167             | 164          | 164          | 161          |
|                                                | 3                     | 166             | 165          | 164          | 159          |
|                                                | 4                     | 166             | 166          | 163          | 158          |
|                                                | 5                     | 168             | 165          | 163          | 160          |
|                                                | 6                     | 168             | 166          | 164          | 158          |
|                                                | 7                     | 167             | 167          | 166          | 159          |
|                                                | 8                     | 169             | 164          | 162          | 160          |
|                                                | 9                     | 165             | 164          | 163          | 161          |
|                                                | 10                    | 165             | 165          | 165          | 160          |
| RATA RATA                                      |                       | 167             | 165          | 163          | 160          |

Lampiran 0 7. Dokumentasi Pengambilan Data Torsi, Daya dan Pengambilan Data Konsumsi Bahan Bakar



Lampiran 0 8. Modul

# MODUL PEMBELAJARAN

## KINERJA MESIN SEPEDA MOTOR BERDASARKAN MODIFIKASI BAHAN FILTER UDARA

Mempelajari pengaruh modifikasi bahan filter udara terhadap torsi, daya, dan konsumsi bahan bakar pada mesin sepeda motor



KERTAS

SPONS

KATUN

KAWAT



Disusun Oleh:

**PUTU AGUS HENDRAWAN**

NIM 2215071002



PROGRAM STUDI PENDIDIKAN TEKNIK MESIN  
JURUSAN TEKNOLOGI INDUSTRI  
FAKULTAS TEKNIK DAN KEJURUAN  
UNIVERSITAS PENDIDIKAN GANESHA  
SINGARAJA

2026



## Lampiran 0 9. HAKI



REPUBLIK INDONESIA  
KEMENTERIAN HUKUM

## SURAT PENCATATAN CIPTAAN

Dalam rangka perlindungan ciptaan di bidang ilmu pengetahuan, seni dan sastra berdasarkan Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta, dengan ini menerangkan:

Nomor dan tanggal permohonan : EC002026095467, 24 Juni 2026

**Pencipta**

Nama : **Putu Agus Hendrawan, NYOMAN ARYA WIGRAHA, S.T., M.T. dkk**

Alamat : **Dusun Kanginan Pakseballi, Dawan, Kab. Klungkung, Bali**

Kewarganegaraan : **Indonesia**

**Pemegang Hak Cipta**

Nama : **Fakultas Teknik dan Kejuruan Universitas Pendidikan Ganesha**

Alamat : **Jalan Udayana No. 11, Singaraja, Buleleng, Kab. Buleleng, Bali, 81116**

Kewarganegaraan : **Indonesia**

Jenis Ciptaan : **Modul**

Judul Ciptaan : **Kinerja Mesin Sepeda Motor Berdasarkan Modifikasi Bahan Filter Udara**

Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia : **23 Juni 2026, di Singaraja**

Jangka waktu perlindungan : **Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.**

Nomor Pencatatan : **001299015**

adalah benar berdasarkan keterangan yang diberikan oleh Pemohon.

Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.



a.n. MENTERI HUKUM  
DIREKTUR JENDERAL KEKAYAAN INTELEKTUAL  
u.b  
Direktur Hak Cipta dan Desain Industri

Agung Damarsasongko, SH.,MH.  
NIP. 196912261994031001

 **Balai Besar Sertifikasi Elektronik**

Disclaimer:

1. Dalam hal pemohon memberikan keterangan tidak sesuai dengan surat pernyataan, Menteri berwenang untuk mencabut surat pencatatan permohonan.
2. Surat Pencatatan ini telah disegel secara elektronik menggunakan segel elektronik yang diterbitkan oleh Balai Besar Sertifikasi Elektronik, Badan Siber dan Sandi Negara.
3. Surat Pencatatan ini dapat dibuktikan keasliannya dengan memindai kode QR pada dokumen ini dan informasi akan ditampilkan dalam browser.

## Lampiran 0 10. KDN (Kutipan Daftar Nilai)



## UNIVERSITAS PENDIDIKAN GANESHA

Alamat : Jalan Udayana No. 11 Singaraja, Bali • Telp.: (0362) 22570 • Fax.: (0362) 25735

Website : <https://undiksha.ac.id> • Email : [humas@undiksha.ac.id](mailto:humas@undiksha.ac.id)

## KUTIPAN DAFTAR NILAI (KDN)

Nama : Putu Agus Hendrawan  
 Tempat / Tanggal Lahir : Takmung / 20 Agustus 2003  
 Nomor Induk : 2215071002  
 Fakultas : Fakultas Teknik dan Kejuruan  
 Jurusan / Program Studi : Jurusan Teknologi Industri / Pendidikan Teknik Mesin (PTM) (S1)

| NO.          | MATA KULIAH                          | K.        | N.   | K/N  | SM/TH.   | NO. | MATA KULIAH                                      | K. | N.   | K/N   | SM/TH.   |
|--------------|--------------------------------------|-----------|------|------|----------|-----|--------------------------------------------------|----|------|-------|----------|
| 1            | PENGASAS                             | 2         | 4    | 8    | 06/22/23 | 33  | PENDIDIKAN KEJURUAN                              | 2  | 3,75 | 7,5   | 03/23/24 |
| 2            | BHASEA INDONESIA                     | 2         | 4    | 8    | 06/22/23 | 34  | KINEMATIKA DAN DINAMIKA                          | 2  | 3,75 | 7,5   | 04/23/24 |
| 3            | TRI HITA KARANA                      | 2         | 3,25 | 6,5  | 06/22/23 | 35  | MANAJEMEN INDUSTRI                               | 2  | 4    | 8     | 04/23/24 |
| 4            | MATEMATIKA TEKNIK                    | 2         | 3,75 | 7,5  | 06/22/23 | 36  | MESIN KONVERSI ENERGI                            | 2  | 4    | 8     | 04/23/24 |
| 5            | FISIKA TEKNIK                        | 2         | 3,25 | 6,5  | 06/22/23 | 37  | KEMIRISALIAN                                     | 2  | 3,75 | 7,5   | 01/23/24 |
| 6            | PENGANTARAN KOMPUTER                 | 2         | 3,75 | 7,5  | 06/22/23 | 38  | METODOLOGI PENELITIAN                            | 2  | 3,75 | 7,5   | 04/23/24 |
| 7            | MENGAMBIK TEKNIK                     | 2         | 3,75 | 7,5  | 06/22/23 | 39  | PEMBELAJARAN MIKRO                               | 2  | 3,75 | 7,5   | 04/23/24 |
| 8            | KIMIA TEKNIK                         | 2         | 4    | 8    | 06/22/23 | 40  | MESIN LISTRIK                                    | 2  | 3,75 | 7,5   | 04/23/24 |
| 9            | WAWASAN KEPENDIDIKAN                 | 2         | 3,75 | 7,5  | 06/22/23 | 41  | PIRAKTUM MESIN LISTRIK                           | 2  | 3,75 | 7,5   | 04/23/24 |
| 10           | PERKEMBANGAN PESERTA DIDIK           | 2         | 3    | 6    | 06/22/23 | 42  | MODIFIKASI TEKNIK OTOMOTIF                       | 2  | 4    | 8     | 04/23/24 |
| 11           | PENDIDIKAN AGAMA HINDU               | 2         | 3    | 6    | 02/22/23 | 43  | TEKNOLOGI BARR KENDARAAN                         | 2  | 3,25 | 6,5   | 04/23/24 |
| 12           | BHASEA INGGRIS                       | 2         | 3,75 | 7,5  | 02/22/23 | 44  | SISTEM PUMPMAM TENAGA                            | 2  | 3,75 | 7,5   | 04/23/24 |
| 13           | PENDIDIKAN KEWARGANEGARAAN           | 2         | 3,75 | 7,5  | 02/22/23 | 45  | TEKNOLOGI OTOMOTIF                               | 2  | 3,25 | 6,5   | 04/23/24 |
| 14           | PENGKURAN TEKNIK                     | 2         | 2,75 | 5,5  | 02/22/23 | 46  | LITERASIKELANGS                                  | 3  | 4    | 12    | 05/24/25 |
| 15           | MENGAMBIK MESIN                      | 3         | 4    | 12   | 02/22/23 | 47  | PERANGKATAN DAN PENGEMBANGAN KURIKULUM           | 3  | 4    | 12    | 05/24/25 |
| 16           | ILMU BAHAN                           | 2         | 4    | 8    | 02/22/23 | 48  | MANAJEMEN DAN KEPIMPINAN                         | 3  | 3,75 | 11,25 | 05/24/25 |
| 17           | MEKANIKA TEKNIK                      | 3         | 3,25 | 9,75 | 02/22/23 | 49  | FILASOFI PENDIDIKAN INDONESIA                    | 3  | 3    | 9     | 05/24/25 |
| 18           | TERBODHINAMIKA                       | 2         | 3,75 | 7,5  | 02/22/23 | 50  | PENDIDIKAN INKLUSI                               | 3  | 3,75 | 11,25 | 05/24/25 |
| 19           | MEKANIKA FLUIDA                      | 2         | 3,25 | 6,5  | 02/22/23 | 51  | ELEMEN MESIN                                     | 2  | 3,75 | 7,5   | 05/24/25 |
| 20           | BELAJARAN DAN PEMBELAJARAN           | 2         | 3,75 | 7,5  | 02/22/23 | 52  | HYDROLIK PNEUMATIK                               | 3  | 4    | 12    | 05/24/25 |
| 21           | TELAH KURIKULUM                      | 2         | 3,75 | 7,5  | 02/22/23 | 53  | TEKNOLOGI BARR DALAM PENGAMARAN DAN PEMBELAJARAN | 3  | 3,75 | 11,25 | 05/24/25 |
| 22           | STATISTIKA                           | 2         | 3,75 | 7,5  | 03/23/24 | 54  | TEKNIK LISTRIK DAN ELEKTRONIKA                   | 2  | 4    | 8     | 06/24/25 |
| 23           | PROPIEDAIAN PAVAS                    | 2         | 3,25 | 6,5  | 03/23/24 | 55  | MEKATRONIKA                                      | 2  | 4    | 8     | 06/24/25 |
| 24           | PROSES TEKNIK MANIFAKTUR             | 2         | 3,25 | 6,5  | 03/23/24 | 56  | MEKANIKA KEKUATAN BAHAN                          | 2  | 4    | 8     | 06/24/25 |
| 25           | PIRAKTIK PROSES TEKNIK MANIFAKTUR    | 2         | 4    | 8    | 03/23/24 | 57  | TEKNIK PEMELIHARAAN OTOMOTIF                     | 3  | 3,75 | 11,25 | 06/24/25 |
| 26           | DASAR DASAR TEKNIK OTOMOTIF          | 2         | 3    | 6    | 03/23/24 | 58  | EMISI GAS BUANG                                  | 3  | 4    | 12    | 06/24/25 |
| 27           | PIRAKTIK DASAR DASAR TEKNIK OTOMOTIF | 2         | 2,75 | 5,5  | 03/23/24 | 59  | DIAGNOSIS KENDARAAN                              | 3  | 3,75 | 11,25 | 06/24/25 |
| 28           | TEKNIK PENGINJEN                     | 2         | 3,25 | 6,5  | 03/23/24 | 60  | KARYA TEKNOLOGI TEKNIK OTOMOTIF                  | 3  | 4    | 12    | 06/24/25 |
| 29           | PIRAKTIK TEKNIK PENGINJEN            | 2         | 4    | 8    | 03/23/24 | 61  | PENGEMBANGAN MEDIA PEMBELAJARAN TEKNIK MESIN     | 3  | 4    | 12    | 06/24/25 |
| 30           | KESELAMATAN DAN KESEHATAN KERJA      | 2         | 3,75 | 7,5  | 03/23/24 | 62  | ASISTENSI MENGAJAR                               | 20 | 4    | 80    | 07/25/26 |
| 31           | STRATEGI DAN DESAIN PEMBELAJARAN     | 2         | 4    | 8    | 03/23/24 | 63  | SEMINAR PROPOSAL                                 | 2  | 3,75 | 7,5   | 08/25/26 |
| 32           | ASISSEMEN DAN EVALUASI PEMBELAJARAN  | 2         | 4    | 8    | 03/23/24 | 64  | SEMINAR HASIL PENELITIAN                         | 4  | 3,75 | 15    | 08/25/26 |
| TOTAL KREDIT |                                      | : 162 SKS |      |      |          |     |                                                  |    |      |       |          |
| IP KUMULATIF |                                      | : 3,73    |      |      |          |     |                                                  |    |      |       |          |



Dokumen ini diciptakan secara elektronik berdasarkan data pada Sistem Informasi Akademik dan ditandatangani secara elektronik menggunakan tanda tangan BSiE-BSSN  
 Tanggal dokumen diciptakan:  
 24 Juni 2026



- UU ITE No. 11 Tahun 2008 Pasal 5 Ayat 1 "Informasi Elektronik dan/atau hasil cetaknya merupakan alat bukti hukum yang sah"
- Dokumen ini telah ditandatangani secara elektronik menggunakan sertifikat elektronik yang diterbitkan BSiE - BSSN, validitas dokumen elektronik ini bisa dicek menggunakan aplikasi mobile VeryDS oleh BSiE
- Cetakan dokumen ini merupakan salinan dari file dokumen bertandatangan elektronik yang keabsahannya dapat diakses melalui scan QRCode yang terdapat pada sertifikat ini.



## Lampiran 0 11. Riwayat Hidup



Putu Agus Hendrawan lahir di desa Takmung pada tanggal 20 Agustus 2003. Anak ke pertama dari dua bersaudara pasangan suami istri I Wayan Darma dan Ni Ketut Serini yang ber alamat di desa Pakseballi. Penulis memulai menempuh pendidikan formal di SD N 1 Peliatan dan lulus pada tahun 2016. Selanjutnya penulis melanjutkan pendidikan di SMP N 2 Ubud dan lulus pada tahun 2019. Pendidikan menengah atas ditempuh di SMK N 1 Tegalalang pada kompetensi keahlian Teknik dan Bisnis Sepeda Motor dan lulus SMK pada tahun 2022.

Pada tahun 2022, penulis melanjutkan pendidikan tinggi di Program Studi Pendidikan Teknik Mesin, Fakultas Teknik dan Kejuruan, Universitas Pendidikan Ganesha (Undiksha), Singaraja, dan menempuh jenjang Sarjana (S1).

