MEASUREMENT REPORT

MEASUREMENTS DATA

TEST DATA

Measurement point	0.0	Date	01-00-1900
Workpiece's reference	Polymeric materials	Location	SINT Lab.
Customer name	0.0	Job number	0

MATERIAL DATA

Material type	0.0				
Young modulus	860.0	±	5.0%		
Poisson's ratio	0.45	±	5.0%		
Yield stress	0.0	MPa		Thickness	24.00 mm

AMPLIFIER / STRAIN GAGE DETAILS

Rosette	K-RY61-1.5/120R			Rosette type	B
Rosette diameter	5.10 mm			Position	Grid A in axial direction
Gage factor - Grid A	1.93	±	1.5%		
Gage factor - Grid B	1.93	±	1.5%		
Gage factor - Grid C	1.93	±	1.5%		

HOLE DATA

Total depth	2.000 mm	Number of steps	40
Hole diameter	1.89 mm	Hole eccentricity	0.030 mm
Hole radius X_1	0.95 mm	Hole radius X_2	0.95 mm
Hole radius Y_1	0.91 mm	Hole radius Y_2	0.97 mm

INSTRUMENT DATA

Hole drilling device	MTS3000-Restan	SINT n.	640	/	641
Strain gage amplifier	QuantumX MX440	SINT n.	1329		
Dial gauge	Mitutoyo 2046SB	SINT n.	992	/	993

The measurement uncertainties stated in this document were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k=2, that for a normal distribution, corresponding to a confidence level of about 95%.

Test Owner	**Head of Residual stress area**
0	Ing. Alessio Benincasa

SINT Technology

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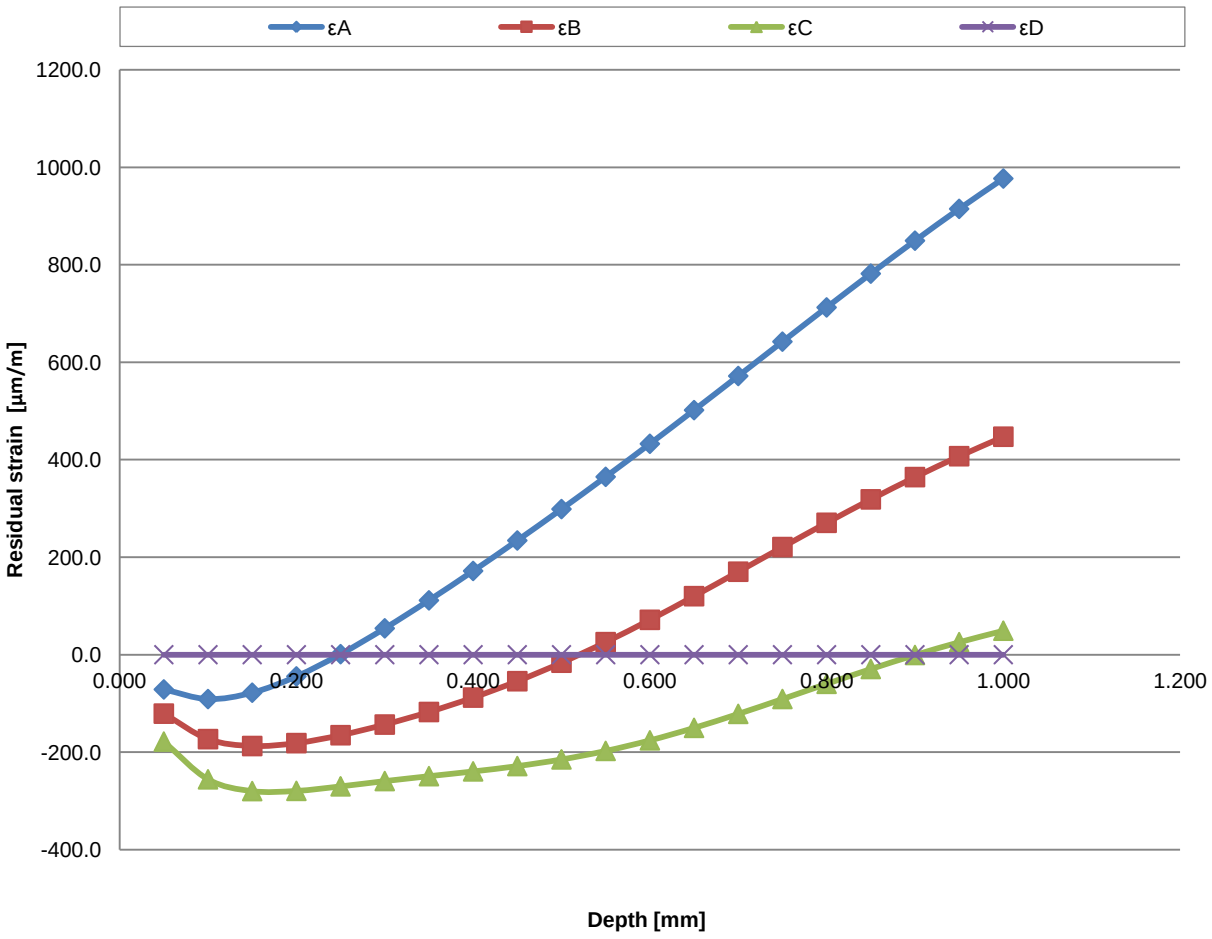
ACQUIRED STRAINS

Depth [mm]	ε_A [µm/m]	±U ε_A [µm/m]	ε_B [µm/m]	±U ε_B [µm/m]	ε_C [µm/m]	±U ε_C [µm/m]	ε_D [µm/m]	±U ε_D [µm/m]
0.050	-71.3	2.8	-121.0	3.2	-178.4	3.8	/	/
0.100	-91.1	3.0	-173.3	3.7	-255.8	4.7	/	/
0.150	-78.1	2.9	-187.5	3.9	-279.9	5.0	/	/
0.200	-44.6	2.7	-181.5	3.8	-279.5	5.0	/	/
0.250	1.1	2.6	-165.3	3.6	-270.2	4.8	/	/
0.300	54.0	2.8	-143.4	3.4	-259.4	4.7	/	/
0.350	111.4	3.1	-117.6	3.2	-249.3	4.6	/	/
0.400	171.8	3.7	-88.1	2.9	-239.5	4.5	/	/
0.450	234.3	4.4	-54.4	2.8	-228.6	4.3	/	/
0.500	298.7	5.2	-16.5	2.6	-214.9	4.2	/	/
0.550	364.9	6.1	25.7	2.7	-197.5	4.0	/	/
0.600	432.7	7.0	71.5	2.8	-175.8	3.7	/	/
0.650	501.8	8.0	120.0	3.2	-150.2	3.5	/	/
0.700	571.8	9.0	170.2	3.7	-121.5	3.2	/	/
0.750	642.3	10.0	220.7	4.2	-90.9	3.0	/	/
0.800	712.5	11.0	270.6	4.9	-59.8	2.8	/	/
0.850	781.9	12.1	318.7	5.5	-29.4	2.7	/	/
0.900	849.5	13.1	364.4	6.1	-0.7	2.6	/	/
0.950	914.8	14.0	407.3	6.7	25.6	2.7	/	/
1.000	977.0	14.9	447.2	7.2	49.2	2.7	/	/

p_{std}^2	0.77	[µm/m]
q_{std}^2	1.34	[µm/m]
t_{std}^2	3.36	[µm/m]



MEASUREMENT REPORT

ASTM E837-13 RESULTS

ASTM E837-13: UNIFORM STRESS

Type:		Blind		$\sigma_{V.M}$ [MPa]	2.1	±	7.8
σ_{MIN} [MPa]	-2.1	±	7.8	σ_X [MPa]	-2.0	±	8.1
σ_{MAX} [MPa]	0.1	±	7.8	σ_Y [MPa]	0.1	±	7.8
β [°]	85.2	±	0.2	τ_{XY} [MPa]	-0.2	±	7.8

ASTM E837-13: NOT UNIFORM STRESS

Depth [mm]	σ_{MIN} [MPa]	±U σ_{MIN} [MPa]	σ_{MAX} [MPa]	±U σ_{MAX} [MPa]	β [°]	±U β [°]	$\sigma_{V.M}$ [MPa]	±U $\sigma_{V.M}$ [MPa]
0.025	7.2	7.8	14.3	38.6	-88.2	0.2	12.4	7.8
0.075	1.4	7.8	4.6	14.5	86.3	0.2	4.1	7.8
0.125	-2.3	7.8	-0.8	8.1	68.1	0.1	2.0	7.8
0.175	-3.8	7.8	-2.4	10.1	59.1	0.1	3.3	7.8
0.225	-4.1	7.8	-2.6	10.4	65.3	0.1	3.6	7.8
0.275	-4.0	7.8	-2.4	10.1	73.7	0.1	3.5	7.8
0.325	-3.9	7.8	-2.2	9.7	80.7	0.2	3.4	7.8
0.375	-4.0	7.8	-2.1	9.6	86.1	0.2	3.4	7.8
0.425	-4.1	7.8	-2.2	9.7	-89.8	0.2	3.6	7.8
0.475	-4.4	7.8	-2.5	10.2	-86.8	0.2	3.8	7.8
0.525	-4.9	7.8	-3.0	11.1	-84.7	0.2	4.3	7.8
0.575	-5.5	7.8	-3.6	12.3	-83.8	0.2	4.8	7.8
0.625	-6.2	7.8	-4.4	14.0	-84.2	0.2	5.5	7.8
0.675	-7.0	7.8	-5.2	15.8	-85.9	0.2	6.3	7.8
0.725	-7.9	7.8	-6.0	17.7	-88.4	0.2	7.1	7.8
0.775	-8.8	7.8	-6.8	19.5	88.9	0.2	8.0	7.8
0.825	-9.8	7.8	-7.5	21.4	86.7	0.2	8.9	7.8
0.875	-10.9	7.8	-8.3	23.3	85.4	0.2	9.9	7.8
0.925	-12.1	7.8	-9.1	25.4	84.7	0.2	10.9	7.8
0.975	-13.4	7.8	-10.0	27.6	84.3	0.2	12.0	7.8

Depth [mm]	σ_X [MPa]	±U σ_X [MPa]	σ_Y [MPa]	±U σ_Y [MPa]	τ_{XY} [MPa]	±U τ_{XY} [MPa]
0.025	7.2	11.4	14.3	7.8	0.2	7.8
0.075	1.5	8.0	4.6	7.8	-0.2	7.8
0.125	-2.1	8.2	-1.0	7.8	-0.5	7.8
0.175	-3.4	8.7	-2.8	7.8	-0.6	7.8
0.225	-3.8	8.9	-2.9	7.8	-0.6	7.8
0.275	-3.9	9.0	-2.5	7.8	-0.4	7.8
0.325	-3.9	9.0	-2.2	7.8	-0.3	7.8
0.375	-4.0	9.0	-2.1	7.8	-0.1	7.8
0.425	-4.1	9.1	-2.2	7.8	0.0	7.8
0.475	-4.4	9.3	-2.5	7.8	0.1	7.8
0.525	-4.9	9.6	-3.0	7.8	0.2	7.8
0.575	-5.5	10.0	-3.6	7.8	0.2	7.8
0.625	-6.2	10.6	-4.4	7.8	0.2	7.8
0.675	-7.0	11.2	-5.2	7.8	0.1	7.8
0.725	-7.9	12.0	-6.0	7.8	0.1	7.8
0.775	-8.8	12.8	-6.8	7.8	0.0	7.8
0.825	-9.8	13.7	-7.5	7.8	-0.1	7.8
0.875	-10.9	14.8	-8.3	7.8	-0.2	7.8
0.925	-12.1	15.9	-9.2	7.8	-0.3	7.8
0.975	-13.3	17.2	-10.0	7.8	-0.3	7.8

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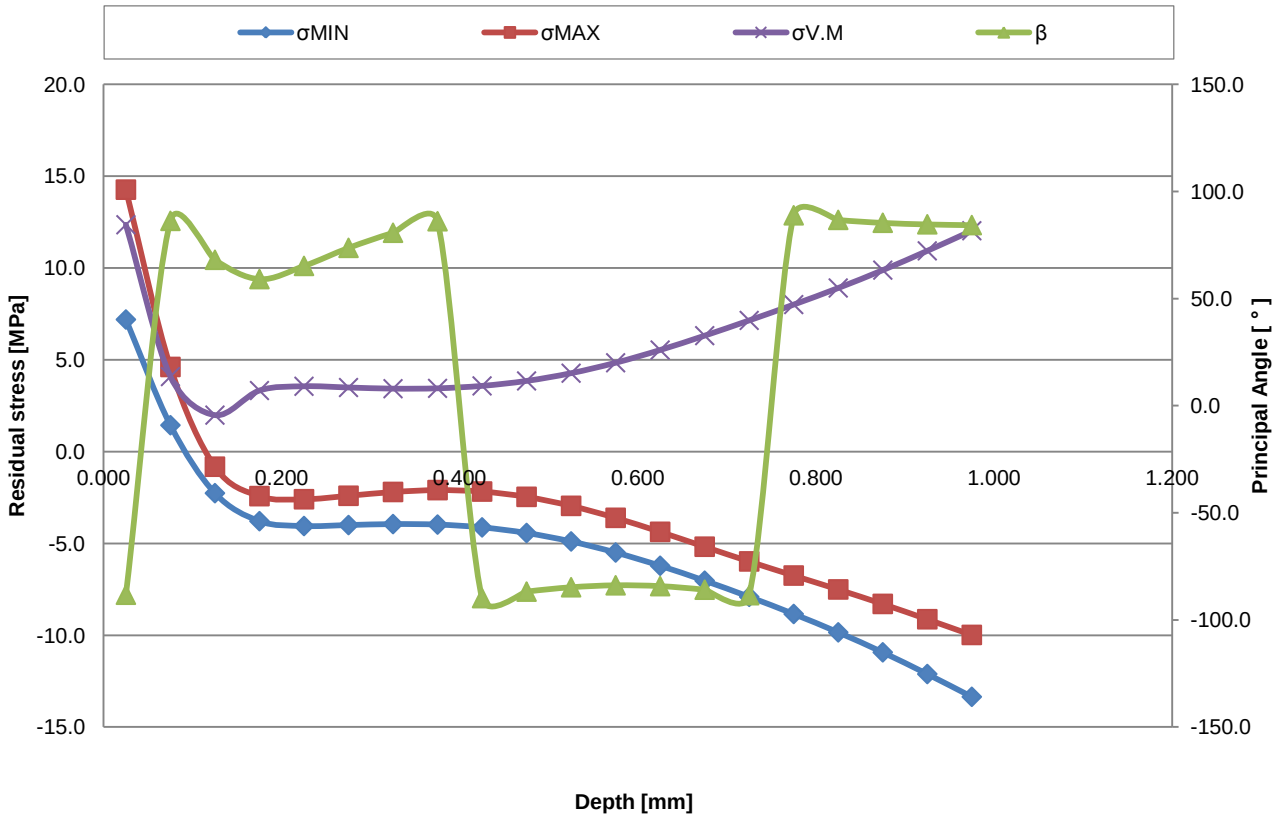
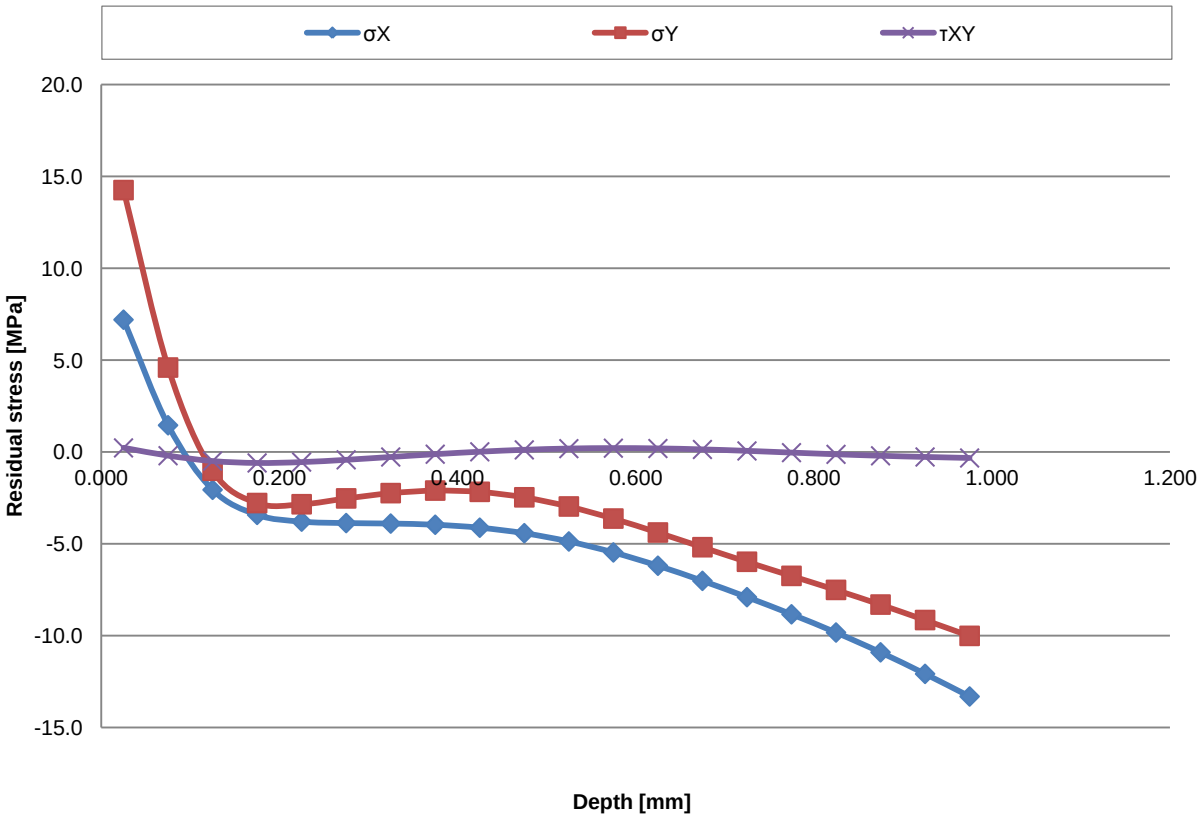
ASTM E837-13 PLOTS





NOTE Several computed stresses significantly exceed 80 % of the material yield stress, then the results are considered as indicative only. In general, the computed stresses whose values exceed 80 % of the material yield stress tend to be overestimated.