

# **LAMPIRAN**

# CURRICULUM VITAE



## Data Pribadi

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Email : [saskara8060@gmail.com](mailto:saskara8060@gmail.com)  
Jenis Kelamin : Laki-laki  
Tempat/Tanggal lahir : Seririt/06 Februari 1997  
Status : Belum Menikah  
Warga Negara : Indonesia  
Agama : Hindu

## Riwayat Pendidikan dan Pelatihan

2003-2009 : SDN 2 Seririt  
2009-2012 : SMPN 4 Seririt  
2012-2015 : SMAN 1 Seririt  
2015-2018 : Program Studi D3 Teknik Mesin, Jurusan Teknik Mesin , Politeknik Negeri Bali  
2018-2020 : Program Studi S1 Teknik Mesin, Fakultas Teknologi Industri, Institut Teknologi Nasional Malang

Malang, 10 Februari 2020  
Saya yang bersangkutan,



Putu Suwendra Saskara

## LAMPIRAN

### 1. Perhitungan uji tarik

$$\sigma = \frac{P}{A_0}$$

Dimana :

$\sigma$  = Tegangan (N/mm<sup>2</sup>)

P = Beban Tarik (N)

A<sub>0</sub> = Luas penampang specimen awal (mm<sup>2</sup>)

➤ 30% Campuran Karet

Spesimen ke 1

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{3466}{252} \\ &= 13,75 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 2

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{3270}{252} \\ &= 12,83 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 3

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{2762}{252} \\ &= 10,96 \text{ Kgf/mm}^2\end{aligned}$$

➤ 40% Campuran Karet

Spesimen ke 1

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{2468}{252} \\ &= 9,76 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 2

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{2332}{252} \\ &= 9,26 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 3

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{2265}{252} \\ &= 8,99 \text{ Kgf/mm}^2\end{aligned}$$

➤ 50% Campuran Karet

Spesimen ke 1

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{2071}{252} \\ &= 8,22 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 2

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{1812}{252} \\ &= 7,19 \text{ Kgf/mm}^2\end{aligned}$$

Spesimen ke 3

$$\begin{aligned}\sigma &= \frac{P}{A_0} \\ &= \frac{1735}{252} \\ &= 6,89 \text{ Kgf/mm}^2\end{aligned}$$

Analisa perhitungan jumlah rata-rata tegangan specimen 1,2, dan 3 pada variasi penguat karet.

$$\text{Jumlah } (\sum^x) = X_1 + X_2 + X_3$$

$$\text{Rata-rata } \bar{x} = \frac{\sum^x}{N}$$

1. Spesimen variasi penguat karet 30 %

$$\begin{aligned}\text{Jumlah } (\sum^x) &= X_1 + X_2 + X_3 \\ &= 13,75 + 12,83 + 10,96 \\ &= 37,54\end{aligned}$$

$$\begin{aligned}\text{Rata-rata } \bar{x} &= \frac{\sum^x}{N} \\ &= \frac{37,75}{3}\end{aligned}$$

$$= 12,5133 \text{ Kgf/mm}^2$$

2. Spesimen variasi penguat karet 40 %

$$\begin{aligned} \text{Jumlah } (\Sigma^x) &= X1+X2+X3 \\ &= 9,76+9,26+8,99 \\ &= 28,01 \end{aligned}$$

$$\begin{aligned} \text{Rata-rata } \bar{x} &= \frac{\Sigma x}{N} \\ &= \frac{28,01}{3} \\ &= 9,3367 \text{ Kgf/mm}^2 \end{aligned}$$

3. Spesimen variasi penguat karet 50 %

$$\begin{aligned} \text{Jumlah } (\Sigma^x) &= X1+X2+X3 \\ &= 8,22+7,19+6,89 \\ &= 22,3 \end{aligned}$$

$$\begin{aligned} \text{Rata-rata } \bar{x} &= \frac{\Sigma x}{N} \\ &= \frac{22,3}{3} \\ &= 7,4333 \text{ Kgf/mm}^2 \end{aligned}$$

## 2. Perhitungan impact

- Variasi persentase karet 30%

Specimen 1

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 37^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7986 - 0,7071)$$

$$E = 1,5586 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,5586}{80}$$

$$HI = 0,0195 \text{ joule/mm}^2$$

- Variasi persentase karet 30%

Specimen 2

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 37^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7986 - 0,7071)$$

$$E = 1,5586 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,5586}{80}$$

$$HI = 0,0195 \text{ joule/mm}^2$$

- Variasi persentase karet 30%

Specimen 3

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 36^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,8090 - 0,7071)$$

$$E = 1,7354 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,7354}{80}$$

$$HI = 0,0217 \text{ joule/mm}^2$$

- Variasi persentase karet 40%

Specimen 1

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 38^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7880 - 0,7071)$$

$$E = 1,3777 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,3777}{80}$$

$$HI = 0,0172 \text{ joule/mm}^2$$

- Variasi persentase karet 40%

Specimen 2

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 37^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7986 - 0,7071)$$

$$E = 1,5586 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,5586}{80}$$

$$HI = 0,0195 \text{ joule/mm}^2$$

- Variasi persentase karet 40%

Specimen 3

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

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$$HI = \frac{1,3777}{80}$$

$$HI = 0,0172 \text{ joule/mm}^2$$

- Variasi persentase karet 50%

Specimen 1

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 38^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7880 - 0,7071)$$

$$E = 1,3777 \text{ joule}$$

$$HI = \frac{E}{A_0}$$

$$HI = \frac{1,3777}{80}$$

$$HI = 0,0172 \text{ joule/mm}^2$$



- Variasi persentase karet 50%

Specimen 2

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 38^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7880 - 0,7071)$$

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- Variasi persentase karet 50%

Specimen 3

Energi yang digunakan secara ideal

$$E = W \times R (\cos \beta - \cos \alpha)$$

$$E = 26,32 \times 0,647 \times (\cos 38^\circ - \cos 45^\circ)$$

$$E = 26,32 \times 0,647 \times (0,7880 - 0,7071)$$

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$$HI = 0,0172 \text{ joule/mm}^2$$



INSTITUT TEKNOLOGI NASIONAL MALANG  
FAKULTAS TEKNOLOGI INDUSTRI JURUSAN TEKNIK MESIN  
**LABORATORIUM PENGUJIAN MATERIAL**

Jl. Raya Karanglo Km. 2 Telp. (0341) 417636 Ext. 511 Malang

Nama : Putu Suwendra Saskara  
NIM/ : 1811919  
Jurusan : Teknik Mesin S1  
Hari / Tanggal : Kamis / 11 Desember 2019  
Specimen : Komposit Serat Karbon, Karet , Rami dan Agave

## TEST REPORT PENGUJIAN TARIK

No	Variasi Prosentase Karet	Jumlah Speciment	Area Mm <sup>2</sup>	Max Force Kgf	0.2 % Y.S Kgf/mm <sup>2</sup>	Tensile Straing Kgf/mm <sup>2</sup>	Elongition (%)
1	30 %	1	252	3466	5.73	13.75	45
		2	252	3270	5.32	12.83	27
		3	252	2762	4.79	10.96	31
2	40 %	1	252	2468	3.95	9.76	35
		2	252	2332	3.98	9.26	26
		3	252	2265	3.89	8.99	24
3	50 %	1	252	2071	3.32	8.22	29
		2	252	1812	3.00	7.19	26
		3	252	1735	3.05	6.89	26

Malang, 11 Desember 2019  
Kepala Laboratorium Pengujian Material  
  
Ir. Teguh Rahardjo, MT  
NIP. 195706011992021001





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**LABORATORIUM PENGUJIAN MATERIAL**  
Jl. Raya Karanglo Km. 2 Telp. (0341) 417636 Ext. 511 Malang

**DATA PENGUJIAN IMPAK**

Nama : Putu Suwendra Saskara  
NIM/ : 1811919  
Jurusan : Teknik Mesin S1  
Hari / Tanggal : Kamis / 11 Desember 2019  
Specimen : Komposit Serat Karbon, Karet , Rami dan Agave

Variasi Prosentase Karet	Jumlah Sample	l (mm)	b (mm)	t (mm)	h (mm)	Luas (mm <sup>2</sup> )	$\alpha$ (°)	$\beta$ (°)	Energi (Joule)	HI (Joule/mm)
30 %	1	55	10	10	8	80	45	37	1,5586	0,0195
	2	55	10	10	8	80	45	37	1,5586	0,0195
	3	55	10	10	8	80	45	36	1,7354	0,0217
40 %	1	55	10	10	8	80	45	38	1,3777	0,0172
	2	55	10	10	8	80	45	37	1,5586	0,0195
	3	55	10	10	8	80	45	38	1,3777	0,0172
50 %	1	55	10	10	8	80	45	38	1,3777	0,0172
	2	55	10	10	8	80	45	38	1,3777	0,0172
	3	55	10	10	8	80	45	38	1,3777	0,0172

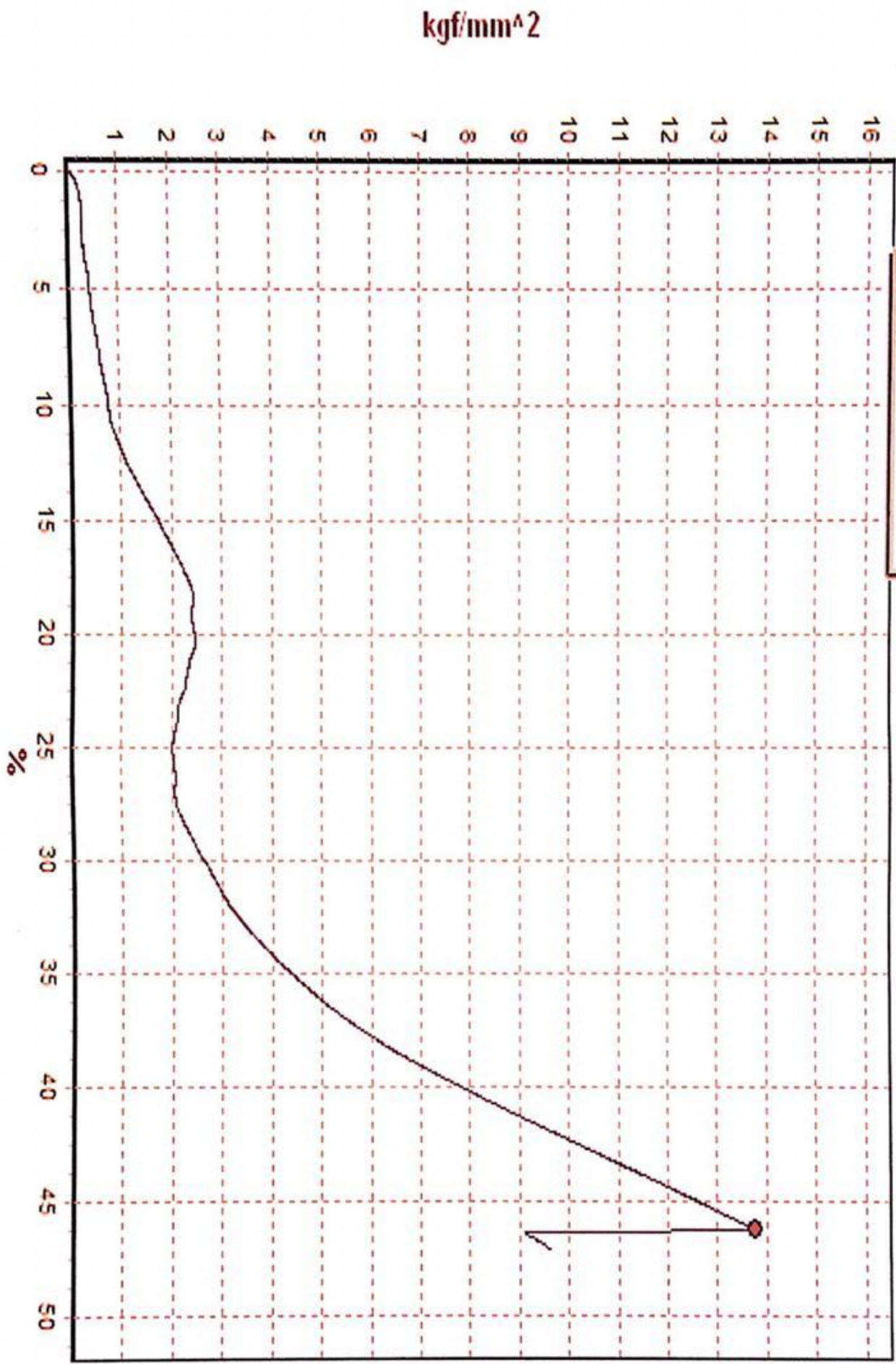
Malang, 11 Desember 2019  
Kepala Laboratorium Uji Material



Ir. Teguh Rahardjo, MT  
NIP. 195706011992021001

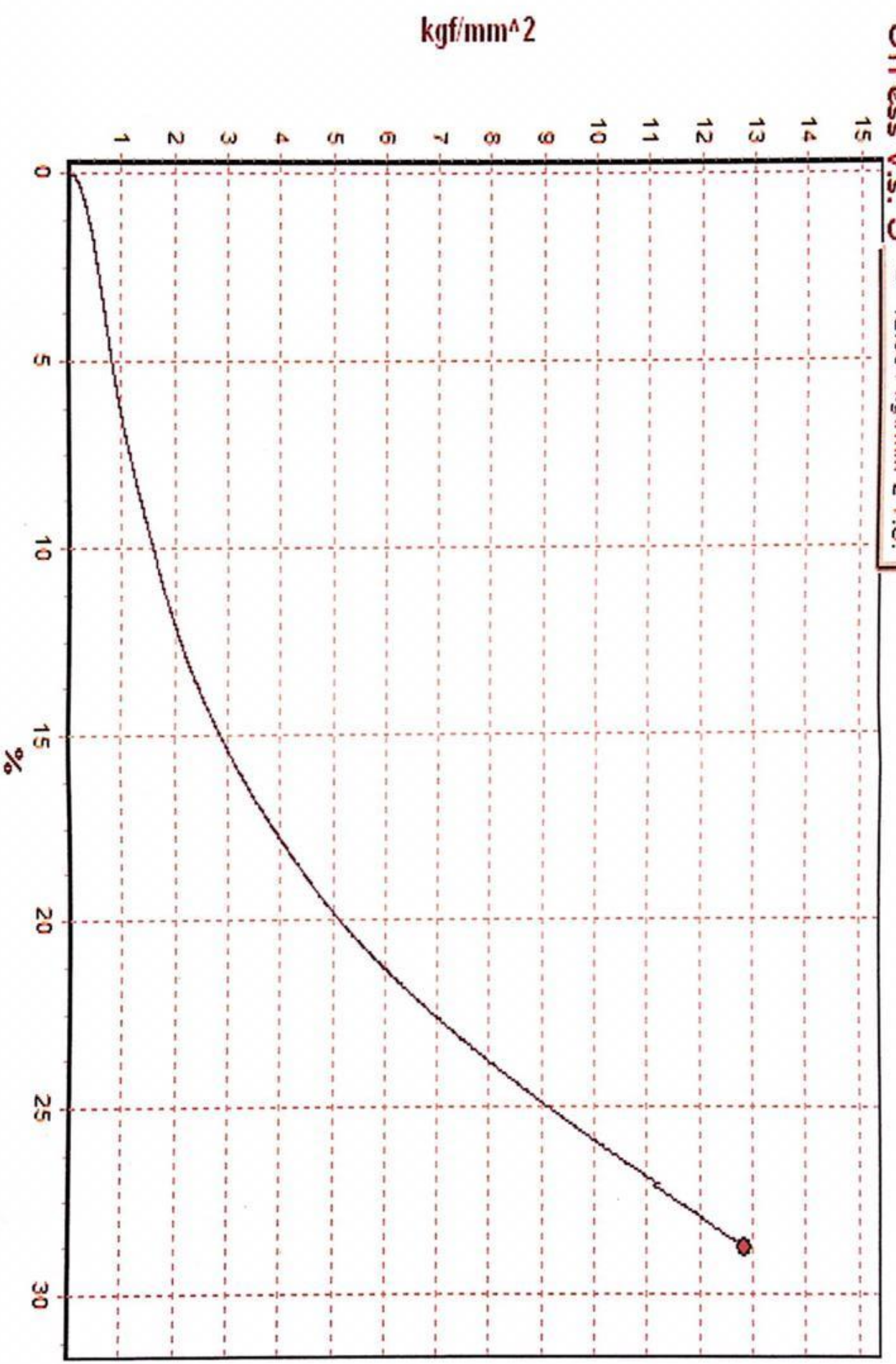


Stress v.s. S ● 13.752 kgf/mm<sup>2</sup> T.S.



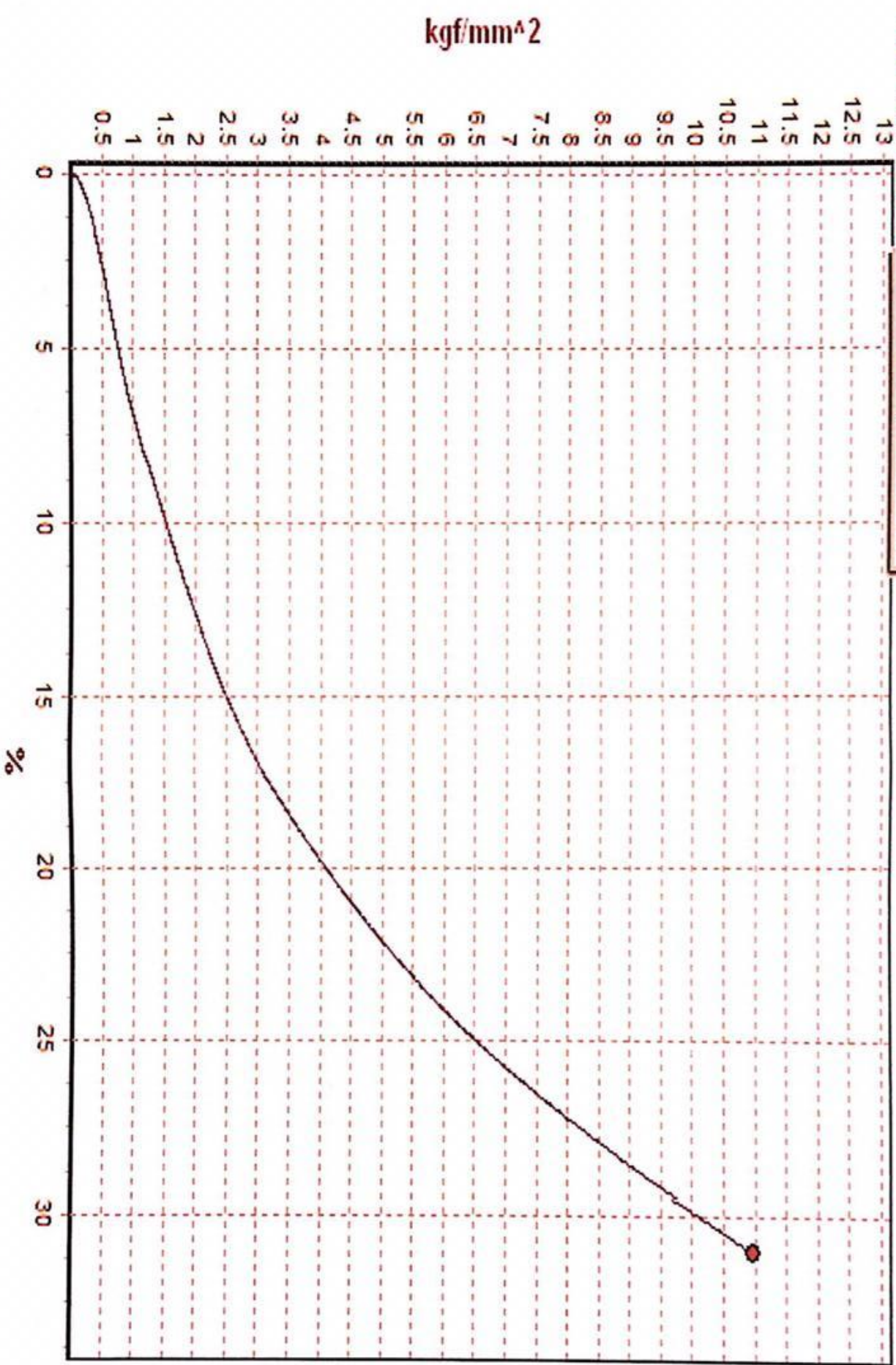
30% / A

Stress v.s. S ● 12.834 kgf/mm<sup>2</sup> T.S.



2020/18

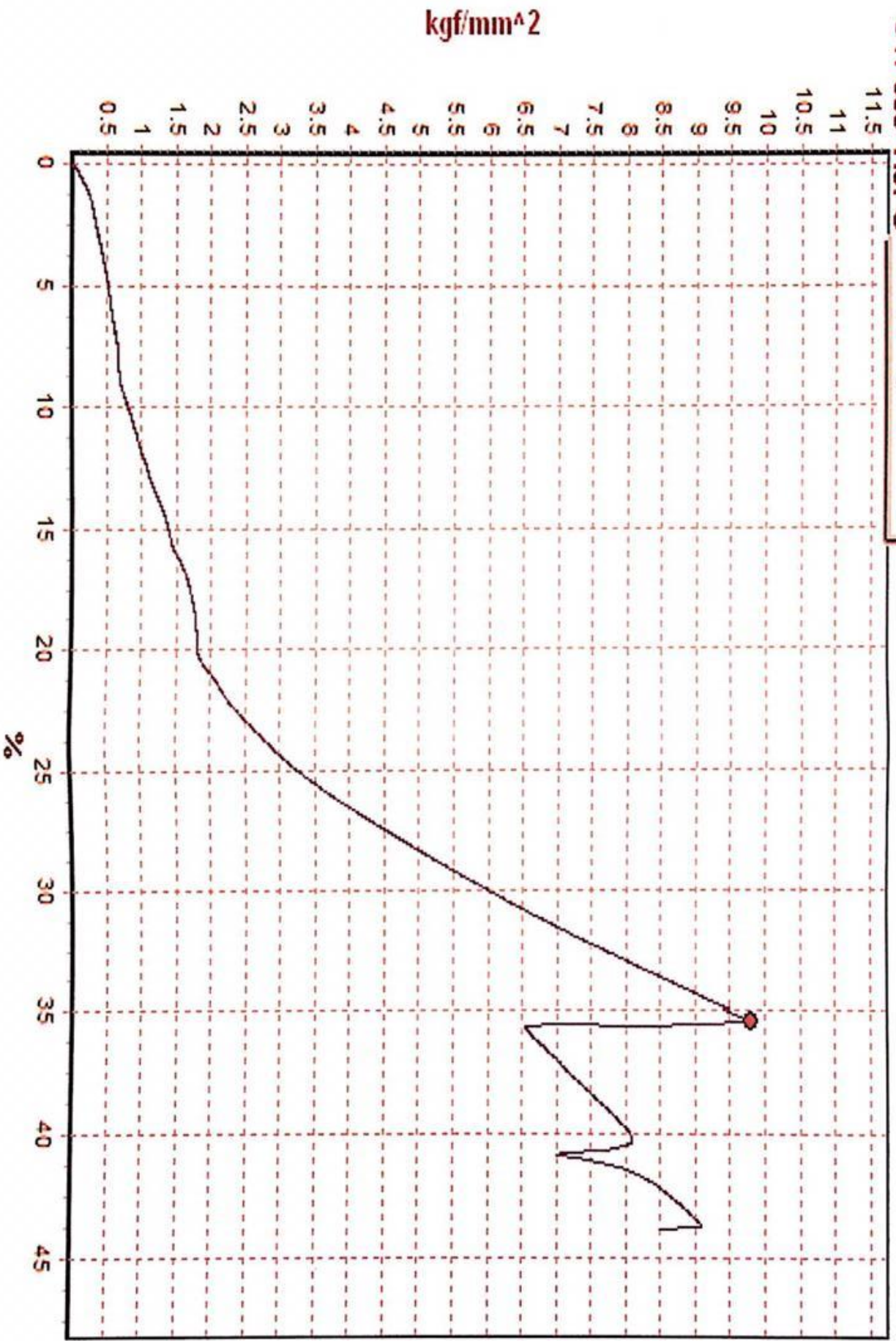
Stress v.s. S ● 10.961 kgf/mm<sup>2</sup> T.S.



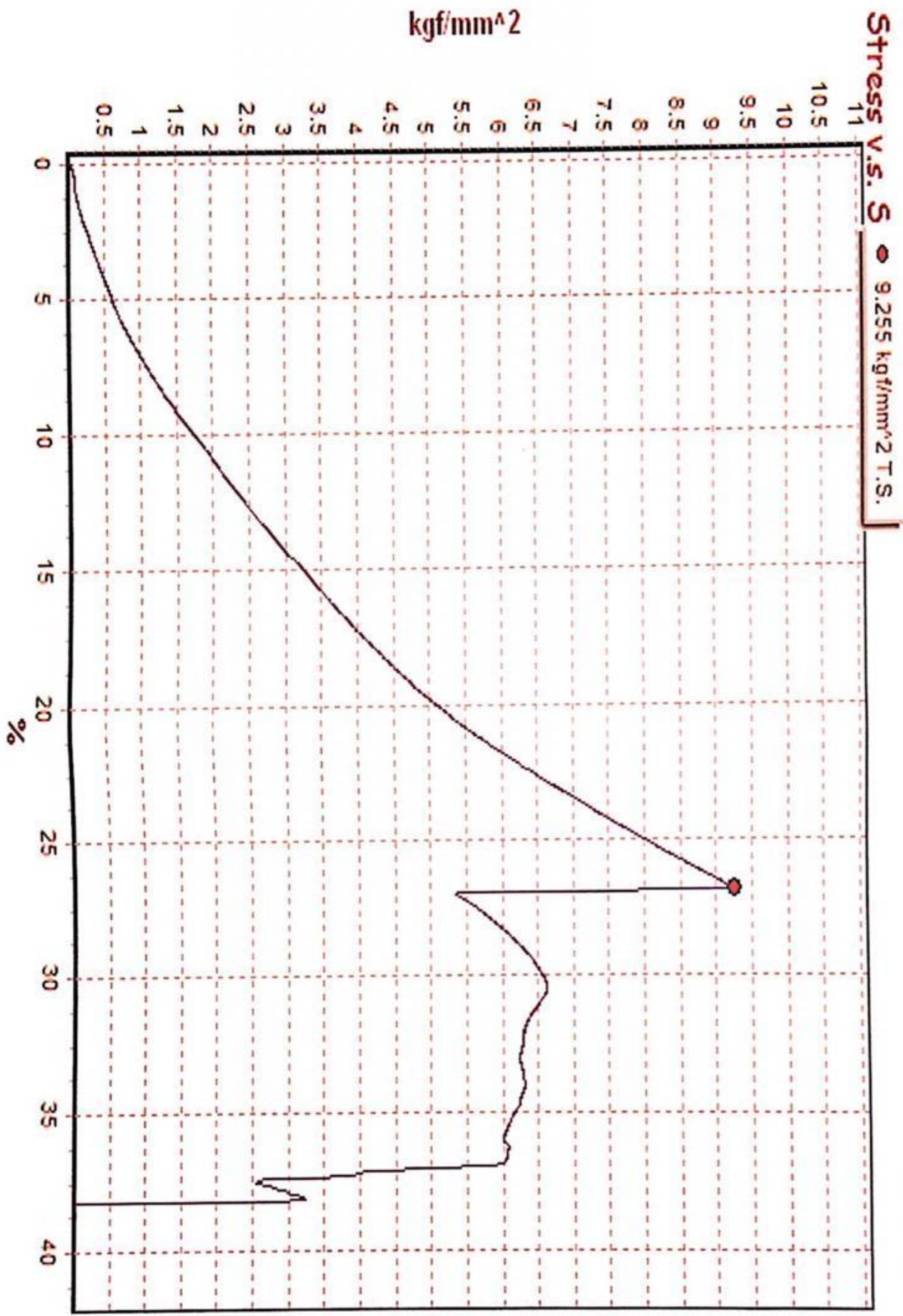
30% / C

Stress v.s. S ● 9.794 kgf/mm<sup>2</sup> T.S.

4070 / A



40% / #



Stress v.s. S 9.255 kgf/mm<sup>2</sup> T.S.

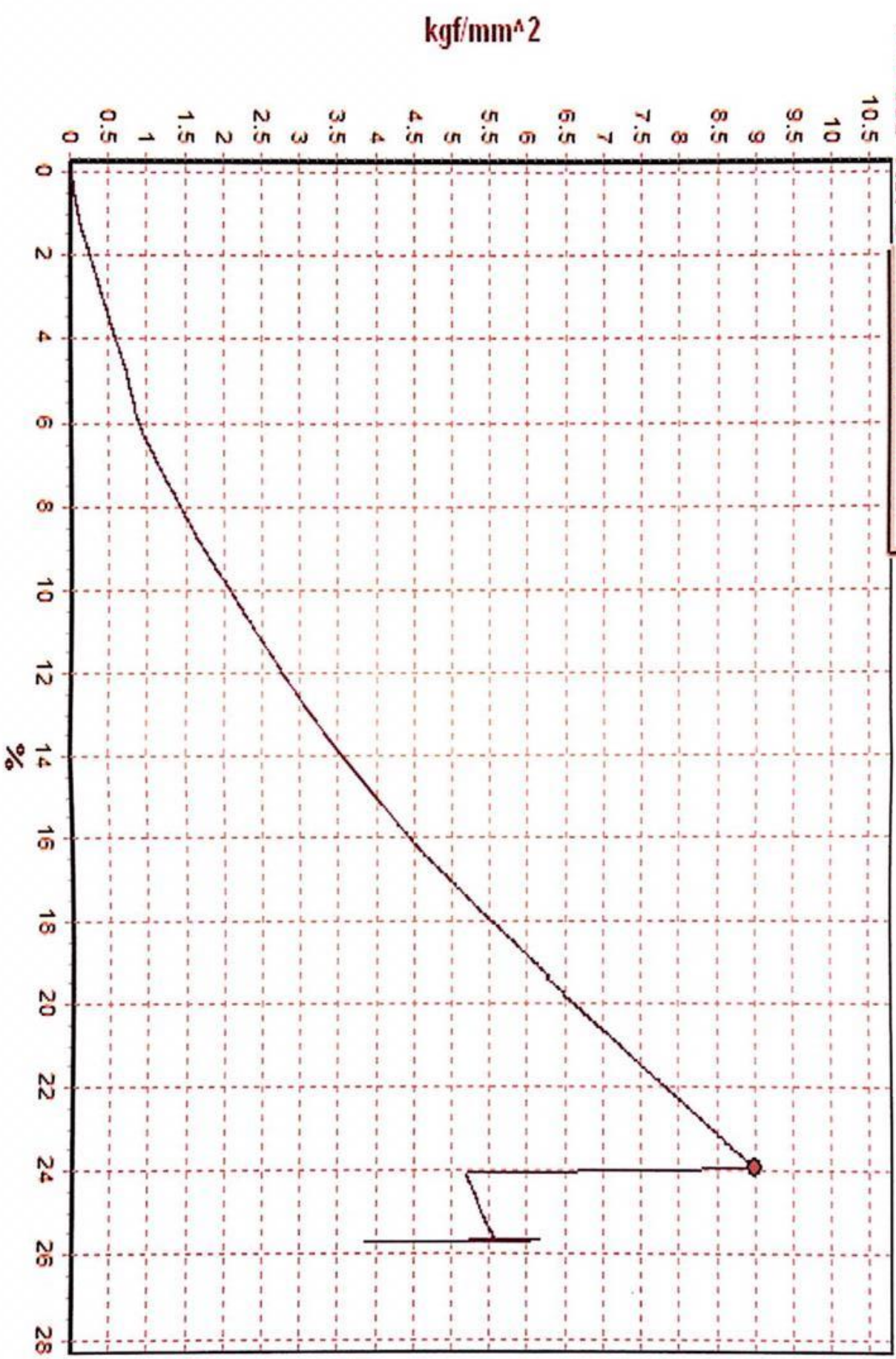
kgf/mm<sup>2</sup>

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11

0 5 10 15 20 25 30 35 40

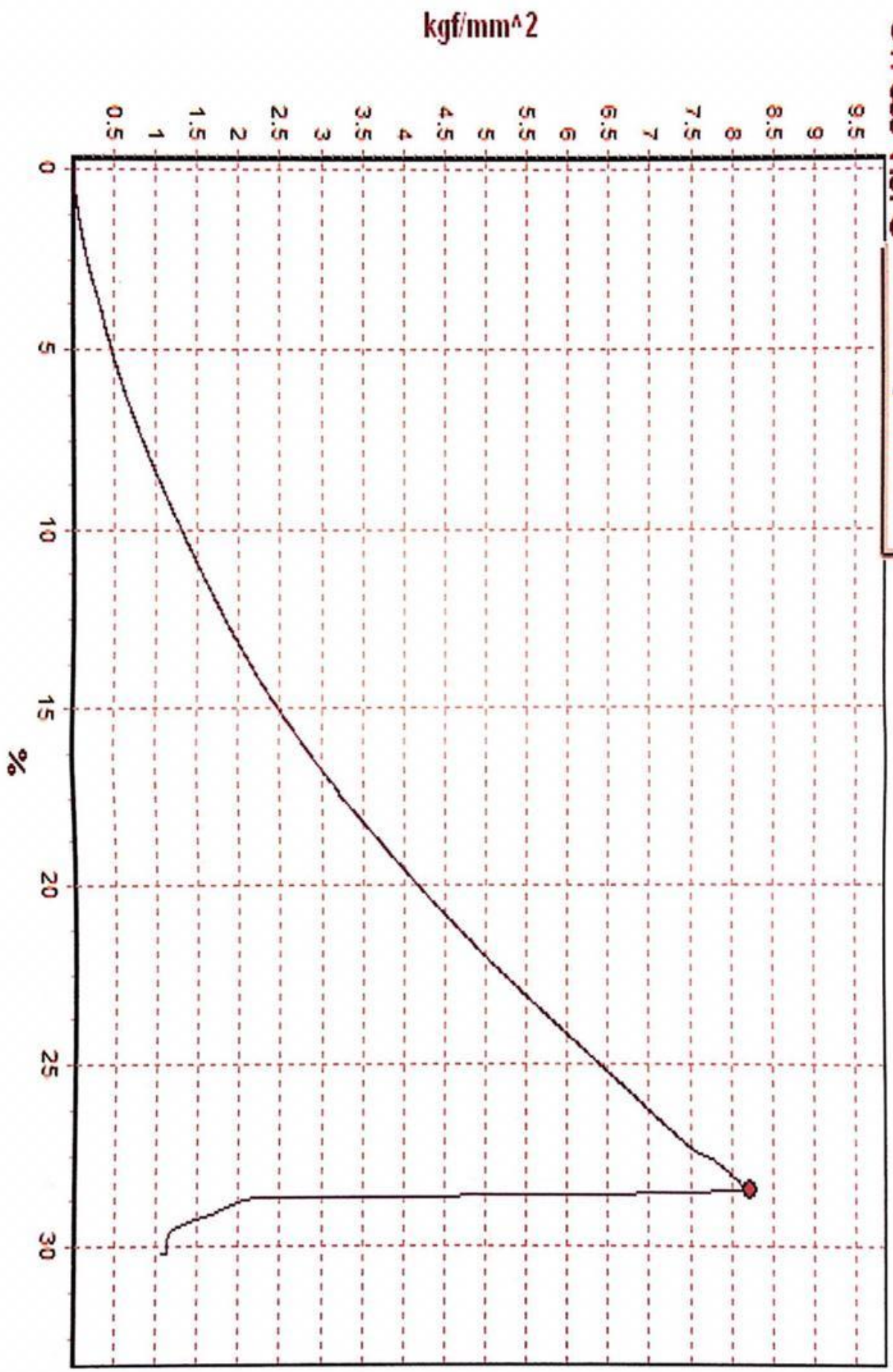


Stress v.s. S ● 8.990 kgf/mm<sup>2</sup> T.S.



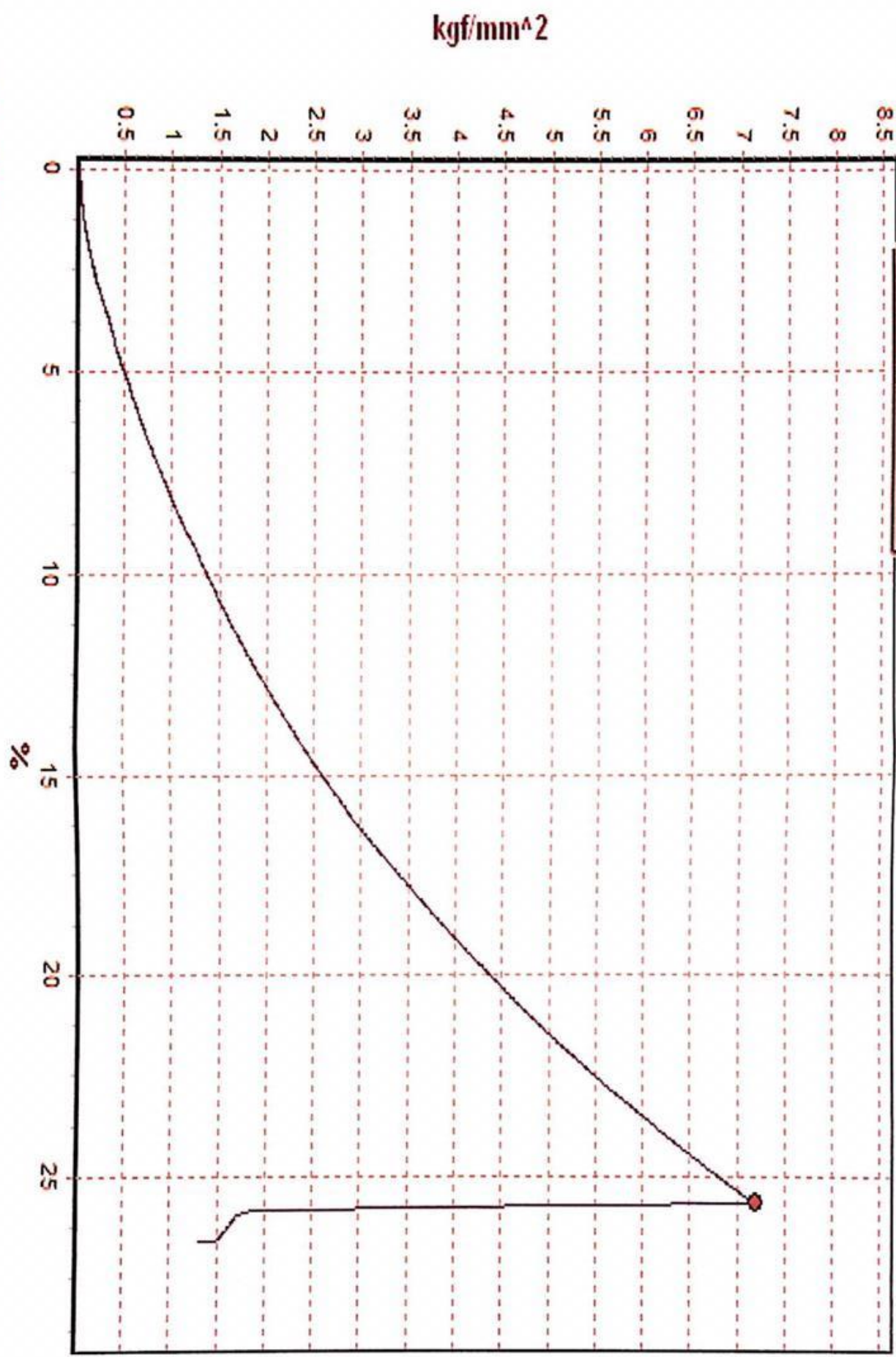
402/c

Stress v.s. S ● 8.219 kgf/mm<sup>2</sup> T.S.



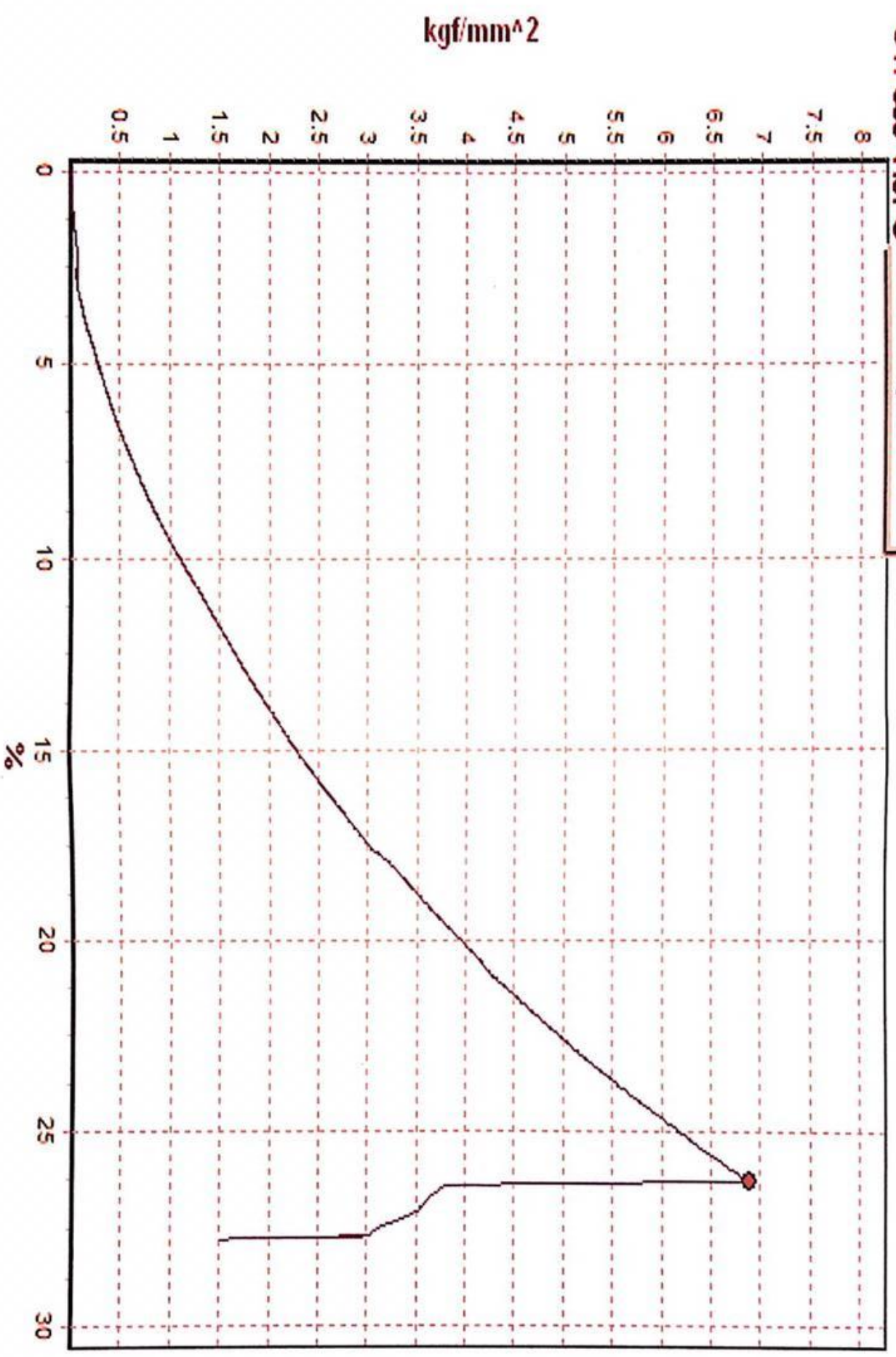
50% / A

Stress v.s. S ● 7.192 kgf/mm<sup>2</sup> T.S.



50% B

Stress v.s. S ● 6.887 kgf/mm<sup>2</sup> T.S.



52/c