LAMPIRAN

1. Perhitungan Pengujian Tarik

1.1 Perhitungan Pengujian Tarik Variasi 0phr

0phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (%)	thickness (mm)	width (mm)
1	293,251	146,625	0,47	0,6	10,2
2	342,709	342,709	1,3	0,6	10,1
3	426,844	411,7	3,81	0,6	10,1
4	341,016	338,794	2,59	0,6	10,2
5	395,995	393,751	2,46	0,6	10,1
mean	359,963	326,7158	2,126	0,6	10,14
median	342,709	342,709	2,46	0,6	10,1
set.dev	52,15015209	105,5348211	1,283288744	0	0,054772256

0phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (%)	thickness (mm)	width (mm)
mean	359,963	326,7158	2,126	0,6	10,14

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,6 x 10,14

= 6,084 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 359,963 (kgf/cm2) x 0,0981

= 32,018 (MPa)

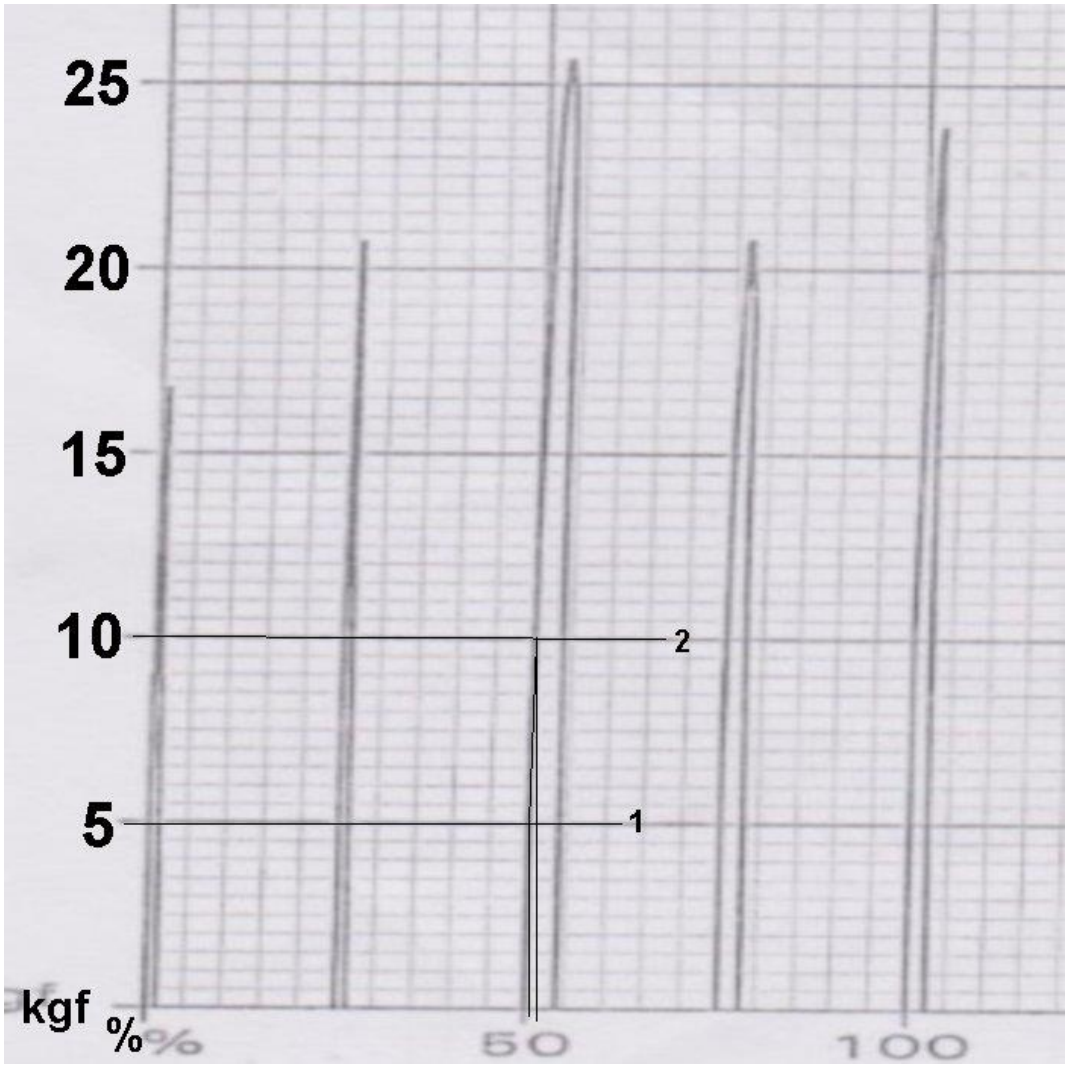
Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 2,126/100

= 0,02126



Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{16{,}432 - 8{,}216}{0{,}0156 - 0{,}00595} = 851{,}406 \text{ (MPa)}$$

1.2 Perhitungan Pengujian Tarik Variasi 8phr

8phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	483,26	340,549	9,02	0,65	10,15
2	479,42	458,102	6,52	0,7	10,25
3	449,874	371,146	8,88	0,8	10,2
4	450,482	449,521	3,63	0,7	10,1
5	484,168	448,271	6,42	0,75	10,1
mean	469,4408	413,5178	6,894	0,72	10,16
median	479,42	448,271	6,52	0,7	10,15
set.dev	17,67583733	53,87852406	2,206939057	0,057008771	0,065192024

8phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	469,4408	413,5178	6,894	0,72	10,16

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,72 x 10,16

= 7,315 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 413,517 (kgf/cm2) x 0,0981

= 40,566 (MPa)

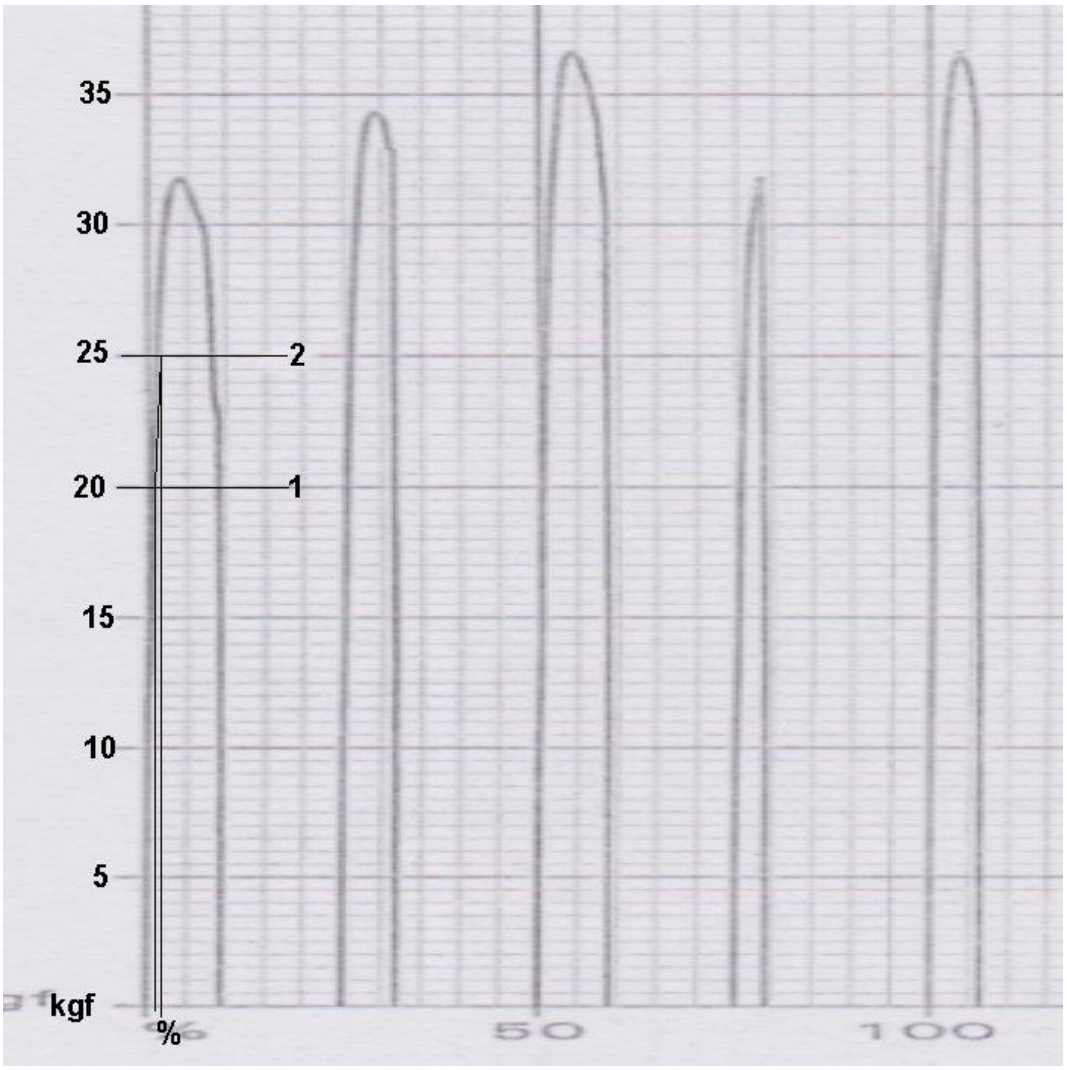
Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 6,894/100

=0,0689



Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{37{,}270 - 29{,}816}{0{,}0182 - 0{,}00946} = 849{,}946(\text{MPa})$$

1.3 Perhitungan Pengujian Tarik Variasi 8phr Metal

8phr metal	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	397,937	363,671	6,54	0,6	10,25
2	349,314	349,314	2,59	0,85	10,2
3	370,313	185,365	1,56	0,8	10,2
4	353,564	352,377	3,34	0,85	10,1
5	353,605	176,987	2,34	0,9	10,2
mean	364,9466	285,5428	3,274	0,8	10,19
median	353,605	349,314	2,59	0,85	10,2
set.dev	20,12298684	95,46929506	1,933204593	0,117260394	0,054772256

8phr metal	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	364,9466	285,5428	3,274	0,8	10,19

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,8 x 10,19

= 8,152 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

=285,5428(kgf/cm2) x 0,0981

= 28,011 (MPa)

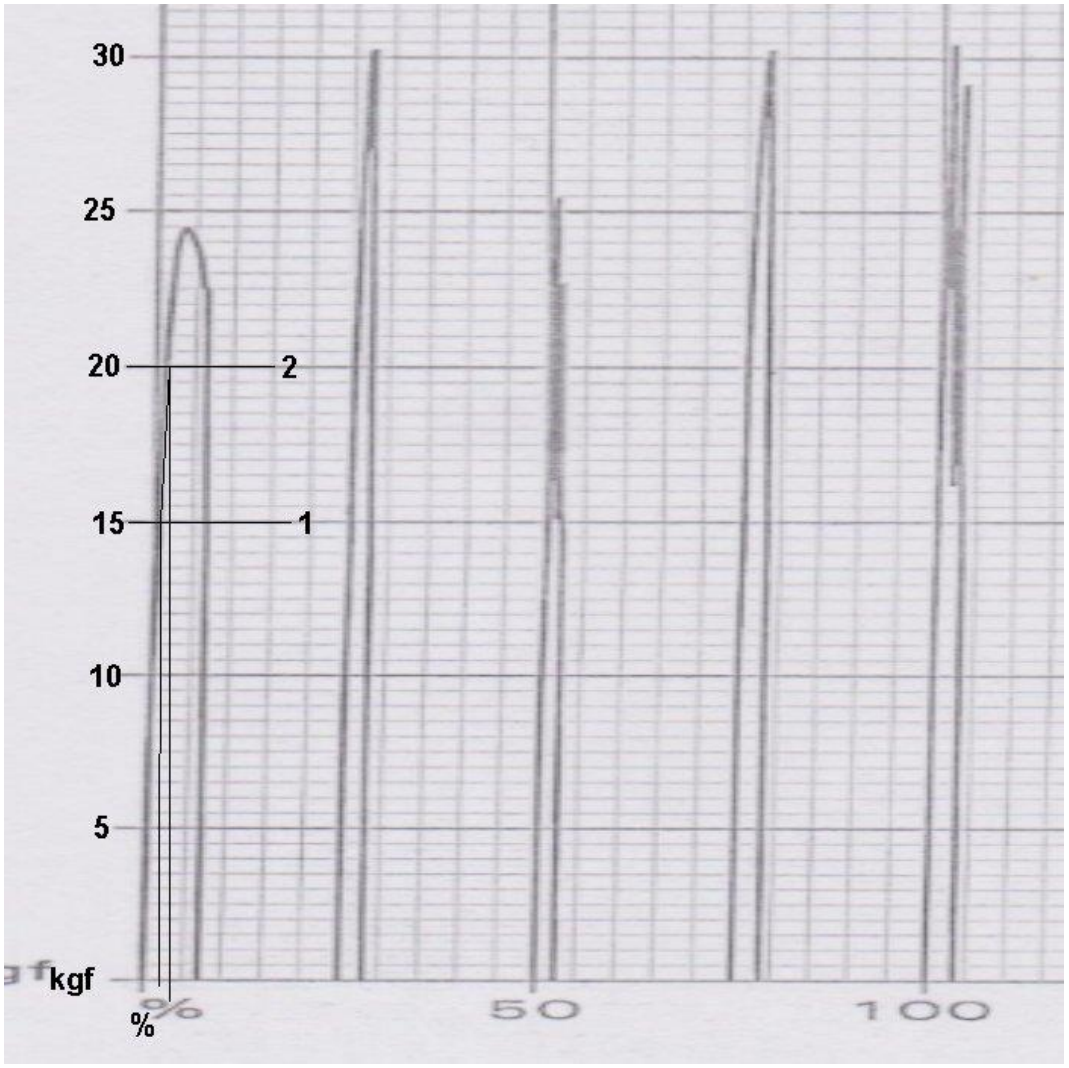
Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 3,274/100

= 0,0327



Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{31{,}867 - 25{,}862}{0{,}0156 - 0{,}00595} = 622{,}269 \text{ (MPa)}$$

1.4 Perhitungan Pengujian Tarik Variasi 10phr

10phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	395,889	198,167	1,8	0,75	10,2
2	471,636	413,944	6,34	0,7	10,1
3	416,55	411,79	4,1	0,7	10,2
4	407,121	355,453	5,23	0,7	10,15
5	367,453	183,948	1,46	0,75	10,2
mean	411,7298	312,6604	3,786	0,72	10,17
median	407,121	355,453	4,1	0,7	10,2
set.dev	38,22497262	113,5692216	2,124918822	0,027386128	0,04472136

10phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	411,7298	312,6604	3,786	0,72	10,17

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,72 x 10,17

= 7,322 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 312,660 (kgf/cm2) x 0,0981

= 30,671 (MPa)

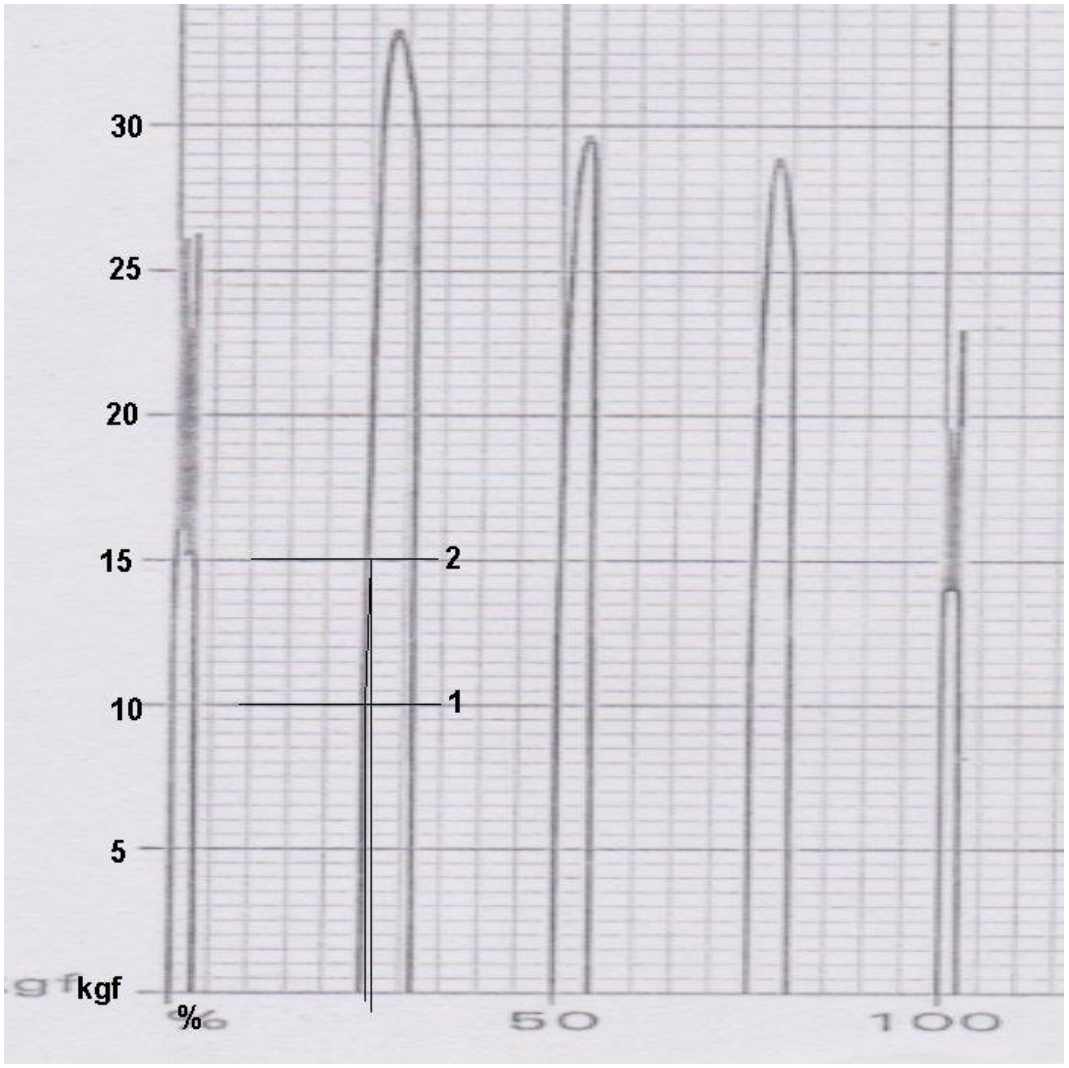
Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 3,786/100

= 0,0378



Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{16{,}716 - 10{,}946}{0{,}0162 - 0{,}0081} = 712{,}145 \text{ (MPa)}$$

1.5 Perhitungan Pengujian Tarik Variasi 10phr Metal

10phr metal	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	359,899	358,9	2,93	1	10,2
2	438,173	391,305	4,5	0,75	10,25
3	360,797	300,222	6,4	0,75	10,25
4	344,548	172,439	2,46	1	10,25
5	424,467	396,767	6,29	0,85	10,25
mean	385,5768	323,9266	4,516	0,87	10,24
median	360,797	358,9	4,5	0,85	10,25
set.dev	42,53104231	92,97729882	1,832983906	0,125499004	0,02236068

10phr metal	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	385,5768	323,9266	4,516	0,87	10,24

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,87 x 10,24

= 8,908 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 323,926 (kgf/cm2) x 0,0981

= 31,777 (MPa)

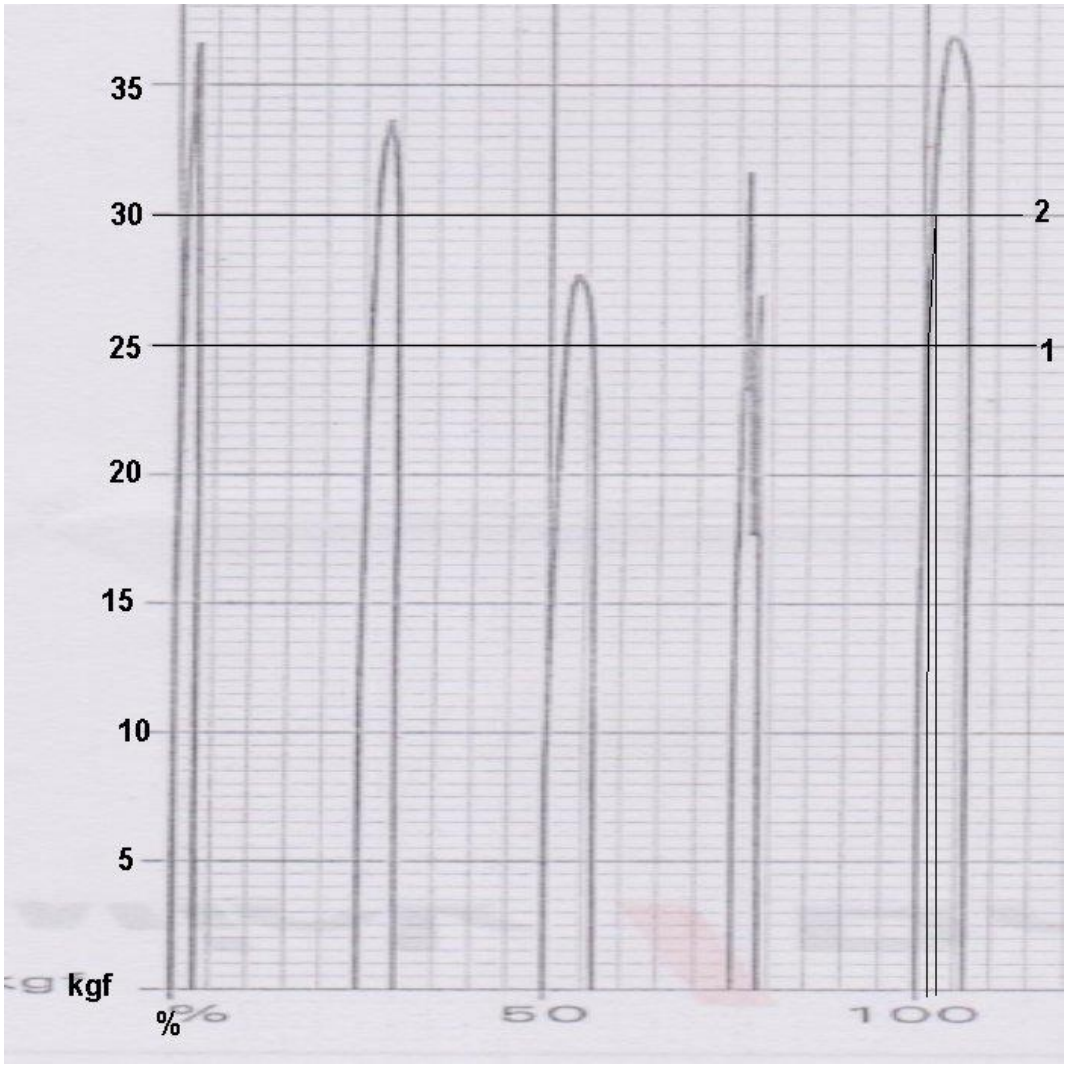
Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 4,516/100

= 0,0451



Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{33{,}762 - 28{,}135}{0{,}0288 - 0{,}01704} = 478{,}487(\text{MPa})$$

1.6 Perhitungan Pengujian Tarik Variasi 20phr

20phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	219,344	216,177	1,3	0,85	10,1
2	170,952	170,952	0,45	1	10,2
3	355,236	330,183	4,26	0,9	10,1
4	370,156	185,266	3,02	0,9	10,05
5	333,174	330,145	3,96	1	10,1
mean	289,7724	246,5446	2,598	0,93	10,11
median	333,174	216,177	3,02	0,9	10,1
set.dev	89,03531875	78,06392886	1,665388843	0,067082039	0,054772256

20phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	289,7724	246,5446	2,598	0,93	10,11

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,93 x 10,11

= 9,402 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 246,544 (kgf/cm2) x 0,0981

= 24,186(MPa)

Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 2,598/100

= 0,0259

Modulus Elastisitas

$$E = \frac{\Delta\sigma}{\Delta\varepsilon}$$

$$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$$

$$= \frac{24{,}576 - 20{,}603}{0{,}02902 - 0{,}02284} = 642{,}983 \text{ (MPa)}$$

1.7 Perhitungan Pengujian Tarik Variasi 30phr

30phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
1	267,786	263,057	3,56	1,15	10
2	346,57	342,127	2,68	0,9	10,2
3	331,99	166,203	1,76	0,8	10,2
4	350,735	348,236	1,94	0,8	10,2
5	278,937	274,997	1,53	0,85	10,15
mean	315,2036	278,924	2,294	0,9	10,15
median	331,99	274,997	1,94	0,85	10,2
set.dev	39,02502314	73,7766552	0,828540886	0,145773797	0,08660254

30phr	max (kgf/cm2)	Break (kgf/cm2)	Ext @ Break (&)	thickness (mm)	width (mm)
mean	315,2036	278,924	2,294	0,9	10,15

Luar Area (A) (mm^2)

A = Lebar x Tebal

= 0,9 x 10,15

= 9,135 mm^2

Tegangan (σ) (MPa)

σ = F/A

σ = Break (kgf/cm2) x 0,0981

= 278,924 (kgf/cm2) x 0,0981

= 27,362(MPa)

Regangan (ε)

$\varepsilon = \frac{\Delta L}{L0}$

ε = Ext @ Break (%)

= 2,294/100

= 0,0229

Modulus Elastisitas

$E = \frac{\Delta\sigma}{\Delta\varepsilon}$

$E = \frac{\sigma 2 - \sigma 1}{\varepsilon 2 - \varepsilon 1}$

$= \frac{26{,}269 - 21{,}392}{0{,}02796 - 0{,}0197} =$ 590,500 (MPa)

2. Perhitungan Pengujian Impak

2.1 Perhitungan Pengujian Impak 0phr

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	3,95	10,75	0,12576	31,69	C
2	4	10,85	0,1175	28,97	C
3	3,95	10,6	0,12025	31,16	C
4	3,95	10,9	0,1093	26,91	C
5	4	10,85	0,12025	29,37	C
st.dev	0,027386	0,119373	0,006009	1,902998	
rata-rata	3,97	10,79	0,118612	29,62	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
0phr	3,97	10,79	0,118612	29,62	0,428363	2,76896

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,79/10) x (3,97/10)

= 0,428 cm^2

Impact Strength (KJ/m2)

σ = Impact energy/ A

σ = 0,118 /0,428

= 0,2768 (J/cm^2)

= 2,768(KJ/m^2)

2.2 Perhitungan Pengujian Impak 8phr

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	3	10,8	0,123	41,19	C
2	4	10,8	0,13407	33,52	C
3	4	10,9	0,12852	32,13	C
4	4	10,8	0,13685	34,05	C
5	4,05	10,95	0,123	30,61	C
st.dev	0,453321	0,070711	0,006315	4,076395	
rata-rata	3,81	10,85	0,129088	34,3	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
8phr	3,81	10,85	0,129088	34,3	0,413385	3,122706

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,85/10) x (3,81/10)

= 0,413 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,129 /0,413

= 0,31227 (J/cm^2)

= 3,1227(KJ/m^2)

2.3 Perhitungan Pengujian Impak 8phr metal

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	4,15	10,75	0,14243	34,96	C
2	4,1	10,7	0,14243	35,39	C
3	4,2	10,75	0,13963	33,25	C
4	4,2	10,9	0,15647	36,57	C
5	4,15	10,75	0,14803	36,17	C
st.dev	0,041833	0,075829	0,006701	1,293337	
rata-rata	4,16	10,77	0,145798	35,268	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
8phr M	4,16	10,77	0,145798	35,268	0,448032	3,254187

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,77/10) x (4,16/10)

= 0,448 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,145 /0,448

= 0,3254 (J/cm^2)

= 3,254(KJ/m^2)

2.4 Perhitungan Pengujian Impak 10phr

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	4,05	11,1	0,23477	57,97	C
2	4,05	11,2	0,25573	62,58	C
3	4	10,9	0,22883	58,26	C
4	4	10,9	0,22587	56,47	C
5	4	10,85	0,24073	60,46	C
st.dev	0,027386	0,151658	0,011834	2,389973	
rata-rata	4,02	10,99	0,237186	59,148	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
10phr	4,02	10,99	0,237186	59,148	0,441798	5,368653

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,99/10) x (4,02/10)

= 0,441 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,237 /0,441

= 0,5368 (J/cm^2)

= 5,368(KJ/m^2)

2.5 Perhitungan Pengujian Impak 10phr metal

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	4	10,8	0,13129	32,52	C
2	4	10,8	0,123	31,03	C
3	3,95	10,8	0,12576	31,84	C
4	3,95	10,85	0,13407	33,78	C
5	3,95	10,85	0,12576	31,84	C
st.dev	0,027386	0,027386	0,004547	1,027969	
rata-rata	3,97	10,82	0,127976	32,202	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
10phr M	3,97	10,82	0,127976	32,202	0,429554	2,979276

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,82/10) x (3,97/10)

= 0,429 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,127 /0,429

= 0,2979 (J/cm^2)

= 2,979(KJ/m^2)

2.6 Perhitungan Pengujian Impak 20phr

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	3,95	10,9	0,12576	31,98	C
2	3,95	10,85	0,123	31,43	C
3	3,95	11	0,12576	31,55	C
4	4	10,9	0,13129	32,82	C
5	3,95	11	0,12025	30,44	C
st.dev	0,022361	0,067082	0,004094	0,866043	
rata-rata	3,96	10,93	0,125212	31,644	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
20phr	3,96	10,93	0,125212	31,644	0,432828	2,892881

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,93/10) x (3,96/10)

= 0,432 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,125 /0,432

= 0,2892 (J/cm^2)

= 2,892(KJ/m^2)

2.7 Perhitungan Pengujian Impak 30phr

No	Width (mm)	Depth below the notch (mm)	W(J)	Ak(J/m)	Type of failure
1	4,1	10,9	0,13407	33,67	C
2	4,1	11,2	0,14803	36,18	C
3	4,05	10,9	0,13407	32,7	C
4	4,1	10,9	0,14243	35,69	C
5	4	11,05	0,14522	36,34	C
st.dev	0,044721	0,134164	0,006424	1,634604	
rata-rata	4,07	10,99	0,140764	34,916	

No	Width (mm)	Depth below the notch (mm)	Impact Energy (J)	Ak(N)	A (cm2)	impact strength (KJ/m2)
30phr	4,07	10,99	0,140764	34,916	0,447293	3,14702

Luar Area (A) (mm^2)

A = Lebar x Tebal

= (10,99/10) x (4,07/10)

= 0,447 cm^2

Impact Strength (KJ/m2)

σ = Impact energy / A

σ = 0,140 /0,447

= 0,3147 (J/cm^2)

= 3,147(KJ/m^2)

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Hounsfield
Test Report
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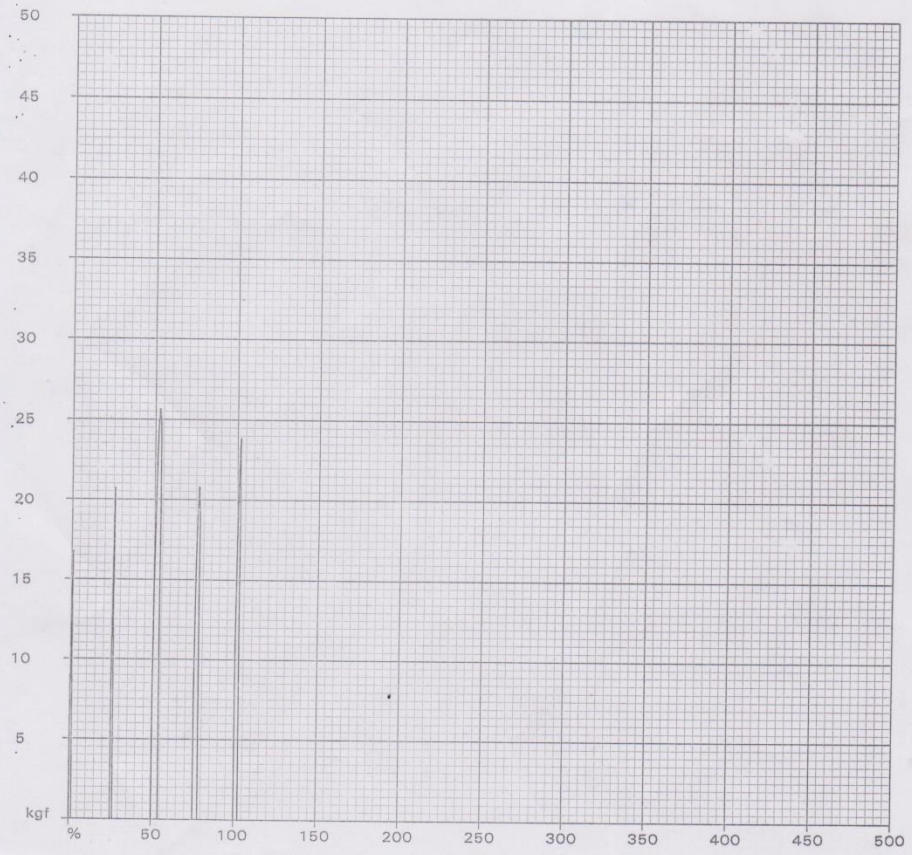
Product Code ..1K-65R IC 0PHR
Date .....: 17.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	293.251	146.625	0.470	0.000	0.000	0.000	0.000	0.000	0.600	10.200
2	342.709	342.709	1.300	0.000	0.000	0.000	0.000	0.000	0.600	10.100
3	426.844	411.700	3.810	0.000	0.000	0.000	0.000	0.000	0.600	10.100
4	341.016	338.794	2.590	0.000	0.000	0.000	0.000	0.000	0.600	10.200
5	395.995	393.751	2.460	0.000	0.000	0.000	0.000	0.000	0.600	10.100
Mean	359.963	326.716	2.126	0.000	0.000	0.000	0.000	0.000	0.600	10.140
Median	342.709	342.709	2.460	0.000	0.000	0.000	0.000	0.000	0.600	10.100
Std.Dev.	52.150	105.534	1.283	0.000	0.000	0.000	0.000	0.000	0.000	0.054



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Hounsfield
Test Report
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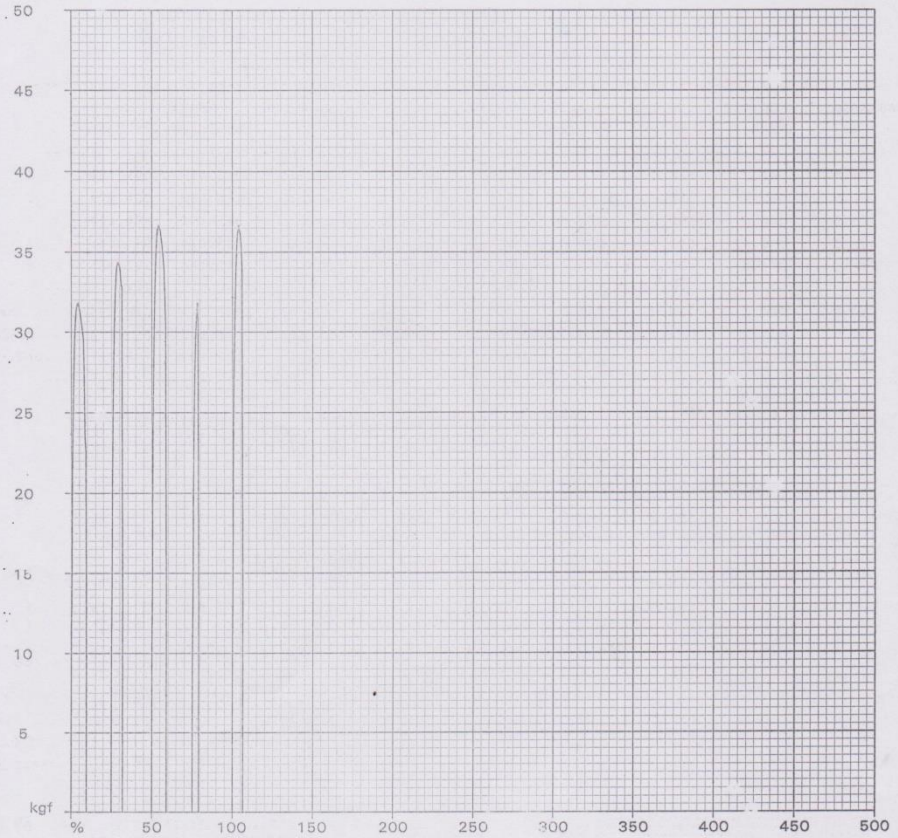
Product Code ..1K-65R IC 8PHR FA
Date .....: 20.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	483.260	340.549	9.020	0.000	0.000	0.000	0.000	0.000	0.650	10.150
2	479.420	458.102	6.520	0.000	0.000	0.000	0.000	0.000	0.700	10.250
3	449.874	371.146	8.880	0.000	0.000	0.000	0.000	0.000	0.800	10.200
4	450.482	449.521	3.630	0.000	0.000	0.000	0.000	0.000	0.700	10.100
5	484.168	448.271	6.420	0.000	0.000	0.000	0.000	0.000	0.750	10.100
Mean	469.441	413.518	6.894	0.000	0.000	0.000	0.000	0.000	0.720	10.160
Median	479.420	448.271	6.520	0.000	0.000	0.000	0.000	0.000	0.700	10.150
Std.Dev.	17.675	53.878	2.206	0.000	0.000	0.000	0.000	0.000	0.057	0.065



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Hounsfield
Test Report
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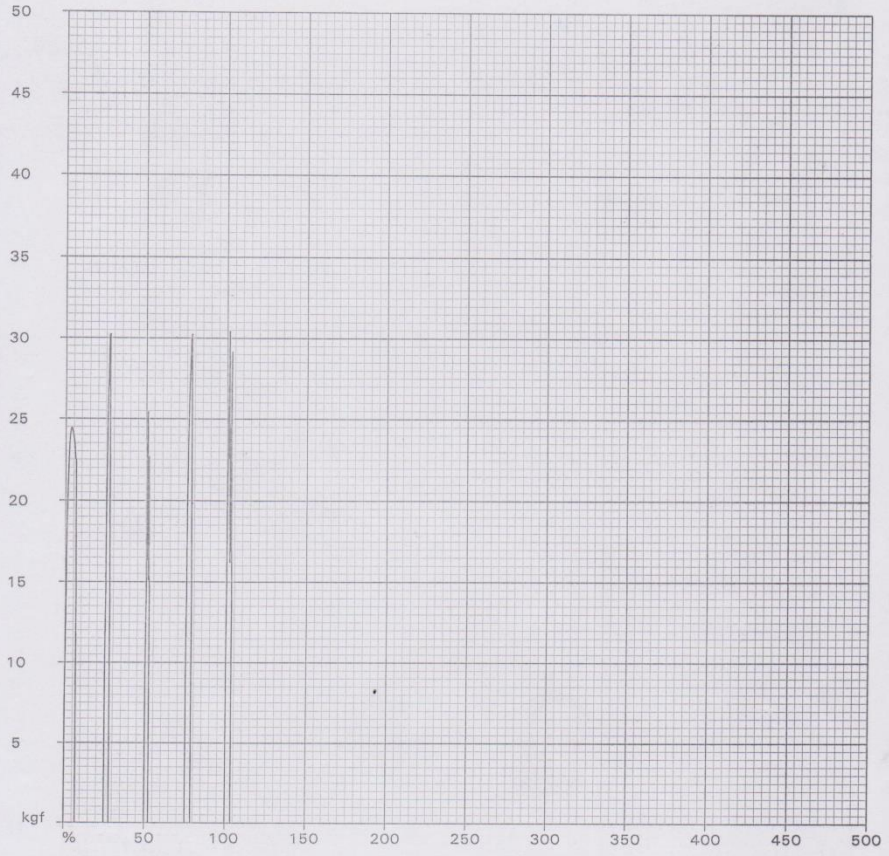
Product Code ..1K-65R IC 8PHR FA M
Date .....: 23.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	397.937	363.671	6.540	0.000	0.000	0.000	0.000	0.000	0.600	10.250
2	349.314	349.314	2.590	0.000	0.000	0.000	0.000	0.000	0.850	10.200
3	370.313	185.365	1.560	0.000	0.000	0.000	0.000	0.000	0.800	10.200
4	353.564	352.377	3.340	0.000	0.000	0.000	0.000	0.000	0.850	10.100
5	353.605	176.987	2.340	0.000	0.000	0.000	0.000	0.000	0.900	10.200
Mean	364.947	285.543	3.274	0.000	0.000	0.000	0.000	0.000	0.800	10.190
Median	353.605	349.314	2.590	0.000	0.000	0.000	0.000	0.000	0.850	10.200
Std.Dev.	20.123	95.469	1.933	0.000	0.000	0.000	0.000	0.000	0.117	0.054



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Hounsfield
Test Report
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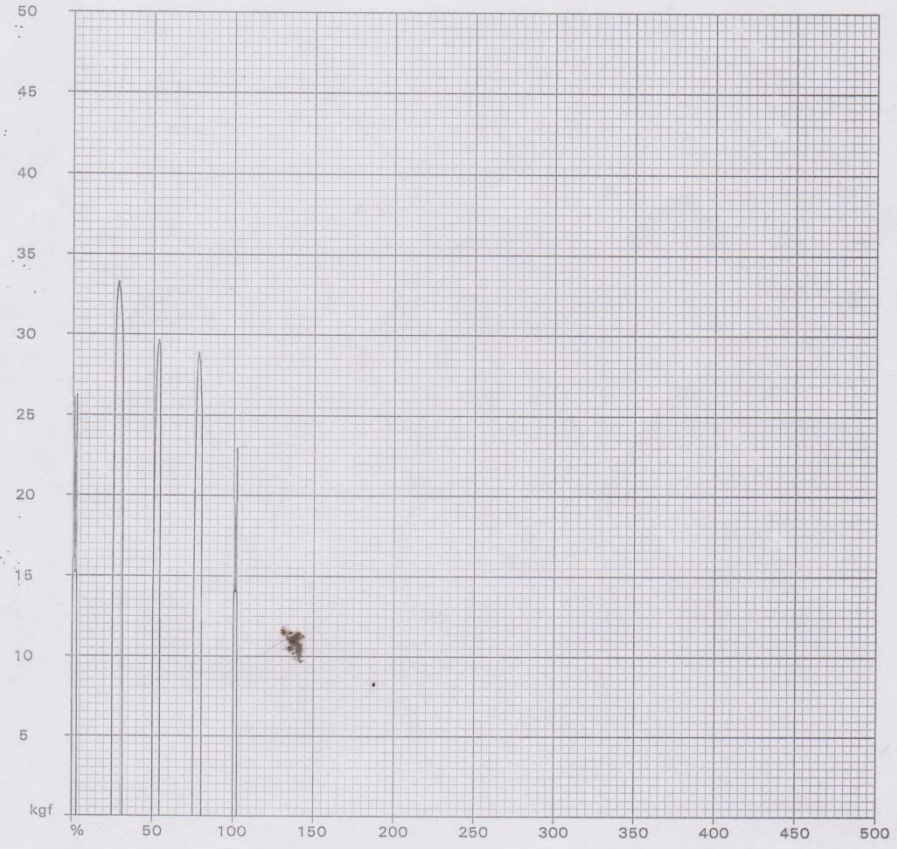
Product Code ..1K-65R IC 10PHR FA
Date .....: 17.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	395.889	198.167	1.800	0.000	0.000	0.000	0.000	0.000	0.750	10.200
2	471.636	413.944	6.340	0.000	0.000	0.000	0.000	0.000	0.700	10.100
3	416.550	411.790	4.100	0.000	0.000	0.000	0.000	0.000	0.700	10.200
4	407.121	355.453	5.230	0.000	0.000	0.000	0.000	0.000	0.700	10.150
5	367.453	183.948	1.460	0.000	0.000	0.000	0.000	0.000	0.750	10.200
Mean	411.730	312.660	3.786	0.000	0.000	0.000	0.000	0.000	0.720	10.170
Median	407.121	355.453	4.100	0.000	0.000	0.000	0.000	0.000	0.700	10.200
Std.Dev.	38.225	113.569	2.124	0.000	0.000	0.000	0.000	0.000	0.027	0.044



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Hounsfield
Test Report
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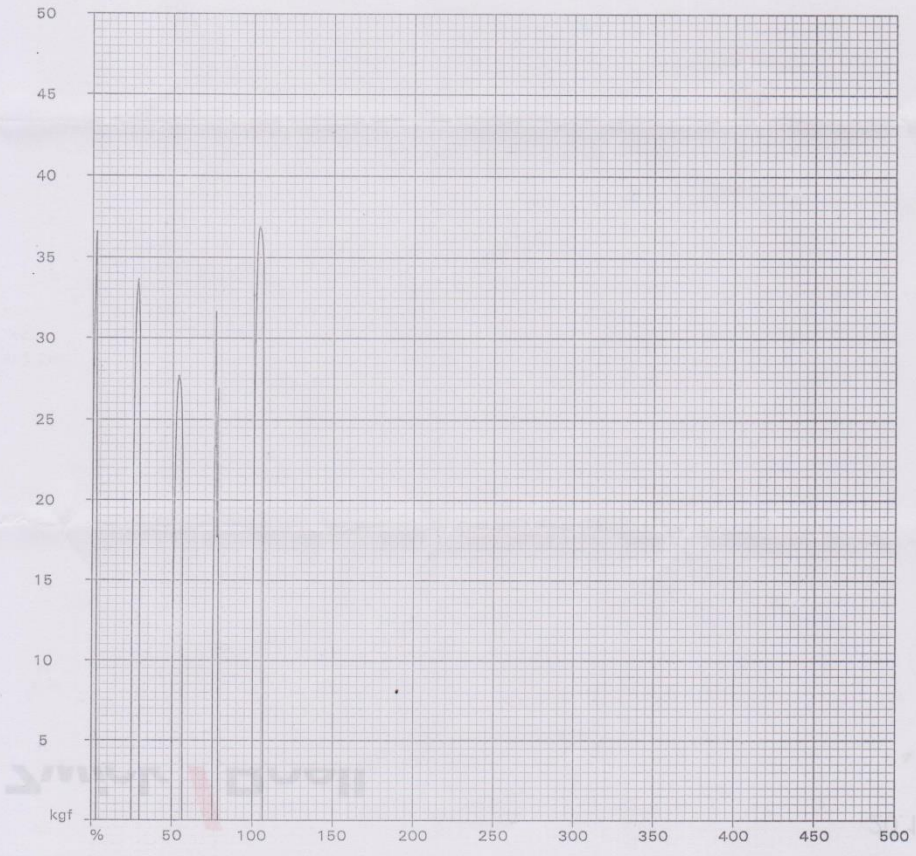
Product Code ..1K-65R IC 10 PHR FA M
Date .....: 21.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	359.899	358.900	2.930	0.000	0.000	0.000	0.000	0.000	1.000	10.200
2	438.173	391.305	4.500	0.000	0.000	0.000	0.000	0.000	0.750	10.250
3	360.797	300.222	6.400	0.000	0.000	0.000	0.000	0.000	0.750	10.250
4	344.548	172.439	2.460	0.000	0.000	0.000	0.000	0.000	1.000	10.250
5	424.467	396.767	6.290	0.000	0.000	0.000	0.000	0.000	0.850	10.250
Mean	385.577	323.927	4.516	0.000	0.000	0.000	0.000	0.000	0.870	10.240
Median	360.797	358.900	4.500	0.000	0.000	0.000	0.000	0.000	0.850	10.250
Std.Dev.	42.531	92.977	1.832	0.000	0.000	0.000	0.000	0.000	0.125	0.022



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Hounsfield
Test Report
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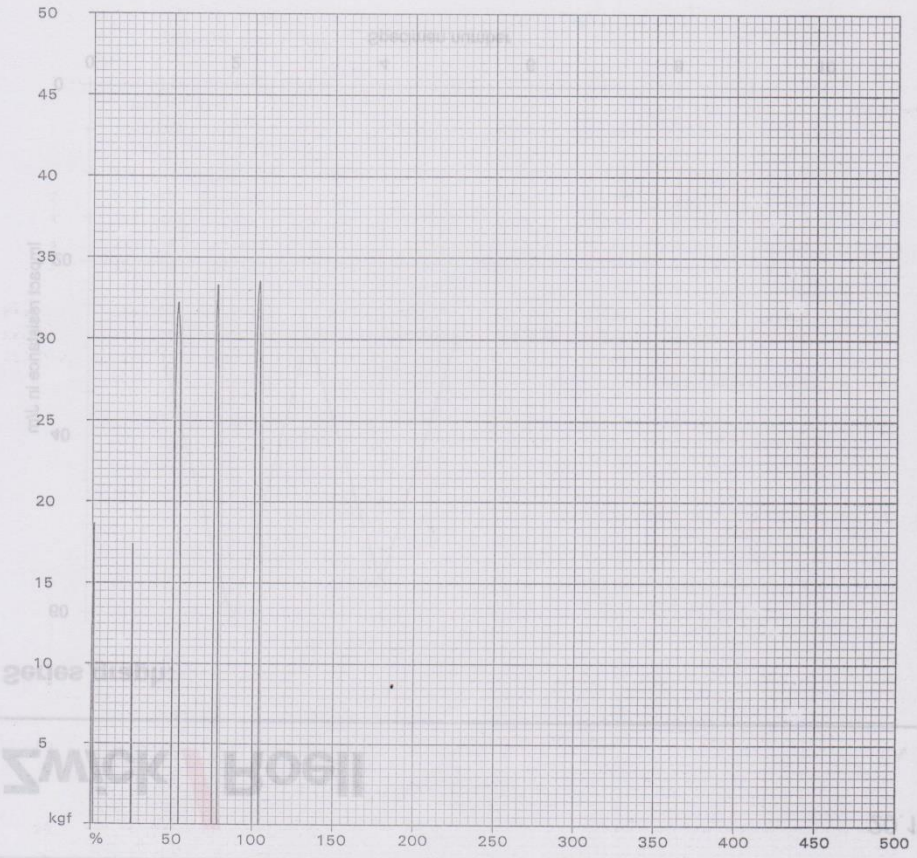
Product Code ..1K-65R IC 20PHR FA
Date .....: 22.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	219.344	216.177	1.300	0.000	0.000	0.000	0.000	0.000	0.850	10.100
2	170.952	170.952	0.450	0.000	0.000	0.000	0.000	0.000	1.000	10.200
3	355.236	330.183	4.260	0.000	0.000	0.000	0.000	0.000	0.900	10.100
4	370.156	185.266	3.020	0.000	0.000	0.000	0.000	0.000	0.900	10.050
5	333.174	330.145	3.960	0.000	0.000	0.000	0.000	0.000	1.000	10.100
Mean	289.773	246.545	2.598	0.000	0.000	0.000	0.000	0.000	0.930	10.110
Median	333.174	216.177	3.020	0.000	0.000	0.000	0.000	0.000	0.900	10.100
Std.Dev.	89.035	78.063	1.665	0.000	0.000	0.000	0.000	0.000	0.067	0.054



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Hounsfield
Test Report
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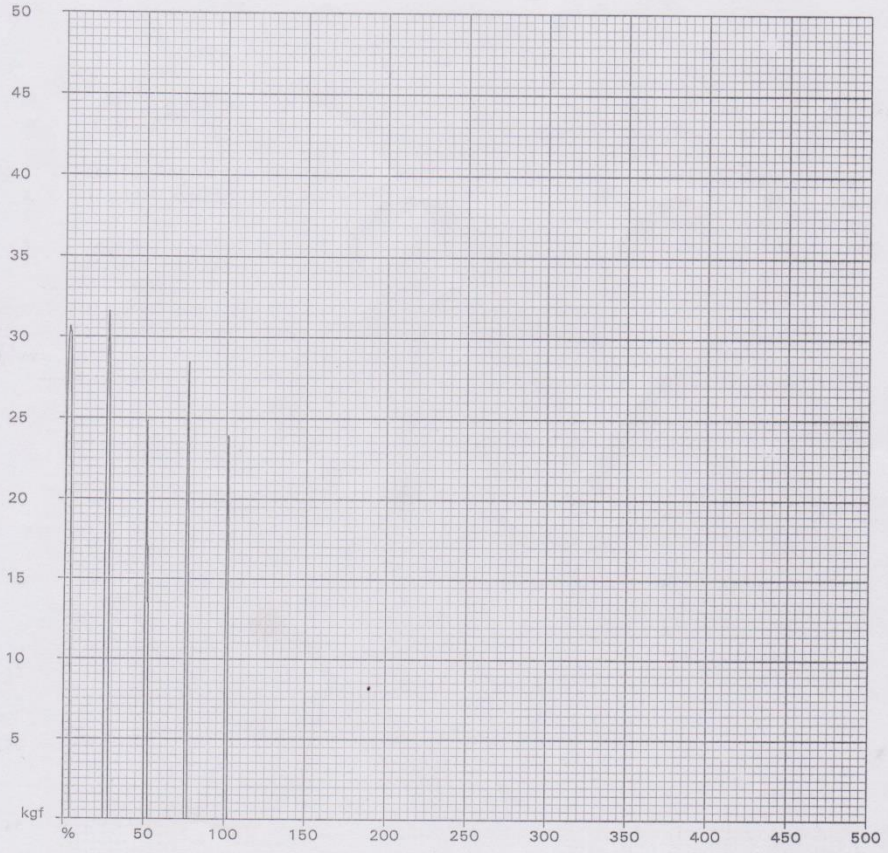
Product Code ..1K-65R IC 30PHR FA
Date .....: 17.11.2017
Batch Number ..:K65R FORMULA IC
Operator .....:NURJEN/KHALIL
Test Speed.....: 10.000{mm/min}
Gauge Length...: 40.000mm

	Max kgf/cm2	Break kgf/cm2	Ext @ Brk %	100.000 kgf/cm2	200.000 kgf/cm2	300.000 kgf/cm2	400.000 kgf/cm2	500.000 kgf/cm2	Thickness mm	Width mm
1	267.786	263.057	3.560	0.000	0.000	0.000	0.000	0.000	1.150	10.000
2	346.570	342.127	2.680	0.000	0.000	0.000	0.000	0.000	0.900	10.200
3	331.990	166.203	1.760	0.000	0.000	0.000	0.000	0.000	0.800	10.200
4	350.735	348.236	1.940	0.000	0.000	0.000	0.000	0.000	0.800	10.200
5	278.937	274.997	1.530	0.000	0.000	0.000	0.000	0.000	0.850	10.150
Mean	315.204	278.924	2.294	0.000	0.000	0.000	0.000	0.000	0.900	10.150
Median	331.990	274.997	1.940	0.000	0.000	0.000	0.000	0.000	0.850	10.200
Std.Dev.	39.025	73.776	0.828	0.000	0.000	0.000	0.000	0.000	0.145	0.086



Zwick / Roell

22.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 0 PHR FLY ASH
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Kerja Praktek
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

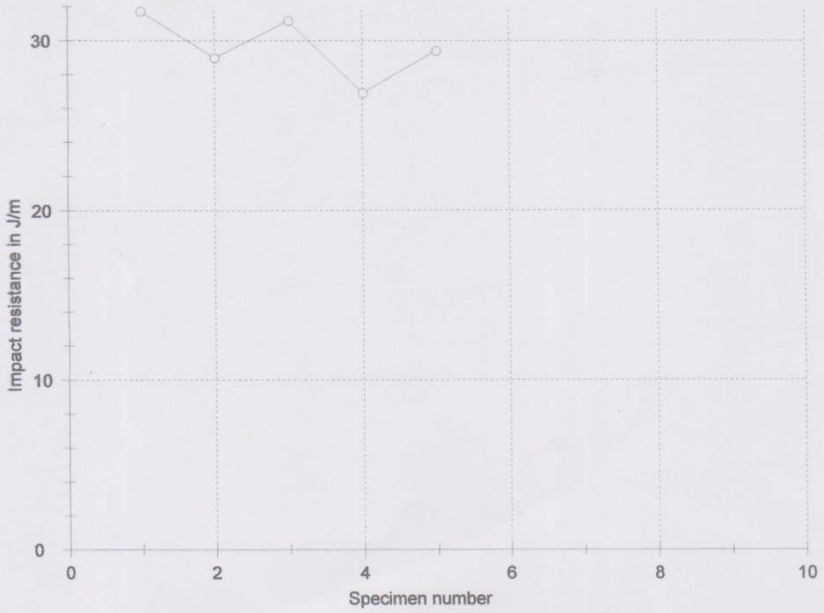
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
1	3.95	10.75	0.12576	31.69	C
2	4	10.85	0.11750	28.97	C
4	3.95	10.6	0.12025	31.16	C
6	3.95	10.9	0.10930	26.91	C
9	4	10.85	0.12025	29.37	C

Charpy FORMULA IC 0 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

Series graph:



Charpy FORMULA IC 0 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
x	3.97	10.79	0.11861	29.62
min	3.95	10.6	0.10930	26.91
max	4	10.9	0.12576	31.69
s	0.02739	0.1194	0.00601	1.90
v	0.69	1.11	5.07	6.43

Charpy FORMULA IC 0 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 8 PHR FLY ASH
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
1	3	10.8	0.12300	41.19	C
7	4	10.8	0.13407	33.52	C
9	4	10.9	0.12852	32.13	C
10	4	10.8	0.13685	34.05	C
14	4.05	10.95	0.12300	30.61	C

Charpy FORMULA IC 8 PHR FLY ASH K-65R (OJT).zs2

Zwick / Roell

22.11.2017

Series graph:

Charpy FORMULA IC 8 PHR FLY ASH K-65R (OJT).zs2

Zwick / Roell

22.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
$\bar{x}$	3.81	10.85	0.12909	34.30
min	3	10.8	0.12300	30.61
max	4.05	10.95	0.13685	41.19
s	0.4533	0.07071	0.00631	4.08
v	11.90	0.65	4.89	11.88

Charpy FORMULA IC 8 PHR FLY ASH K-65R (OJT).zs2

Zwick / Roell

23.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 8 PHR FLY ASH METAL
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

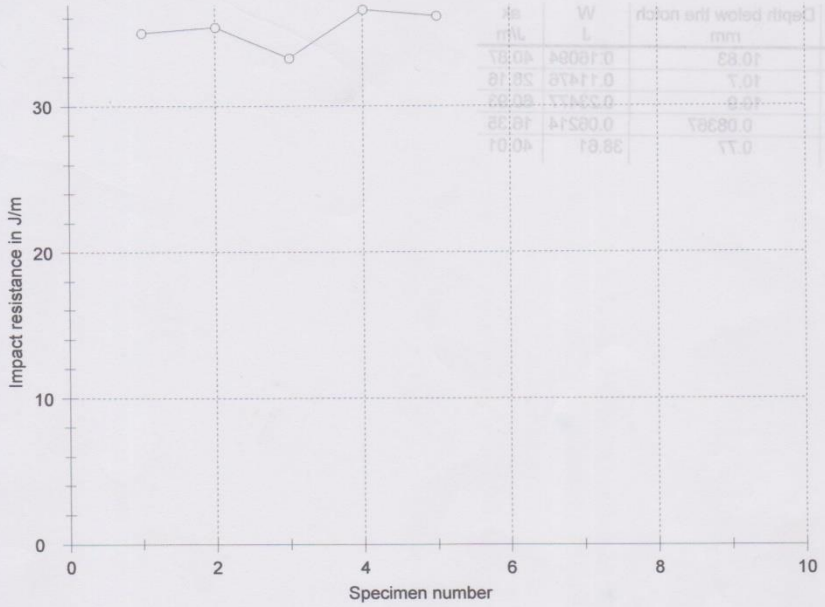
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
2	4.15	10.75	0.14243	34.96	C
3	4.1	10.7	0.14243	35.39	C
4	4.2	10.75	0.13963	33.25	C
6	4.2	10.9	0.15647	36.57	C
8	4.15	10.75	0.14803	36.17	C

Charpy FORMULA IC 8 PHR FLY ASH K-65R METAL(OJT).zs2

Zwick / Roell

23.11.2017

Series graph:



Charpy FORMULA IC 8 PHR FLY ASH K-65R METAL(OJT).zs2

Zwick / Roell

23.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
$\bar{x}$	4.16	10.77	0.14580	35.27
min	4.1	10.7	0.13963	33.25
max	4.2	10.9	0.15647	36.57
s	0.04183	0.07583	0.00670	1.29
v	1.01	0.70	4.60	3.67

Charpy FORMULA IC 8 PHR FLY ASH K-65R METAL(OJT).zs2

Zwick / Roell

22.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 10 PHR FLY ASH
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

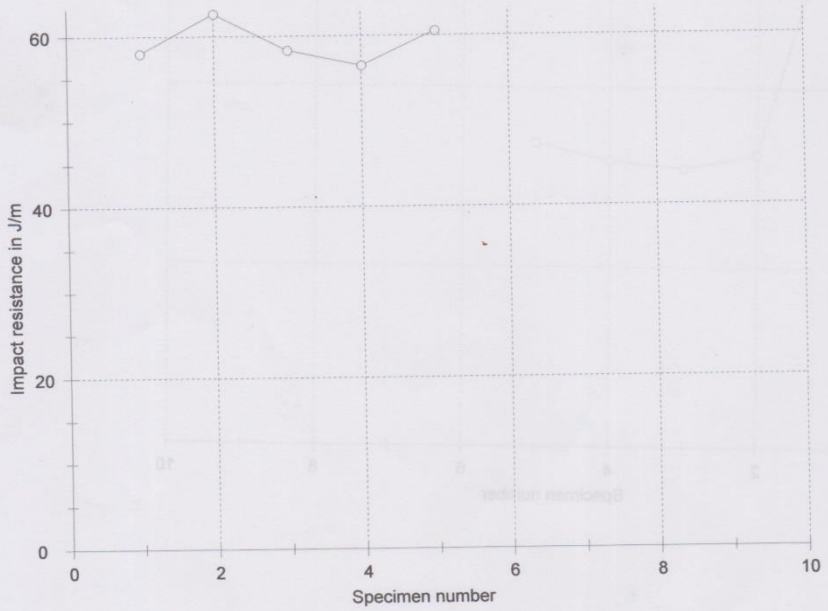
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
1	4.05	11.1	0.23477	57.97	C
2	4.05	11.2	0.25573	62.58	C
3	4	10.9	0.22883	58.26	C
5	4	10.9	0.22587	56.47	C
11	4	10.85	0.24073	60.46	C

Charpy FORMULA IC 10 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

Series graph:



Charpy FORMULA IC 10 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
x	4.02	10.99	0.23719	59.15
min	4	10.85	0.22587	56.47
max	4.05	11.2	0.25573	62.58
s	0.02739	0.1517	0.01183	2.39
v	0.68	1.38	4.99	4.04

Charpy FORMULA IC 10 PHR FLY ASH (OJT).zs2

Zwick / Roell

22.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 10 PHR FLY ASH METAL
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

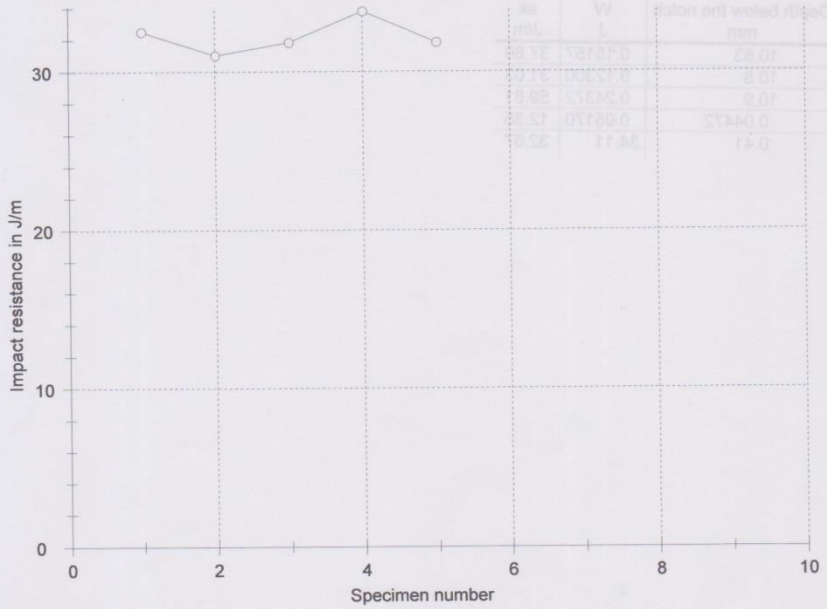
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
2	4	10.8	0.13129	32.52	C
3	4	10.8	0.12300	31.03	C
4	3.95	10.8	0.12576	31.84	C
5	3.95	10.85	0.13407	33.78	C
7	3.95	10.85	0.12576	31.84	C

Charpy FORMULA IC 10 PHR FLY ASH K-65R METAL (OJT).zs2

Zwick / Roell

22.11.2017

Series graph:



Charpy FORMULA IC 10 PHR FLY ASH K-65R METAL (OJT).zs2

Zwick / Roell

22.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
$\bar{x}$	3.97	10.82	0.12797	32.20
min	3.95	10.8	0.12300	31.03
max	4	10.85	0.13407	33.78
s	0.02739	0.02739	0.00455	1.03
v	0.69	0.25	3.55	3.19

Charpy FORMULA IC 10 PHR FLY ASH K-65R METAL (OJT).zs2

Zwick / Roell

20.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 20 PHR FLY ASH
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

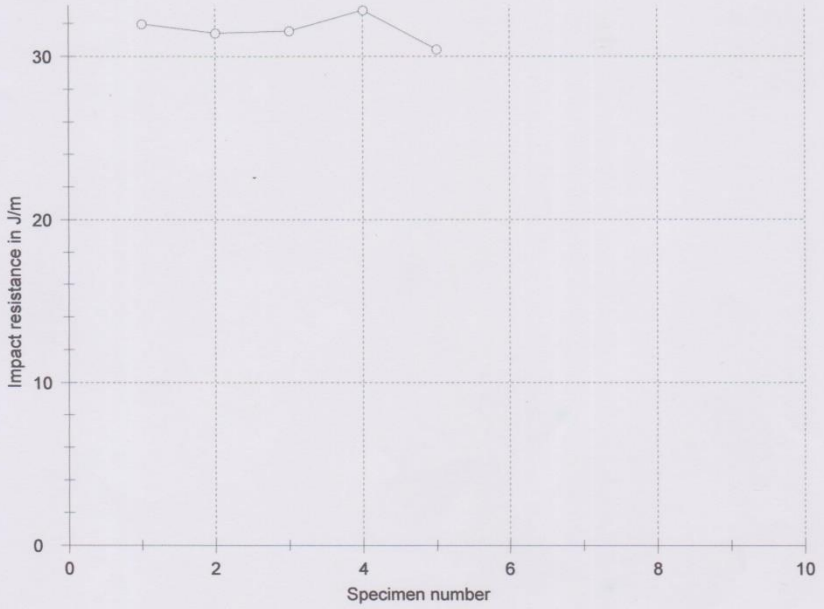
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
1	3.95	10.9	0.12576	31.98	C
2	3.95	10.85	0.12300	31.43	C
3	3.95	11	0.12576	31.55	C
4	4	10.9	0.13129	32.82	C
5	3.95	11	0.12025	30.44	C

Charpy FORMULA IC 20 PHR FLY ASH (OJT).zs2

Zwick / Roell

20.11.2017

Series graph:



Charpy FORMULA IC 20 PHR FLY ASH (OJT).zs2

Zwick / Roell

20.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
$\bar{x}$	3.96	10.93	0.12521	31.64
min	3.95	10.85	0.12025	30.44
max	4	11	0.13129	32.82
s	0.02236	0.06708	0.00410	0.87
v	0.56	0.61	3.27	2.74

Charpy FORMULA IC 20 PHR FLY ASH (OJT).zs2

Zwick / Roell

20.11.2017

CHARPY IMPACT TESTS Accdording to ASTMD 6110

Customer	:	OJT
Job no.	:	
Tester	:	KHALIL
Test standard	:	ASTM D256
Material	:	FORMULA INITIAL COLOR 30 PHR FLY ASH
Quality	:	
Type and origin	:	
Product ID	:	K-65R
Specimen manufacture	:	
Specimen removal	:	
Pre-treatment	:	
Direction of impact	:	
Notes...	:	Penelitian Skripsi
Machine data	:	
Nominal work capacity	:	5.4 J
Impact velocity	:	3.458 m/s

Results:

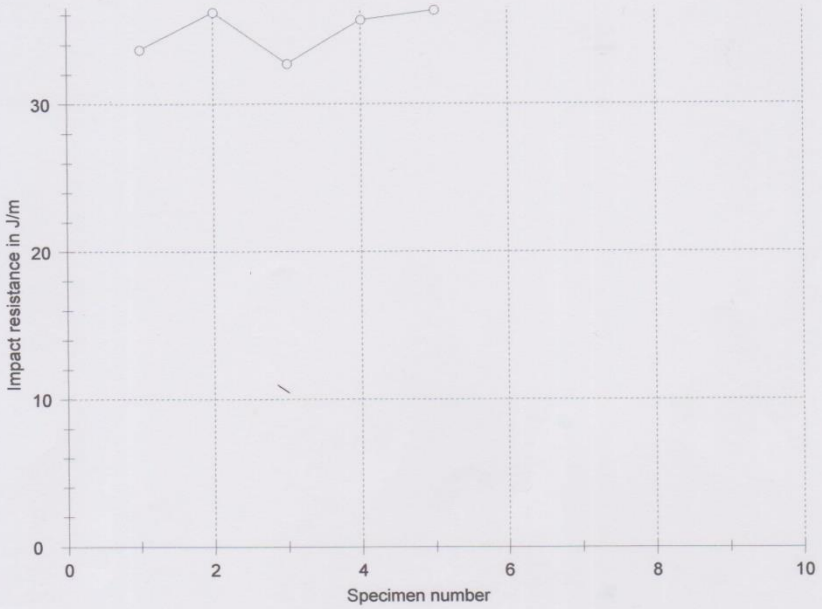
Nr	Width mm	Depth below the notch mm	W J	ak J/m	Type of failure
1	4.1	10.9	0.13407	33.67	C
2	4.1	11.2	0.14803	36.18	C
3	4.05	10.9	0.13407	32.70	C
4	4.1	10.9	0.14243	35.69	C
5	4	11.05	0.14522	36.34	C

Charpy FORMULA IC 30 PHR FLY ASH (OJT).zs2

Zwick / Roell

20.11.2017

Series graph:



Charpy FORMULA IC 30 PHR FLY ASH (OJT).zs2

Zwick / Roell

20.11.2017

Statistics:

Series n = 5	Width mm	Depth below the notch mm	W J	ak J/m
$\bar{x}$	4.07	10.99	0.14076	34.92
min	4	10.9	0.13407	32.70
max	4.1	11.2	0.14803	36.34
s	0.04472	0.1342	0.00643	1.64
v	1.10	1.22	4.56	4.69

Charpy FORMULA IC 30 PHR FLY ASH (OJT).zs2