

**AMENDEMENT LAMPIRAN SERTIFIKAT AKREDITASI LK-075-IDN (Amd-2 Penetapan: 16 September 2026)**

**LABORATORIUM KALIBRASI - SNI ISO/IEC 17025:2017 (ISO/IEC 17025:2017)**

|          |                                                                                    |                                   |
|----------|------------------------------------------------------------------------------------|-----------------------------------|
| Nama LPK | : Balai Besar Standardisasi dan Pelayanan Jasa Pencegahan Pencemaran Industri      | Masa berlaku:                     |
| Alamat   | : Jalan Ki Mangunsarkoro No.6, Karangkidul, Semarang Tengah, Semarang, Jawa Tengah | 29 Maret 2023                     |
| Telepon  | : (024)-8316315                                                                    | s/d                               |
| Email    | : lk075idn@gmail.com                                                               | 26 Februari 2028                  |
|          |                                                                                    | Amendemen ke-1: 22 Januari 2025   |
|          |                                                                                    | Amendemen ke-2: 16 September 2026 |

**KEMAMPUAN KALIBRASI DAN PENGUKURAN (CMC) LABORATORIUM KALIBRASI**

| Kelompok pengukuran | Jenis alat atau standar atau bahan yang dikalibrasi atau yang diukur | Rentang ukur                                                                                            | Ketidakpastian yang diperluas *)        | Metode kalibrasi/ dokumen standar dan teknik yang digunakan | Keterangan |
|---------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------|------------|
| Suhu dan Kelembapan | Oven                                                                 | 100 °C      130 °C<br>130 °C      180 °C<br>180 °C      195 °C                                          | 1.3 °C<br>1.5 °C<br>1.7 °C              | KAN.Pd-02.04 : 2019                                         |            |
|                     | Inkubator                                                            | 20 °C      41.5 °C<br>41.5 °C      100 °C                                                               | 1.2 °C<br>1.5 °C                        | KAN.Pd-02.04 : 2019                                         |            |
|                     | Waterbath                                                            | 44 °C      55 °C<br>55 °C      100 °C                                                                   | 0.8 °C<br>0.8 °C                        | KAN.Pd-02.04 : 2019                                         |            |
|                     | Refrigerator                                                         | 2 °C      8 °C                                                                                          | 1.4 °C                                  | KAN.Pd-02.04 : 2019                                         |            |
|                     | Termometer Gelas                                                     | 0 °C      ~      100 °C                                                                                 | 0.65 °C                                 | ASTM E 77-2014                                              |            |
|                     | Termometer Digital                                                   | -10 °C      ~      10 °C<br>25 °C      ~      125 °C                                                    | 0.32 °C<br>0.34 °C                      | JIS Z 8710-1993                                             |            |
|                     | Termohigrometer                                                      | 15 °C      ~      35 °C<br>40 %RH      ~      85 %RH                                                    | 0.36 °C<br>2.8 %RH                      | JIS B 7920 : 2000                                           |            |
|                     | Temperature Sensor with Indicator <sup>1</sup>                       | -20 °C      ~      125 °C<br>125 °C      ~      150 °C<br>150 °C      ~      195 °C                     | 0.20 °C<br>0.21 °C<br>0.24 °C           | SNSU PK.S-02:2021                                           |            |
|                     | Timbangan (Elektronik, Mekanik)                                      | 0 g      ~      50 g<br>50 g      ~      200 g<br>200 g      ~      1000 g<br>1000 g      ~      3000 g | 0.11 mg<br>0.24 mg<br>1.4 mg<br>0.088 g | CSIRO, 2010                                                 |            |
|                     |                                                                      |                                                                                                         |                                         |                                                             |            |

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|---------------------|----------------------------------------------------------------------|--------------------|----------------------------------|-------------------------------------------------------------|------------------|
| Volume              | Pipet Volume                                                         | 1 mL               | 0.006 mL                         | MK-03                                                       |                  |
|                     |                                                                      | 2 mL               | 0.009 mL                         |                                                             |                  |
|                     |                                                                      | 3 mL               | 0.009 mL                         |                                                             |                  |
|                     |                                                                      | 4 mL               | 0.009 mL                         |                                                             |                  |
|                     |                                                                      | 5 mL               | 0.009 mL                         |                                                             |                  |
|                     |                                                                      | 6 mL               | 0.011 mL                         |                                                             |                  |
|                     |                                                                      | 7 mL               | 0.011 mL                         |                                                             |                  |
|                     |                                                                      | 8 mL               | 0.011 mL                         |                                                             |                  |
|                     |                                                                      | 9 mL               | 0.011 mL                         |                                                             |                  |
|                     |                                                                      | 10 mL              | 0.011 mL                         |                                                             |                  |
|                     |                                                                      | 15 mL              | 0.014 mL                         |                                                             |                  |
|                     |                                                                      | 20 mL              | 0.014 mL                         |                                                             |                  |
|                     |                                                                      | 25 mL              | 0.014 mL                         |                                                             |                  |
|                     | Labu Ukur                                                            | 50 mL              | 0.055 mL                         | MK-03                                                       |                  |
|                     |                                                                      | 100 mL             | 0.077 mL                         |                                                             |                  |
|                     |                                                                      | 200 mL             | 0.11 mL                          |                                                             |                  |
|                     |                                                                      | 250 mL             | 0.11 mL                          |                                                             |                  |
|                     |                                                                      | 500 mL             | 0.16 mL                          |                                                             |                  |
|                     |                                                                      | 1000 mL            | 0.26 mL                          |                                                             |                  |
|                     | Pipet Ukur                                                           | 0.5 mL ~ 5 mL      | 0.031 mL                         | MK-03                                                       |                  |
|                     |                                                                      | 5 mL ~ 10 mL       | 0.031 mL                         |                                                             |                  |
|                     | Mikropipet <sup>2</sup>                                              | 20 µL ~ 100 µL     | 0.43 µL                          | SNSU PK.M-01: 2024                                          |                  |
|                     |                                                                      | 100 µL ~ 1000 µL   | 2.2 µL                           |                                                             |                  |
|                     |                                                                      | 1 mL ~ 5 mL        | 11 µL                            |                                                             |                  |
|                     |                                                                      | 5 mL ~ 10 mL       | 23 µL                            |                                                             |                  |
| Gelas Ukur          | 1 mL ~ 10 mL                                                         | 0.058 mL           | MK-03                            |                                                             |                  |
|                     | 10 mL ~ 25 mL                                                        | 0.14 mL            |                                  |                                                             |                  |
|                     | 25 mL ~ 50 mL                                                        | 0.29 mL            |                                  |                                                             |                  |
|                     | 50 mL ~ 100 mL                                                       | 0.29 mL            |                                  |                                                             |                  |
|                     | 100 mL ~ 1000 mL                                                     | 2.9 mL             |                                  |                                                             |                  |
| Gaya                | Load Cell <sup>1</sup>                                               | 0.0 kgf ~ 25 kgf   | 0.24 kgf                         | MK. 10<br>ISO 376 : 2011                                    | 1 kgf = 9.8066 N |
|                     |                                                                      | 25.0 kgf ~ 250 kgf | 0.71 kgf                         |                                                             |                  |
|                     |                                                                      | 250 kgf ~ 500 kgf  | 2.1 kgf                          |                                                             |                  |

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| Kelompok pengukuran | Jenis alat atau standar atau bahan yang dikalibrasi atau yang diukur | Rentang ukur                | Ketidakpastian yang diperluas *) | Metode kalibrasi/ dokumen standar dan teknik yang digunakan | Keterangan |
|---------------------|----------------------------------------------------------------------|-----------------------------|----------------------------------|-------------------------------------------------------------|------------|
| Instrumen Analitik  | Spektrofotometer                                                     | Panjang Gelombang           |                                  | ASTM E925-09 (2014)<br>SNSU PK.F-01:2020                    |            |
|                     |                                                                      | Filter Gelas Holmium Oksida |                                  |                                                             |            |
|                     |                                                                      | 279.3 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 287.5 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 333.7 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 360.7 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 418.4 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 445.7 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 453.4 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 459.9 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 536.1 nm                    | 0.25 nm                          |                                                             |            |
|                     |                                                                      | 637.5 nm                    | 0.25 nm                          |                                                             |            |
|                     | Filter Gelas Didymium Oksida                                         | 329.7 nm                    | 0.33 nm                          |                                                             |            |
|                     |                                                                      | 472.0 nm                    | 0.33 nm                          |                                                             |            |
|                     |                                                                      | 512.4 nm                    | 0.33 nm                          |                                                             |            |
|                     |                                                                      | 680.9 nm                    | 0.33 nm                          |                                                             |            |
|                     |                                                                      | 886.5 nm                    | 0.33 nm                          |                                                             |            |
|                     | Linearitas Fotometrik                                                | 235 nm                      |                                  |                                                             |            |
|                     |                                                                      | 0.2496 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 0.4972 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 0.7492 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 0.9998 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 1.2498 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 257 nm                      |                                  |                                                             |            |
|                     |                                                                      | 0.2884 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 0.5768 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 0.8711 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 1.1607 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 1.4541 Abs                  | 0.0075 Abs                       |                                                             |            |
|                     |                                                                      | 313 nm                      |                                  |                                                             |            |
|                     |                                                                      | 0.0968 Abs                  | 0.0076 Abs                       |                                                             |            |
|                     |                                                                      | 0.1942 Abs                  | 0.0076 Abs                       |                                                             |            |
|                     |                                                                      | 0.2924 Abs                  | 0.0076 Abs                       |                                                             |            |
|                     |                                                                      | 0.3880 Abs                  | 0.0076 Abs                       |                                                             |            |
|                     |                                                                      | 0.4852 Abs                  | 0.0076 Abs                       |                                                             |            |

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|---------------------|----------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|----------------------------|
| Instrumen Analitik  | Spektrofotometer (Lanjutan)<br><br>Linearitas Fotometrik             | 350 nm                | 0.2155 Abs<br>0.4301 Abs<br>0.6478 Abs<br>0.8601 Abs<br>1.0752 Abs | ASTM E925-09 (2014)<br>SNSU PK.F-01:2020                    |                            |
|                     |                                                                      |                       | 0.0076 Abs                                                         |                                                             |                            |
|                     |                                                                      |                       | 0.0076 Abs                                                         |                                                             |                            |
|                     |                                                                      |                       | 0.0076 Abs                                                         |                                                             |                            |
|                     |                                                                      |                       | 0.0076 Abs                                                         |                                                             |                            |
|                     |                                                                      |                       | 0.0076 Abs                                                         |                                                             |                            |
|                     |                                                                      | 440 nm                | 0.314 Abs<br>0.514 Abs<br>1.052 Abs                                |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      | 465 nm                | 0.285 Abs<br>0.473 Abs<br>0.980 Abs                                |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      | 546.1 nm              | 0.299 Abs<br>0.491 Abs<br>1.001 Abs                                |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      | 590 nm                | 0.347 Abs<br>0.551 Abs<br>1.078 Abs                                |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      | 635 nm                | 0.352 Abs<br>0.545 Abs<br>1.047 Abs                                |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      |                       | 0.006 Abs                                                          |                                                             |                            |
|                     |                                                                      | 875.7 nm              | 0.0968 Abs<br>0.1942 Abs<br>0.2924 Abs<br>0.388 Abs<br>0.485 Abs   |                                                             |                            |
|                     |                                                                      |                       | 0.33 Abs                                                           |                                                             |                            |
|                     |                                                                      |                       | 0.33 Abs                                                           |                                                             |                            |
|                     |                                                                      |                       | 0.33 Abs                                                           |                                                             |                            |
|                     |                                                                      |                       | 0.33 Abs                                                           |                                                             |                            |
|                     |                                                                      |                       | 0.33 Abs                                                           |                                                             |                            |
|                     | Autoclave                                                            | 1100 mBar<br>121 °C   | 70 mBar<br>0.85 °C                                                 | BS EN 13060:2014                                            | 1 bar = 10 <sup>5</sup> Pa |
|                     | pHmeter <sup>1</sup>                                                 | 4 pH<br>7 pH<br>10 pH | 0.021 pH<br>0.021 pH<br>0.031 pH                                   | MK. 11<br>ASTM E70: 2024                                    |                            |
|                     |                                                                      |                       |                                                                    |                                                             |                            |

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|---------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------|
| Instrumen Analitik  | <i>Turbidity Meter</i> <sup>1</sup>                                  | 20 NTU<br>100 NTU<br>1000 NTU                                                                      | 0.46 NTU<br>2.1 NTU<br>7.5 NTU                                                                   | MK. 12                                                      |            |
|                     | <i>Ozone Analyzer</i> <sup>2</sup>                                   | 0 ppb ~ 200 ppb                                                                                    | 1.5 % of reading                                                                                 | MK. 17                                                      |            |
|                     | <i>Gas Analyzer</i> <sup>1,2</sup>                                   |                                                                                                    |                                                                                                  |                                                             |            |
|                     | CO                                                                   | 0 ppm ~ 5 ppm<br>5 ppm ~ 10 ppm<br>100 ppm ~ 400 ppm<br>400 ppm ~ 800 ppm<br>800 ppm ~ 1000 ppm    | 7.0 % of reading<br>5.0 % of reading<br>4.3 % of reading<br>4.2 % of reading<br>4.3 % of reading | MK. 09<br>ISO 6145-1:2019<br>ISO 6145-7:2018                |            |
|                     | NO                                                                   | 100 ppm ~ 400 ppm<br>400 ppm ~ 800 ppm<br>800 ppm ~ 1000 ppm                                       | 4.3 % of reading<br>4.3 % of reading<br>4.1 % of reading                                         |                                                             |            |
|                     | NO2                                                                  | 0 ppb ~ 30 ppb<br>30 ppb ~ 75 ppb<br>75 ppb ~ 125 ppb                                              | 12 % of reading<br>16 % of reading<br>23 % of reading                                            |                                                             |            |
|                     |                                                                      | 0 ppm ~ 20 ppm<br>20 ppm ~ 60 ppm<br>60 ppm ~ 100 ppm                                              | 1.7 ppm<br>2.7 ppm<br>3.1 ppm                                                                    |                                                             |            |
|                     | O2                                                                   | 0 %<br>5 %<br>10 %<br>20 %                                                                         | 0.11 % of reading<br>0.11 % of reading<br>0.21 % of reading<br>0.42 % of reading                 |                                                             |            |
|                     | CO2                                                                  | 0 %<br>6 %<br>12 %                                                                                 | 0.13 % of reading<br>0.13 % of reading<br>0.25 % of reading                                      |                                                             |            |
|                     | NMHC                                                                 | 0 ppm ~ 2 ppm                                                                                      | 16 % of reading                                                                                  |                                                             |            |
|                     | SO <sub>2</sub>                                                      | 0 ppb ~ 30 ppb<br>30 ppb ~ 100 ppb<br>100 ppm ~ 400 ppm<br>400 ppm ~ 800 ppm<br>800 ppm ~ 1000 ppm | 12 % of reading<br>15 % of reading<br>4.5 % of reading<br>4.3 % of reading<br>4.2 % of reading   |                                                             |            |

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|---------------------|----------------------------------------------------------------------|--------------|-----------------------------------------------|-------------------------------------------------------------|------------|
| Instrumen Analitik  | CEMS Cylinder Gas Audit (CGA) <sup>2</sup>                           | O2           | 5 % ~ 10 %                                    | 2.1 % of reading                                            | MK. 14     |
|                     |                                                                      | CO2          | 6 % ~ 12 %                                    | 2.1 % of reading                                            |            |
|                     |                                                                      | CO           | 100 ppm ~ 1200 ppm                            | 2.2 % of reading                                            |            |
|                     |                                                                      | NO           | 20 ppm ~ 400 ppm                              | 2.2 % of reading                                            |            |
|                     |                                                                      | SO2          | 20 ppm ~ 180 ppm                              | 2.6 % of reading                                            |            |
|                     |                                                                      |              | 180 ppm ~ 500 ppm                             | 5.4 % of reading                                            |            |
|                     | CEMS Relative Accuracy Test Audit (RATA) <sup>2</sup>                | O2           | 3 % ~ 17 %                                    | 5.0 % of reading                                            | MK. 13     |
|                     |                                                                      | CO2          | 3 % ~ 13 %                                    | 3.5 % of reading                                            |            |
|                     |                                                                      | CO           | 45 mg/m <sup>3</sup> ~ 75 mg/m <sup>3</sup>   | 6.4 % of reading                                            |            |
|                     |                                                                      |              | 75 mg/m <sup>3</sup> ~ 105 mg/m <sup>3</sup>  | 11 % of reading                                             |            |
|                     |                                                                      | NO           | 45 mg/m <sup>3</sup> ~ 170 mg/m <sup>3</sup>  | 6.3 % of reading                                            |            |
|                     |                                                                      | SO2          | 60 mg/m <sup>3</sup> ~ 95 mg/m <sup>3</sup>   | 8.3 % of reading                                            |            |
|                     |                                                                      |              | 120 mg/m <sup>3</sup> ~ 150 mg/m <sup>3</sup> | 5.9 % of reading                                            |            |
|                     |                                                                      |              |                                               |                                                             |            |

Catatan :

<sup>\*)</sup> Ketidakpastian yang diperluas dinyatakan pada tingkat kepercayaan 95% dengan faktor cakupan k = 2 yang merupakan ketidakpastian terbaik yang dapat dicapai dalam layanan kalibrasi rutin dengan sumberdaya yang dimiliki laboratorium

Lampiran sertifikat akreditasi ini tidak boleh digandakan kecuali seluruhnya, tanpa persetujuan tertulis dari pihak KAN

<sup>1</sup>Amendemen ke-1, Perluasan ruang lingkup

<sup>2</sup>Amendemen ke-2, Perluasan ruang lingkup

