



LABORATORIUM BAHAN TEKNIK
DEPARTEMEN TEKNIK MESIN SEKOLAH VOKASI
UNIVERSITAS GADJAH MADA

HASIL PENGUJIAN KEKERASAN

No. 133 / P.Kkr / BT.DTM / 2018

Spesimen Friction Welding (Aluminium-Aluminium), Kecepatan Putaran 1500 RPM

No	Kode	Jarak dr sambungan		d ₁	d ₂	d _{rata-rata}	Kekerasan				
				(μm)	(μm)	(μm)	(VHN)				
1	SA	AI Seri 1	9.5	mm	84.0	82.0	83.00	26.9			
			7.5	mm	83.0	87.0	85.00	25.7			
			5.5	mm	81.0	80.0	80.50	28.6			
			3.5	mm	81.0	80.0	80.50	28.6			
			1.5	mm	64.0	65.0	64.50	44.6			
			0.5	mm	62.0	64.0	63.00	46.7			
		AI Seri 5	0.0	mm	67.0	63.0	65.00	43.9			
			0.5	mm	69.0	67.0	68.00	40.1			
			1.5	mm	67.0	66.0	66.50	41.9			
			3.5	mm	60.0	61.0	60.50	50.7			
			5.5	mm	57.0	60.0	58.50	54.2			
			7.5	mm	60.0	60.0	60.00	51.5			
			9.5	mm	60.0	60.0	60.00	51.5			
			2	SB	AI Seri 1	9.5	mm	85.0	85.0	85.00	25.7
						7.5	mm	85.0	85.0	85.00	25.7
5.5	mm	84.0				81.0	82.50	27.2			
3.5	mm	77.0				76.0	76.50	31.7			
1.5	mm	78.0				75.0	76.50	31.7			
0.5	mm	71.0				65.0	68.00	40.1			
AI Seri 5	0.0	mm			64.0	64.0	64.00	45.3			
	0.5	mm			60.0	61.0	60.50	50.7			
	1.5	mm			61.0	61.0	61.00	49.8			
	3.5	mm			60.0	61.0	60.50	50.7			
	5.5	mm			60.0	61.0	60.50	50.7			
	7.5	mm			62.0	62.0	62.00	48.2			
	9.5	mm			61.0	61.0	61.00	49.8			

Lembar asli, tidak untuk digandakan

Keterangan :

1. Kode SA : Silinder Alur
2. Kode SB : Silinder Biasa
3. Menggunakan metode uji Vickers dengan pembebanan 100 gf, 5 detik
4. Satuan pengukuran diagonal jejak indenter dalam μm
5. Pengujian dilakukan pada tanggal 19 Juli 2018

Lembar 1 dari 3



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No. 133 / P.Kkr / BT.DTM / 2018

Spesimen Friction Welding (Aluminium-Aluminium), Kecepatan Putaran 1500 RPM

No	Kode	Jarak dr sambungan		d ₁ (μm)	d ₂ (μm)	d rata-rata (μm)	Kekerasan (VHN)	
3	TA	Al Seri 1	9.5	mm	72.0	73.0	72.50	35.3
			7.5	mm	80.0	81.0	80.50	28.6
			5.5	mm	86.0	84.0	85.00	25.7
			3.5	mm	70.0	71.0	70.50	37.3
			1.5	mm	65.0	68.0	66.50	41.9
			0.5	mm	64.0	69.0	66.50	41.9
		Al Seri 5	0.0	mm	68.0	69.0	68.50	39.5
			0.5	mm	70.0	67.0	68.50	39.5
			1.5	mm	71.0	69.0	70.00	37.8
			3.5	mm	60.0	60.0	60.00	51.5
			5.5	mm	61.0	60.0	60.50	50.7
			7.5	mm	61.0	60.0	60.50	50.7
			9.5	mm	60.0	60.0	60.00	51.5
			4	TB	Al Seri 1	9.5	mm	85.0
7.5	mm	83.0				83.0	83.00	26.9
5.5	mm	87.0				85.0	86.00	25.1
3.5	mm	74.0				76.0	75.00	33.0
1.5	mm	73.0				74.0	73.50	34.3
0.5	mm	64.0				67.0	65.50	43.2
Al Seri 5	0.0	mm			60.0	62.0	61.00	49.8
	0.5	mm			62.0	61.0	61.50	49.0
	1.5	mm			60.0	60.0	60.00	51.5
	3.5	mm			60.0	60.0	60.00	51.5
	5.5	mm			60.0	60.0	60.00	51.5
	7.5	mm			60.0	60.0	60.00	51.5
	9.5	mm			60.0	60.0	60.00	51.5

Keterangan :

1. Kode SA : Tirus Alur
2. Kode SB : Tirus Biasa
3. Menggunakan metode uji Vikers dengan pembebanan 100 gf, 5 detik
4. Satuan pengukuran diagonal jejak indentor dalam μm
5. Pengujian dilakukan pada tanggal 19 Juli 2018

Lembar 2 dari 3



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UNIVERSITAS GADJAH MADA

HASIL PENGUJIAN KEKERASAN

No. 133 / P.Kkr / BT.DTM / 2018

Spesimen Aluminium / Raw Material.

No	Kode	Posisi Titik Uji	d ₁ (μ m)	d ₂ (μ m)	d _{rata-rata} (μ m)	Kekerasan (VHN)
5	AL-1	Acak	71.0	71.0	71.00	36.8
			67.0	72.0	69.50	38.4
			70.0	70.0	70.00	37.8
6	AL-5	Acak	62.0	62.0	62.00	48.2
			62.0	63.0	62.50	47.5
			60.0	61.0	60.50	50.7

Keterangan :

1. Kode AL-1 : Aluminium seri 1
2. Kode AL-2 : Aluminium seri 2
3. Menggunakan metode uji Vickers dengan pembebanan 100 gf, 5 detik
4. Satuan pengukuran diagonal jejak indenter dalam μ m
5. Pengujian dilakukan pada tanggal 19 Juli 2018

Yogyakarta, 19 Juli 2018

Ka Sub Laboratorium Bahan Teknik



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

Lembar asli, tidak untuk digandakan



CV. KARYA HIDUP SENTOSA

PABRIK MESIN ALAT PERTANIAN • PENGECORAN LOGAM • DEALER UTAMA DIESEL KUBOTA

Kantor Pusat : Jl. Magelang No. 144 Jogjakarta 55241 Indonesia

Telp. : (0274) 512095 (hunting), 563217, 584874, 513025, 556923

Fax. : (0274) 563523 (Umum), 554069 (Pembelian) E-mail : operator1@quick.co.id

Website : www.quick.co.id • M-Web : m.quick.co.id • Facebook : facebook.com/quicktraktor

LAPORAN HASIL ANALISA REPORT OF ANALYSIS

Order No. : 0143013
Customer : Bagas Wiratama
Mhs UMY.
Analisa : Spectrometer.

Tanggal : 14-07-2018.
Kode Sampel : AI 5
Alat Uji : Thermo ARL 3560 OES.
Program : ALSICU.

Hasil/Result :

Unsur	%
Si	0,09
Fe	0,2498
Cu	0,028
Mn	0,0395
Mg	>1,9553
Zn	0,0333
Ti	0,0204
Cr	0,2171
Ni	0,0003
Pb	0,0011
Sn	0,0039
Al	97,36

Ass. Ka. Unit Lab, Pola & Finishing UP2L


Abdul Kafi

Ka. Seksi Laboratorium UP2L


Reny Hayu W.

Catatan : - Unsur Mg di atas standard kaliberasi program alat kami
- Sampel dari pemesan diuji di Laboratorium kami.

Cabang

Surabaya : Jl. Kebonrojo 6BB Telp. (031)3525687, 3525688, 3525076 Fax. (031)3540454 E-mail : sby@quick.co.id

Jakarta : Jl. Gajah Mada 154 Telp. (021) 6292044, 6293428, 6490020 Fax. (021) 6490013 E-mail : jkt@quick.co.id

Tanjungkarang : Jl. Raden Intan 159 Telp. (0721) 268498, 268495 Fax. (0721) 268498 E-mail : tkj@quick.co.id

Makasar : Jl. Kima 4 No. M4 Daya, Kec. Biringkanaya Telp. (0411) 514573, Fax. (0411) 514573 E-mail : mks@quick.co.id

Medan : Jl. Letda Sujono Komplek Pergudangan Tembung Intan No. 13 Medan, Indonesia Telp. (061) 7384680 Fax. (061) 7384680 E-mail : mdn@quick.co.id

Cabang Pembantu

Sidrap : Jl. Poros Parepare-Sidenreng Rappang, Kel. Batu Lappa, Kec. Watang Pulu, Kab. Sidenreng Rappang, SULSEL
Telp. +62-82192906262, +62-88804250543 E-mail : sidrap@quick.co.id



CV. KARYA HIDUP SENTOSA

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Website : www.quick.co.id • M-Web : m.quick.co.id • Facebook : facebook.com/quicktraktor

LAPORAN HASIL ANALISA

REPORT OF ANALYSIS

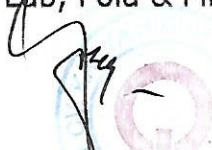
Order No. : 0143013
Customer : Bagas Wiratama
Mhs UMY.
Analisa : Spectrometer.

Tanggal : 14-07-2018.
Kode Sampel : Al 1
Alat Uji : Thermo ARL 3560 OES.
Program : ALSICU.

Hasil/Result :

Unsur	%
Si	0,09
Fe	0,3970
Cu	0,054
Mn	0,0141
Mg	0,0106
Zn	0,0526
Ti	0,0141
Cr	0,0012
Ni	0,0003
Pb	0,0038
Sn	0,0043
Al	99,36

Ass. Ka. Unit Lab, Pola & Finishing UP2L


Abdul Kafi

Ka. Seksi Laboratorium UP2L


Reny Hayu W.

Catatan : - Sampel dari pemesan diuji di Laboratorium kami.

Cabang

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Telp. +62-82192906262, +62-88804250543 E-mail : sidrap@quick.co.id

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

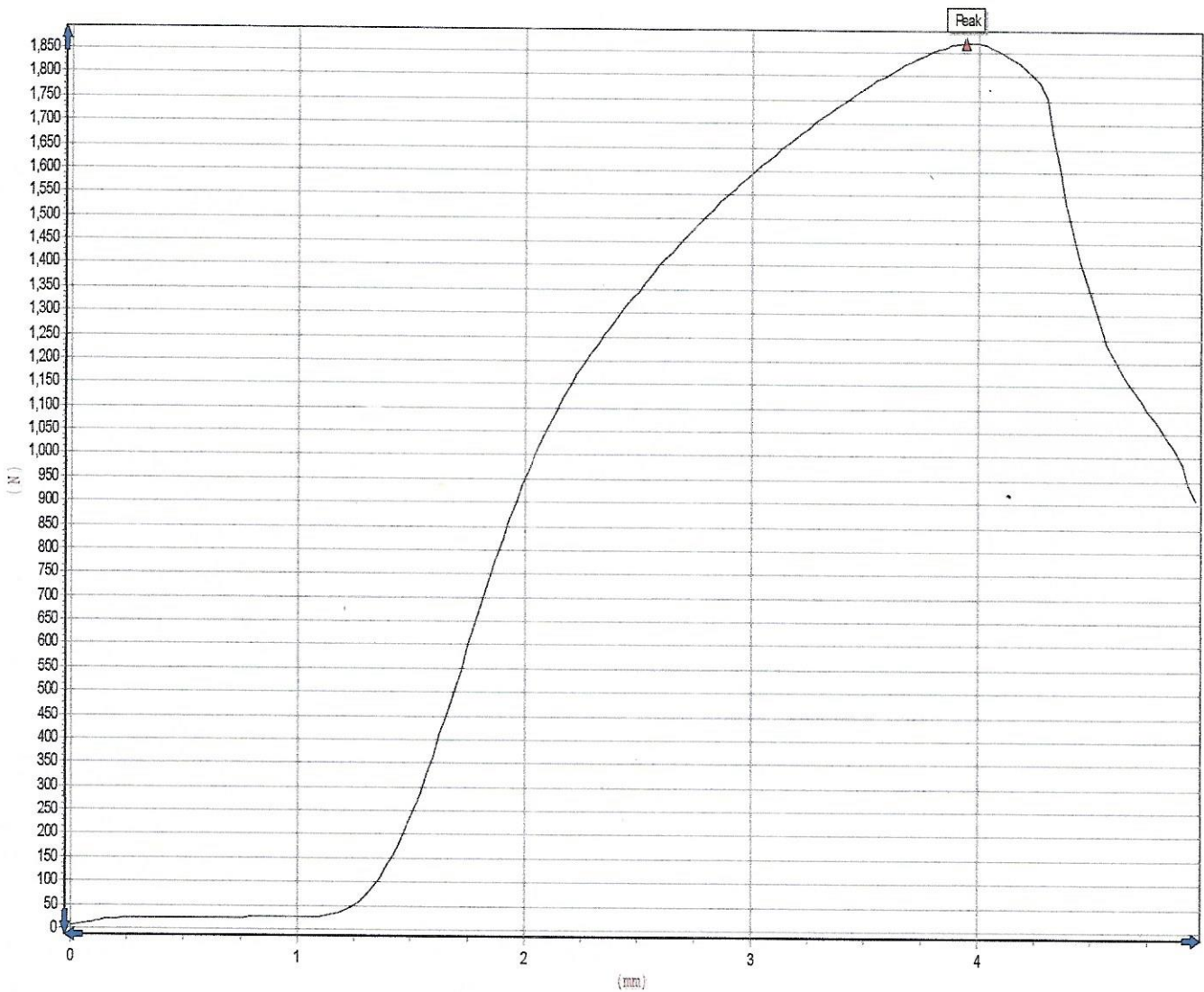
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Silinder Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
1		1869.90					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

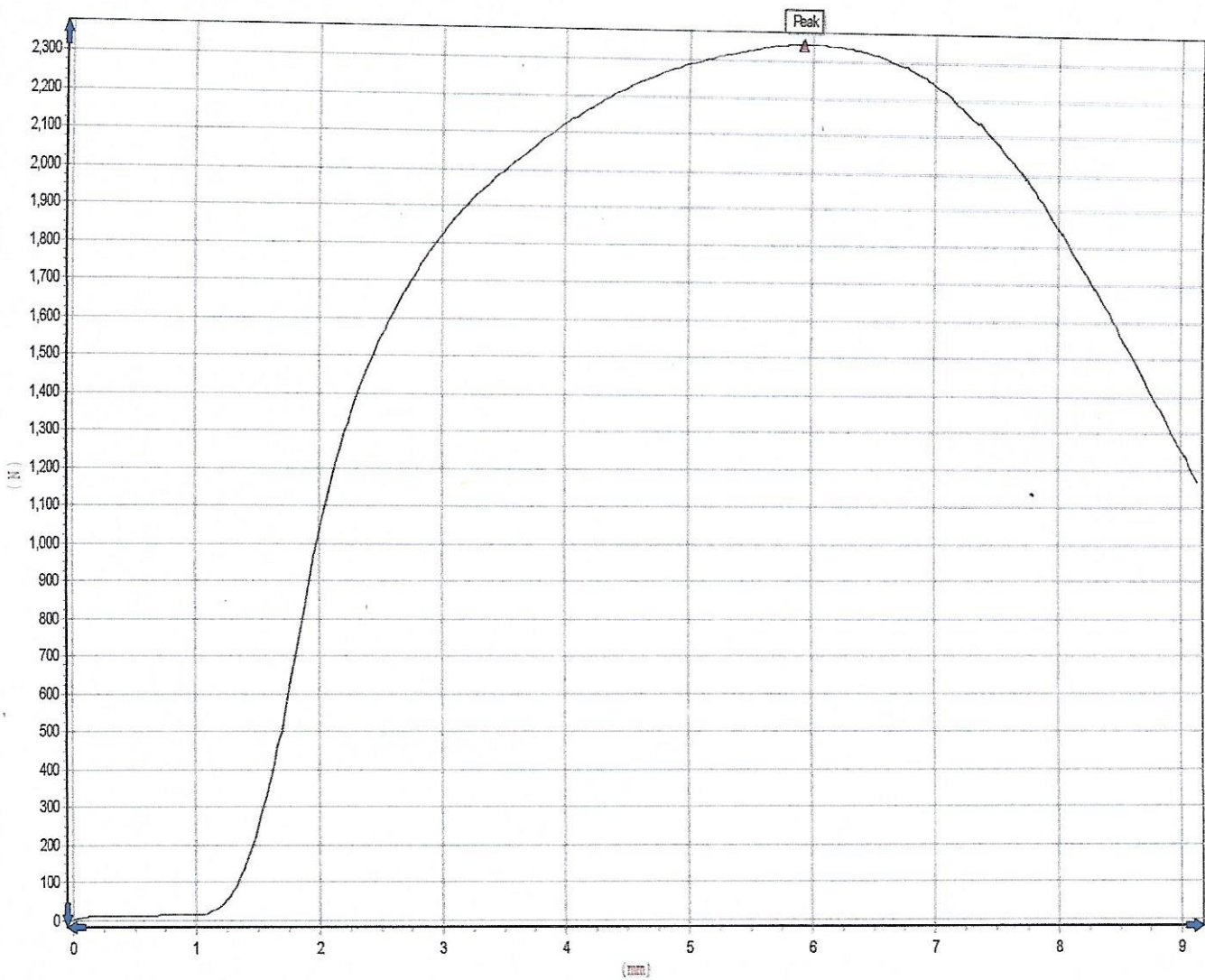
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : silinder Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
2		2346.26					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

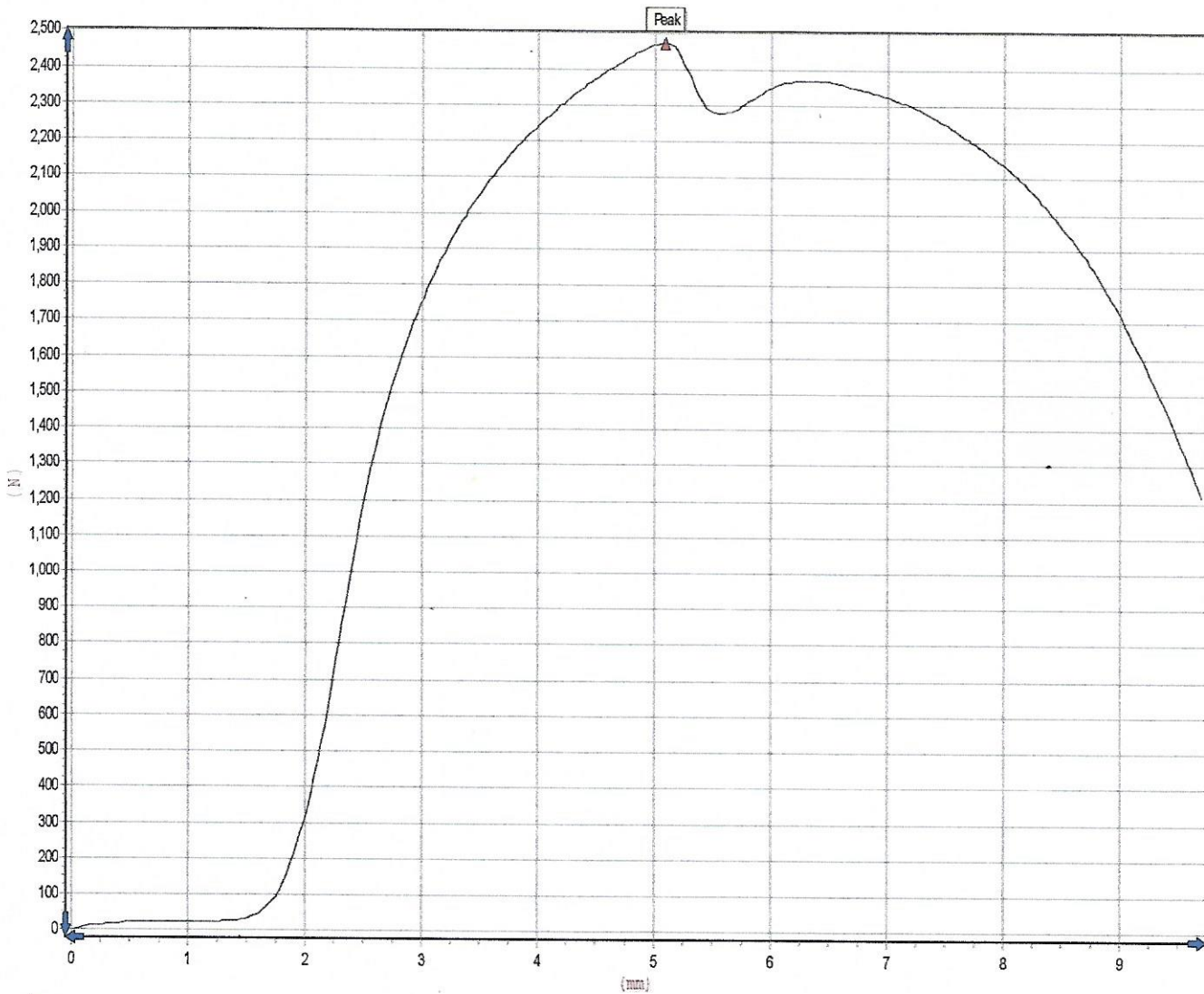
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : *Silinder Beralur*

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
3		2471.75					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

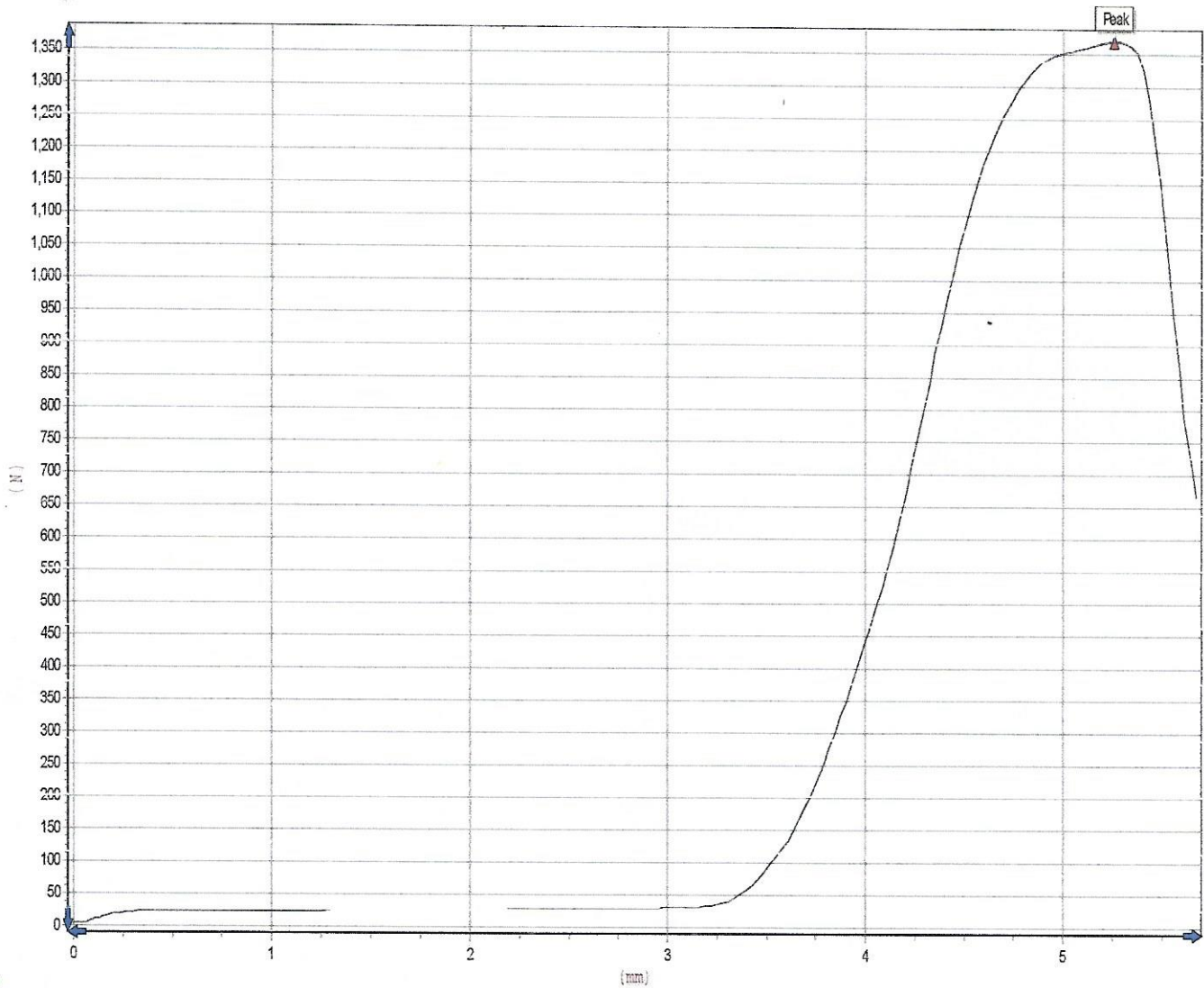
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Tirus Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
1		1367.94					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

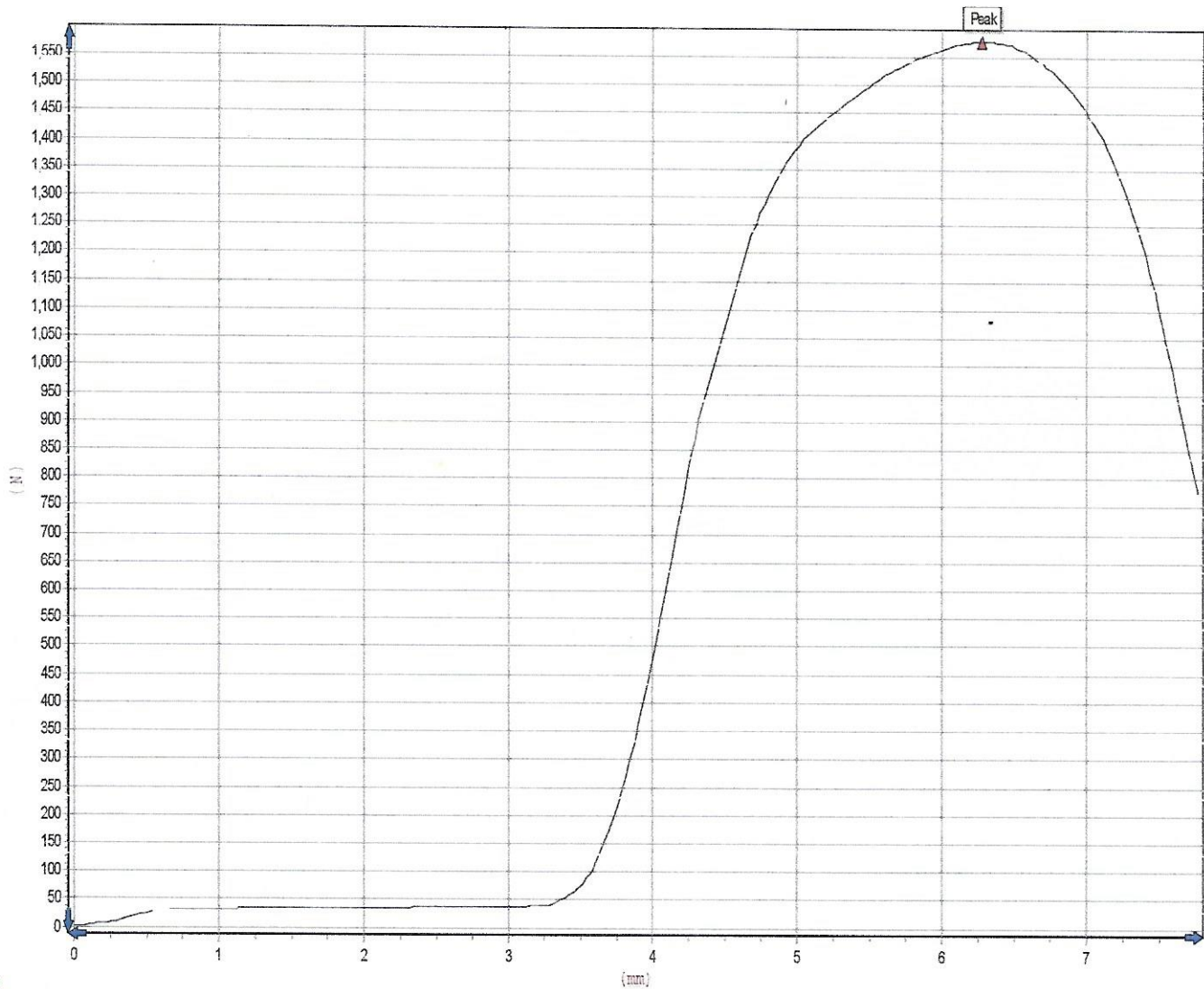
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Tirus Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
2		1577.33					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

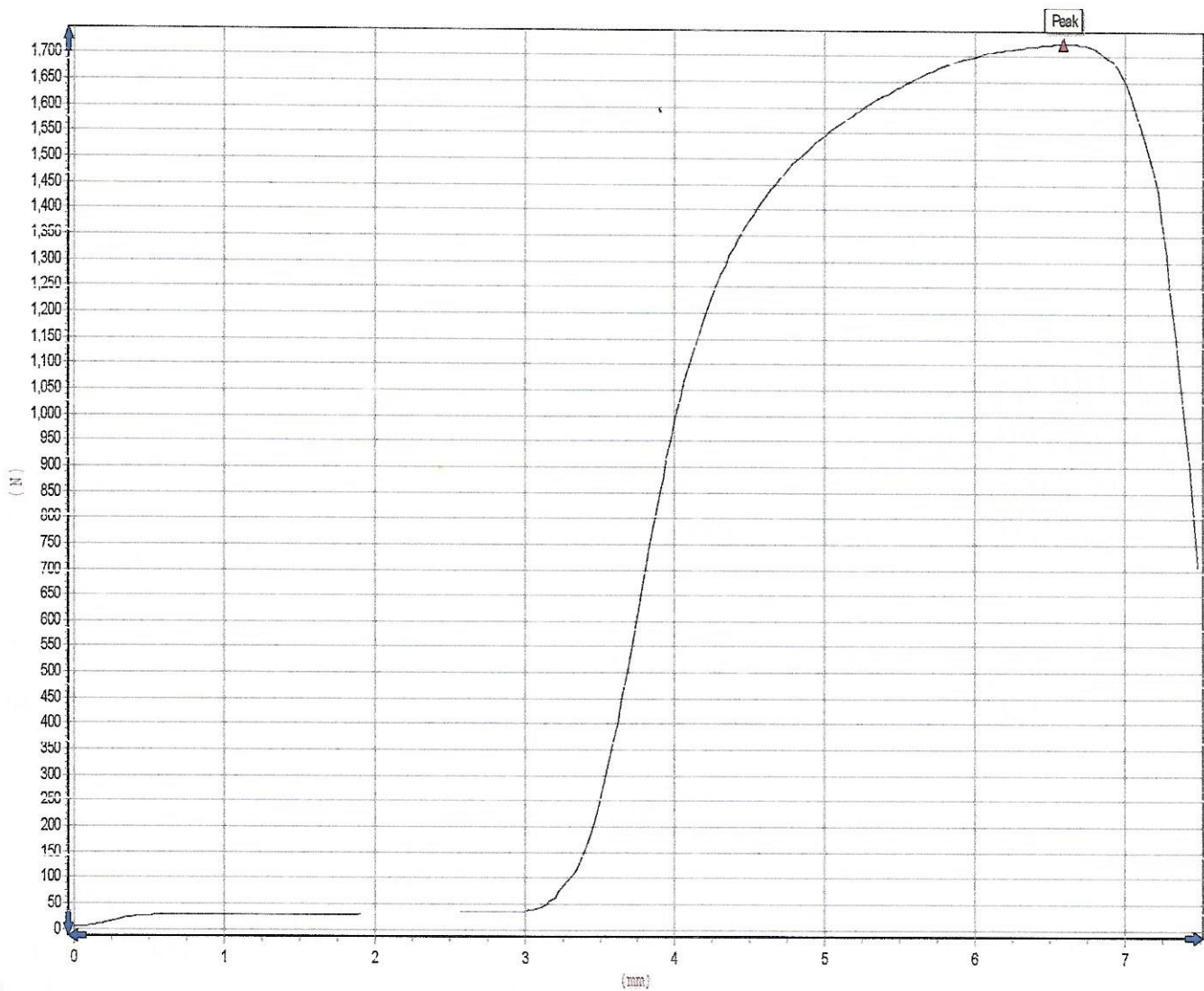
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Tirus Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
3		1725.21					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

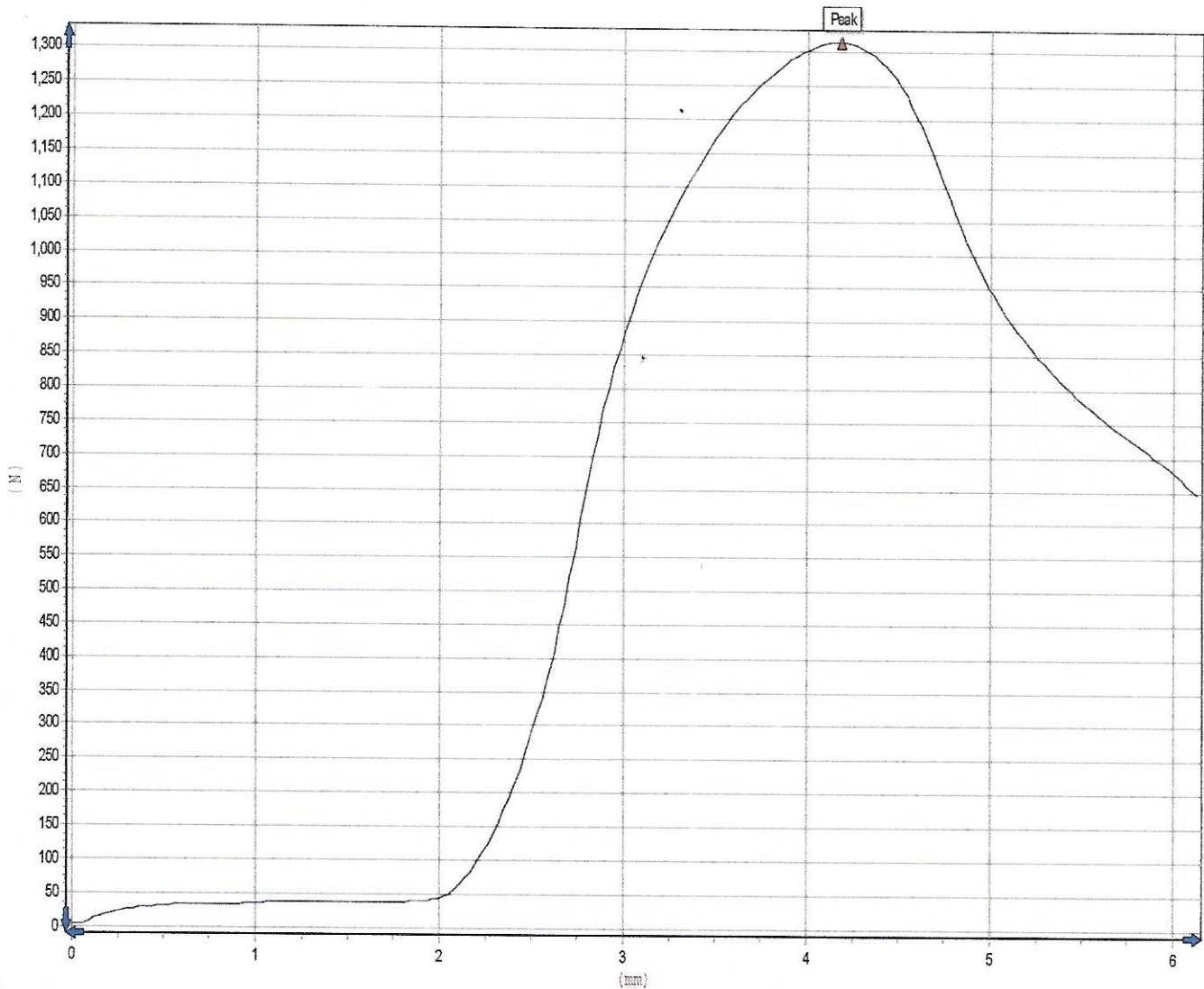
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : *Silinder Tidak Beraturan*

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
1		1314.62					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

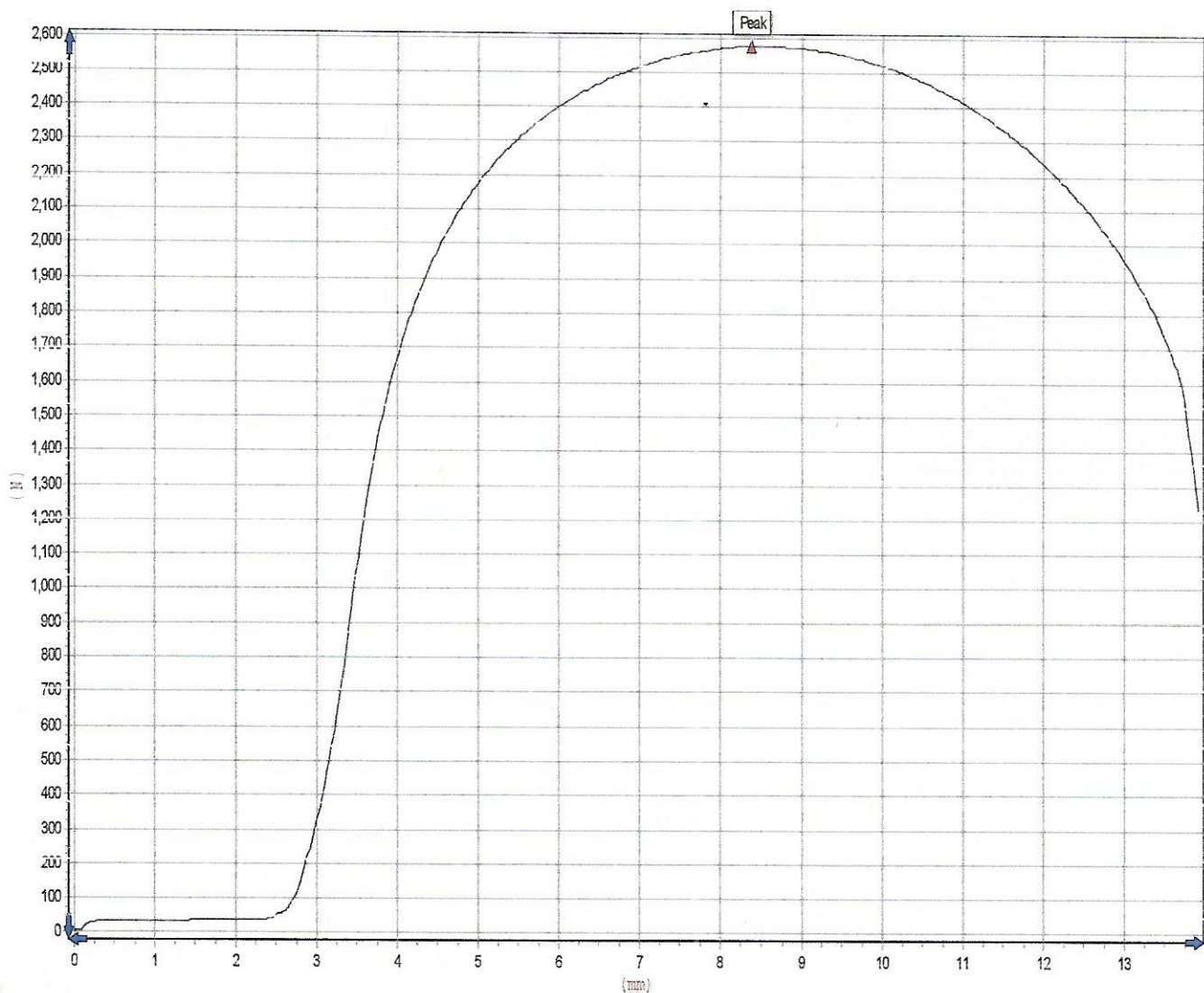
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Silinder Tidak Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
2		2575.55					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

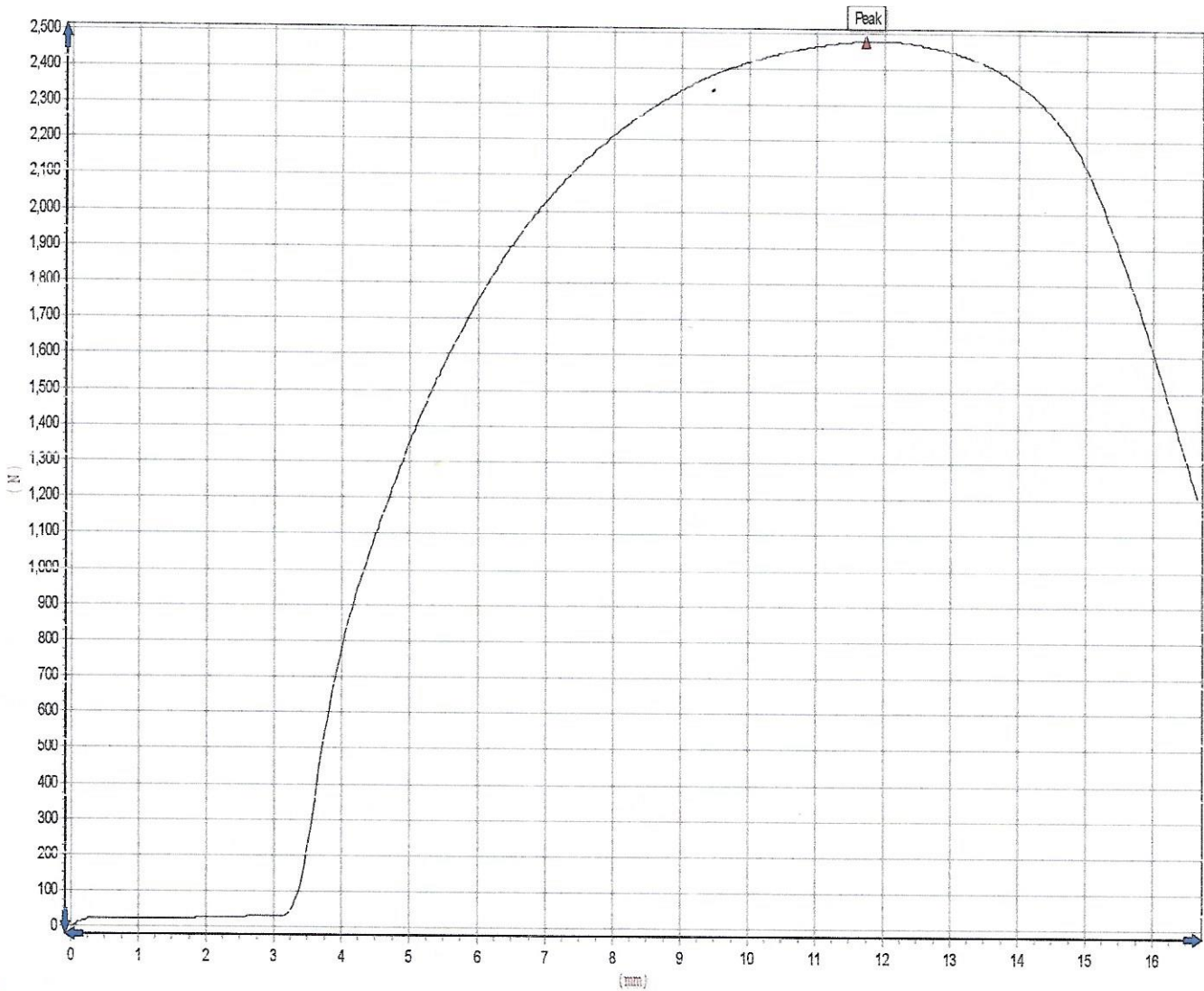
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500

Test Description : Silinder Tidak Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
3		2477.44					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500 rpm

Test Description : Tirus Tidak Beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
1		2232.15					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

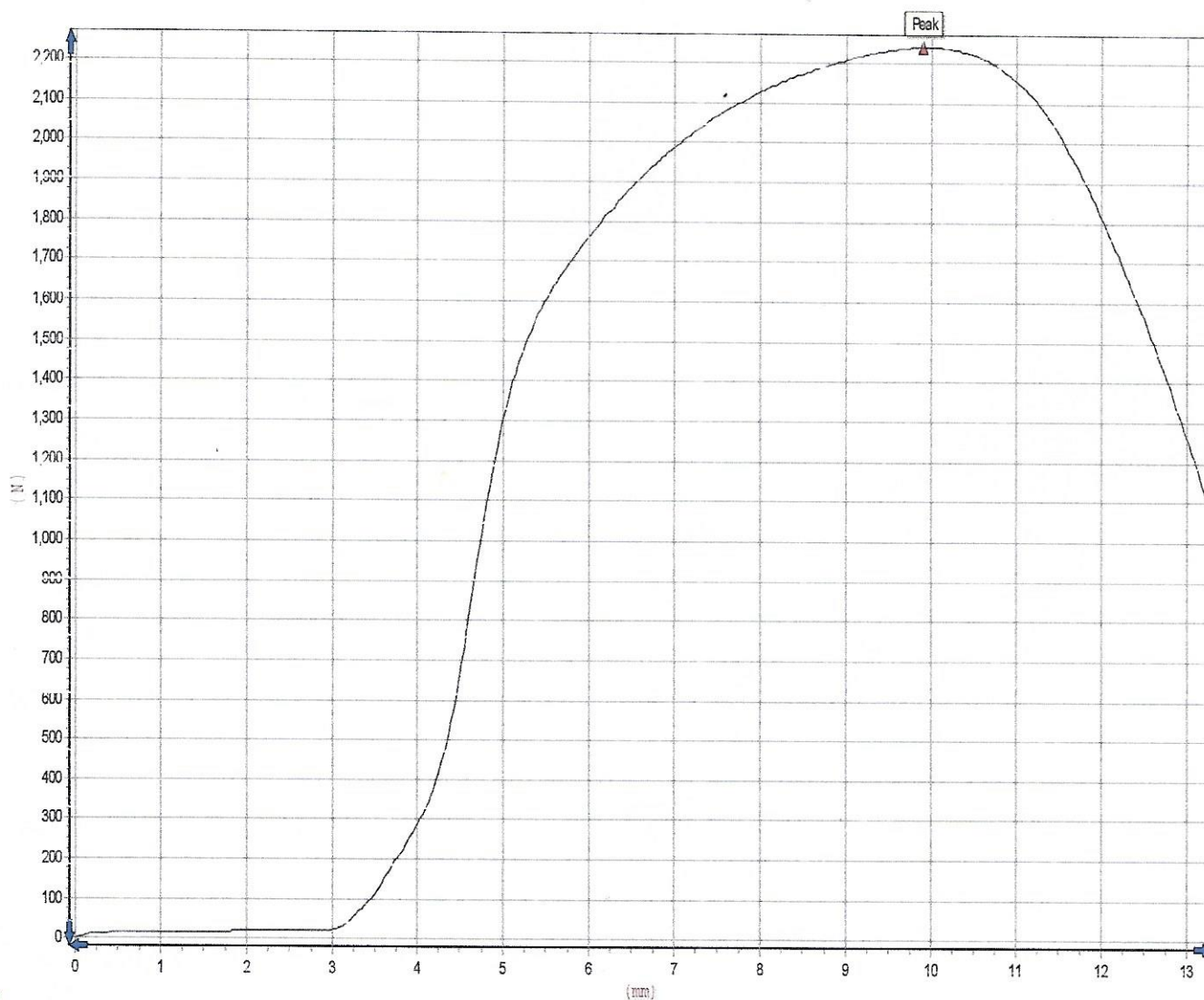
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500 Pm

Test Description : TITUS Tidak beralur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
2		2239.26					



Q.C. Dept. : _____

Tester : _____

LABORATORIUM MATERIAL JURUSAN TEKNIK MESIN FT UNS

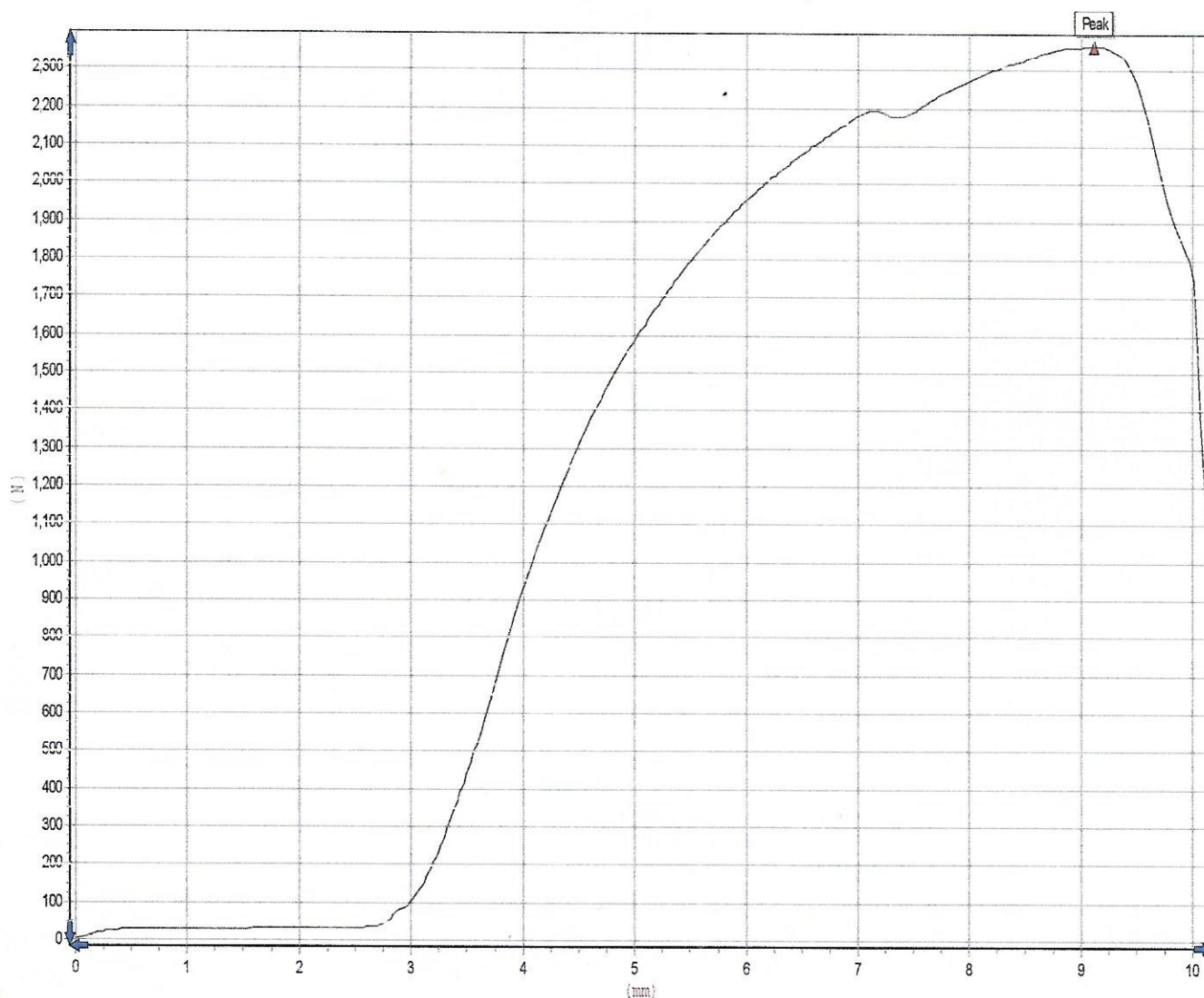
Jl. Ir. Sutami no.36 A Surakarta, Jawa Tengah

TEST REPORT

Test NO. : 1500 rpm

Test Description : Tirus tidak betalur

Speciment	Area mm ²	Max Force N	Tensile Strenght N/mm ²	Yield Load N	Yield Strenght N/mm ²	Break Force N	Elong. %
3		2363.68					



Q.C. Dept. : _____

Tester : _____