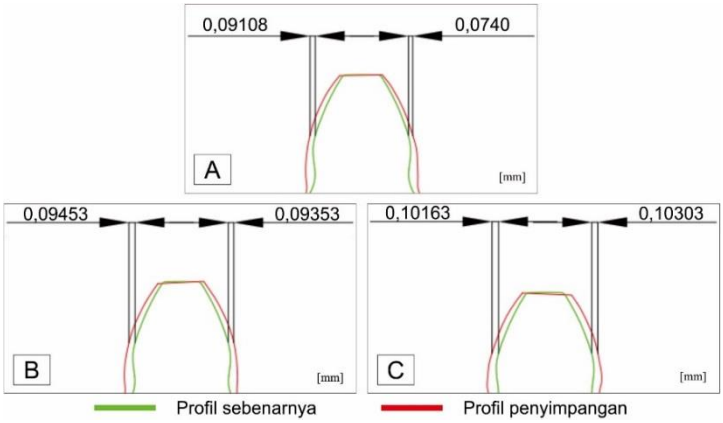
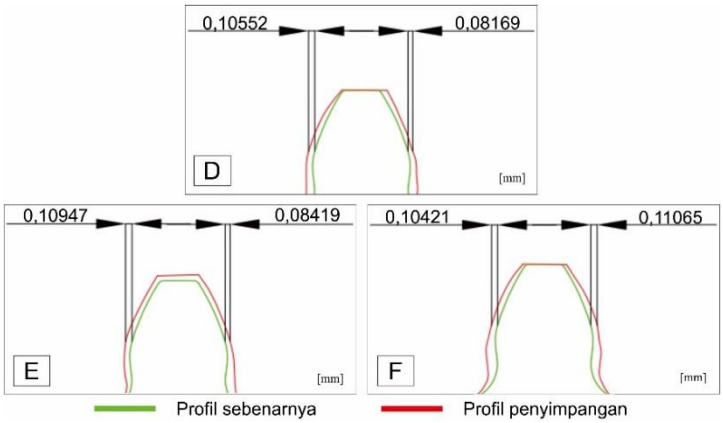
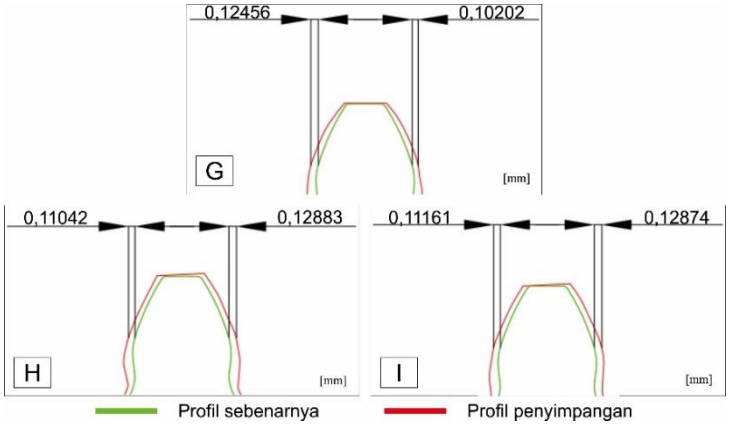
# Lampiran 1




*Gambar 1 Profile error* pada variasi arus listrik 5, 7, dan 9 A dengan *Wire feed* 5 mm/menit.

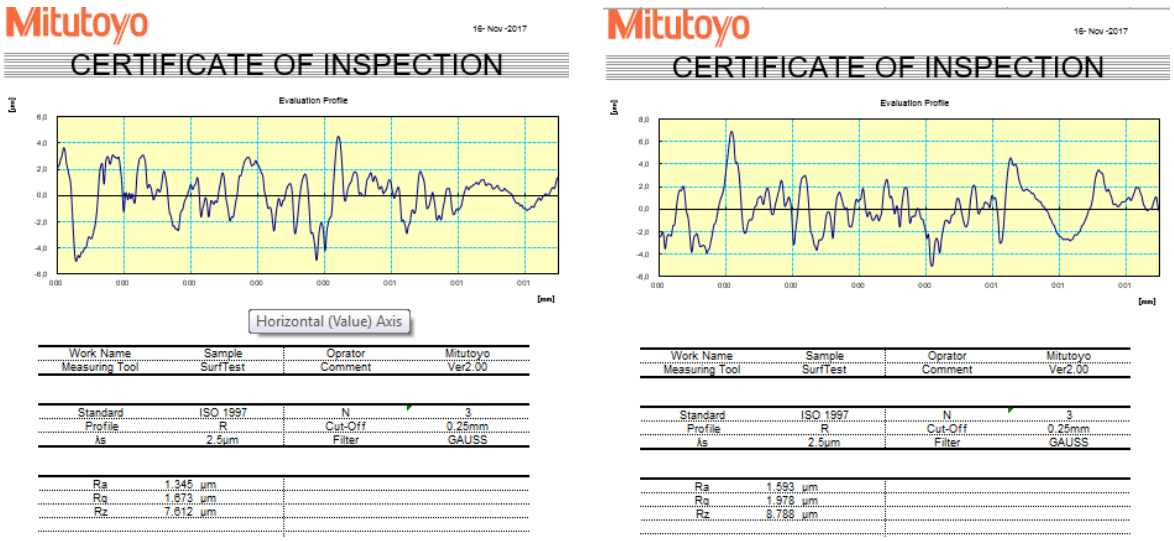



*Gambar 2 Profile error* pada variasi arus listrik 5, 7, dan 9 A dengan *Wire feed* 7 mm/menit.

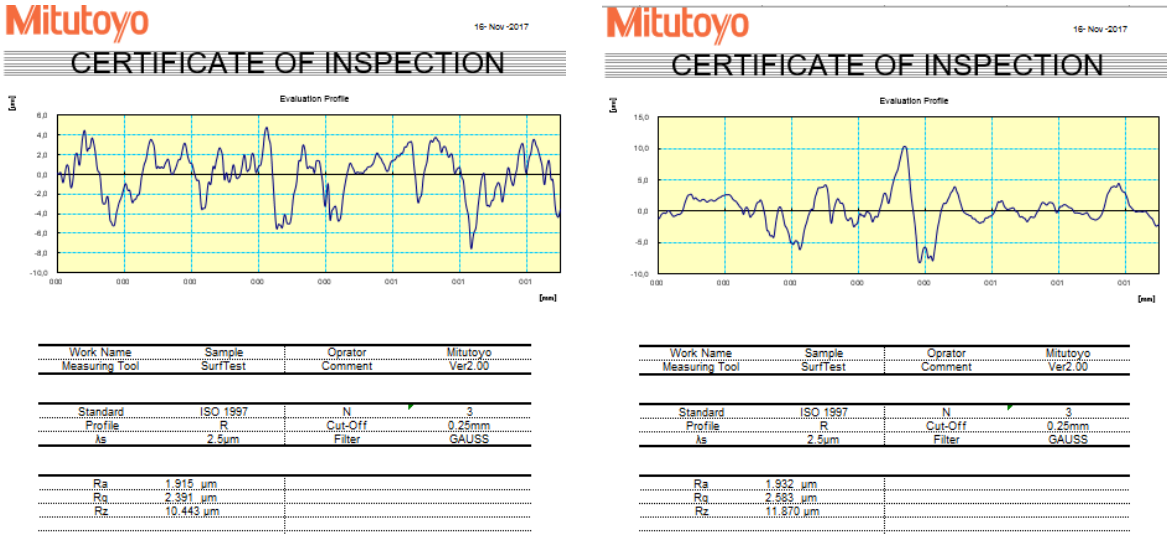



*Gambar 3 Profile error* pada variasi arus listrik 5, 7, dan 9 A dengan *Wire feed* 10 mm/menit.

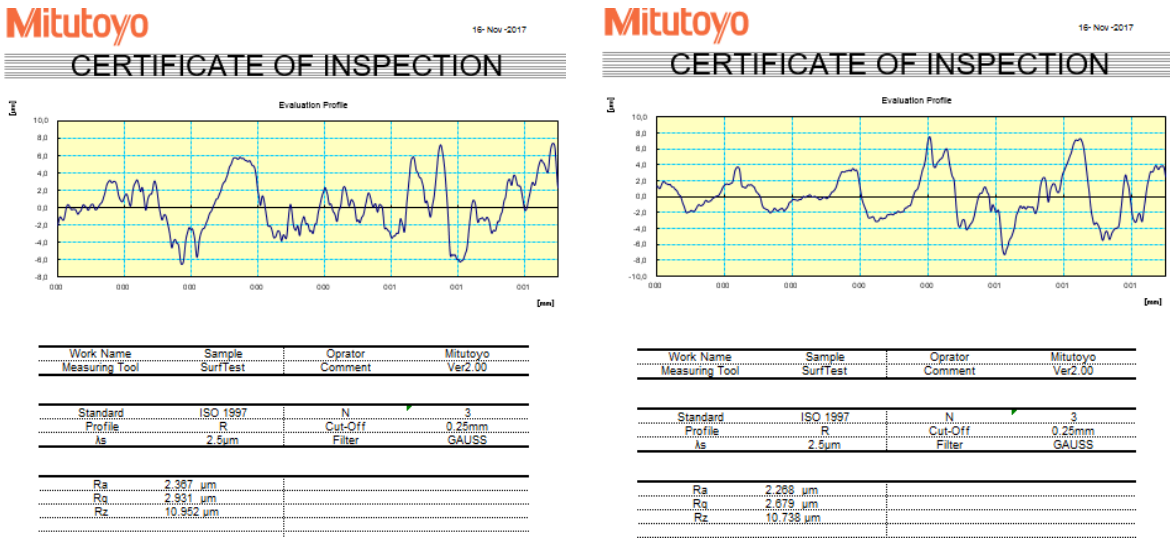
# Lampirn 2



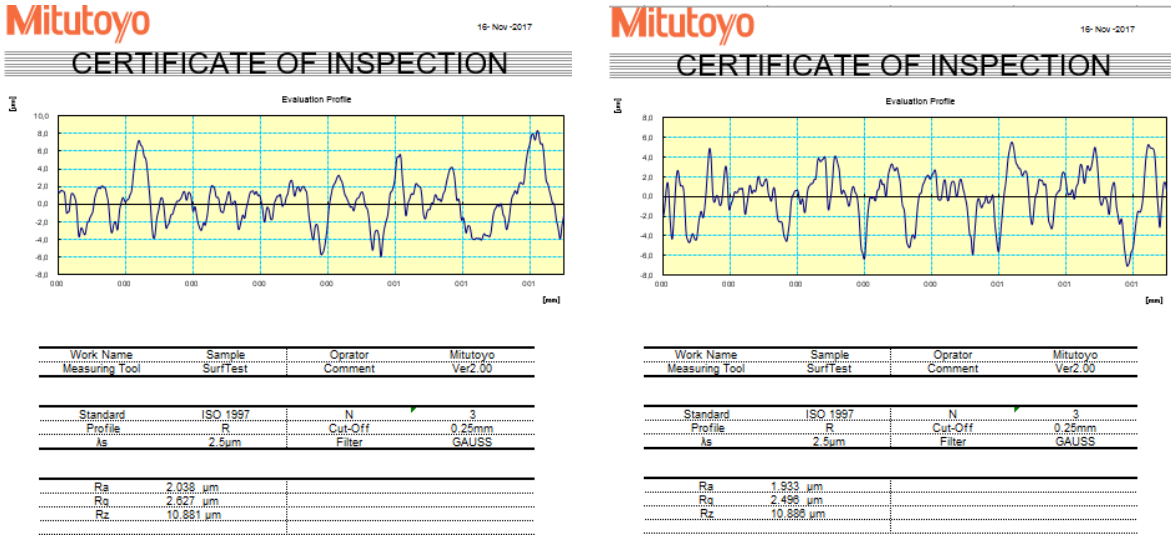

*Gambar 4* Pengujian kekasaran pada variasi arus listrik 5 A dengan *Wire feed* 5 mm/menit



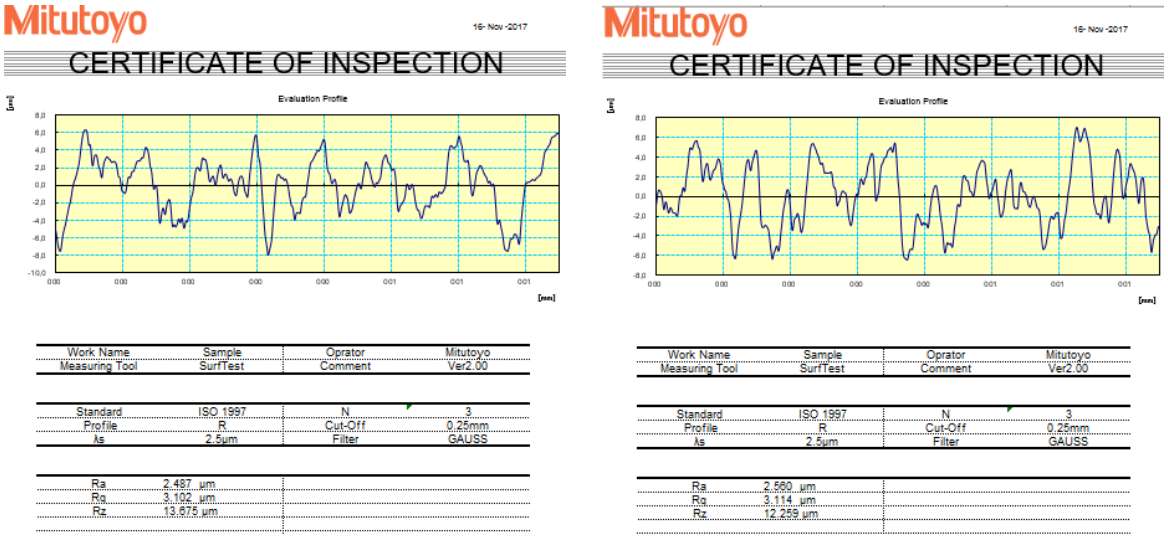

*Gambar 5* Pengujian kekasaran pada variasi arus listrik 7 A dengan *Wire feed* 5 mm/menit



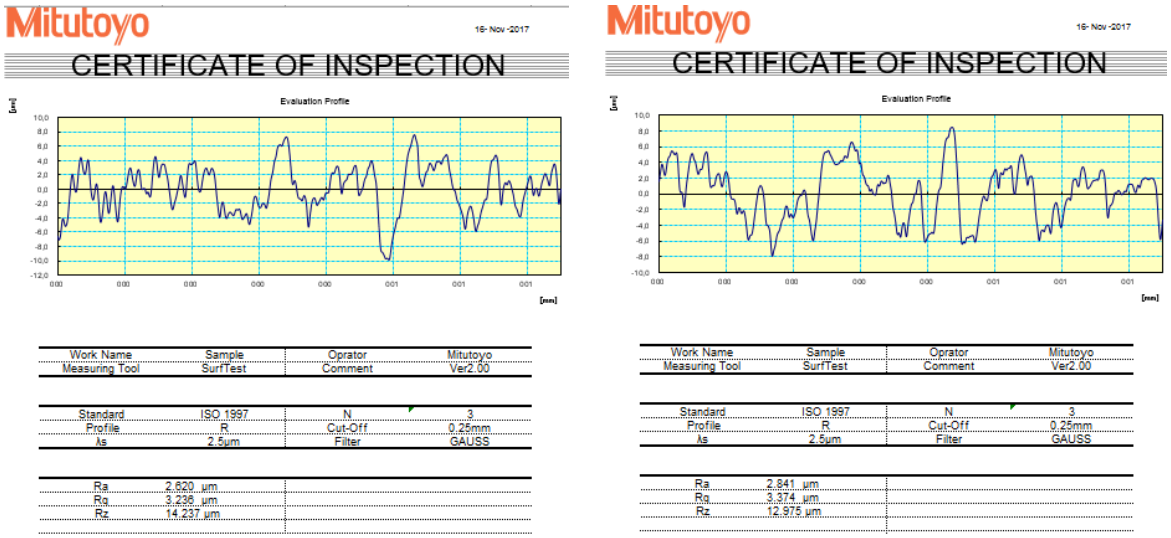

*Gambar 6* Pengujian kekasaran pada variasi arus listrik 9 A dengan *Wire feed* 5 mm/menit



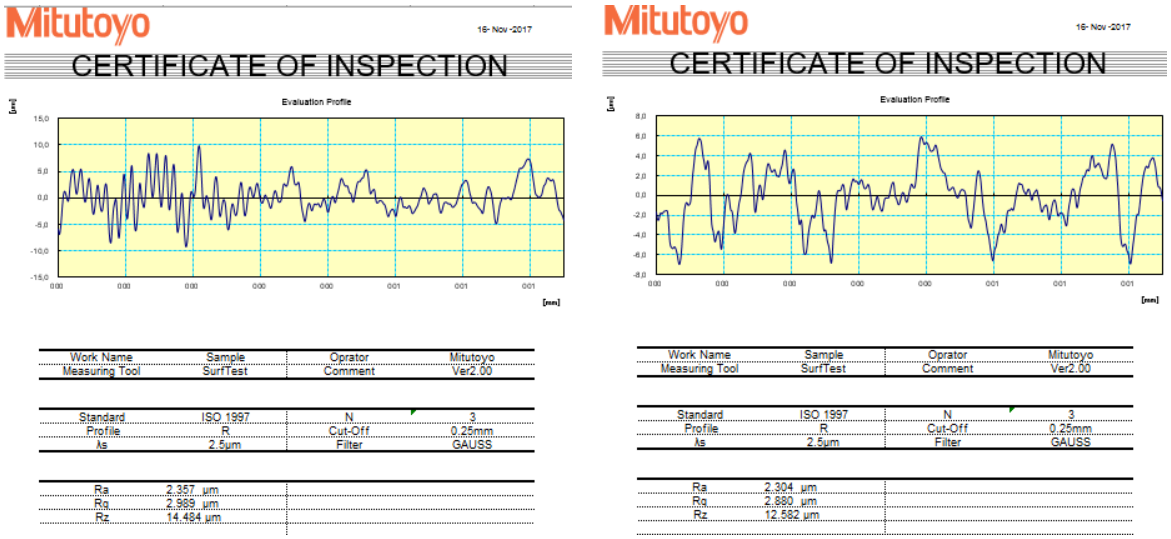

*Gambar 7* Pengujian kekasaran pada variasi arus listrik 5 A dengan *Wire feed* 7 mm/menit



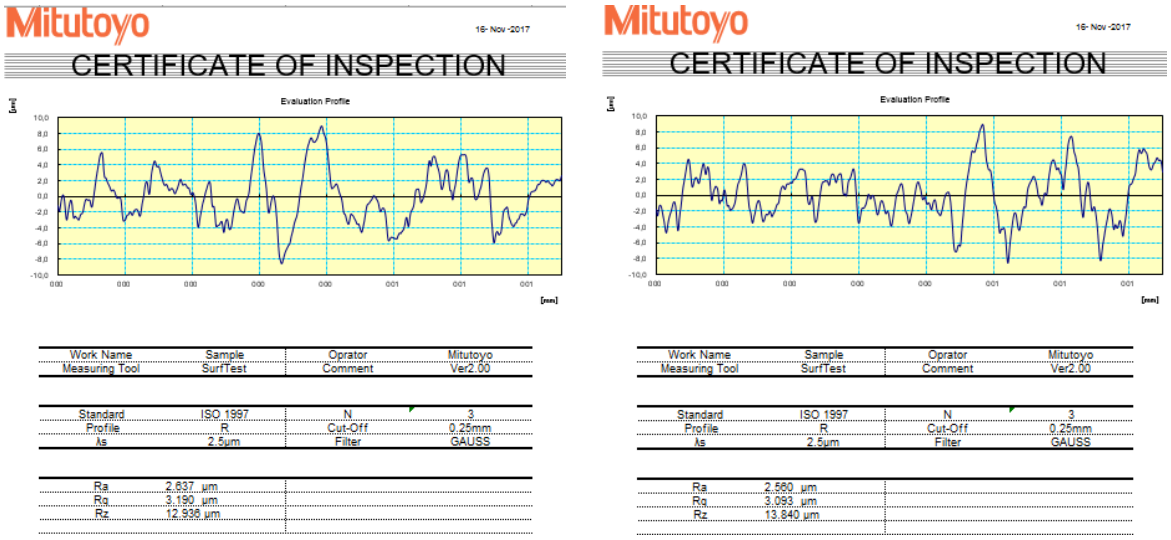

*Gambar 8* Pengujian kekasaran pada variasi arus listrik 7 A dengan *Wire feed* 7 mm/menit



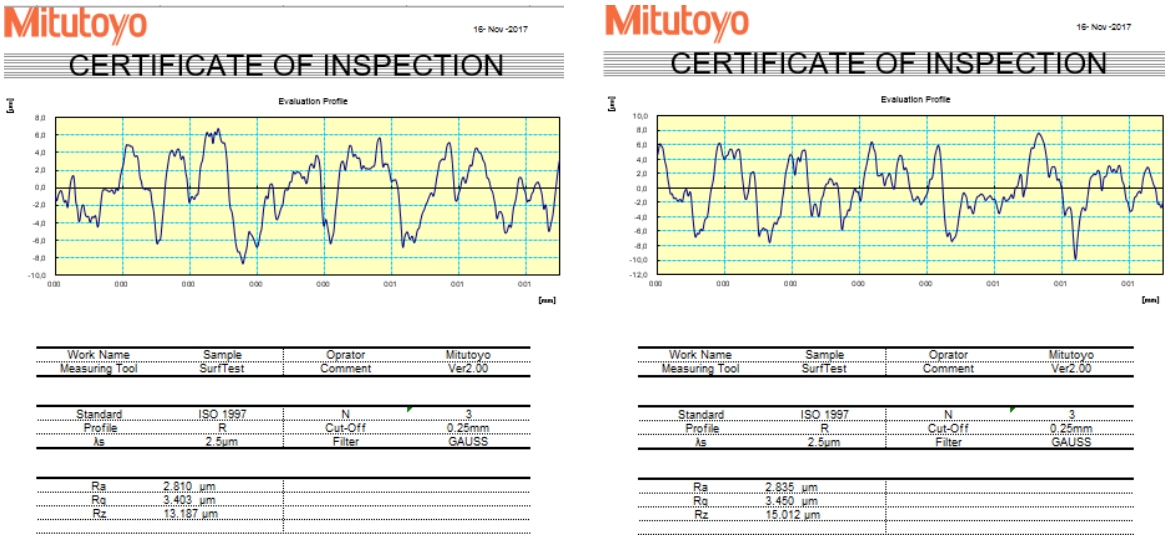

*Gambar 9* Pengujian kekasaran pada variasi arus listrik 9 A dengan *Wire feed* 7 mm/menit




*Gambar 10* Pengujian kekasaran pada variasi arus listrik 9 A dengan *Wire feed* 5 mm/menit.




*Gambar 11* Pengujian kekasaran pada variasi arus listrik 9 A dengan *Wire feed* 7 mm/menit.


Mitutoyo 16- Nov -2017
CERTIFICATE OF INSPECTION
Evaluation Profile
[µm]
[mm]
Work Name | Sample | Oprator | Mitutoyo
Measuring Tool | SurfTest | Comment | Ver2.00
Standard | ISO 1997 | N | 3
Profile | R | Cut-Off | 0.25mm
λs | 2.5µm | Filter | GAUSS
Ra 2.810 µm
Rq 3.403 µm
Rz 13.187 µm
Mitutoyo 16- Nov -2017
CERTIFICATE OF INSPECTION
Evaluation Profile
[µm]
[mm]
Work Name | Sample | Oprator | Mitutoyo
Measuring Tool | SurfTest | Comment | Ver2.00
Standard | ISO 1997 | N | 3
Profile | R | Cut-Off | 0.25mm
λs | 2.5µm | Filter | GAUSS
Ra 2.835 µm
Rq 3.450 µm
Rz 15.012 µm

*Gambar 12* Pengujian kekasaran pada variasi arus listrik 9 A dengan *Wire feed* 10 mm/menit.

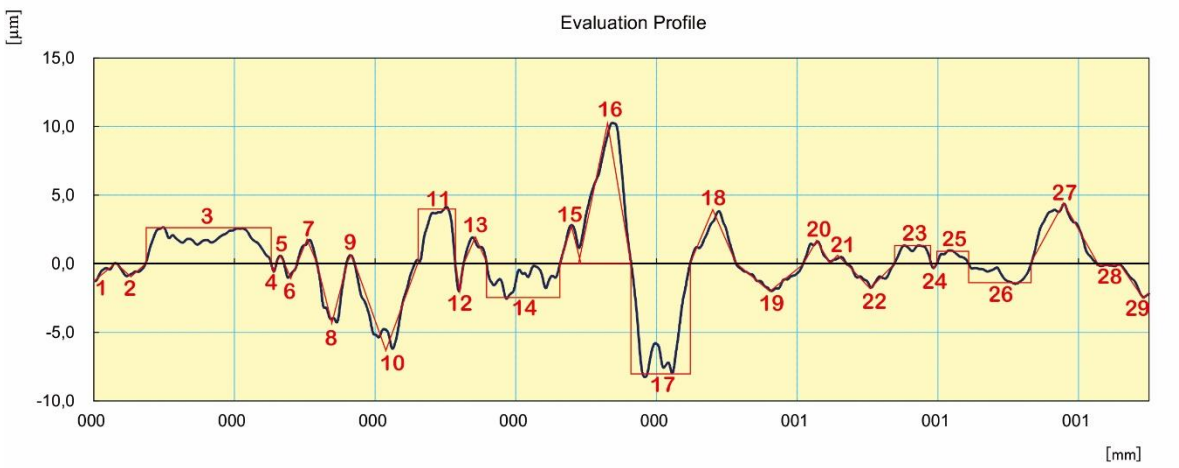
# Lampiran 3

Tabel 1 Data Hasil Pengujian *profile error mold* roda gigi plastik menggunakan baja SKD11 proses *wire* EDM.

| Arus Listrik / *Wire Feed* | 5A | 7A | 9A |
|---|---|---|---|
| 5 mm/menit | 0,08254 mm | 0,09403 mm | 0,10233 mm |
| 7 mm/menit | 0,09360 mm | 0,09683 mm | 0,10743 mm |
| 10 mm/menit | 0,11329 mm | 0,11962 mm | 0,12817 mm |

Tabel 2 Data Hasil Pengujian Kekasaran Permukaan *mold* roda gigi plastik menggunakan baja SKD11 proses *wire* EDM.

| Arus Listrik / *Wire Feed* | 5A | 7A | 9A |
|---|---|---|---|
| 5 mm/menit | 1,4690 µm | 1,9235 µm | 2,3175 µm |
| 7 mm/menit | 1,9855 µm | 2,5235 µm | 2,7305 µm |
| 10 mm/menit | 2,3305 µm | 2,5985 µm | 2,8225 µm |



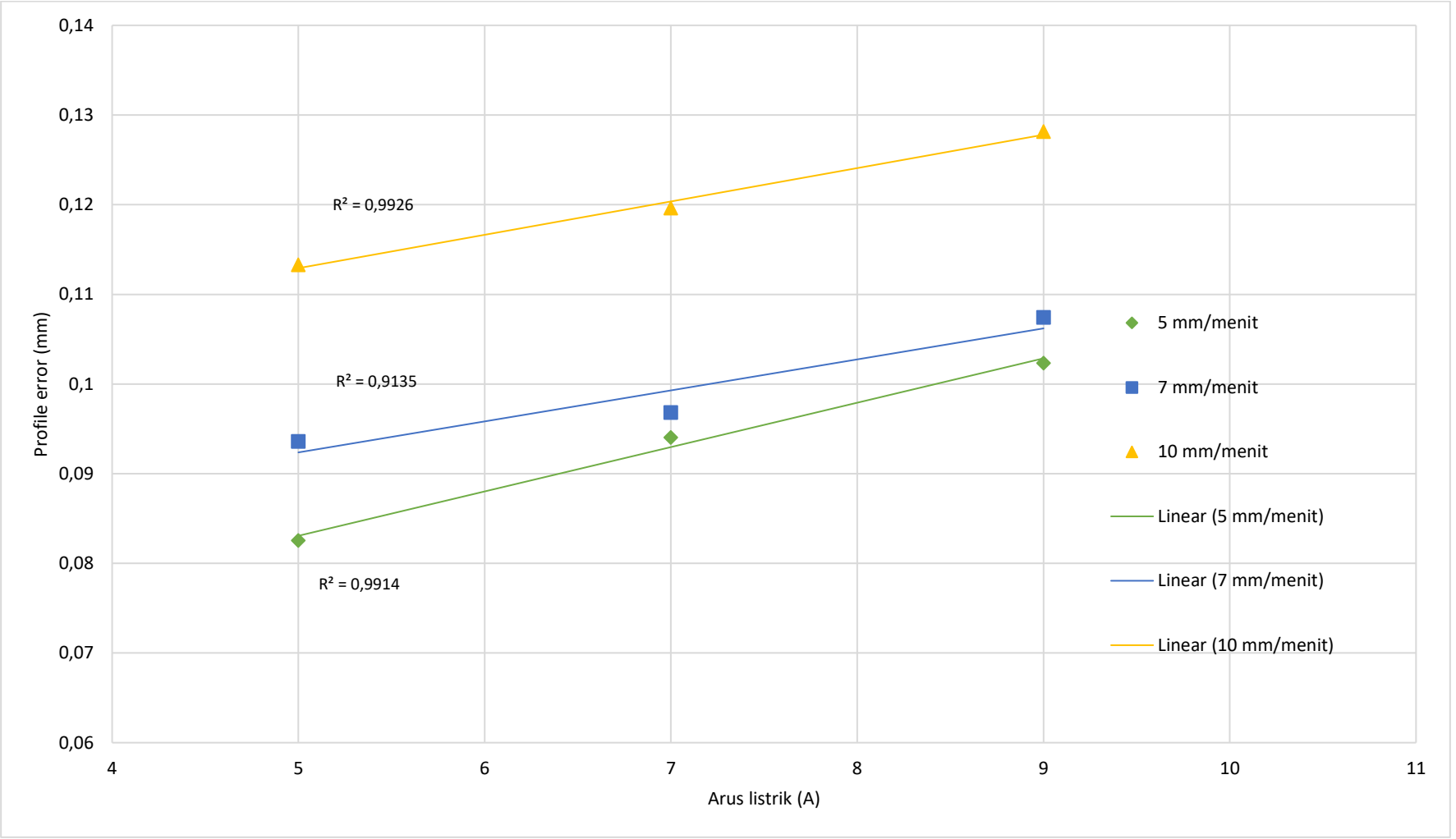

*Gambar 13* Perhitungan manual kekasaran pada vaariasi arus listrik 7 A dengan *wire feed* 5 mm/menit.

Tabel 3 Data Hasil Perhitungan manual kekasaran pada vaariasi arus listrik 7 A dengan *wire feed* 5 mm/menit.

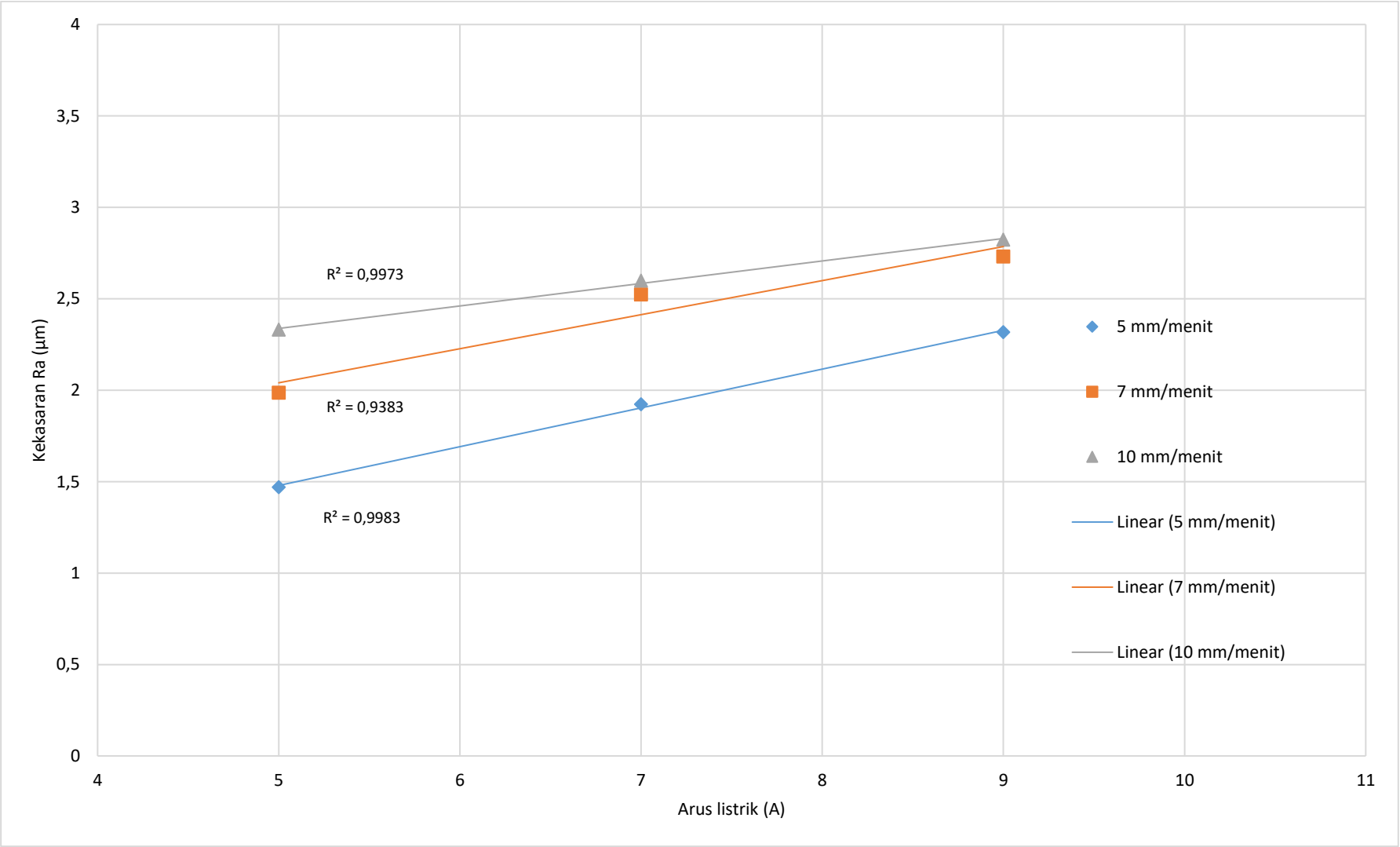
| No | X (mm) | Skala | X (mm) | Y (mm) | Skala | Y (mm) | Luas Daerah |
|---|---|---|---|---|---|---|---|
| 1 | 3 | 24 | 0,125 | 3 | 12 | 0,25 | 0,03125 |
| 2 | 5 | 24 | 0,208333 | 2 | 12 | 0,166667 | 0,0347222 |
| 3 | 21 | 24 | 0,875 | 6 | 12 | 0,5 | 0,21875 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 1 | 24 | 0,041667 | 1 | 12 | 0,083333 | 0,0034722 |
| 5 | 1 | 24 | 0,041667 | 1 | 12 | 0,083333 | 0,0034722 |
| 6 | 3 | 24 | 0,125 | 2 | 12 | 0,166667 | 0,0208333 |
| 7 | 3 | 24 | 0,125 | 4 | 12 | 0,333333 | 0,0416667 |
| 8 | 5 | 24 | 0,208333 | 10 | 12 | 0,833333 | 0,1736111 |
| 9 | 1 | 24 | 0,041667 | 1 | 12 | 0,083333 | 0,0034722 |
| 10 | 11 | 24 | 0,458333 | 15 | 12 | 1,25 | 0,5729167 |
| 11 | 6 | 24 | 0,25 | 9 | 12 | 0,75 | 0,1875 |
| 12 | 2 | 24 | 0,083333 | 4 | 12 | 0,333333 | 0,0277778 |
| 13 | 4 | 24 | 0,166667 | 4 | 12 | 0,333333 | 0,0277778 |
| 14 | 12 | 24 | 0,5 | 5 | 12 | 0,416667 | 0,1041667 |
| 15 | 4 | 24 | 0,166667 | 6 | 12 | 0,5 | 0,0833333 |
| 16 | 9 | 24 | 0,375 | 24 | 12 | 2 | 0,75 |
| 17 | 10 | 24 | 0,416667 | 19 | 12 | 1,583333 | 0,3298611 |
| 18 | 8 | 24 | 0,333333 | 8 | 12 | 0,666667 | 0,2222222 |
| 19 | 11 | 24 | 0,458333 | 5 | 12 | 0,416667 | 0,1909722 |
| 20 | 4 | 24 | 0,166667 | 4 | 12 | 0,333333 | 0,0555556 |
| 21 | 2 | 24 | 0,083333 | 1 | 12 | 0,083333 | 0,0069444 |
| 22 | 9 | 24 | 0,375 | 4 | 12 | 0,333333 | 0,125 |
| 23 | 6 | 24 | 0,25 | 3 | 12 | 0,25 | 0,03125 |
| 24 | 1 | 24 | 0,041667 | 1 | 12 | 0,083333 | 0,0017361 |
| 25 | 5 | 24 | 0,208333 | 2 | 12 | 0,166667 | 0,0173611 |
| 26 | 11 | 24 | 0,458333 | 3 | 12 | 0,25 | 0,1145833 |
| 27 | 11 | 24 | 0,458333 | 11 | 12 | 0,916667 | 0,2100694 |
| 28 | 4 | 24 | 0,166667 | 1 | 12 | 0,083333 | 0,0138889 |
| 29 | 5 | 24 | 0,208333 | 8 | 12 | 0,666667 | 0,1388889 |
| | | | | | | | 3,7430556 |

# Lampiran 4

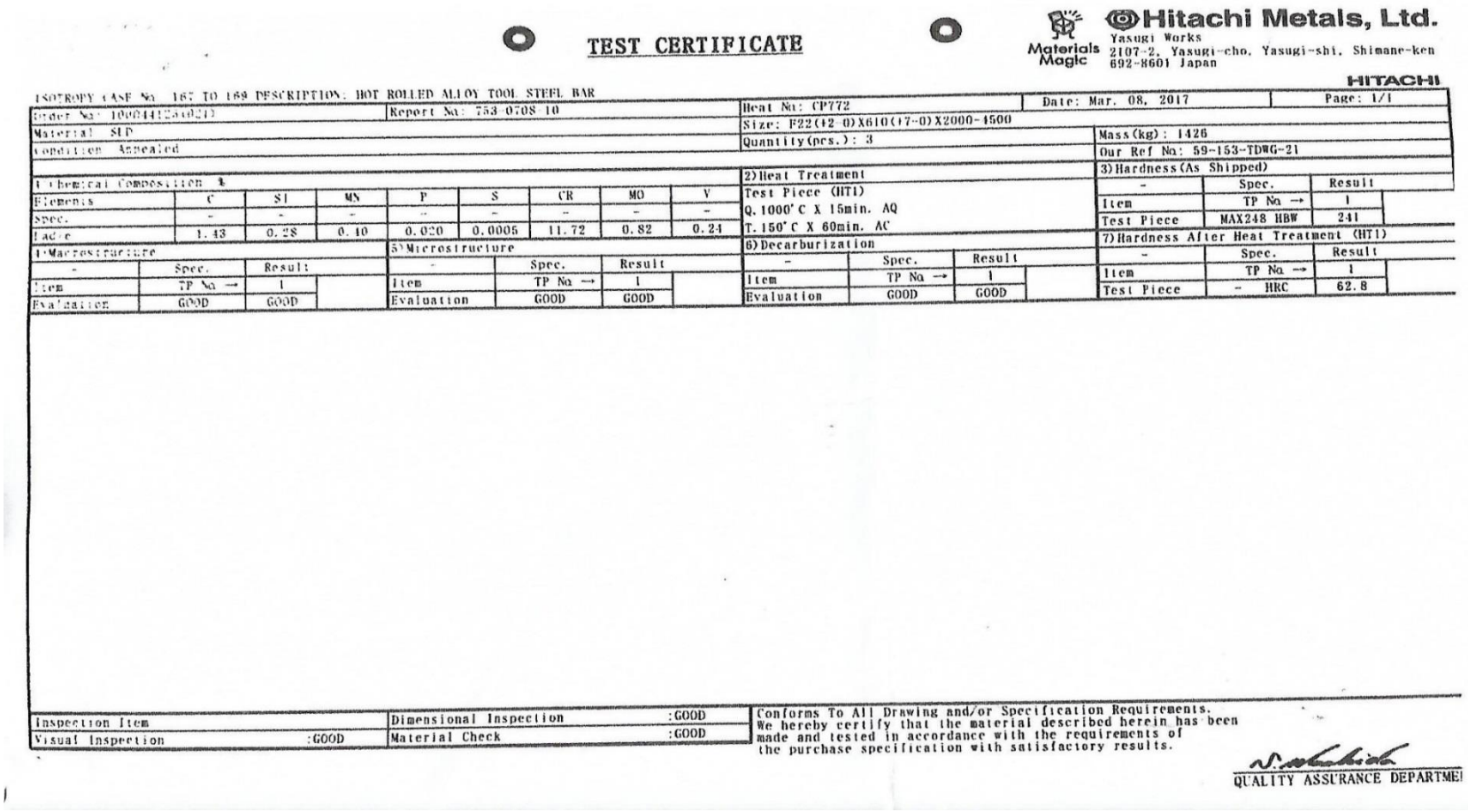



*Gambar 14* Grafik pengaruh *wire feed* dan arus listrik terhadap *profile error* permukaan pada *mold* roda gigi baja SKD11 menggunakan *wire* EDM




*Gambar 15* Grafik pengaruh *wire feed* dan arus listrik terhadap kekasaran permukaan pada *mold* roda gigi baja SKD11 menggunakan *wire* EDM

## Lampiran 5



TEST CERTIFICATE

Hitachi Metals, Ltd.
Yasugi Works
2107-2, Yasugi-cho, Yasugi-shi, Shimane-ken
692-8601 Japan

Materials Magic

HITACHI

ISOTROPY CASE No. 167 TO 169 DESCRIPTION: HOT ROLLED ALLOY TOOL STEEL BAR

| | | | |
|---|---|---|---|
| Order No: 1000411234(20) | Report No: 753-0708-10 | Heat No: CP772 | Date: Mar. 08, 2017 |
| Material SLD | | Size: F22(42.0)X610(17-0)X2000-4500 | Page: 1/1 |
| Condition Annealed | | Quantity(pcs.): 3 | Mass(kg): 1426 |
| | | | Our Ref No: 59-153-TDWG-21 |

1) Chemical Composition %

| Elements | C | SI | MN | P | S | CR | MO | V |
|---|---|---|---|---|---|---|---|---|
| Spec. | - | - | - | - | - | - | - | - |
| Lade | 1.43 | 0.28 | 0.10 | 0.020 | 0.0005 | 11.72 | 0.82 | 0.24 |

2) Heat Treatment
Test Piece (HT1)
Q. 1000°C X 15min. AQ
T. 150°C X 60min. AC

3) Hardness(As Shipped)

| - | Spec. | Result |
|---|---|---|
| Item | TP No. → | 1 |
| Test Piece | MAX248 HBW | 241 |

4) Macrostructure

| - | Spec. | Result |
|---|---|---|
| Item | TP No. → | 1 |
| Evaluation | GOOD | GOOD |

5) Microstructure

| - | Spec. | Result |
|---|---|---|
| Item | TP No. → | 1 |
| Evaluation | GOOD | GOOD |

6) Decarburization

| - | Spec. | Result |
|---|---|---|
| Item | TP No. → | 1 |
| Evaluation | GOOD | GOOD |

7) Hardness After Heat Treatment (HT1)

| - | Spec. | Result |
|---|---|---|
| Item | TP No. → | 1 |
| Test Piece | - HRC | 62.8 |

| Inspection Item | | Dimensional Inspection | :GOOD |
|---|---|---|---|
| Visual Inspection | :GOOD | Material Check | :GOOD |

Conforms To All Drawing and/or Specification Requirements.
We hereby certify that the material described herein has been made and tested in accordance with the requirements of the purchase specification with satisfactory results.

QUALITY ASSURANCE DEPARTME

*Gambar 16* Sertifikat Baja SKD11