

# Flexural Strength of Coated Fabrics Using the Miniature 3-Point Bend Fixture

## Application Report

### Introduction

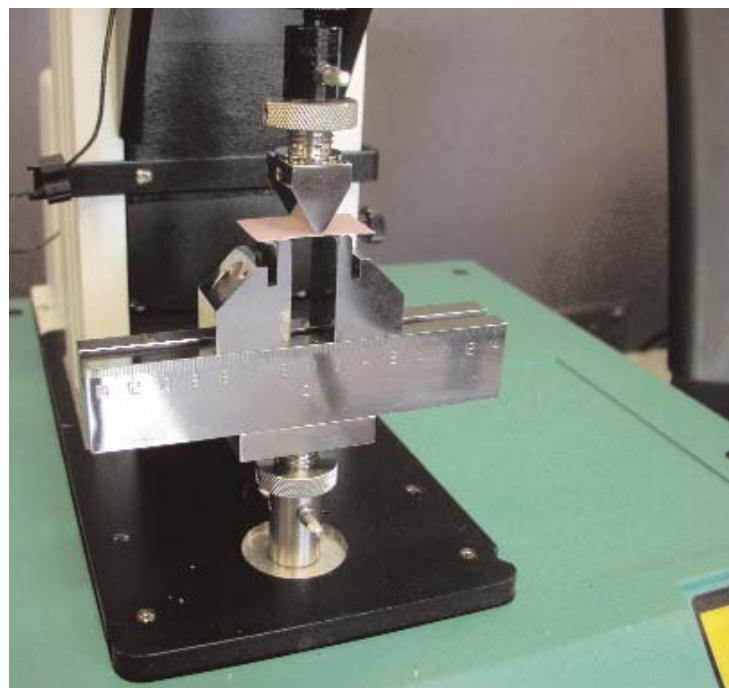
A manufacturer of coated fabrics is interested in evaluating the effect of a particular coating on the flexural properties of fabric material. Four different coated fabric samples were delivered to the Instron® demonstration laboratory for evaluation. Because of the low forces expected, a miniature three-point bend fixture was recommended in order to reduce specimen size. All testing was conducted in accordance with ASTM D 790, 'Standard test method for flexural properties of unreinforced and reinforced plastics and electrical insulating materials'.

### Test Configuration

- **EM frame** - model 3345
- **Load cell** - 5 N
- **Fixture** - Miniature 3-point bend fixture with 4 cm span
- **Specimen dimensions** - 25 mm width x 37.5 mm length
- **Test speed** - 25 mm/min
- **End of test** - 5 mm flexure displacement

### Results and Conclusions

The flexural strength test reveals that the striped materials have approximately the same flexural strength and are both significantly higher than the flexural strength of the unstriped materials. The stiffness of the dark brown striped material was the highest and the most flexible of the materials was the white sample. These results show that the test configuration was successfully able to distinguish between the fabrics and measure the mechanical properties of each.

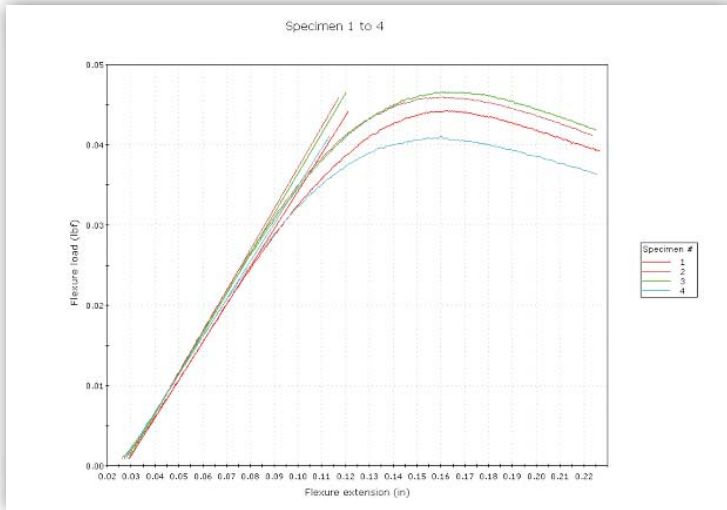


▲  
**Figure 1:**  
 Test configuration before start of test.

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### Sample #1 - white with dark brown stripe

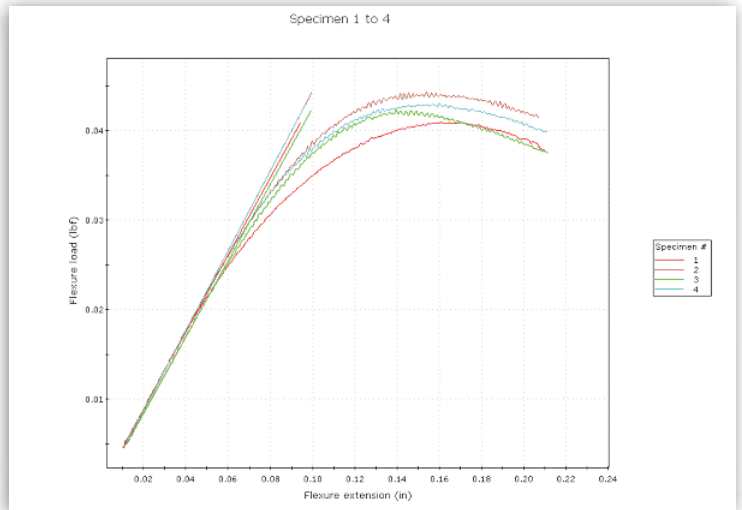


▲ **Figure 2:**  
Flexure load vs. extension for four specimens in Sample 1.

| Specimen #  | Maximum Flexure Load (lbf) | Flexure Modulus (psi) |
|-------------|----------------------------|-----------------------|
| 1           | 0.044                      | 460.067               |
| 2           | 0.046                      | 498.777               |
| 3           | 0.047                      | 487.946               |
| 4           | 0.041                      | 457.723               |
| <b>Mean</b> | 0.044                      | 476.128               |
| <b>S.D.</b> | 0.002                      | 20.407                |

▲ **Table 1:**  
Maximum flexure load and modulus results for Sample 1.

### Sample #2 - white with yellow stripe



▲ **Figure 3:**  
Flexure load vs. extension for four specimens in Sample 2.

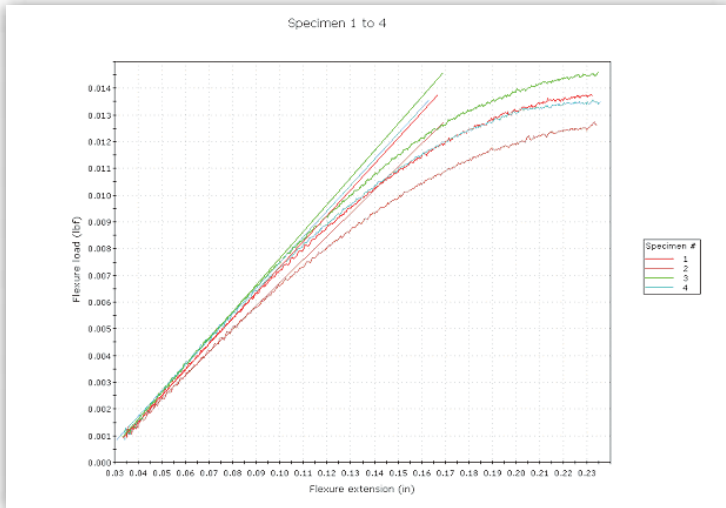
| Specimen #  | Maximum Flexure Load (lbf) | Flexure Modulus (psi) |
|-------------|----------------------------|-----------------------|
| 1           | 0.041                      | 418.861               |
| 2           | 0.044                      | 434.754               |
| 3           | 0.042                      | 415.529               |
| 4           | 0.043                      | 435.095               |
| <b>Mean</b> | 0.043                      | 426.06                |
| <b>S.D.</b> | 0.001                      | 10.327                |

▲ **Table 2:**  
Maximum flexure load and modulus results for Sample 2.

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### Sample #3 - white

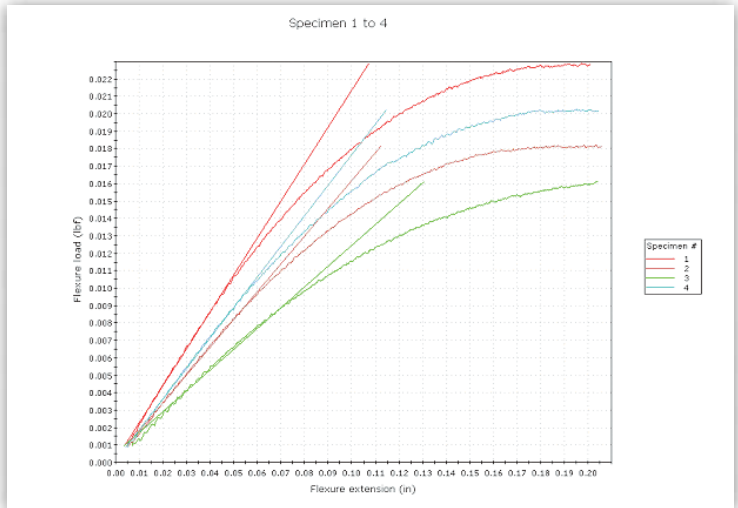


▲ **Figure 4:**  
Flexure load vs. extension for four specimens in Sample 3.

| Specimen # | Maximum Flexure Load (lbf) | Flexure Modulus (psi) |
|------------|----------------------------|-----------------------|
| 1          | 0.014                      | 93.715                |
| 2          | 0.013                      | 84.58                 |
| 3          | 0.015                      | 97.776                |
| 4          | 0.014                      | 93.763                |
| Mean       | 0.014                      | 92.459                |
| S.D.       | 0.001                      | 5.587                 |

▲ **Table 3:**  
Maximum flexure load and modulus results for Sample 3.

### Sample #4 - light brown



▲ **Figure 5:**  
Flexure load vs. extension for four specimens in Sample 4.

| Specimen # | Maximum Flexure Load (lbf) | Flexure Modulus (psi) |
|------------|----------------------------|-----------------------|
| 1          | 0.023                      | 207.234               |
| 2          | 0.018                      | 155.422               |
| 3          | 0.016                      | 116.407               |
| 4          | 0.02                       | 170.946               |
| Mean       | 0.019                      | 162.502               |
| S.D.       | 0.003                      | 37.626                |

▲ **Table 4:**  
Maximum flexure load and modulus results for Sample 4.



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