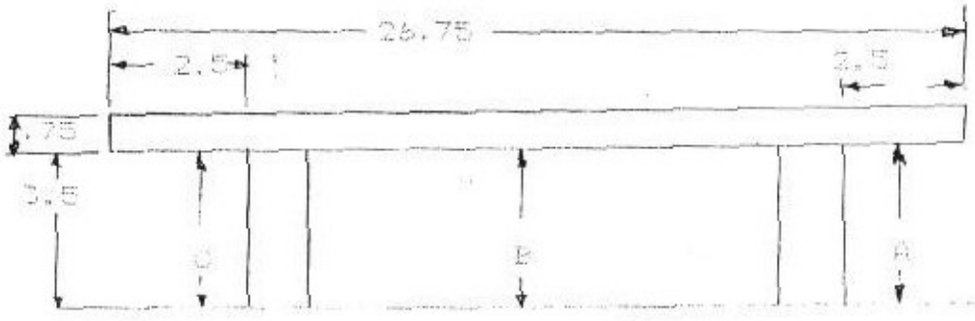
THERMAL/CREEP TEST

Performed: July 28 & 29, 1994 and August 1, 1994
Performed in Albuquerque, NM by C. Ford and O. Estrada
Average local temperature during test equalled 94°F.

Test Setup T1

Test object: .75 x 5.5 x 26.75 piece of SBMRP produced plastic lumber. This test sample had been produced from .25" grind post-consumer comingled material the last week of June '94.



Setup was placed on a flat section of driveway which was at all times in direct sunlight. Measurements were taken and recorded at one hour intervals beginning at 9:00 AM MT.

Raw Data (inches)

	A	B	C
9:00 AM	3.37	3.63	3.31
10:00 AM	3.37	3.63	3.31
11:00 AM	3.37	3.63	3.31
12:00 AM	3.37	3.63	3.31
1:00 PM	3.37	3.63	3.31
2:00 PM	3.37	3.63	3.31

Test repeated 7-29-94 from 9:00 AM to 12:00 AM with identical results.

Test Setup T2

Same as above but added a 5.0 pound steel weight in the center. The dimensions of the steel weight are 1.0 x 3.0 x 6.0 inches. The same test object was used.

Raw Data (inches)

	A	B	C
8:00 AM	3.37	3.56	3.37
9:00 AM	3.37	3.56	3.37
10:00 AM	3.37	3.54	3.37
11:00 AM	3.37	3.54	3.37
12:00 AM	3.37	3.54	3.37

1:00 PM	3.37	3.54	3.37

CONCLUSION

It appears that this sample exhibited very stable characteristics due to the application of radiated heat, even under small load conditions. More testing is required but this should satisfy a first glance inquiry.

31 MAY 1994

OUTGASSING TESTS FOR THE SOLVENT BASED PLASTICS RECYCLING PROCESS

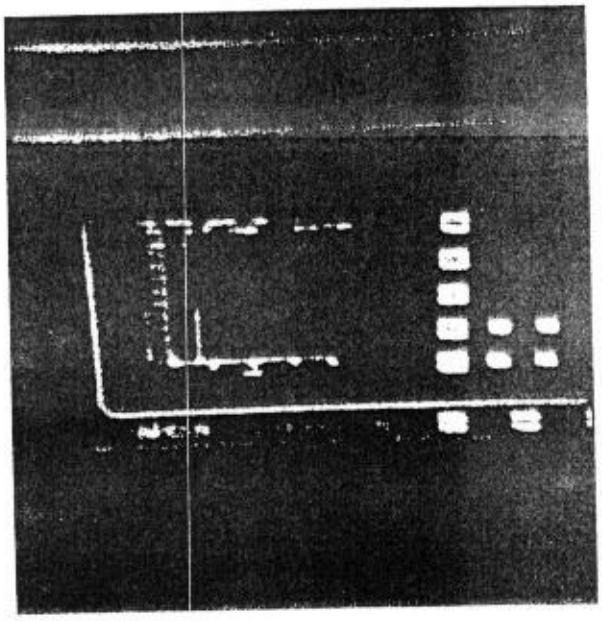
Performed by: John Cleveland, President
Cleveland Enterprises, Inc.
4410 Hawkins NE, Suite C
Albuquerque, NM 87109
(505) 345-7751

Testing performed for: Innovative Research Corporation
PO Box 482
Peralta, NM 87042

Test Equipment: INFICON Quadex 200, quadrapole mass spectrometer and pumping system.

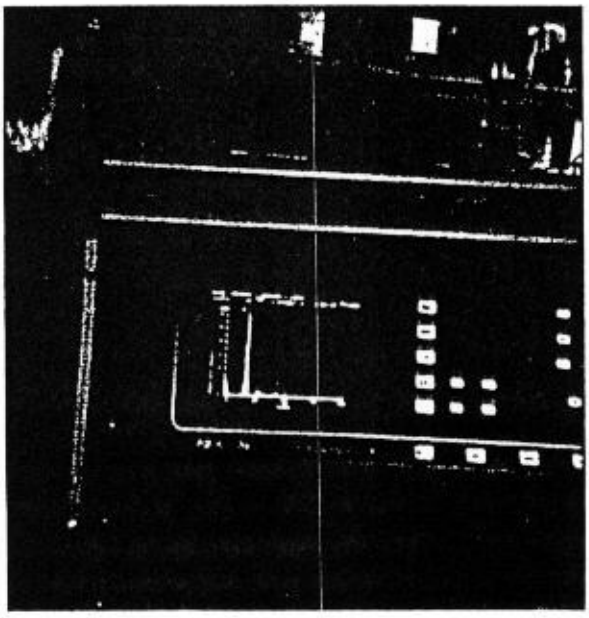
Testing Methods:

Test 1. Mass spectrometer was valved off and pumped down to 8.5 x 10E-9 torr. The system ran its self calibration and was detirmined to be working properly. The system was vented and a valved test fixture vacuum vessel was attached. The system was pumped down again, this time to 4.5 x 10E-7 torr, the valve was opened and a base line specrometer reading was obtained. The base line signal was photographed. The spectrometer was set to read from 0 to 100 atomic mass units (amu), element numbers, with a vertical scaling of 0 to 6 x 10E-10 amperes. The photo was fairly fuzzy but you will note that the 18 amu peak, water vapor is slightly saturated and off scale. The 17 amu peak is proportionally present. No other peaks are noticeable.



R. Nino

Test 2. The system was vented and the valved test fixture vacuum vessel was loaded with a .625 x 1.25 x 3.625 inch green colored sample from a 2 x 4 sample plastic lumber fabricated March 17th of this year. This sample contained an ABS-Polycarbonate blend, a blue polycarbonate, a red polycarbonate, an acetal, a styrene, a polyethylene, a glass-filled polycarbonate, an acrylic, an ABS, a PVC, a foamed polystyrene, 25% by volume of shredded paper and viewgraph film mix, two ounces of green coloring resin and solvent. This mixture was a total weight of 9 pounds with approximately equal amounts of each species by volume and a small amount of solvent. The system was pumped down again, this time to 1.5 x 10E-5 torr, the pressure was limited by the porosity of the material acting like a virtual leak. A spectrometer reading was obtained. The line signal was photographed. The spectrometer was set to read from 0 to 100 atomic mass units (amu), element numbers, with a vertical scaling of 0 to 6 x 10E-10 amperes. You will note that the 18 amu peak, water vapor is slightly saturated and off scale. The 17 amu peak is proportionally present. The 15, 28 and 43 peaks are noticeable. The 15 peak is slight but represents methane. The 28 peak is also slight and represents air (nitrogen). The 43 peak is the major peak related to the solvent used but at these levels are insignificant.

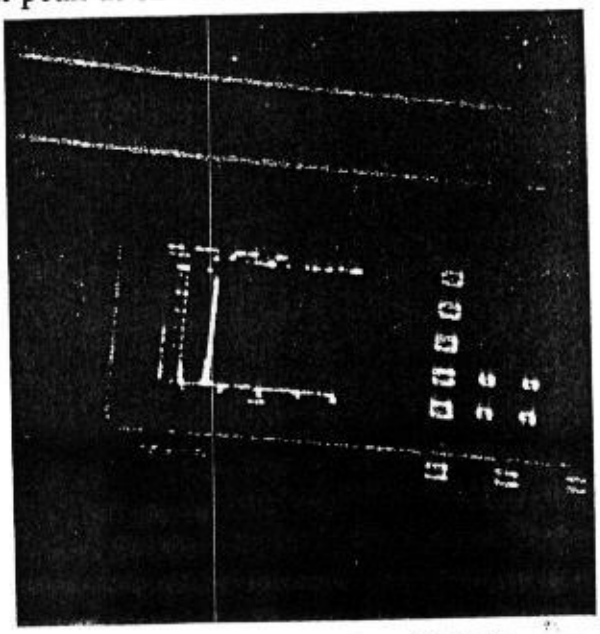


Green sample
spike at 43
Line 26-28
1.5×10^{-5} torr

0-100 amu
left # 0-6 x 10^{-10} amp
amplitude

Test 3. The system was vented and the valved test fixture vacuum vessel was loaded with a .125 x .875 x 1.625 inch off white colored sample of PVC, typical of schedule 80 pipe. This sample was soaked in the desired solvent for five minutes prior to insertion. The system was pumped down again, this time to 2.5 x 10E-6 torr. A spectrometer reading

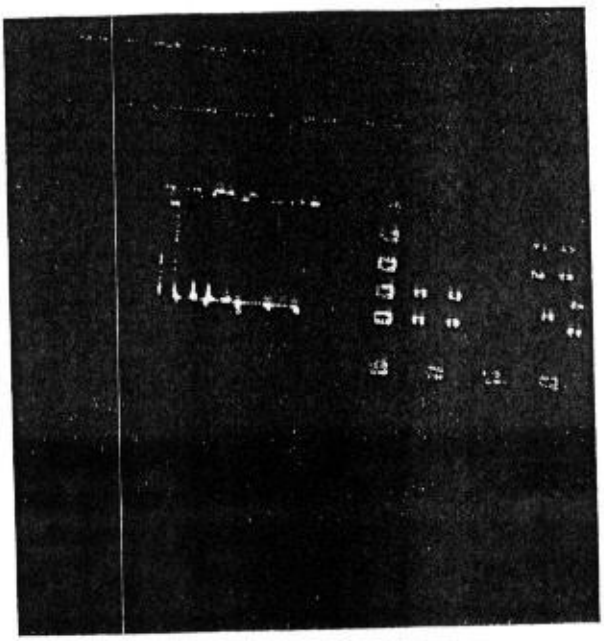
was obtained. The line signal was photographed. The spectrometer was set to read from 0 to 100 atomic mass units (amu), element numbers, with a vertical scaling of 0 to 6 x 10E-10 amperes. You will note that the 18 amu peak, water vapor is slightly saturated and off scale. The 17 amu peak is proportionally present. The 15, 26, 28 and 43 peaks are noticeable. the 15 peak is slight but still present and represents methane, possibly introduced unintentionally. The 26 peak is insignificant but noticeable and can be attributed to several elements such as complex hydrogen compounds or the accidental introduction of acetylene which is not really possible. The 28 peak is also slight and represents air (nitrogen). The 43 peak is the major peak related to the solvent used but at these levels are insignificant. No peaks representing hazardous compounds such as vinyl chloride which has a significant peak at 62 were noticed.



PVC
spike at 43
none 26-28

0 - 100 amu
scale 0-6 x 10^{-10} amps
$P = 2.5 \times 10^{-6}$

Test 4. Then a conglomerate of assorted post-consumer plastic waste soaked in solvent for approximately 20 minutes. This material was placed in the test chamber. The system was pumped down again, this time to 1.0 x 10E-4 torr, the pressure was high due to the high liquid content of the material introduced. A line spectrometer reading was obtained. The line signal was photographed. The spectrometer was set to read from 0 to 100 atomic mass units (amu), element numbers, with a vertical scaling of 0 to 6 x 10E-10 amperes. You will note that the 18 amu peak, water vapor is not saturated at this pressure level. The 17 amu peak is proportionally present. The 15, 26, 28 and 43 peaks are noticeable at higher levels due to the high concentration of solvent, air and water vapor present.



Conglomerate
apide at 15,43 + H2O
zone 26-28
1×10^{-4} torr

0 – 100 amu
$0 - 6 \times 10^{-10}$ amps

CONCLUSIONS:
This testing proves without a doubt that no hazardous compounds are created by the reaction of the desired solvent and post-consumer plastic waste. There also appears to be no leaching of gases from fully cured products from this process.

ROCKY MOUNTAIN TESTING
6444 EDITH BLVD
ALBUQUERQUE NM 87107

TENSILE AND BENDING TESTS

TEST DATE 5/4/94

CUSTOMER INOVATIVE RESEARCH CORPORATION PROJECT PALLET MATERIAL TESTS TESTED BY Len Leonard

TESTED IN ACCORDANCE WITH LUMBER TEST TYPE OF SAMPLE LAB No 10748

SAMPLE	WIDTH-IN	THICK.-IN	AREA	LOAD-LBS	STRENGTH-PSI	FAILURE	BENDING
WOOD	3½	3/4	N/A	2,704	N/A	BENDING	
LIGHT PLASTIC	3½	3/4	N/A	981	N/A	BENDING	
DARK PLASTIC	3½	3/4	N/A	981	N/A	BENDING	
WOOD	3½	1½	N/A	12,000	N/A	COMPRESSION	
LIGHT PLASTIC	3½	1½	N/A	32,000	N/A	COMPRESSION	
WOOD	3½	1½	N/A	7,350	N/A	STRINGER	
LIGHT PLASTIC	3½	1½	N/A	1,378	N/A	STRINGER	

OAK

COMMENTS: PLASTIC HAD ¼" GRAIN SIZE AND NO FIBER.

ACCEPT # 1

Len Leonard

0003325

SINTECH
A Division of MTS Systems Corporation

Fax #

July 8, 1993

To: Gary Estepp
From: Douglas Albert
Subject: Brick Test Results

Dear Gary,

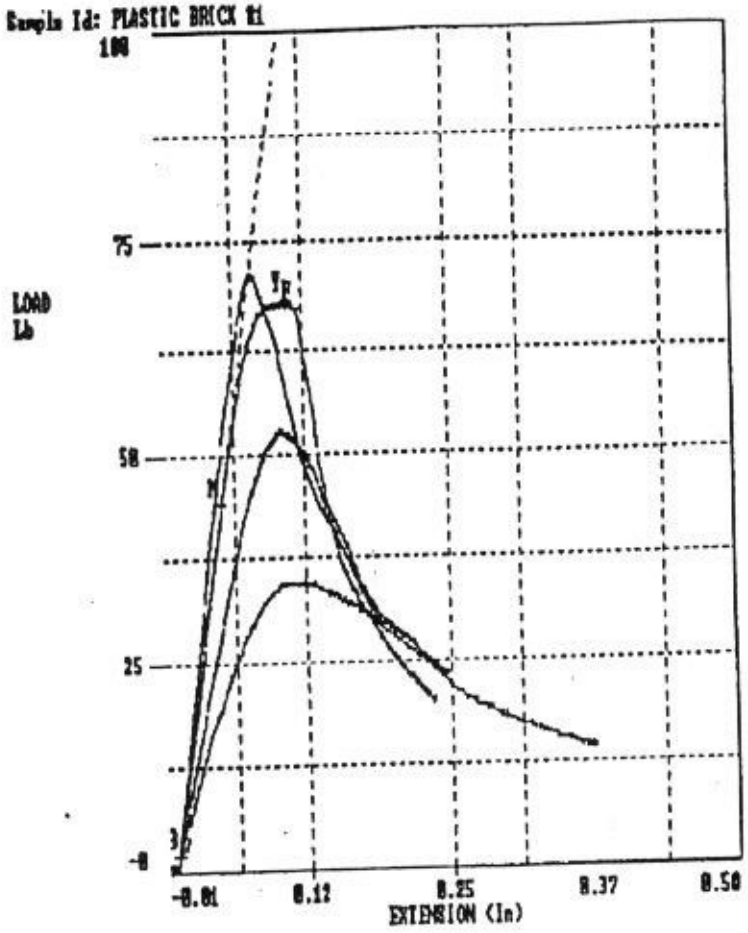
Sorry that it has taken me so long to get back to you with this data. I had the brick machine into eight pieces last week and had the testing completed today.
The following pages should include all of the information that you requested.

Results are for compression tests, with and without machine compliance corrections, and flex tests. The yields were measured as "zero slope" yields and not as offset yields. I was unsure of the procedure that you wanted to use.
Yield was used in compression as there is not a distinctive point of failure.
Also, dimensions are noted on the reports.

I have the results on disks and would be more than happy to include any other calculations that you may desire. I hope that these results are to your satisfaction.

Best Regards,

Douglas G. Albert


Sample Id: PLASTIC BRICK #1
100
75
50
25
0
LOAD
Lb
-0.01
0.12
0.25
0.37
0.50
EXTENSION (In)

Sintech Inc.

Report Date:Jul 08, 1

Detailed Report

Report Header goes here
second line
third line
last line

Method: 3 POINT FLEX ASTM D-790 BRICK
Sample ID> PLASTIC BRICK

Test Date: Jul 08, 1993
Operator ID: SINTECH

	Width (b) In	Depth (d) In	Length (l) In	Peak Load Lb	Peak Stress PSI	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Modulus PSI
1	1.168	0.945	7.000	68.2	589	68.2	588.7	0.1065	1.6773	53188.86
2	1.169	0.968	7.000	34.8	286	34.8	285.7	0.1195	1.9274	24770.87
3	1.163	0.953	7.000	52.7	449	52.7	449.3	0.1010	1.6048	36657.74
4	1.169	0.950	7.000	71.3	608	71.3	608.0	0.0753	1.1917	60872.11
Mean	1.167	0.954	7.000	56.8	483	56.8	482.9	0.1006	1.6003	43872.40
Min	1.163	0.945	7.000	34.8	286	34.8	285.7	0.0753	1.1917	24770.87
Max	1.169	0.968	7.000	71.3	608	71.3	608.0	0.1195	1.9274	60872.11
StDv	0.003	0.010	0.000	16.8	149	16.8	149.3	0.0186	0.3055	16255.32
%Cov	0.246	1.038	0.000	29.5	31	29.5	30.9	18.4502	19.0876	37.05
Medn	1.169	0.951	7.000	60.5	519	60.5	519.0	0.1038	1.6410	44923.30
% Ref				*********	*********	*********	*********	*********	*********	*********

Calculation Input(s):

Span 1	6.00	In
Brk % Drop	10	%
Brk Drop Elong	0.001	In
Min Slope Load	0.00	Lb
Max Slope Load	10000.17	Lb
%Strain Point1	2.00	%

Test Input(s):

Initial Speed	0.0625	In/Min
% Strain Limit	100.0	%
Load Limit HI	2000	Lb
Ext Limit HI	20.0	In
Brk Sensitivity	75	%

000328

Statistics of Sample Means.

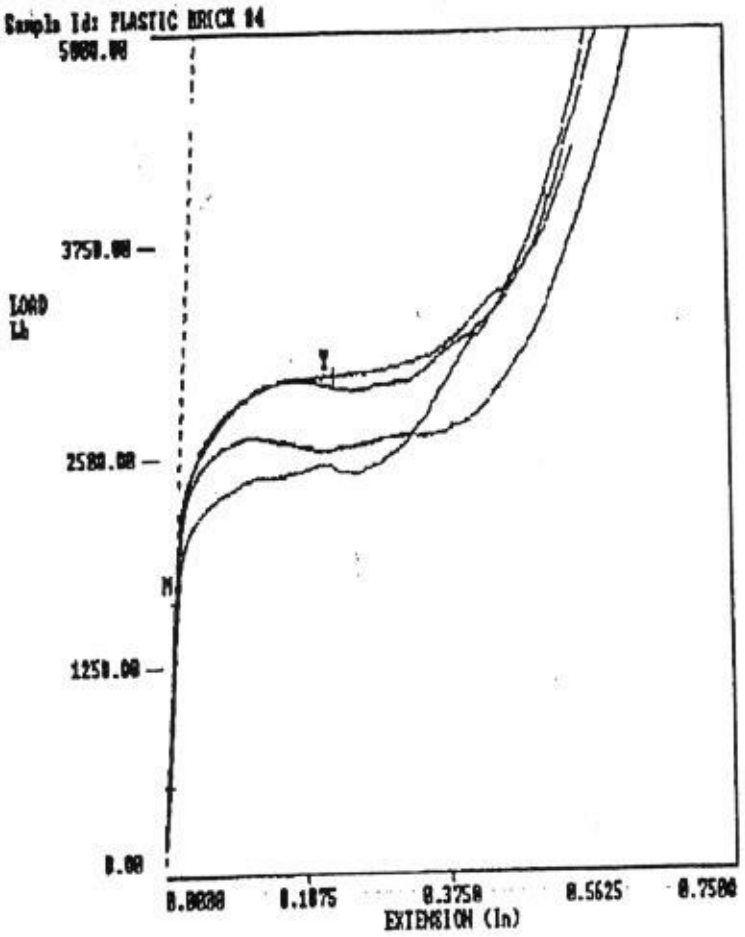
Total Number of Samples: 1

	Width (b) In	Depth (d) In	Length (l) In	Peak Load Lb	Peak Stress PSI	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Modulus PSI
Mean	1.167	0.954	7.000	56.8	483	56.8	482.9	0.1006	1.6003	43872.40
Min	1.167	0.954	7.000	56.8	483	56.8	482.9	0.1006	1.6003	43872.40
Max	1.167	0.954	7.000	56.8	483	56.8	482.9	0.1006	1.6003	43872.40
StDv	0.000	0.000	0.000	0.0	0	0.0	0.0	0.0000	0.0000	0.00
%Cov	0.000	0.000	0.000	0.0	0	0.0	0.0	0.0000	0.0000	0.00
% Ref				**********	**********	**********	**********	**********	**********	**********

Statistics of all specimen.

Total Number of Specimen: 4

	Width (b) In	Depth (d) In	Length (l) In	Peak Load Lb	Peak Stress PSI	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Modulus PSI
Mean	1.167	0.954	7.000	56.8	483	56.8	482.9	0.1006	1.6003	43872.40
Min	1.163	0.945	7.000	34.8	286	34.8	285.7	0.0753	1.1917	24770.87
Max	1.169	0.968	7.000	71.3	608	71.3	608.0	0.1195	1.9274	60872.11
StDv	0.003	0.010	0.000	16.8	149	16.8	149.3	0.0186	0.3055	16255.32
%Cov	0.246	1.038	0.000	29.5	31	29.5	30.9	18.4502	19.0876	37.05
% Ref				**********	**********	**********	**********	**********	**********	**********


Sample Id: PLASTIC BRICK 04
5000.00
3750.00
LOAD
Lb
2500.00
1250.00
0.00
0.0000
0.1875
0.3750
0.5625
0.7500
EXTENSION (In)

Sintech Inc.

Report Date:Jul 08, 1

Detailed Report

Report Header goes here
second line
third line
last line

Test Date: Jul 07, 1993
Operator ID: SINTECH

Method: BRICK TEST
Sample ID> PLASTIC BRICK

Sample Information:

User Input 1	User Default 1
User Input 2	User Default 2
User Input 3	User Default 3
User Input 4	User Default 5
User Input 5	User Default 6
User Input 6	User Default 6
User Input 7	User Default 7
User Input 8	User Default 8
User Input 9	User Default 9
User Input 10	User Default 10

	Width In	Length In	Height In	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Energy @ Yield In-Lb	Modulus PSI
1	1.923	1.983	1.170	2955.8	775.1	0.1679	14.3483	409.3	22827.75
2	1.970	1.965	1.184	2614.4	675.4	0.1316	11.1161	290.1	25405.55
3	1.980	1.913	1.180	2439.8	644.1	0.2223	18.8414	480.5	25152.44
4	1.989	1.910	1.180	2977.0	783.6	0.2321	19.6734	607.1	28229.15
Mean	1.965	1.943	1.178	2746.8	719.6	0.1885	15.9948	446.7	25403.72
Min	1.923	1.910	1.170	2439.8	644.1	0.1316	11.1161	290.1	22827.75
Max	1.989	1.983	1.184	2977.0	783.6	0.2321	19.6734	607.1	28229.15
StDv	0.029	0.037	0.006	263.6	70.3	0.0473	4.0061	132.7	2212.22
%Cov	1.495	1.897	0.507	9.6	9.8	25.0916	25.0464	29.7	8.71
Medn	1.975	1.939	1.180	2785.1	725.3	0.1951	16.5949	444.9	25279.00
% Ref				*********	*********	*********	*********	*********	*********

Calculation Input(s):

Gage Length	1.18	In
Brk % Drop	10	%
Brk Drop Elong	0.001	In
Min Slope Load	0.00	Lb
Max Slope Load	10000.17	Lb
%Strain Point1	2.00	%

000331

Test Input(s):

Initial Speed	0.05	In/Min

Test Input(s):

Secondary Speed	0.05	In/Min
% Strain Limit	5.0	%
Deformation Lim	200.0	%
Load Limit HI	30001	Lb
Load Limit LO	-30001	Lb
Ext Limit HI	20.0	In
Ext Limit LO	-20.0	In
Brk Sensitivity	75	%

Statistics of Sample Means.

Total Number of Samples: 1

	Width In	Length In	Height In	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Energy @ Yield In-Lb	Modulus PSI
Mean	1.965	1.943	1.178	2746.8	719.6	0.1885	15.9948	446.7	25403.72
Min	1.965	1.943	1.178	2746.8	719.6	0.1885	15.9948	446.7	25403.72
Max	1.965	1.943	1.178	2746.8	719.6	0.1885	15.9948	446.7	25403.72
StDv	0.000	0.000	0.000	0.0	0.0	0.0000	0.0000	0.0	0.00
VCov	0.000	0.000	0.000	0.0	0.0	0.0000	0.0000	0.0	0.00
% Ref				*********	*********	*********	*********	*********	*********

Statistics of all specimen.

Total Number of Specimen: 4

Mean	1.965	1.943	1.178	2746.8	719.6	0.1885	15.9948	446.7	25403.72
Min	1.923	1.910	1.170	2439.8	644.1	0.1316	11.1161	290.1	22827.75
Max	1.989	1.983	1.184	2977.0	783.6	0.2321	19.6734	607.1	28229.15
StDv	0.029	0.037	0.006	263.6	70.3	0.0473	4.0061	132.7	2212.22
VCov	1.495	1.897	0.507	9.6	9.8	25.0916	25.0464	29.7	8.71
% Ref				*********	*********	*********	*********	*********	*********

Detailed Report

Report Header goes here
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third line
last line

Method: BRICK TEST (no compliance)
Sample ID> PLASTIC BRICK

Test Date: Jul 07, 1993
Operator ID: SINTECH

Sample Information:

User Input 1	User Default 1
User Input 2	User Default 2
User Input 3	User Default 3
User Input 4	User Default 5
User Input 5	User Default 6
User Input 6	User Default 6
User Input 7	User Default 7
User Input 8	User Default 8
User Input 9	User Default 9
User Input 10	User Default 10

	Width In	Length In	Height In	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Energy @ Yield In-Lb	Modulus PSI
1	1.923	1.983	1.17	2955.8	775.1	0.1712	14.6295	414.2	21092.62
2	1.970	1.965	1.18	2614.4	675.4	0.1345	11.3629	293.9	23249.68
3	1.980	1.913	1.18	2439.8	644.1	0.2251	19.0725	483.8	23071.90
4	1.989	1.910	1.18	2977.0	783.6	0.2355	19.9554	612.1	25626.66
Mean	1.965	1.943	1.18	2746.8	719.6	0.1916	16.2551	451.0	23260.22
Min	1.923	1.910	1.17	2439.8	644.1	0.1345	11.3629	293.9	21092.62
Max	1.989	1.983	1.18	2977.0	783.6	0.2355	19.9554	612.1	25626.66
StDv	0.029	0.037	0.01	263.6	70.3	0.0473	4.0086	133.0	1855.99
%Cov	1.495	1.897	0.51	9.6	9.8	24.7036	24.6605	29.5	7.98
Medn	1.975	1.939	1.18	2785.1	725.3	0.1981	16.8510	449.0	23160.79
% Ref				*********	*********	*********	*********	*********	*********

Calculation Input(s):

Gage Length	1.18	In
Brk % Drop	10	%
Brk Drop Elong	0.001	In
Min Slope Load	0.00	Lb
Max Slope Load	10000.17	Lb
%Strain Point1	2.00	%

Test Input(s):

Initial Speed	0.05	In/Min

Test Input(s):

% Strain Limit	5.0	%
Deformation Lim	200.0	%
Load Limit HI	30001	Lb
Load Limit LO	-30001	Lb
Ext Limit HI	20.0	In
Ext Limit LO	-20.0	In
Brk Sensitivity	75	%

	Width In	Length In	Height In	Yield Load Lb	Yield Stress PSI	Elong @ Yield In	%Strain @ Yield %	Energy @ Yield In-Lb	Modulus PSI

Statistics of Sample Means.

Total Number of Samples: 1

Mean	1.965	1.943	1.18	2746.8	719.6	0.1916	16.2551	451.0	23260.22
Min	1.965	1.943	1.18	2746.8	719.6	0.1916	16.2551	451.0	23260.22
Max	1.965	1.943	1.18	2746.8	719.6	0.1916	16.2551	451.0	23260.22
StDv	0.000	0.000	0.00	0.0	0.0	0.0000	0.0000	0.0	0.00
%Cov	0.000	0.000	0.00	0.0	0.0	0.0000	0.0000	0.0	0.00
% Ref				**********	**********	**********	**********	**********	**********

Statistics of all specimen.

Total Number of Specimen: 4

Mean	1.965	1.943	1.18	2746.8	719.6	0.1916	16.2551	451.0	23260.22
Min	1.923	1.910	1.17	2439.8	644.1	0.1345	11.3629	293.9	21092.62
Max	1.989	1.983	1.18	2977.0	783.6	0.2355	19.9554	612.1	25626.66
StDv	0.029	0.037	0.01	263.6	70.3	0.0473	4.0086	133.0	1855.99
%Cov	1.495	1.897	0.51	9.6	9.8	24.7036	24.6605	29.5	7.98
% Ref				**********	**********	**********	**********	**********	**********