



## SUMMARY

### FTIR Analysis

The samples were received and processed for FTIR analysis of polystyrene (or polycarbonate) and silicone. There are three samples: raw material beads, puffed material beads, and a finished seven-slot tray product.

Approximately 3.0 grams of raw and 2.5 grams of puffed material styrene bead sample was extracted in 10 ml hexane for 10 minutes. The remaining extract was allowed to evaporate to a dry residue. The residue was extracted with 2-ml hexane and evaporated onto a Horizontal Attenuated Total Reflectance (HATR) trough plate drop wire. The remaining residue was extracted with 2-ml of dichloroform and evaporated onto the HATR with the residue from previous extract. The HATR was placed in a FTIR spectrometer for analysis. The FTIR analysis was performed at 1000-10000 cm<sup>-1</sup>.

# TEST REPORT

## For Tempo Plastics

Organic analysis of polystyrene/polyphenylene (Dytherm 270R) copolymer samples using a Fourier Transformed Infrared Spectrometer for Silicone (Dimethicone) and Liquid Particle Counting (LPC) on Finished Seven-Slot Tray.

Report #: MC1699  
12/16/02



## SUMMARY

### *FTIR Analysis*

The samples were received and processed for FTIR analysis of polystyrene for Silicone and slip agents. There are three samples: raw material beads, puffed material beads, and a final seven-slot tray product.

Approximately 5.0 grams of raw and 2.5 grams of puff material styrene bead sample was extracted in 10 ml hexane for 10 minutes. The resulting extract was allowed to evaporate to a dry residue. The residue was extracted with 5-ml hexane and evaporated onto a Horizontal Attenuate Total Reflectance (HATR) trough plate drop wise. The remaining residue was extracted with 2-ml of chloroform and evaporated onto the HATR with the residue from previous extract. The HATR was placed in a FTIR and the residue was analyzed. The FTIR spectrum was compared to that of silicone oil. The four signature peaks for silicone oil are at approximately 1258, 1088, 1017 and 796  $\text{cm}^{-1}$ .

### *LPC Analysis-Zero-Stress Method*

A sample tray was placed in a clean tray with 1000-ml ultrapure deionized water, from which a method blank was taken from consisting of three 10-ml aliquots. Then 1000-ml of ultrapure deionized water was poured over entire surface. The sample was allowed to remain for 1 minute, while being slosed 10x then the sample was removed and a second sample was place into the same extract. Another 1000-ml of ultrapure deionized water was poured over the entire surface. The sample was removed and three 10-ml aliquots were taken using a Hiac-Royco 8103 liquid particle counter. The results are reported in counts/ $\text{in}^2$ .

## APPENDIX

Extrac 2708 raw material polymer (red) with silicone oil (dimethicone)  
Sample matrix

Peaks: 2924.36, 2915.06, 2849.13, 1460.02 methyl group, 1731.39, 1173.01  
 $\text{C}_2\text{H}_5$  (CH<sub>2</sub>)<sub>2</sub> (131.36, 1195.4) olefinic

### Specimen 2

Extrac 2708 puff material polymer (red) with silicone oil (dimethicone)  
Sample matrix

Peaks: 2925.20, 2915.06, 2849.13, 1469.38 methyl group, 1731.39, 1173.01  
 $\text{C}_2\text{H}_5$  (CH<sub>2</sub>)<sub>2</sub> (1341.06, 1178.96) olefinic



## DISCUSSION

Silicone (dimethicone) was not present in the two samples and the major peaks identified represent polystyrene residue from extraction. The 7-slot tray has extremely few particles per surface area; see Table 1 Results of LPC below.

Table 1. Results of LPC.

Cummulative Particle Range Size	7-Slot Tray Counts/in <sup>2</sup>
0.3	1.8
0.5	1.0
1.0	0.6
2.0	0.4
3.0	0.3
5.0	0.2
10.0	0.0
15.0	0.0

## EQUIPMENT USED FOR TESTING

Thermo Mattson Satellite FTIR  
Thermo Spectra Tech Foundation Series HATR  
Hiac-Royco 8103 LPC

## SPECTRA APPENDIX

### Spectrum 1

Dytherm 270R raw material polymer (red) with silicone oil (dimethicone) (blue) spectra  
Peaks: 2955.00, 2915.08, 2849.13, 1466.02 ethyl group; 1737.55, 1173.47 R2-C=CH<sub>2</sub>; 1537.38, 1396.41 cis alkene

### Spectrum 2

Dytherm 270R puff material polymer (red) with silicone oil (dimethicone) (blue) spectra  
Peaks: 2955.20, 2915.06, 2849.13, 1469.30 ethyl group; 1731.19, 1177.91 R2-C=CH<sub>2</sub>; 1540.66, 1378.86 cis alkene





The results provided in this report are accurate within the limits appropriate to each test standard. The results of this report are statistically significant only to the samples submitted for testing. MicroStat Laboratories has no controls, and assumes no responsibility for the tested product's functionality or use.

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Michael Tosolini

12/16/02

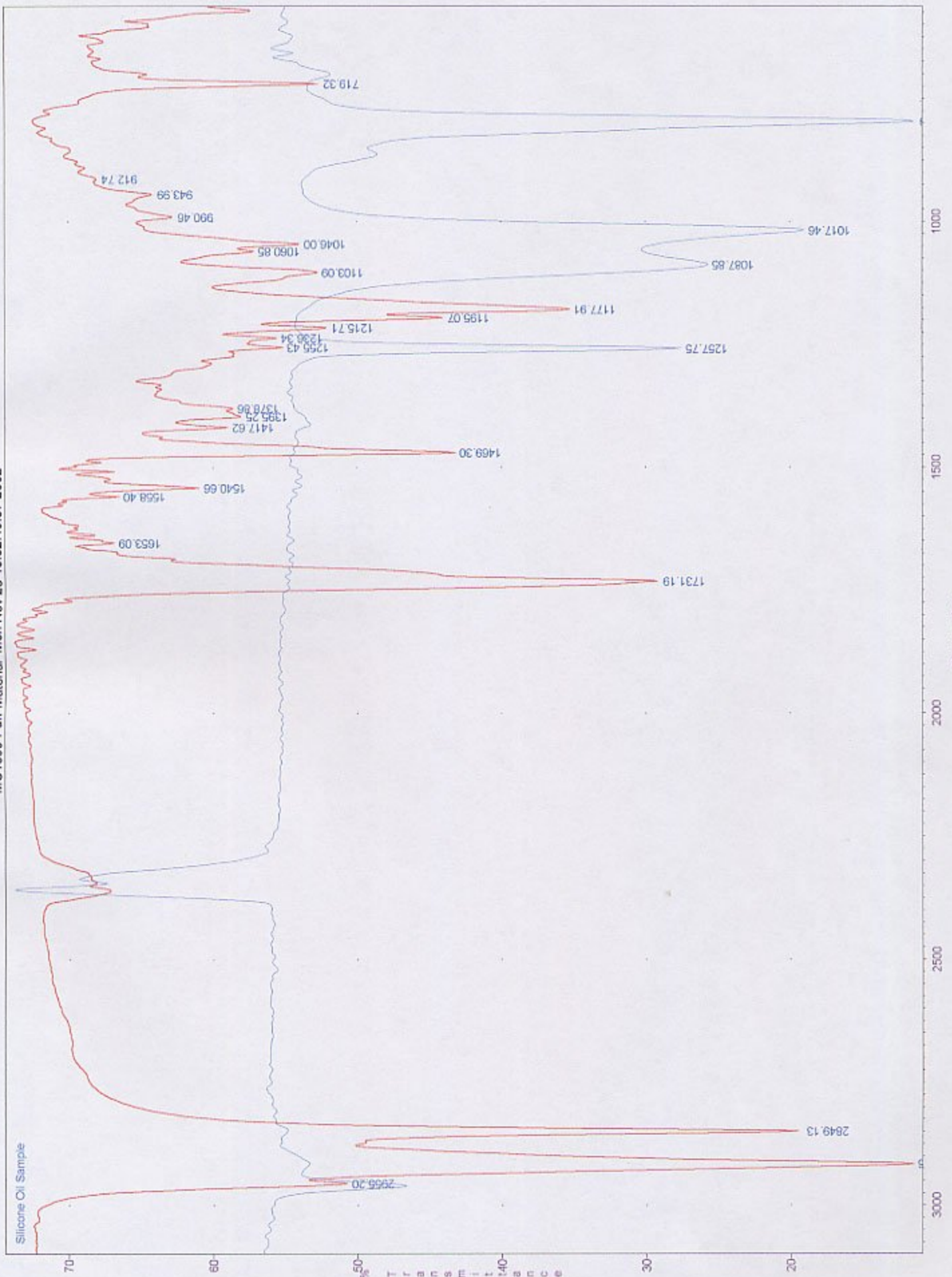
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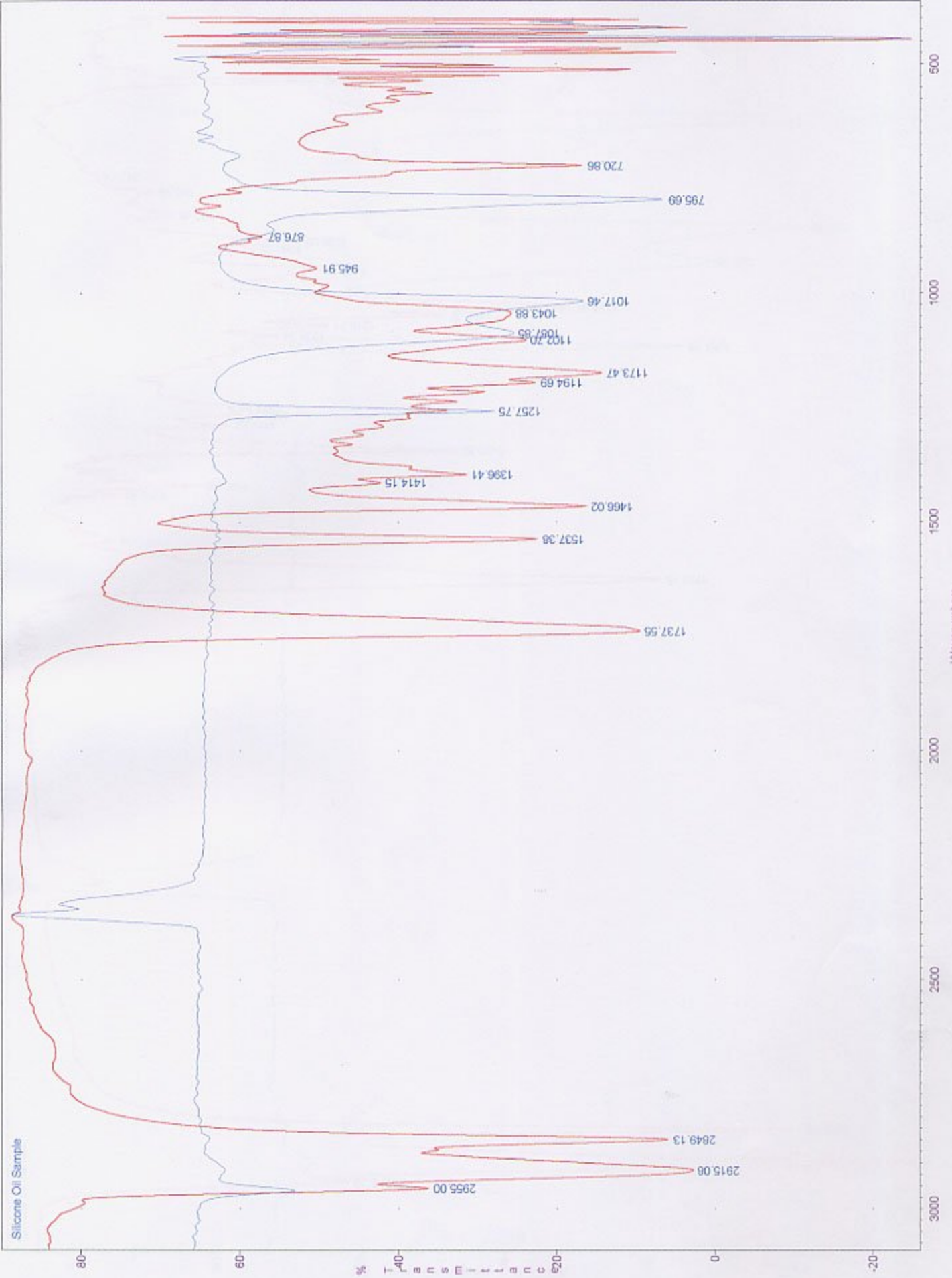
Reviewed:

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Carl E Newberg

12/16/02

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Date





Silicone Oil Sample