

## Lampiran 1



**LABORATORIUM BAHAN TEKNIK**  
**DEPARTEMEN TEKNIK MESIN SEKOLAH VOKASI**  
**UNIVERSITAS GADJAH MADA**

### HASIL PENGUJIAN KEKERASAN

No. 157 / P.Kkr / BT.DTM / 2019

#### Spesimen Friction Welding (Aluminium-Aluminium), Feed Rate 5.67 cm / menit

No	Kode	Jarak dr sambungan		d <sub>1</sub> ( $\mu$ m)	d <sub>2</sub> ( $\mu$ m)	d rata-rata ( $\mu$ m)	Kekerasan (VHN)				
1	n.910	Al Seri 1	9.5	mm	64.0	67.0	65.50	43.2			
			7.5	mm	67.0	67.0	67.00	41.3			
			5.5	mm	69.0	68.0	68.50	39.5			
			3.5	mm	70.0	71.0	70.50	37.3			
			1.5	mm	77.0	74.0	75.50	32.5			
			0.5	mm	66.0	68.0	67.00	41.3			
			0.0	mm	56.0	56.0	56.00	59.1			
		Al Seri 5	0.5	mm	70.0	70.0	70.00	37.8			
			1.5	mm	60.0	59.0	59.50	52.4			
			3.5	mm	58.0	58.0	58.00	55.1			
			5.5	mm	57.0	57.0	57.00	57.1			
			7.5	mm	56.0	60.0	58.00	55.1			
			9.5	mm	59.0	60.0	59.50	52.4			
			2	n.1500	Al Seri 1	9.5	mm	80.0	78.0	79.00	29.7
						7.5	mm	80.0	79.0	79.50	29.3
5.5	mm	79.0				79.0	79.00	29.7			
3.5	mm	73.0				72.0	72.50	35.3			
1.5	mm	62.0				62.0	62.00	48.2			
0.5	mm	69.0				69.0	69.00	38.9			
0.0	mm	70.0				70.0	70.00	37.8			
Al Seri 5	0.5	mm			59.0	56.0	57.50	56.1			
	1.5	mm			60.0	59.0	59.50	52.4			
	3.5	mm			60.0	60.0	60.00	51.5			
	5.5	mm			62.0	61.0	61.50	49.0			
	7.5	mm			60.0	60.0	60.00	51.5			
	9.5	mm			62.0	61.0	61.50	49.0			

Lembar asli, tidak untuk digandakan

**Keterangan :**

1. Menggunakan metode uji Vikers dengan pembebanan 100 gf, 5 detik
2. Satuan pengukuran diagonal jejak indenter dalam  $\mu$ m
3. Pengujian dilakukan pada tanggal 24 September 2019.

Lembar 1 dari 2

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No	Kode	Jarak dr sambungan	d <sub>1</sub> ( $\mu$ m)	d <sub>2</sub> ( $\mu$ m)	d rata-rata ( $\mu$ m)	Kekerasan (VHN)	
3	n.2280	Al Seri 1	9.5 mm	74.0	71.0	72.50	35.3
			7.5 mm	75.0	72.0	73.50	34.3
			5.5 mm	78.0	78.0	78.00	30.5
			3.5 mm	80.0	77.0	78.50	30.1
			1.5 mm	79.0	77.0	78.00	30.5
			0.5 mm	81.0	77.0	79.00	29.7
		Al Seri 5	0.0 mm	72.0	69.0	70.50	37.3
			0.5 mm	60.0	58.0	59.00	53.3
			1.5 mm	60.0	60.0	60.00	51.5
			3.5 mm	62.0	58.0	60.00	51.5
			5.5 mm	60.0	60.0	60.00	51.5
			7.5 mm	62.0	59.0	60.50	50.7
			9.5 mm	60.0	60.0	60.00	51.5
4	Al Seri 1	Acak	70.0	69.0	69.50	38.4	
			69.0	70.0	69.50	38.4	
			68.0	69.0	68.50	39.5	
5	Al Seri 5	Acak	53.0	52.0	52.50	67.3	
			53.0	53.0	53.00	66.0	
			52.0	53.0	52.50	67.3	

Lembar asli, tidak untuk digandakan

**Keterangan :**

1. Menggunakan metode uji Vickers dengan pembebanan 100 gf, 5 detik
2. Satuan pengukuran diagonal jejak indentor dalam  $\mu$ m
3. Pengujian dilakukan pada tanggal 24 September 2019.

Yogyakarta, 24 September 2019.  
Ka Sub Laboratorium Bahan Teknik

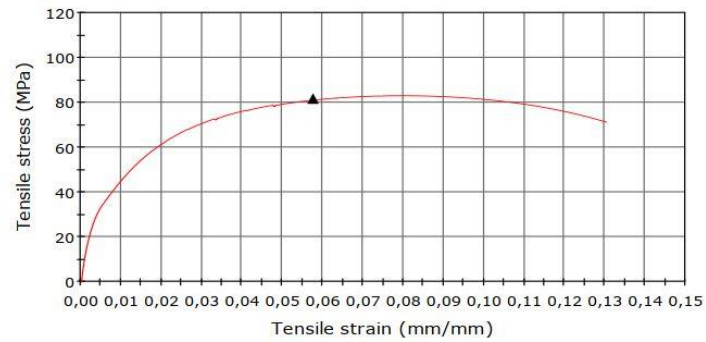


Lilik Dwi Setyana, ST., M.T.  
NIP. 197703312002121002

Lembar 2 dari 2

## Lampiran 2

Spesimen 1 910 rpm

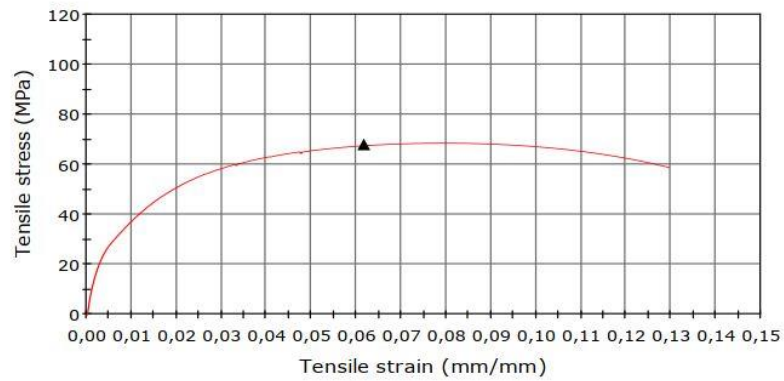


	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2427,68	80,914	0,0584

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	11,20	1,87

Spesimen 2 910 rpm

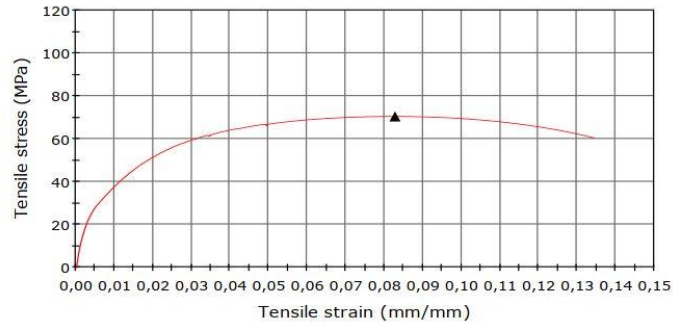


	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	1964,79	63,508	0,0615

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	11,80	1,97

Spesimen 3 910 rpm



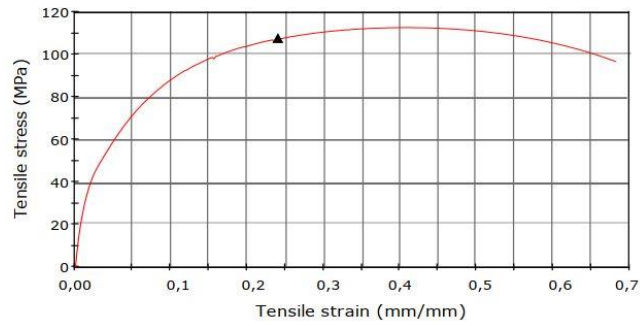
Specimen #  
3

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2194,96	69,852	0,0828

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	15,90	2,65

Spesimen 1 1500 rpm



Specimen #  
1

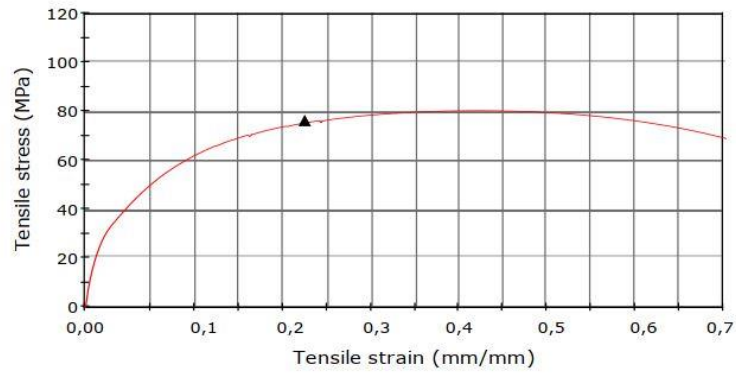
	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	3122,84	112,614	0,2446

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	47,00	7,83



### Spesimen 2 1500 rpm

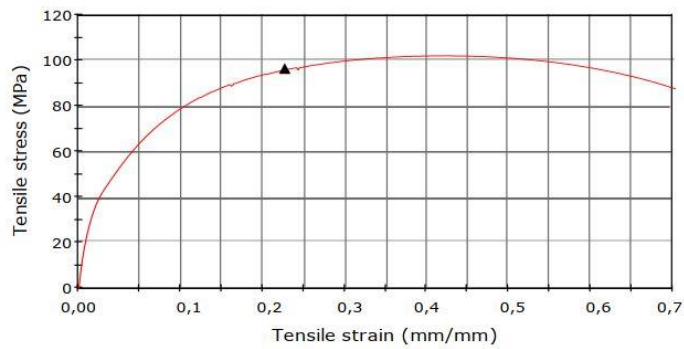


Specimen #  
— 2

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2757,19	78,56	0,2368

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	45,50	7,58

### Spesimen 3 1500 rpm

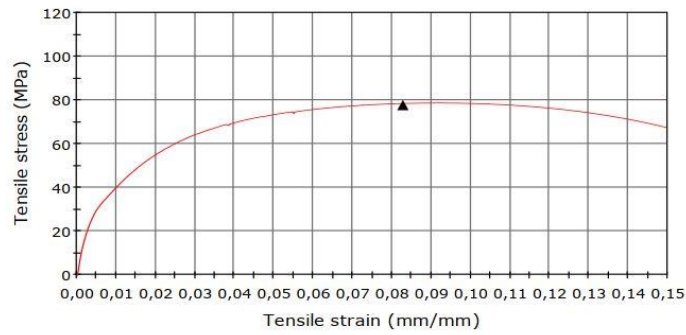


Specimen #  
— 3

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2785,54	96,978	0,2240

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	43,00	7,17

Spesimen 1 2280 rpm

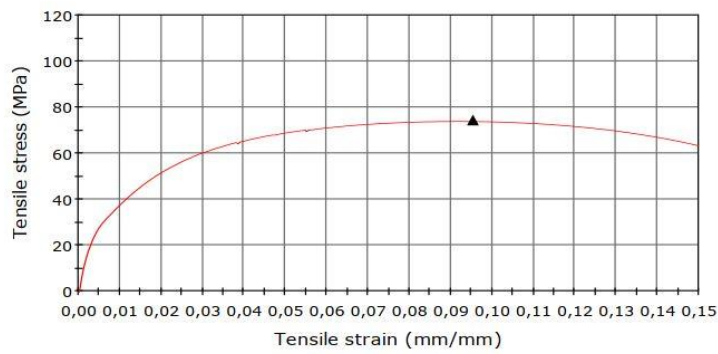


Specimen #  
1

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2553,44	79,484	0,0834

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	16,00	2,67

Spesimen 2 2280 rpm

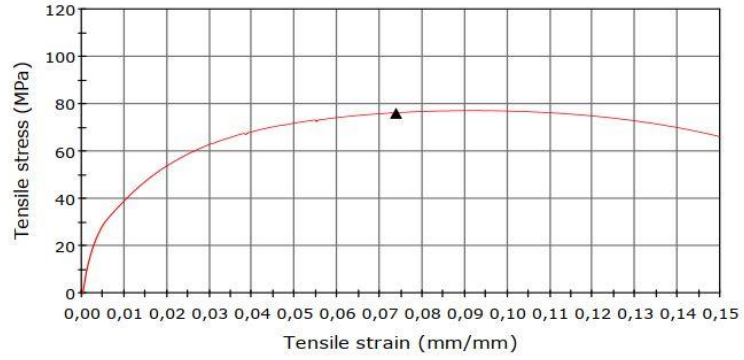


Specimen #  
2

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2376,05	74,758	0,0968

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	18,60	3,10

Spesimen 3 2280 rpm



Specimen #  
3

	Maximum Load (N)	Tensile stress at Maximum Load (MPa)	Tensile strain at Maximum Load (mm/mm)
1	2299,79	74,552	0,0728

	Time at Maximum Load (sec)	Extension at Maximum Load (mm)
1	14,00	2,33