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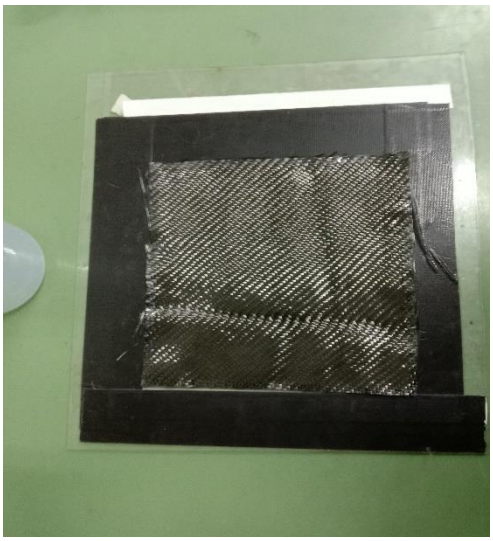
LAMPIRAN

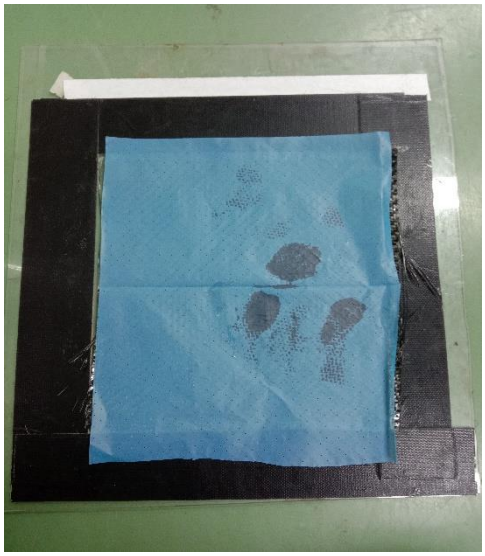
Proses Pembuatan CFRP dan CARALL

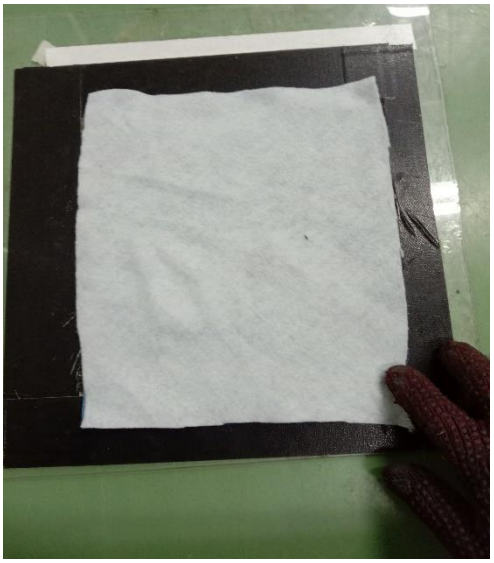
Persiapan Alat

Pengukuran dan Pencampuran Resin

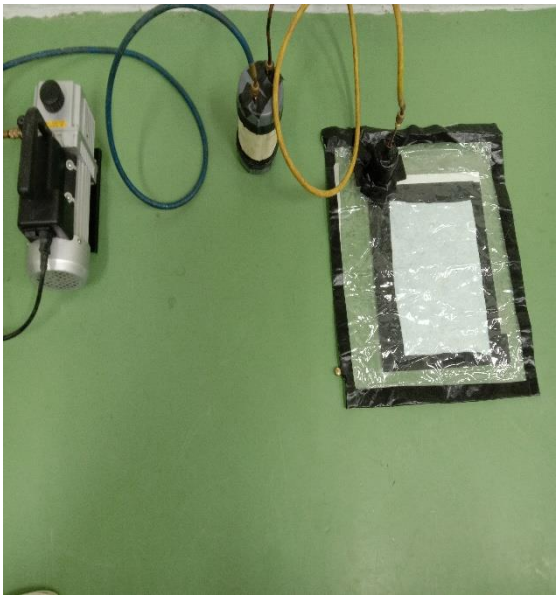


Pengolesan resin dan peletakan serat karbon ke media pencetakan

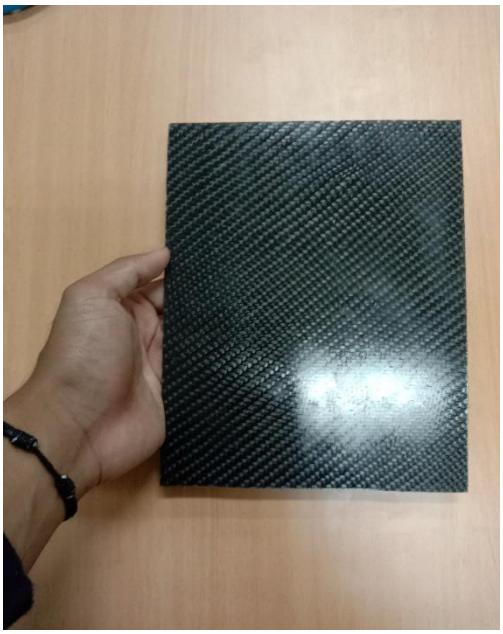




Peletakan *Perforated Release* dan *Film Carbon Breather*

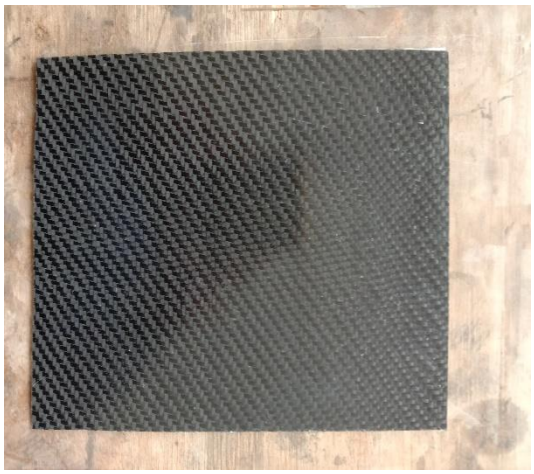


Proses *Vacuum bagging*



Hasil pembuatan CFRP

Proses Pembuatan CARALL



Mempersiapkan Alat dan bahan

Meletakkan spesimen yang telah diberi lem pada media pencetakan

Proses penekanan spesimen

Tabel Pengujian dan Data Pengujian
Pengujian Tarik

Nama Spesimen	*Ao (mm2)*	*Δl (mm)*	*F (MPa)*	*F max (MPa)*	*F elastis (MPa)*	*Kekuatan tarik max (MPa)*	*Kekuatan tarik elastis (MPa)*	*Regangan (%)*	*Modulus elastitas (MPa)*
CFRP(1)	6,875	3,2	32	3200	2350	465,455	341,818	5,614%	6088,636
CFRP(2)	3,75	2,984	0,6	600	10	160,000	2,667	5,235%	50,938
CFRP(3)	5,625	2,43	2,5	2500	2300	444,444	408,889	4,263%	9591,221
Al 0,5 (1)	7,5	2,51	0,85	850	198	113,333	26,400	4,404%	599,522
Al 0,5 (2)	7,5	2,23	0,85	850	850	113,333	113,333	3,912%	2896,861
Al 0,5 (3)	7,5	1,748	0,55	550	495	73,333	66,000	3,067%	2152,174
CARALL 1 (1)	28,75	1,9	4,35	4350	4400	151,304	153,04	3,333%	4591,304
CARALL 1 (2)	28,75	1,96	4,7	4700	3400	163,478	118,26	3,439%	3439,219
CARALL 1 (3)	27,5	2,133	5,5	5500	3650	200,000	132,73	3,742%	3546,861
CARALL 3 (1)	42,5	4,323	8,55	8550	8850	201,176	208,24	7,584%	2745,642
CARALL 3 (2)	43,75	3,7	9,1	9100	8850	208,000	202,29	6,491%	3116,293
CARALL 3 (3)	44,375	3,22	9	9000	7550	202,817	170,14	5,649%	3011,810
CARALL 2 (1)	25	2,64	6,8	6800	3050	272,000	122,00	4,632%	2634,091
CARALL 2 (2)	25	3,553	6,5	6500	6500	260,000	260,00	6,233%	4171,123
CARALL 2 (3)	25	2,35	4,95	4950	3450	198,000	138,00	4,123%	3347,234
CARALL 4 (1)	40	2,895	8	8000	2900	150,649	150,649	5,100%	2953,909
CARALL 4 (2)	39,375	4,764	9,6	9600	3150	165,789	165,789	4,302%	3853,997
CARALL 4 (3)	40	2,422	7,75	7750	920	154,054	49,730	4,516%	1101,241

Pengujian Bending

Nama Spesimen	*P (N)*	*L (mm)*	*b (mm)*	*d (mm)*	*m (mm)*	*Kekuatan bending (Mpa)*	*Modulus elastisitas (Mpa)*
CFRP(1)	5,8	40	12,5	0,48	2	120,833	23148,15
CFRP(2)	6,5	40	12,5	0,5	2,55	124,800	26112,00
CFRP(3)	9,9	40	12,5	0,45	3,21	234,667	45089,71
Al 0,5 (1)	18	40	12,5	0,6	4,2	240,000	24888,89
Al 0,5 (2)	20,1	40	12,5	0,6	8,3	268,000	49185,19
Al 0,5 (3)	16,5	40	12,5	0,6	7,4	220,000	43851,85
CARALL 1 (1)	103,4	40	12,5	1,6	118,3	193,875	28177,69
CARALL 1 (2)	96,1	40	12,5	1,7	153,26	159,612	21882,26
CARALL 1 (3)	143,4	40	12,5	1,7	153,29	238,173	25106,36
CARALL 2 (1)	63,1	40	12,5	1,4	118,3	154,531	18928,00
CARALL 2 (2)	93,9	40	12,5	1,4	153,26	229,959	24521,60
CARALL 2 (3)	102	40	12,5	1,45	153,29	161,180	24526,40
CARALL 3 (1)	255,6	40	12,5	3,15	893,2	123,646	20593,27
CARALL 3 (2)	237,4	40	12,5	3,1	775,66	118,576	17866,12
CARALL 3 (3)	229,7	40	12,5	3,1	760	114,730	33061,47
CARALL 4 (1)	165,6	40	12,5	2,9	1037,3	94,516	26363,26
CARALL 4 (2)	167,6	40	12,5	2,8	769,48	102,612	24926,81
CARALL 4 (3)	147	40	12,5	2,5	510,34	112,896	6644,38

Pengujian Impak

Nama Spesimen	α	β	H_1 (m)	m (kg)	H_k (m)	H_2 (m)	H_s (m)	U_s	U1
CFRP(1)	160	152	1,843	8,3	0,012	1,772	0,058	36,240	0,744
CFRP(2)	160	150	1,843	8,3	0,012	1,772	0,058	36,152	0,826
CFRP(3)	160	151	1,843	8,3	0,012	1,772	0,058	36,065	0,826
Al 0,5 (1)	160	150	1,843	8,3	0,012	1,787	0,043	36,065	0,457
Al 0,5 (2)	160	150	1,843	8,3	0,012	1,789	0,041	36,065	0,437
Al 0,5 (3)	160	150	1,843	8,3	0,012	1,772	0,058	36,065	0,620
CARALL 1 (1)	160	142	1,843	8,3	0,012	1,720	0,110	31,374	0,442
CARALL 1 (2)	160	126,5	1,843	8,3	0,012	1,653	0,177	32,130	0,666
CARALL 1 (3)	160	140	1,843	8,3	0,012	1,713	0,117	32,130	0,441
CARALL 2 (1)	160	120,5	1,843	8,3	0,012	1,700	0,130	33,084	0,556
CARALL 2 (2)	160	120,5	1,843	8,3	0,012	1,700	0,130	35,210	0,556
CARALL 2 (3)	160	116	1,843	8,3	0,012	1,681	0,149	34,903	0,637
CARALL 3 (1)	160	149,5	1,843	8,3	0,012	1,52	0,311	35,210	0,642
CARALL 3 (2)	160	149,5	1,843	8,3	0,012	1,514	0,316	35,319	0,654
CARALL 3 (3)	160	149	1,843	8,3	0,012	1,52	0,311	34,903	0,642
CARALL 4 (1)	160	142	1,843	8,3	0,012	1,52	0,311	36,010	0,687
CARALL 4 (2)	160	143	1,843	8,3	0,012	1,52	0,311	36,010	0,711
CARALL 4 (3)	160	141	1,843	8,3	0,012	1,482	0,349	35,966	0,894

Kekuatan Spesifik Uji Tarik, Bending, dan Impak

Kekuatan Spesifik Uji tarik

Nama	Massa (Kg)	Volume (m^3)	Densitas (Kg/ m^3)	Kekuatan Spesifik (kN.m/Kg)	
CARALL 1	0,0134	8,17733E-06	1642,713	92,106	101,212
	0,0142	8,17733E-06	1739,321	93,990	
	0,0133	7,82179E-06	1701,528	117,541	
CARALL 2	0,0111	7,11072E-06	1558,633	174,512	164,524
	0,0101	7,11072E-06	1423,625	182,632	
	0,0103	7,11072E-06	1451,330	136,427	
CARALL 3	0,0228	1,20882E-05	1883,817	106,792	116,696
	0,0211	1,24438E-05	1693,057	122,855	
	0,0213	1,26215E-05	1683,948	120,441	
CARALL 4	0,0183	1,13772E-05	1607,696	124,402	125,882
	0,0193	1,11994E-05	1721,077	141,661	
	0,0198	1,13772E-05	1736,375	111,583	

Kekuatan Spesifik Uji Bending

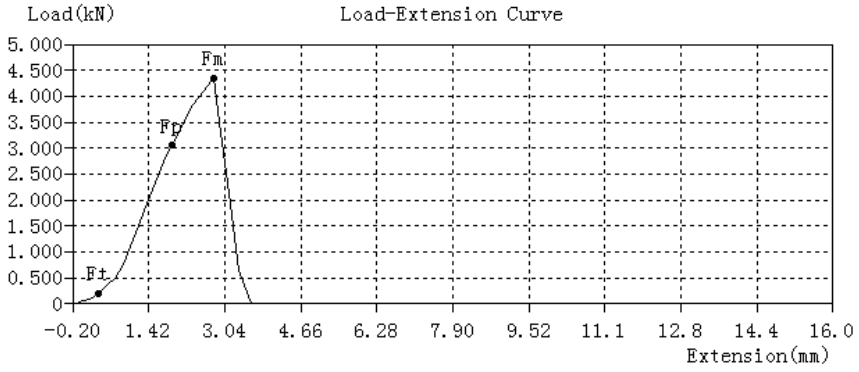
Nama	Massa (Kg)	Volume (m^3)	Densitas (Kg/ m^3)	Kekuatan Spesifik (kN.m/Kg)	
CARALL 1	0,00774	2,54E-06	3048,82	63,590	68,101
	0,00776	2,7E-06	2875,41	55,510	
	0,00754	2,7E-06	2795,37	85,203	
CARALL 2	0,00614	2,22E-06	2760,85	55,972	65,660
	0,00645	2,22E-06	2900,79	79,275	
	0,00601	2,3E-06	2610,92	61,733	
CARALL 3	0,0121	5E-06	2426,1	50,965	48,027
	0,0122	4,92E-06	2498,76	47,454	
	0,0123	4,92E-06	2512,57	45,663	
CARALL 4	0,0109	4,6E-06	2381,97	39,680	41,313
	0,0108	4,45E-06	2451,74	41,853	
	0,0105	3,97E-06	2662,3	42,405	

Kekuatan Spesifik Uji Impak

Nama	Massa (Kg)	Volume (m^3)	Densitas (Kg/ m^3)	Kekuatan Spesifik (kN.m/Kg)	
CARALL 1	0,0035	1,30048E-06	2691,314	0,3762	0,202
	0,003771	1,38176E-06	2729,128	0,1129	
	0,003665	1,38176E-06	2652,414	0,1176	
CARALL 2	0,002666	1,2192E-06	2186,680	0,2544	0,263
	0,0028	1,2192E-06	2296,588	0,2422	
	0,00267	1,2192E-06	2189,961	0,2911	
CARALL 3	0,00601	2,51968E-06	2385,224	0,2693	0,274
	0,006121	2,51968E-06	2429,277	0,2693	
	0,005693	2,51968E-06	2259,414	0,2843	
CARALL 4	0,004905	2,35712E-06	2080,929	0,3300	0,334
	0,005112	2,27584E-06	2246,204	0,3166	
	0,005092	2,032E-06	2505,906	0,3567	

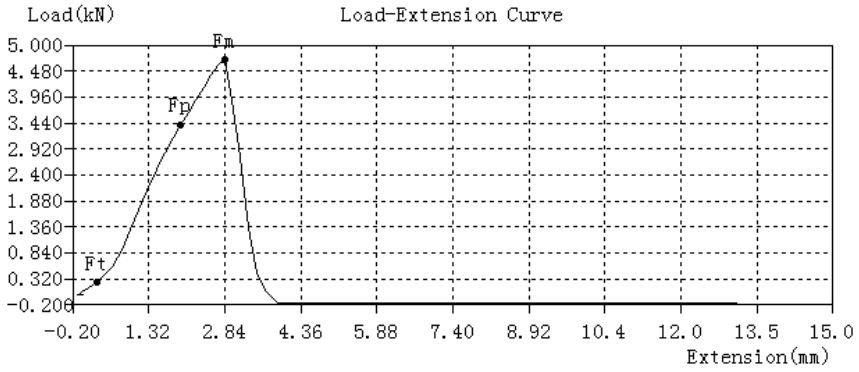
FMLA I

SampleID	FMLA I	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	4.35
Rm(MPa)	140	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	3.05
Rp(MPa)	100	Ft(kN)	/
Rt(MPa)	/	E(GPa)	4.06



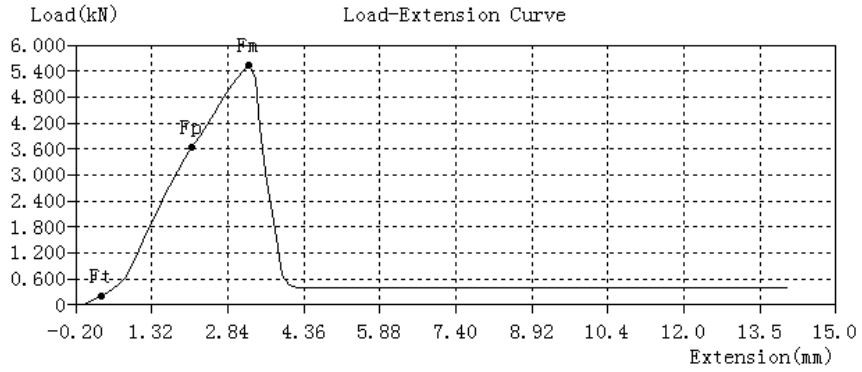
FMLA II

SampleID	FMLA II	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	4.70
Rm(MPa)	150	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	3.40
Rp(MPa)	110	Ft(kN)	/
Rt(MPa)	/	E(GPa)	3.63



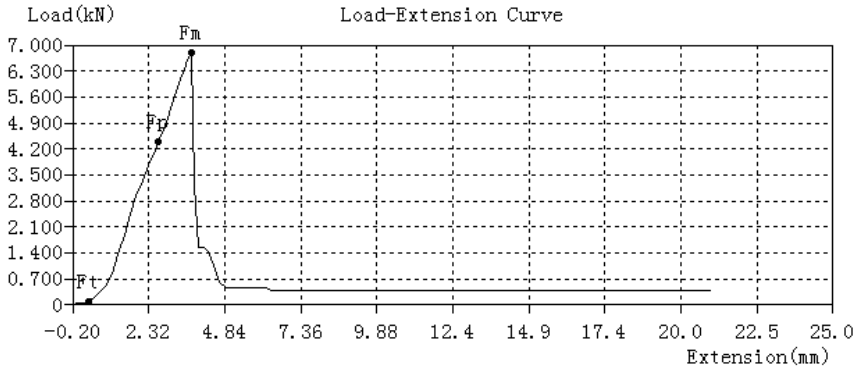
FMLA III

SampleID	FMLA III	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	5.55
Rm(MPa)	180	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	3.65
Rp(MPa)	115	Ft(kN)	/
Rt(MPa)	/	E(GPa)	3.79



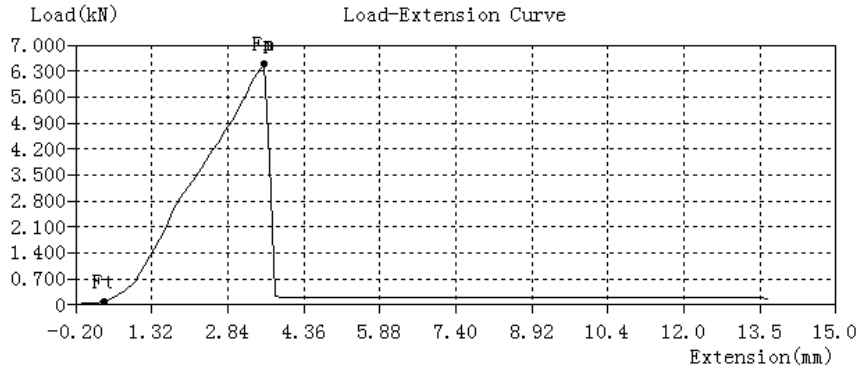
FMLC I

SampleID	FMLC I	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	6.80
Rm(MPa)	220	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	4.40
Rp(MPa)	140	Ft(kN)	/
Rt(MPa)	/	E(GPa)	3.74



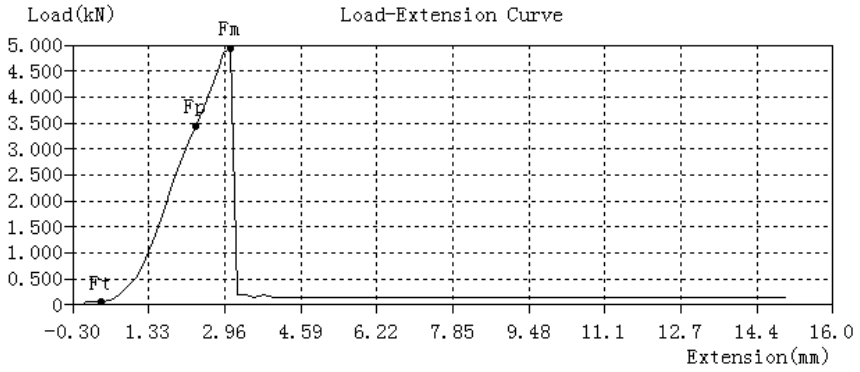
FMLC II

SampleID	FMLC II	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	6.50
Rm(MPa)	210	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	6.50
Rp(MPa)	210	Ft(kN)	/
Rt(MPa)	/	E(GPa)	3.33



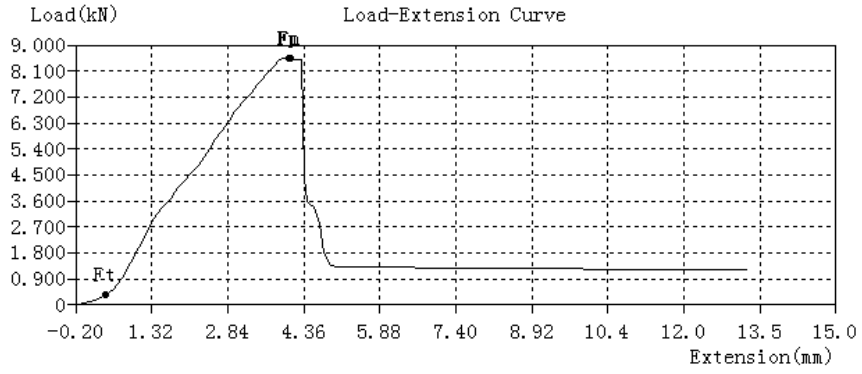
FMLC III

SampleID	FMLC III	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*2.5	Ao(mm^2)	31.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	4.95
Rm(MPa)	160	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	3.45
Rp(MPa)	110	Ft(kN)	/
Rt(MPa)	/	E(GPa)	4.32



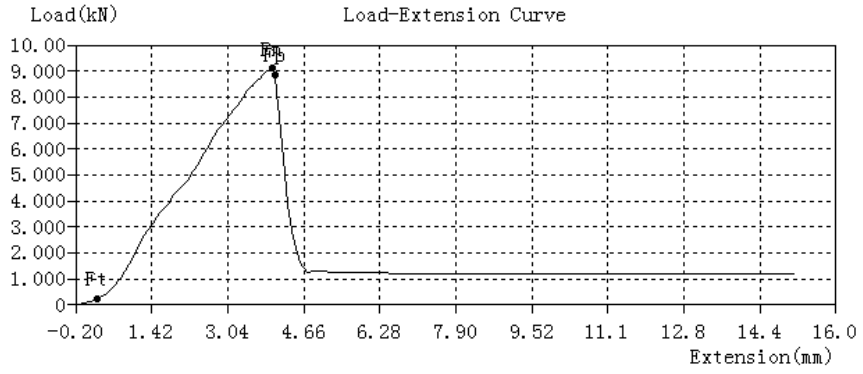
FMLA2 I

SampleID	FMLA2 I	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	8.55
Rm(MPa)	170	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	8.55
Rp(MPa)	170	Ft(kN)	/
Rt(MPa)	/	E(GPa)	2.13



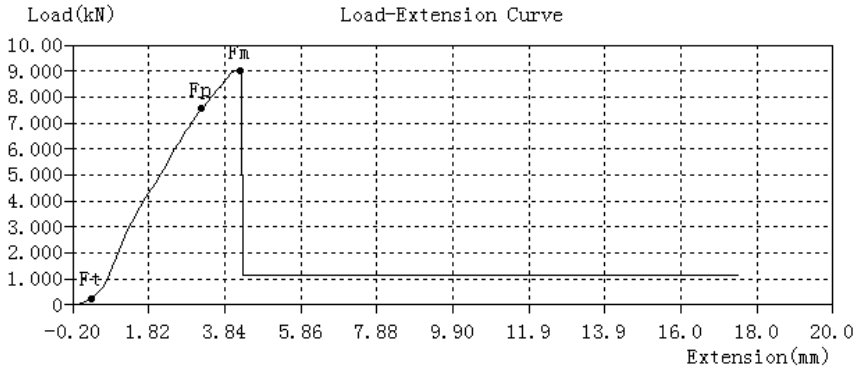
FMLA2 II

SampleID	FMLA2 II	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	9.10
Rm(MPa)	180	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	8.85
Rp(MPa)	175	Ft(kN)	/
Rt(MPa)	/	E(GPa)	2.18



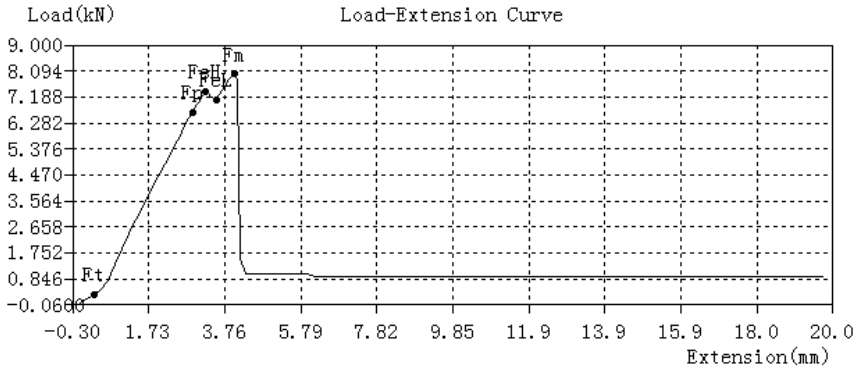
FMLA2 III

SampleID	FMLA2 III	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	9.00
Rm(MPa)	180	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	7.55
Rp(MPa)	150	Ft(kN)	/
Rt(MPa)	/	E(GPa)	2.47



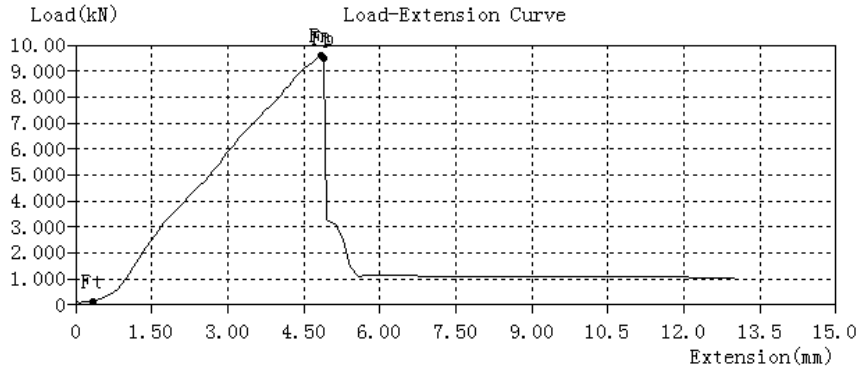
FMLC2 I

SampleID	FMLC2 I	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	8.00
Rm(MPa)	160	FeH(kN)	7.40
UYS(MPa)	150	FeL(kN)	7.10
LYS(MPa)	140	Fp(kN)	6.65
Rp(MPa)	135	Ft(kN)	/
Rt(MPa)	/	E(GPa)	2.68



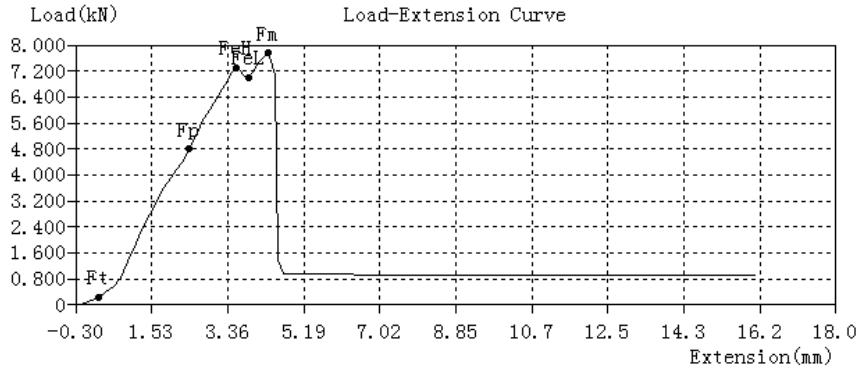
FMLC2 II

SampleID	FMLC2 II	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	9.60
Rm(MPa)	190	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	9.50
Rp(MPa)	190	Ft(kN)	/
Rt(MPa)	/	E(GPa)	1.99



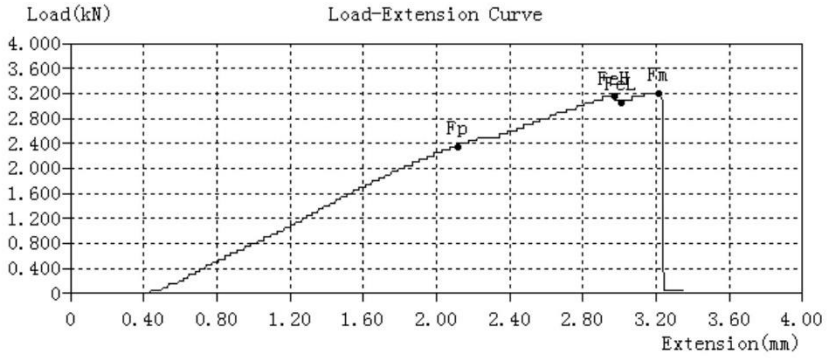
FMLC2 III

SampleID	FMLC2 III	TestDate	11/10/2020
Operator		Type	Flat
Size(mm)	12.5*4	Ao(mm^2)	50.00
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	7.75
Rm(MPa)	155	FeH(kN)	7.30
UYS(MPa)	145	FeL(kN)	7.00
LYS(MPa)	140	Fp(kN)	4.80
Rp(MPa)	95	Ft(kN)	/
Rt(MPa)	/	E(GPa)	2.43



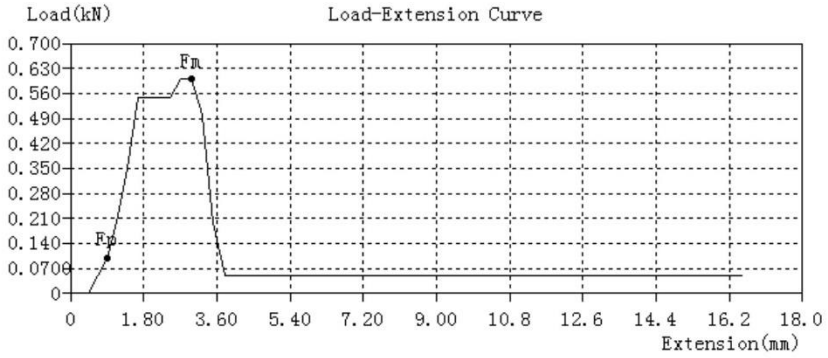
CFRP 01

Customer	CFRP 01	TestDate	3/9/2020
Coil No/Packet No		Type	Flat
Size(mm)	0.5*12.5	So(mm^2)	6.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Su(mm^2)	/
Z(%)	/	Fm(kN)	3.200
Rm(MPa)	/	FeH(kN)	3.150
ReH(MPa)	/	FeL(kN)	3.050
ReL(MPa)	/	Fp(kN)	2.350
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/



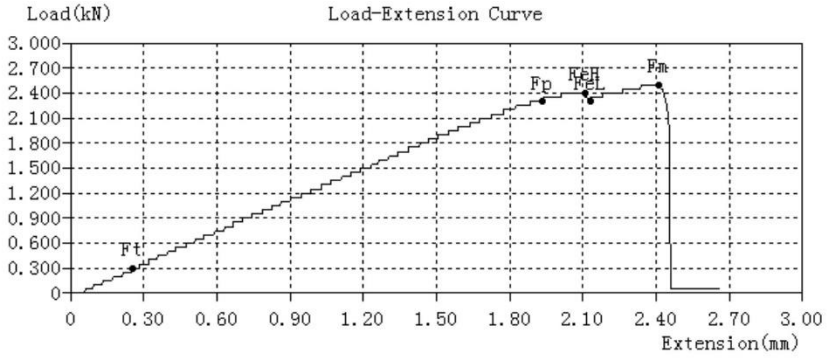
CFRP 02

Customer	CFRP 02	TestDate	3/9/2020
Coil No/Packet No		Type	Flat
Size(mm)	0.5*12.5	So(mm^2)	6.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Su(mm^2)	/
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
ReH(MPa)	/	FeL(kN)	/
ReL(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/



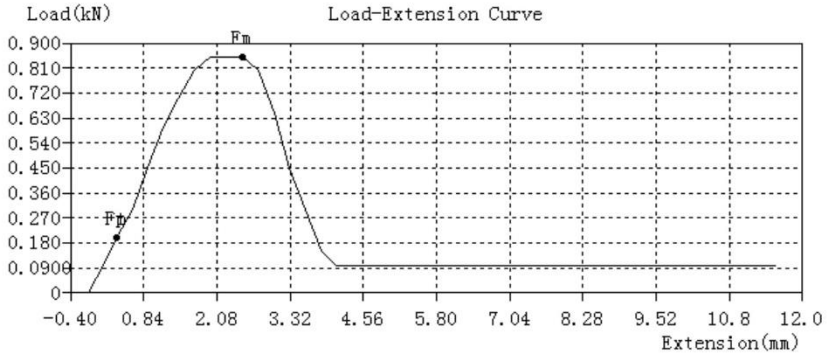
CFRP 03

Customer	CFRP 03	TestDate	3/9/2020
Coil No/Packet No		Type	Flat
Size(mm)	0.5*12.5	So(mm^2)	6.25
Lo(mm)	57	Lu(mm)	
A(%)	/	Su(mm^2)	/
Z(%)	/	Fm(kN)	2.500
Rm(MPa)	/	FeH(kN)	2.400
ReH(MPa)	/	FeL(kN)	2.300
ReL(MPa)	/	Fp(kN)	2.300
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/



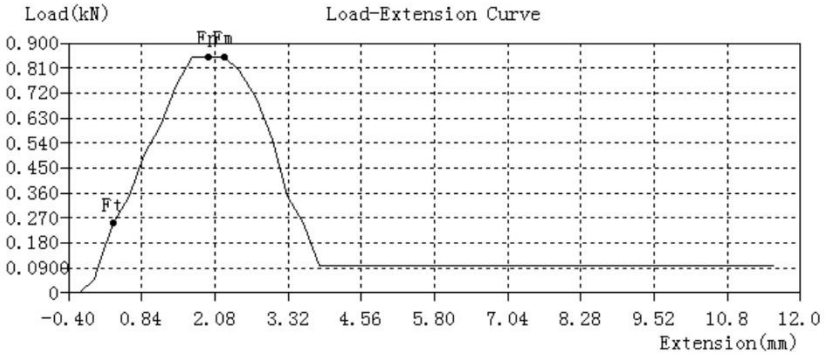
Aluminium 0.5mm (1)

SampleID	Aluminium 0.5mm (	TestDate	13/9/2020
Operator	1)	Type	Flat
Size(mm)	12.5*0.5	Ao(mm^2)	12.50
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/



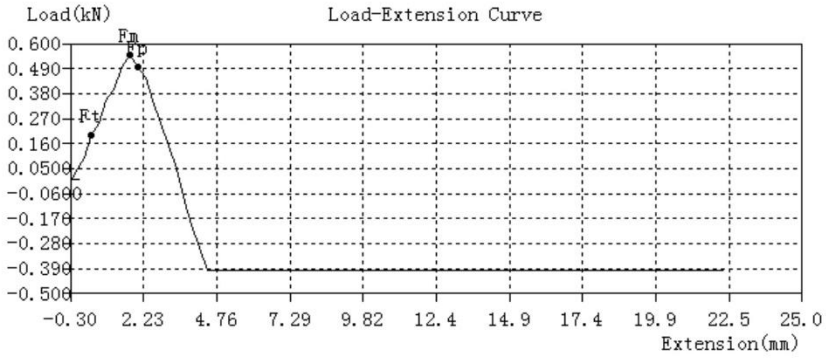
Aluminium 0.5mm (2)

SampleID	Aluminium 0.5mm (	TestDate	13/9/2020
Operator	2)	Type	Flat
Size(mm)	12.5*0.5	Ao(mm^2)	12.50
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	1.52

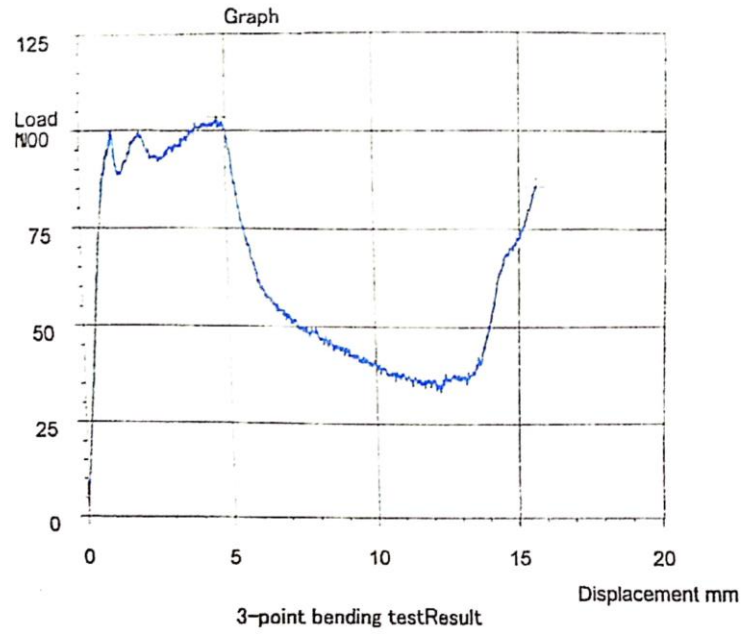


Aluminium 0.5mm (3)

SampleID	Aluminium 0.5mm (	TestDate	13/9/2020
Operator	3)	Type	Flat
Size(mm)	12.5*0.5	Ao(mm^2)	12.50
Lo(mm)	57	Lu(mm)	
A(%)	/	Au(mm^2)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	0.76



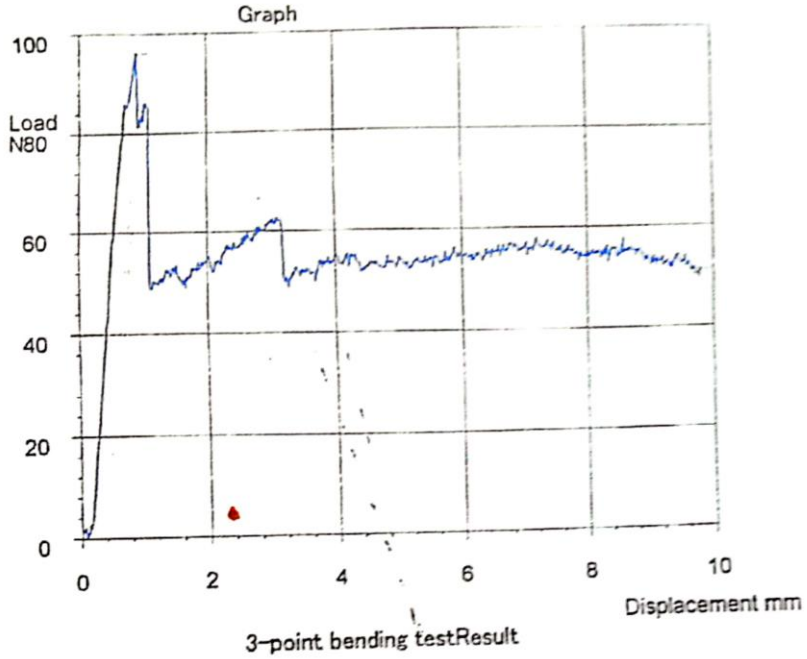
CARALL 1



3-point bending testResult

Machine name	RTF			Test type	3-point bending			
Strain input 1	Not used			Test speed	1.0 mm/min			
Chart speed OFF				Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0	
N	0	0	0	mm	0	0	0	
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm		
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N		
Elong adjust	No			Break point measurem	0.1 kN			
Save SS curve	Yes							

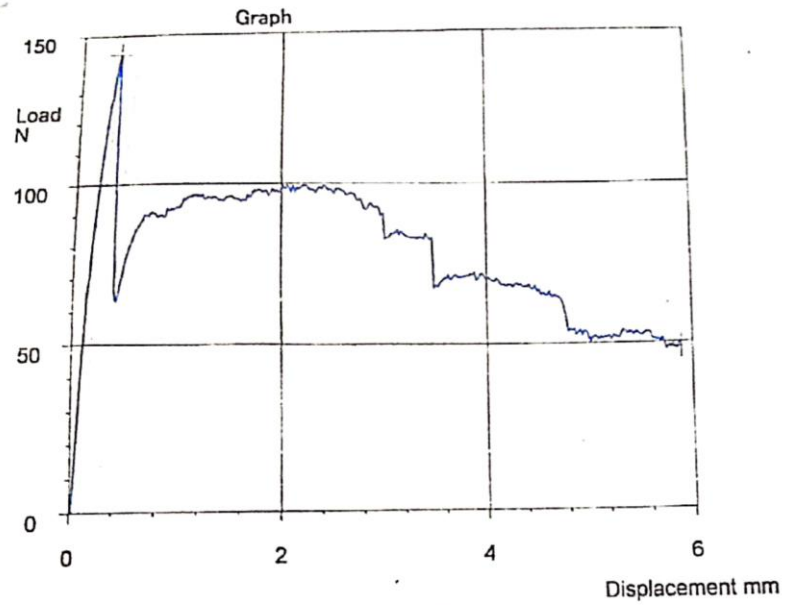
Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 1



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measuren	0.1 kN		
Save SS curve	Yes						

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 2

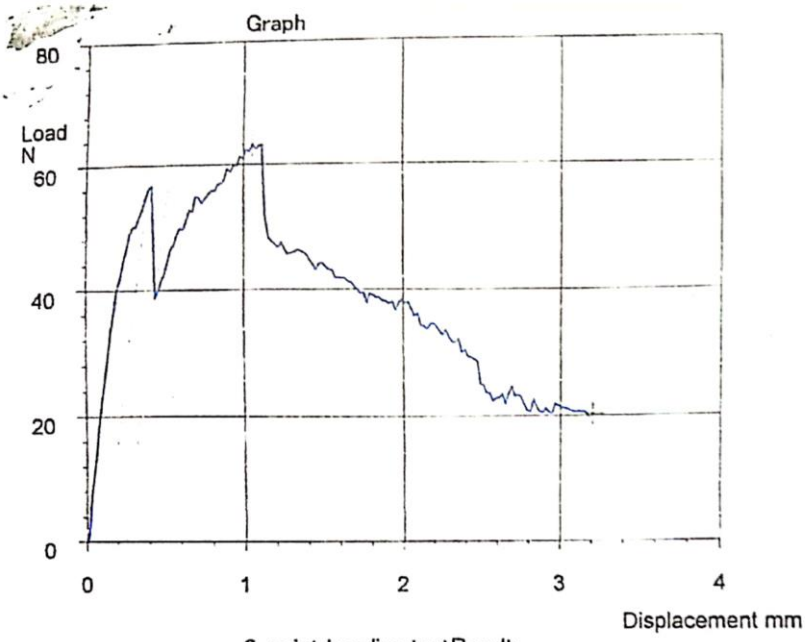


3-point bending testResult

Machine name	RTF			Test type	3-point bending			
Strain input 1	Not used			Test speed	1.0 mm/min			
Chart speed OFF				Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0	
N	0	0	0	mm	0	0	0	
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	40 mm		
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N		
Elong adjust	No			Break point measurem	0.1 kN			
Save SS curve	Yes							

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 3

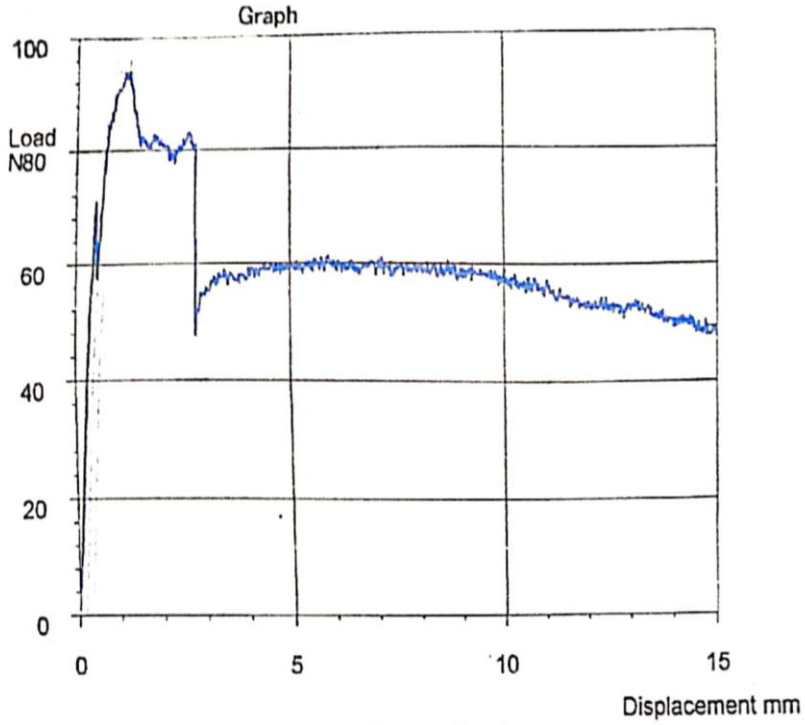
CARALL 2



3-point bending testResult

Machine name	RTF			Test type	3-point bending			
Strain input 1	Not used			Test speed	1.0 mm/min			
Chart speed OFF				Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0	
N	0	0	0	mm	0	0	0	
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm		
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N		
Elong adjust	No			Break point measuren	0.1 kN			
Save SS curve	Yes							

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 1

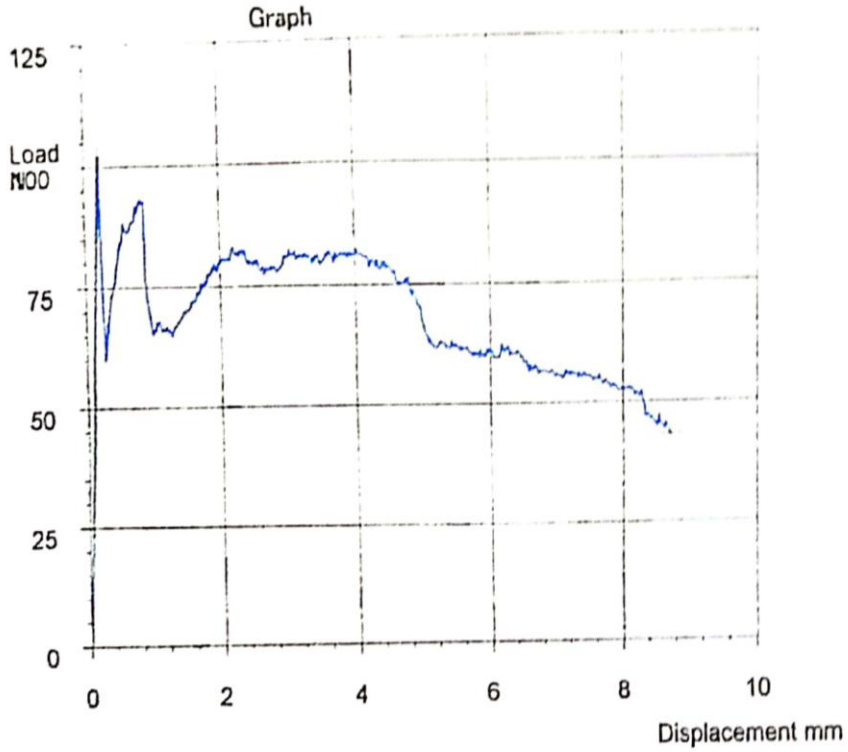


Sample No.	Color
Average 03	

3-point bending testResult

Machine name	RTF			Test type	3-point bending			
Strain input 1	Not used			Test speed	1.0 mm/min			
Chart speed OFF				Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0	
N	0	0	0	mm	0	0	0	
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm		
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N		
Elong adjust	No			Break point measurem	0.1 kN			
Save SS curve	Yes							

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 3

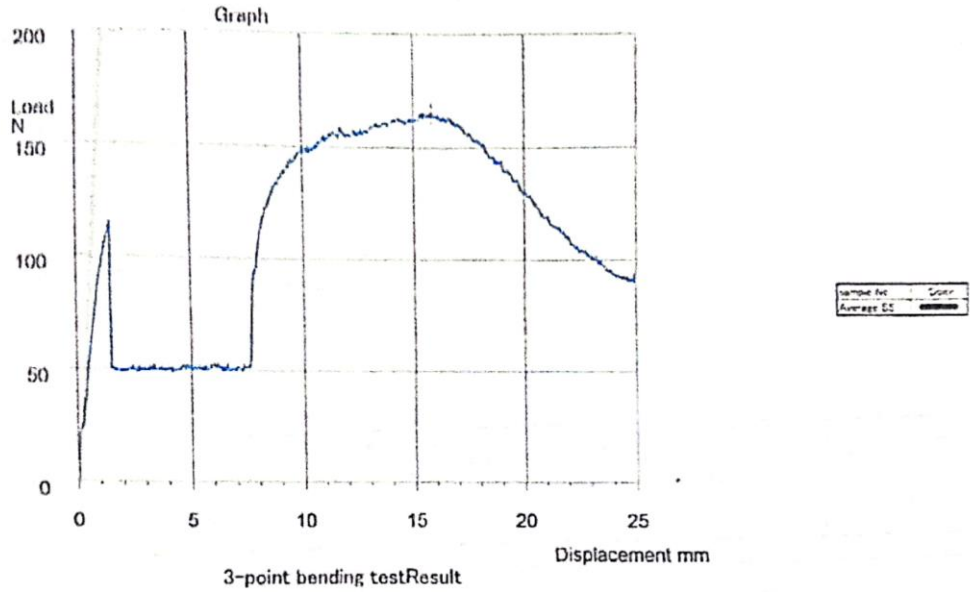


3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 3

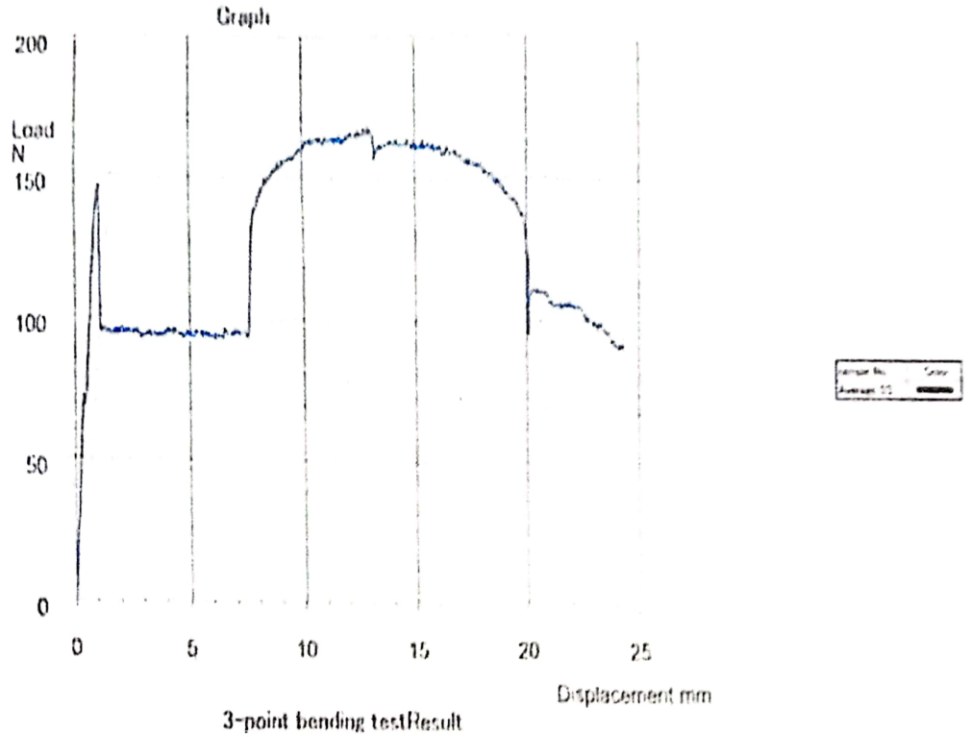
CARALL 3



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

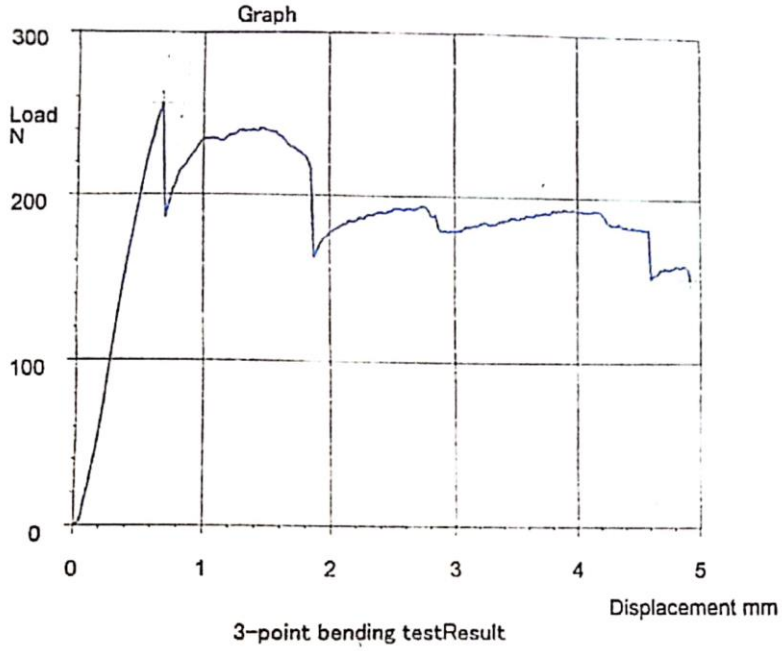
Test date	2020/09/17
Humidity	60 %RH
Lot No	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 1



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	0.5 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal	Interval	1	100	Initial sample length	Edge spac	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1 kN	
Elong adjust	No			Break point measured	0.1 kN		
Save SS curve	Yes						

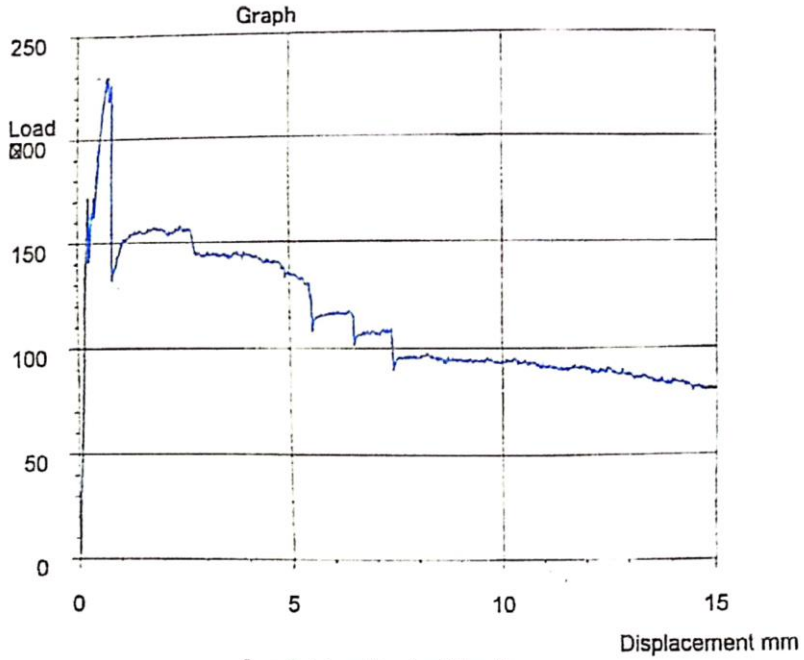
CARALL 4



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

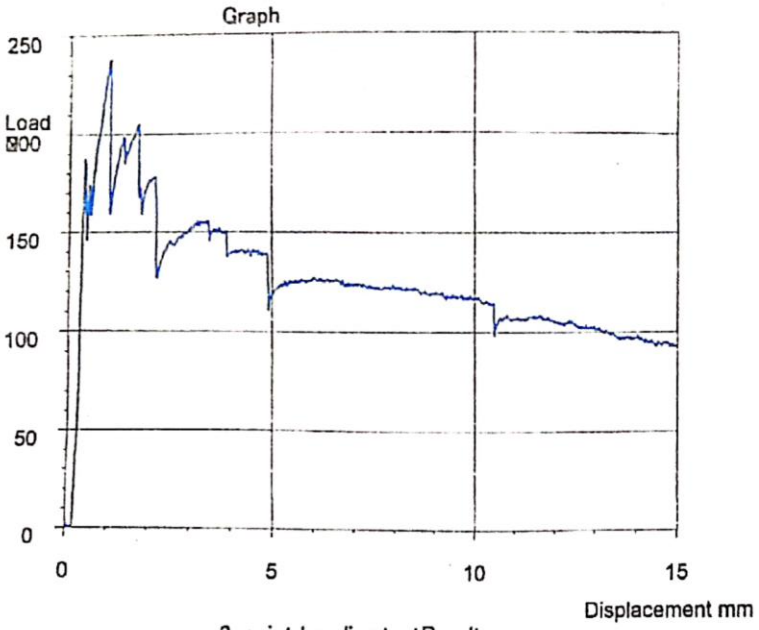
Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 1



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measuren	0.1 kN		
Save SS curve	Yes						

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 3

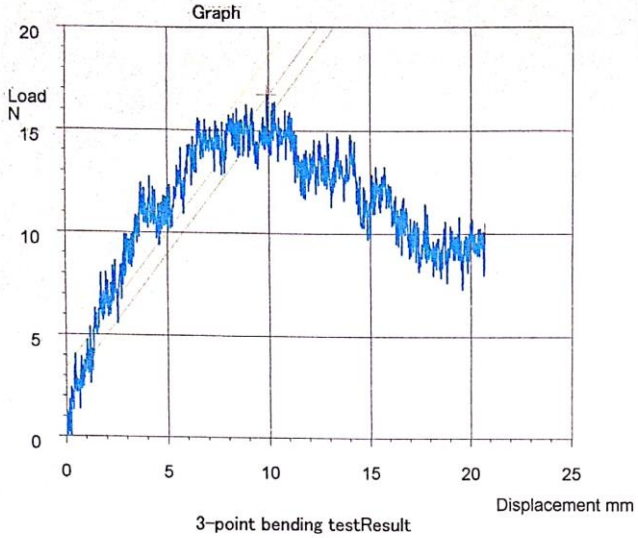


Sample No.	Color
Average SS	

3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

Test date	2020/10/22
Humidity	60 %RH
Lot No.	
Operator	Epafroditus Pakiding, ST
Comment 1	Sample 1

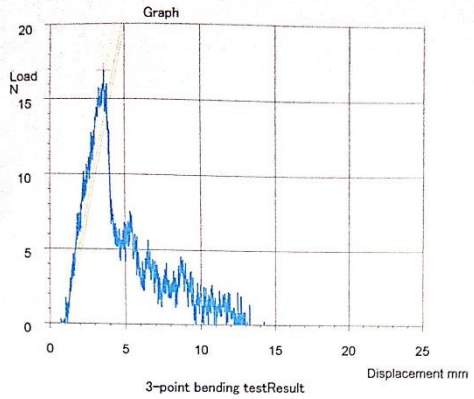


3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1 kN	
Elong adjust	No			Break point measuren	0.1 kN		
Save SS curve	Yes						

Test date	2020/09/17	Temperature	26 C
Humidity	60 %RH	Sample name	CPRP
Lot No.		Preparation	
Operator	Epafroditus Pakiding, ST	User	Salim
Comment 1	Sample 1	Comment 2	

CFRP

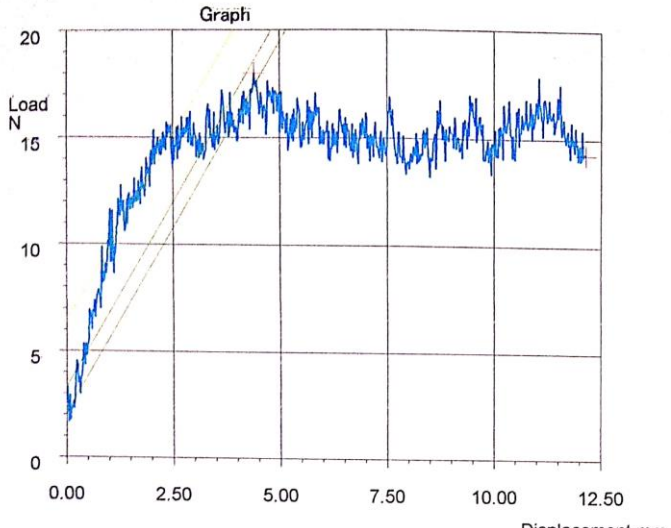


3-point bending testResult

Machine name	RTF			Test type	3-point bending			
Strain input 1	Not used			Test speed	1.0 mm/min			
Chart speed OFF				Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0	
N	0	0	0	mm	0	0	0	
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spar	60 mm		
Load	Pitch	5 N		Origin of elongation	Init. load	1 kN		
Elong adjust	No			Break point measurem	0.1 kN			
Save SS curve	Yes							

Test date	2020/09/17	Temperature	26 C
Humidity	60 %RH	Sample name	CFRP
Lot No.		Preparation	
Operator	Epafroditus Pakiding, ST	User	Salim
Comment 1	Sample 1	Comment 2	

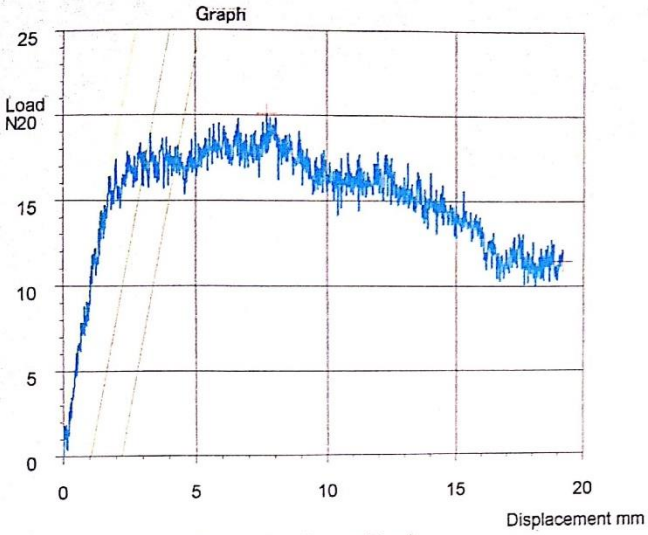
CFRP



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	40 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1000 N	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

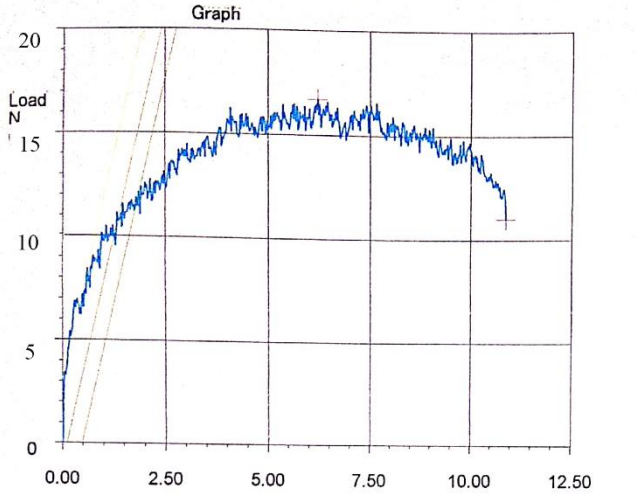
Test date	2020/09/18	Temperature	26 C
Humidity	60 %RH	Sample name	aLMUNIUM
Lot No.		Preparation	
Operator	Epafroditus Pakiding, ST	User	Salim
Comment 1	Sample 2	Comment 2	



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1 kN	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

Test date	2020/09/17	Temperature	26 C
Humidity	60 %RH	Sample name	Almunium
Lot No.		Preparation	
Operator	Epafroditus Pakiding, ST	User	Salim
Comment 1	Sample 1	Comment 2	



3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	1.0 mm/min		
Chart speed OFF				Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
N	0	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spai	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	1 kN	
Elong adjust	No			Break point measurem	0.1 kN		
Save SS curve	Yes						

Test date	2020/09/17	Temperature	26 C
Humidity	60 %RH	Sample name	Almunium
Lot No.		Preparation	
Operator	Epafroditus Pakiding, ST	User	Salim
Comment 1	Sample 1	Comment 2	