

Projekt: 13-02093  
Rapport: 13-02093-05121300  
Datum: 2005-12-13  
Antal sidor: 6  
Bilagor:



## Stepisol 195

### Mätning av statisk och dynamisk styvhet

**Uppdragsgivare:** Svensk Emballageteknik AB  
Håkan Forsmark

Åkervägen 15  
177 41 Järfälla

Tel: 08-580 940 00

**Uppdrag:** Mätning av statisk och dynamisk styvhet för Stepisol 195

**Sammanfattning:** Statisk styvhet har bestämts till  $0,014 \text{ N/mm}^3$  i området 20-100  $\text{kN/m}^2$ . Den dynamiska styvheten har uppmätts vid två statiska förlaster och är vid 30 Hz som exempel:  
 $0,026 \text{ N/mm}^3$  vid förlasten  $12 \text{ kN/m}^2$   
 $0,055 \text{ N/mm}^3$  vid förlasten  $86 \text{ kN/m}^2$

**Handläggare:**

Jörgen Svensson

**Kvalitetskontroll:**

Calle Ekstrand

## 1. Test method

The tests were carried out 2005-12-02 in a test rig which conforms to the International Standard ISO 10846-2:1997. Static preload as well as dynamic load was applied by a servohydraulic actuator.

Sample size: 300x270x25 mm

### 1.1. Static test

Test signal: Ramping displacement during 25 s

Load: 0-9,2 kN (also 0-10,2 kN on sample size 120x97x25 mm)

Preconditioning: 5 static load cycles 0-9,2 kN

### 1.2. Dynamic test

Test signal: Swept sine 1-300 Hz.  
Constant displacement amplitude 0,05 mm RMS.  
Preload 0,012 and 0,086 kN/m<sup>2</sup> (1 kN and 7 kN respectively).

Preconditioning: Static test

### 1.3. Instrumentation

<i>Equipment</i>	<i>Model</i>	<i>Our ID</i>
Hydraulic actuator	MTS 242.02	E 18.1
Servo valve	MTS 252.43	E 18.2
Control unit	MTS 458.20,11,13	E 18.3
Force transducer	MTS 661.19C/D-02	E 18.4
Digital signal analyser	Hewlett-Packard 3562A	AL 107

Instruments are calibrated with traceability to national and international standards following our quality system which conforms to ISO/IEC 17025

## 2. Results

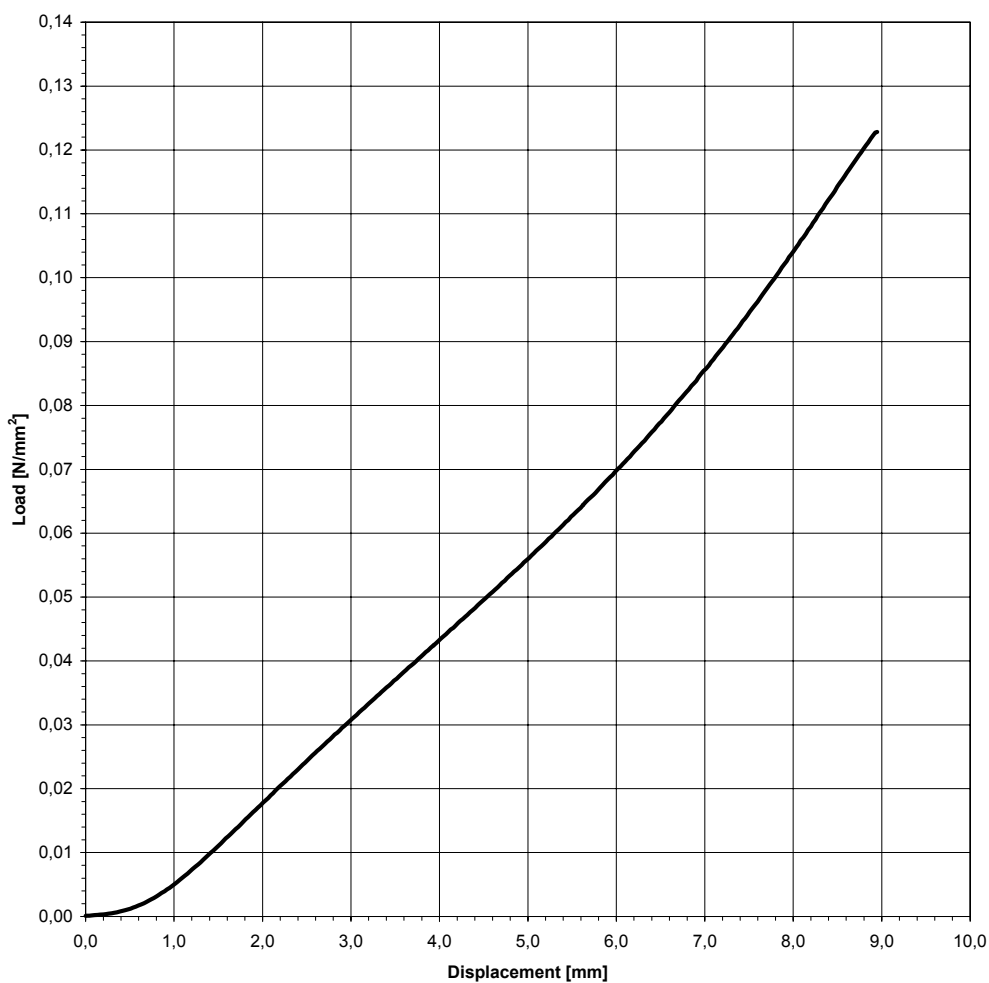
See protocols on pages 3-6.



## Static stiffness

Project: 13-02093  
Date: 02-dec-05  
Sign: JÖS

**Commissioner:** Svensk Emballageteknik  
**Object:** Stepisol 195 25 mm      **Prov 1**  
**Test code:**  
**Test equipment:** MTS servohydraulic system 242.02, 252.43, 661.19C/D02, 458.20; HP 3562A  
**Preconditioning:** 5 cycles  
**Coordinate:** Z (Vertical)      **Object temp.:** 22 °C  
**Mounting:** 300x270x25 mm      **Ambient temp.:** +22 °C  
**Static preload:** 0 N  
**Load cycle:** 0- 9800 N      Compression      **Stiffness 20-100 kN/m<sup>2</sup>:** 0,0142 N/mm<sup>3</sup>  
**Ramp speed:** 23520 N/min



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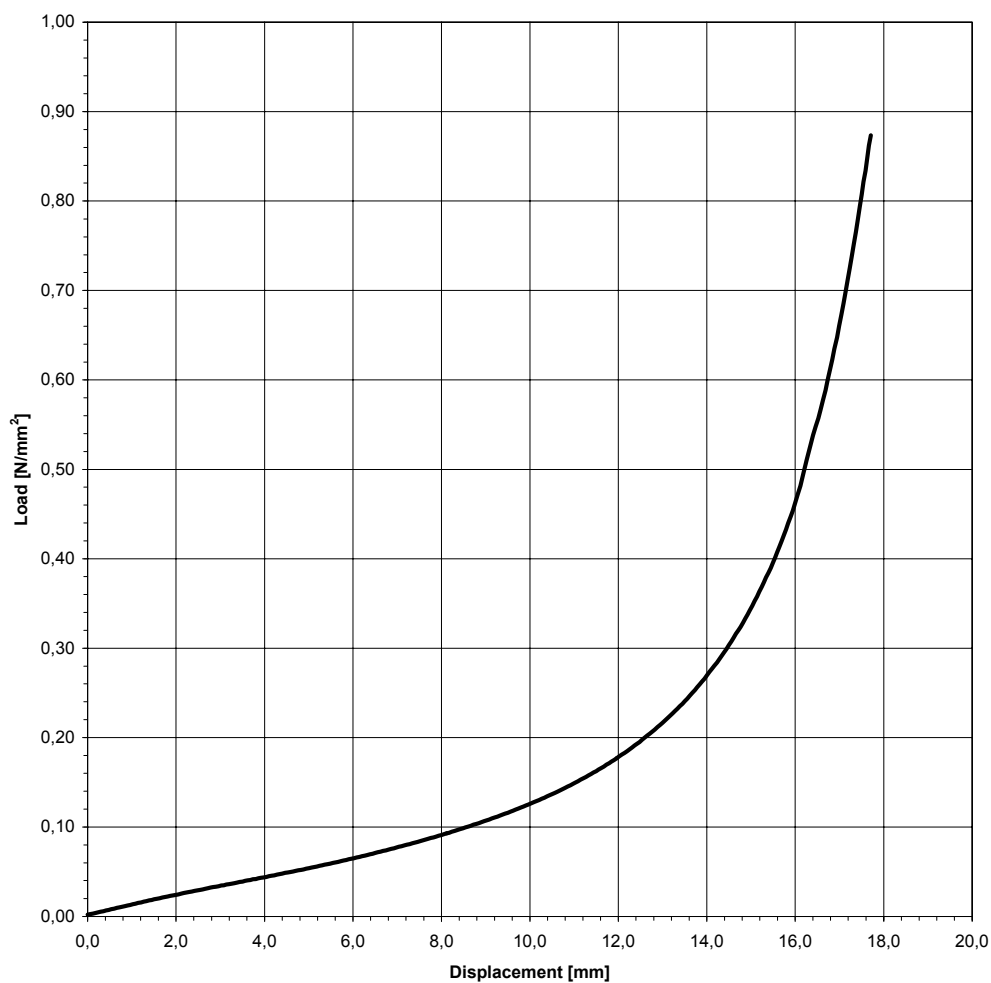
Quality check:

Carl-Gunnar Ekstrand

**Static stiffness**

**Project:** 13-02093  
**Date:** 02-dec-05  
**Sign:** JÖS

**Commissioner:** Svensk Emballageteknik  
**Object:** Stepisol 195 25 mm      **Prov 3b**  
**Test code:**  
**Test equipment:** MTS servohydraulic system 242.02, 252.43, 661.19C/D02, 458.20; HP 3562A  
**Preconditioning:** 5 cycles  
**Coordinate:** Z (Vertical)      **Object temp.:** 22 °C  
**Mounting:** 120x97x25 mm      **Ambient temp.:** +22 °C  
**Static preload:** 0 N  
**Load cycle:** 0- 10200 N      Compression      **Stiffness 20-100 kN/m<sup>2</sup>:** 0,0114 N/mm<sup>3</sup>  
**Ramp speed:** 24480 N/min



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Quality check:

Carl-Gunnar Ekstrand

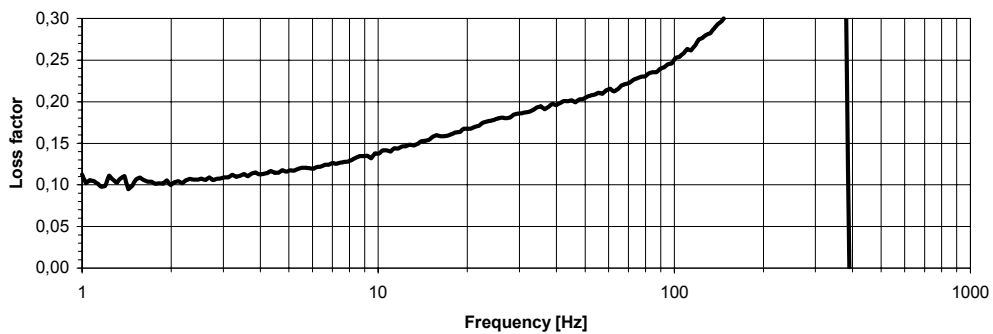
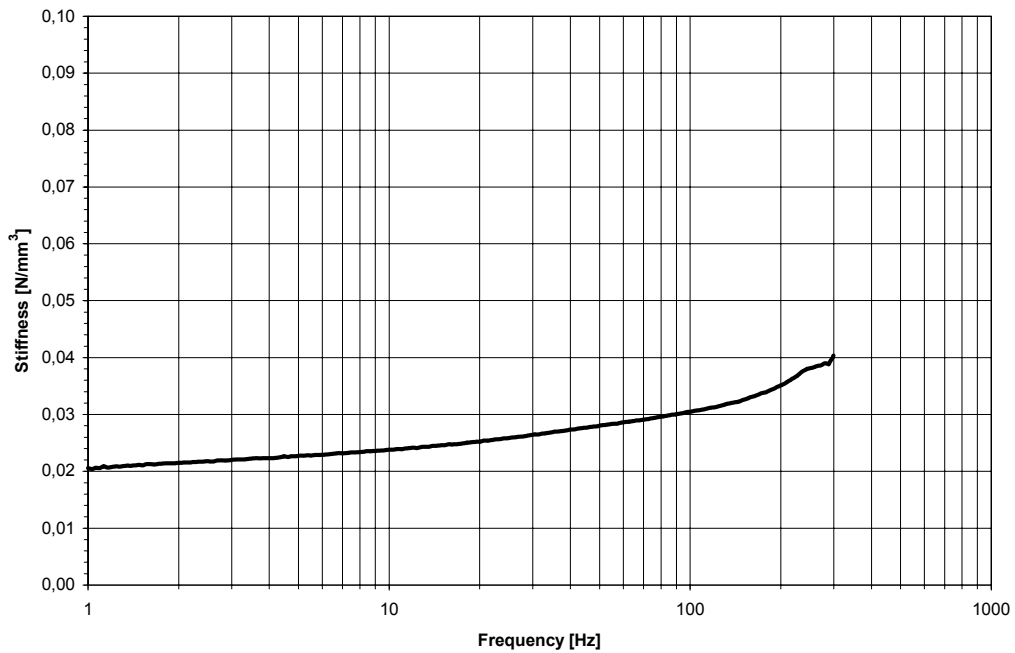


**Dynamic transfer stiffness**  
**EN ISO 10846-2:1998**

**Project:** 13-02093  
**Date:** 2005-12-02  
**Sign:** JÖS

**Commissioner:** Svensk Emballageteknik  
**Object:** Stepisol 195 25 mm Prov 1  
**Test code:**  
**Test equipment:** MTS servohydraulic system 242.02, 252.43, 661.19C/D02, 458.20; HP 3562A  
**Preconditioning:** Static test  
**Coordinate:** Z  
**Mounting:** 300x270x25 mm  
**Static preload:** 0,012 N/mm<sup>2</sup>  
**Dyn. amplitude:** 0,05 mm peak

**Object temp.:** +22 °C  
**Ambient temp.:** +22 °C



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Jörgen Svensson

Quality check:

Carl-Gunnar Ekstrand

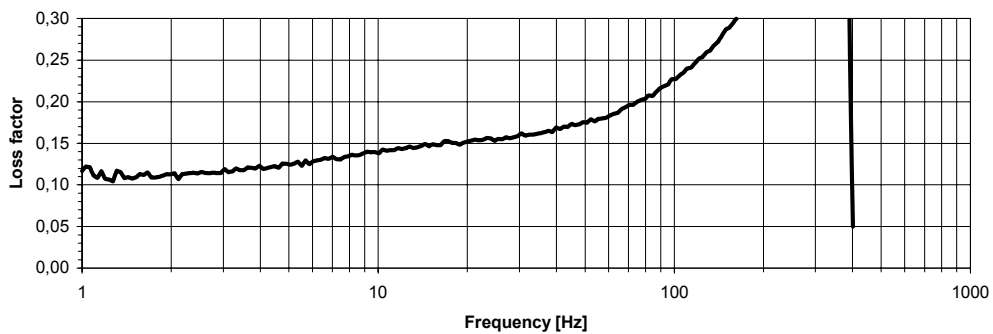
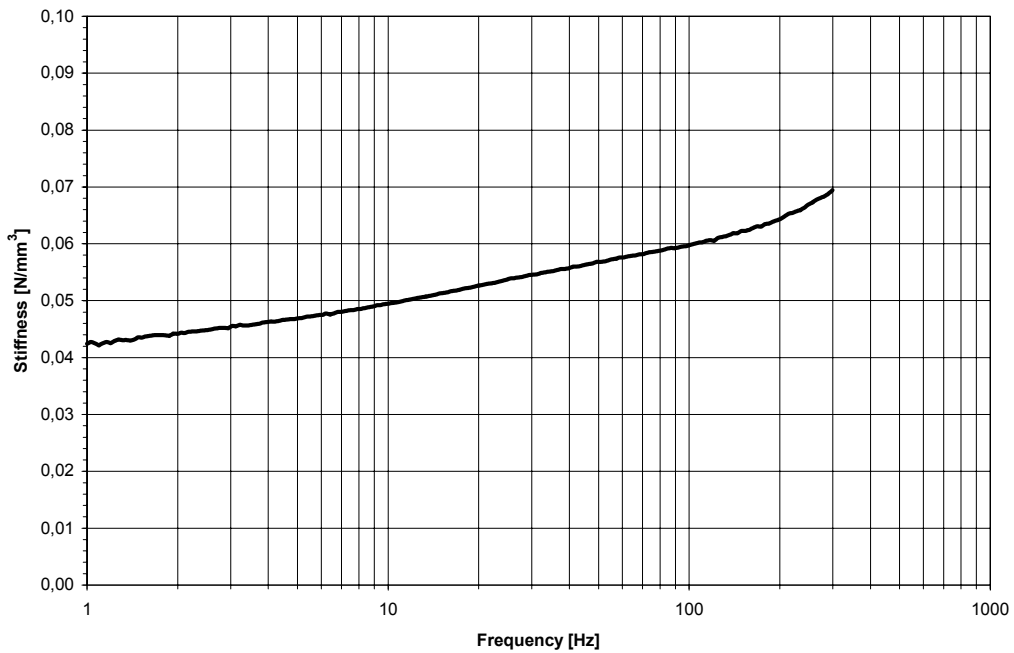


**Dynamic transfer stiffness**  
 EN ISO 10846-2:1998

**Project:** 13-02093  
**Date:** 2005-12-02  
**Sign:** JÖS

**Commissioner:** Svensk Emballageteknik  
**Object:** Stepisol 195 25 mm Prov 1  
**Test code:**  
**Test equipment:** MTS servohydraulic system 242.02, 252.43, 661.19C/D02, 458.20; HP 3562A  
**Preconditioning:** Static test  
**Coordinate:** Z  
**Mounting:** 300x270x25 mm  
**Static preload:** 0,086 N/mm<sup>2</sup>  
**Dyn. amplitude:** 0,05 mm peak

**Object temp.:** +22 °C  
**Ambient temp.:** +22 °C



Göteborg 2005-12-06  
**Ingemansson Automotive AB**

Jörgen Svensson

Quality check:

Carl-Gunnar Ekstrand