

## O-EEA PEDESTRIAN PROTECTION ABSORBER

**Purpose :** The O-EEA tube is applicable for Pedestrian Protection in Front End Modules as well as 2.5 mph bumper testing. It serves as an energy absorber which can be filled with foam. Pedestrian Testing conducted by accredited lab has shown ability to meet all requirements with one tube. It is capable of meeting the IHS 5 & 6 mph bumper testing as another option.

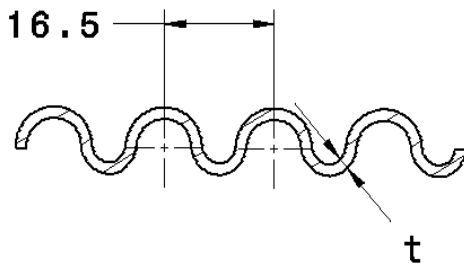
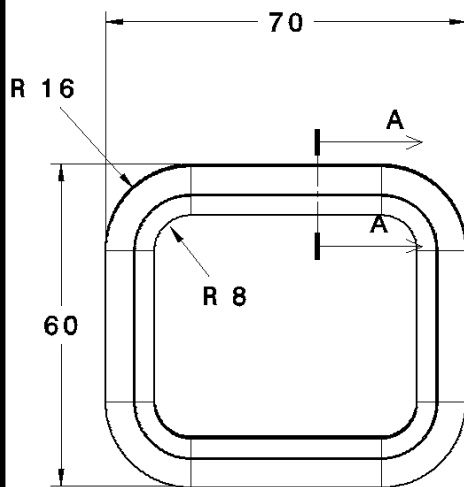
**Characteristics :** light weight, flexible, anti-corrosion

**Standard Size :** 70mm x 60mm x L

**Wall Thicknesses:** 0.9mm ~ 2.2mm FEA Model Available

**Options:** Custom size, tapered ends, attachments, foam filling, stiffness

**Compression Strength :** See Chart on page 4



Section cut A-A

### O-EEA Properties

60x70 (60mm stroke)

Wall Thickness	Mass	Wall Thickness (avg.)		Cross Section		Corrugations		Static Force Level @ 80% Stroke kN
		Peak mm	Valley mm	Width mm	Height mm	Radius mm	Corr's / m	
0.9	0.30	0.9	1.3	60	70	16	60	6.2
1.0	0.33	1.0	1.4	60	70	16	60	11.1
1.2	0.36	1.2	1.5	60	70	16	60	15.6
1.8	0.50	1.7	1.9	60	70	16	60	22.3

70x60 (70mm stroke)

Wall Thickness	Mass	Wall Thickness (avg.)		Cross Section		Corrugations		Static Force Level @ 80% Stroke kN
		Peak mm	Valley mm	Width mm	Height mm	Radius mm	Corr's / m	
0.9	0.30	0.9	1.3	70	60	16	60	4.9
1.0	0.33	1.0	1.4	70	60	16	60	8.4
1.2	0.36	1.2	1.5	70	60	16	60	13.7
1.8	0.50	1.7	1.9	70	60	16	60	16.2

O-FLEX INC

O-Flex Automotive  
1531 Sarah Court  
Murfreesboro, TN 37129

Phone: (615) 898-1910  
Fax: (615) 898-1912

E-mail: btokarz@oflex.com  
www.oflex.com

**PATENTS: EU 0 0888 952 A; US Patent Pending**

Rev. Date 11-08

## O-EEA PEDESTRIAN PROTECTION TUBE

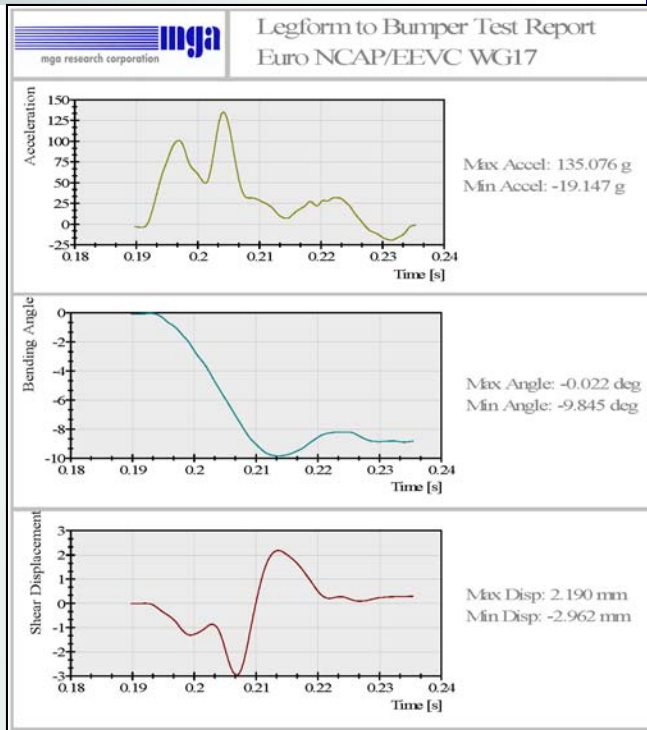
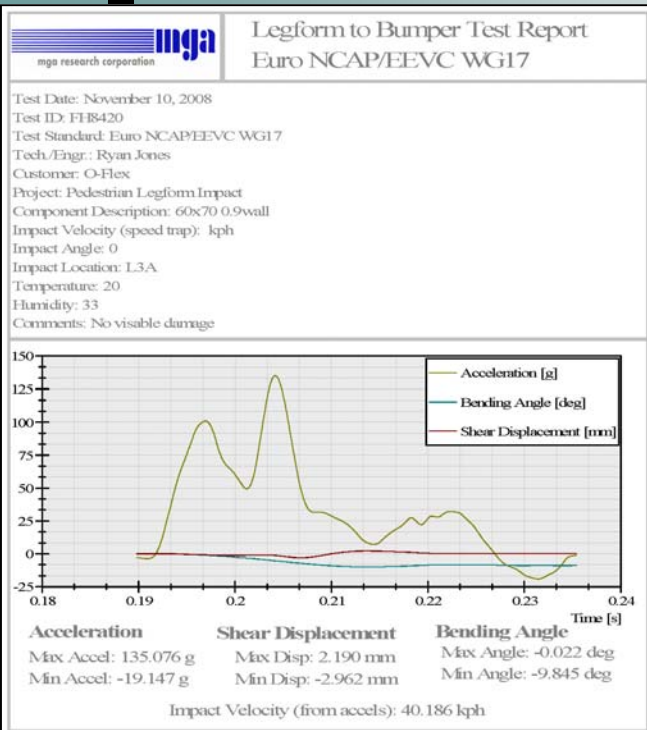


FIGURE 1—Euro NCAP Test Results for One Row 60mm x 70mm x 0.9mm wall. Tested with 60mm stroke orientation. Tested on production intent vehicle. Tested 11-10-2008

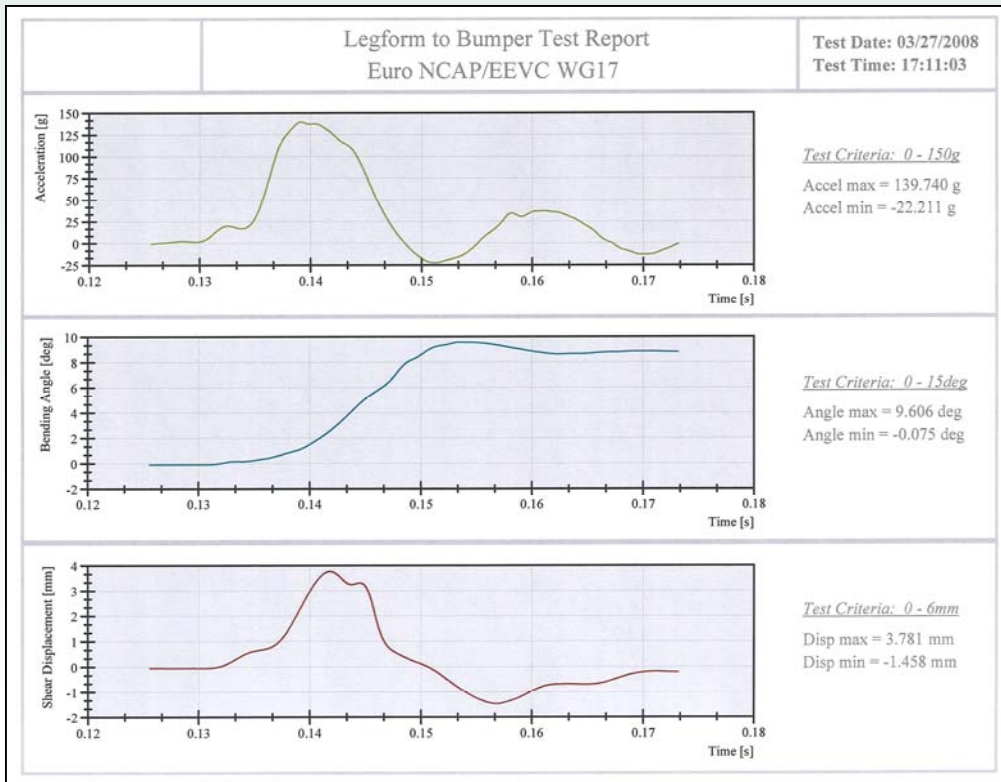


FIGURE 2—Euro NCAP Pedestrian Protection Test Results for One Row O-EEA 60x70 1.0mm wall. Tested in the 60mm stroke orientation, tested in full production vehicle. Tested 3-27-2008

O-FLEX INC

O-Flex Automotive  
 1531 Sarah Court  
 Murfreesboro, TN 37129

Phone: (615) 898-1910  
 Fax: (615) 898-1912  
 E-mail: btokarz@oflex.com  
 www.oflex.com

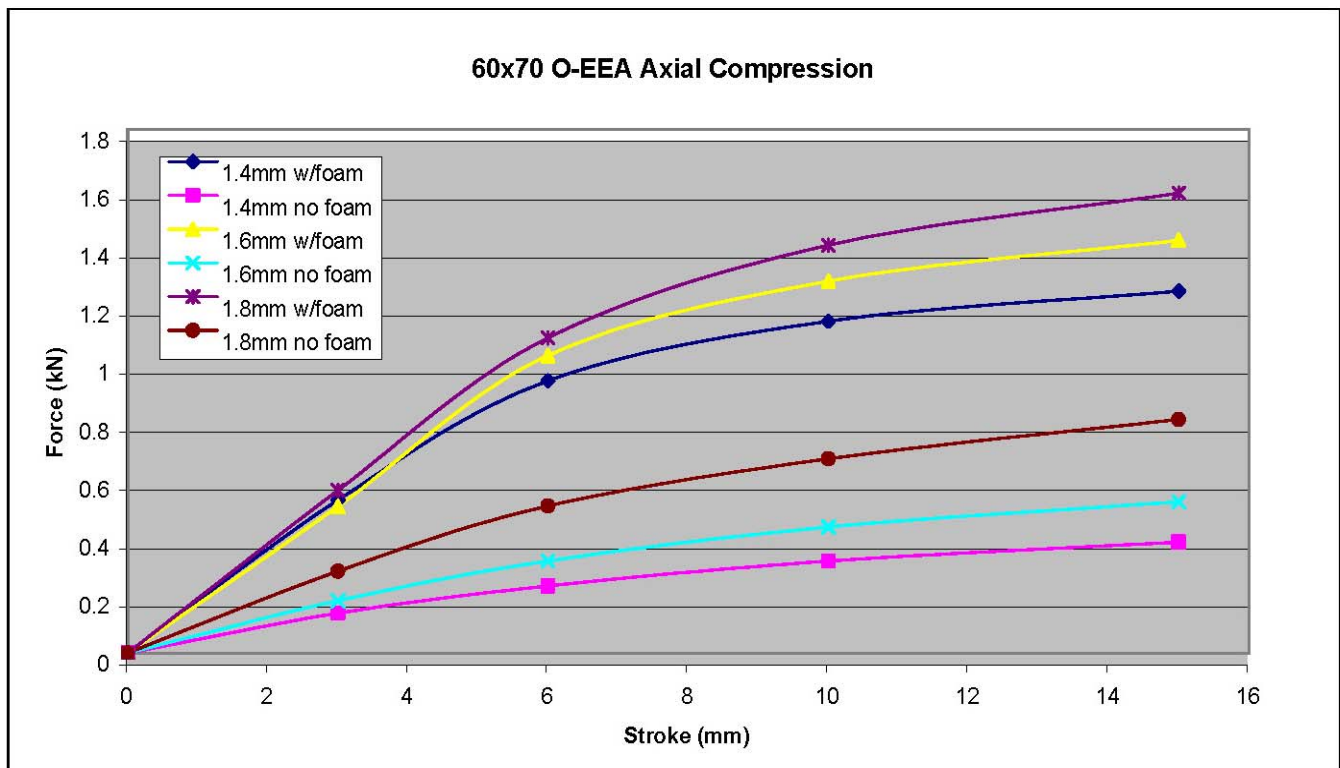
PATENTS: EU 0 0888 952 A; US Patent Pending

Rev. Date 11-08

## O-EEA PEDESTRIAN PROTECTION TUBE

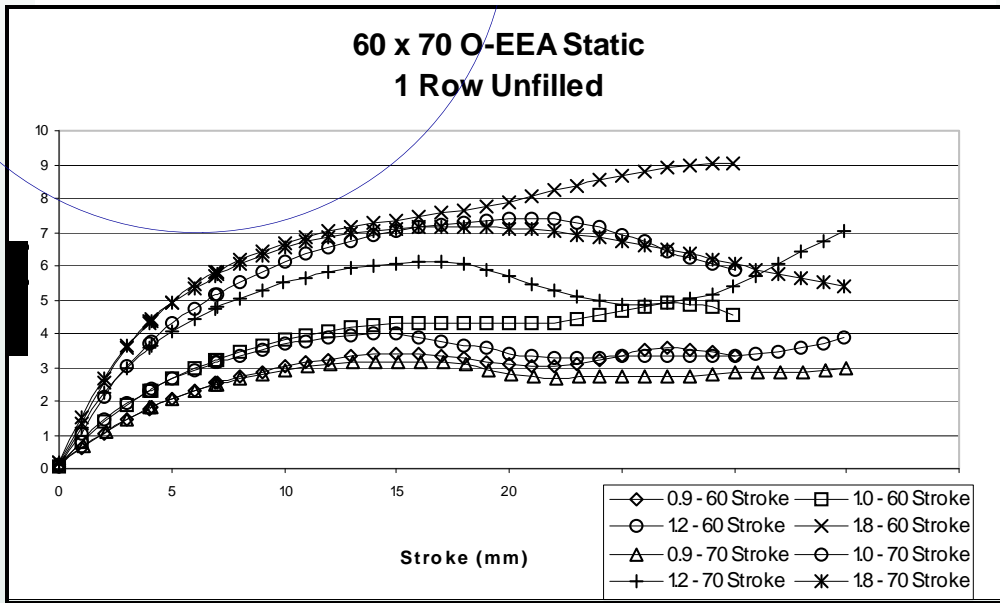
### 60x70 O-EEA Axial Compression Test Results

Thickness	Foam Content	Lase			
		1	2	3	4
1.4	yes	0.540	0.988	1.158	1.232
	no	0.142	0.232	0.308	0.347
1.6	yes	0.532	1.008	1.227	1.375
	no	0.187	0.335	0.460	0.582
1.8	yes	0.552	1.117	1.428	1.612
	no	0.280	0.498	0.650	0.797
Mean 1.4 without foam		0.137	0.231	0.316	0.382
Mean 1.4 with foam		0.526	0.936	1.141	1.245
Mean 1.6 without foam		0.180	0.316	0.433	0.520
Mean 1.6 with foam		0.505	1.023	1.279	1.419
Mean 1.8 without foam		0.282	0.506	0.668	0.803
Mean 1.8 with foam		0.559	1.083	1.403	1.581



# O-EEA PEDESTRIAN PROTECTION TUBE

## Force Deflection—Static Load



## Dynamic Test Results (Tube stroking 70mm, bench test no fascia)

No	Shot #	OEEA Tube	Foam Filled	Part Details	Vel [kph]	EA <sub>1</sub> [J]	d [mm]	F <sub>avg</sub> [kN]	a <sub>avg</sub> [G]	a <sub>max</sub> [G]	
1	102864	0.9 Wall	No	2 Rows with Spacer	34.30	318.18	67.84	4.69	68.22	169.76	
2	102867	0.9 Wall	Yes	2 Rows with Spacer	33.90	310.80	42.07	7.39	107.47	160.46	
3	102849	1.0 Wall	No	2 Rows with Spacer	34.30	318.17	49.87	6.38	92.81	137.68	
4	102863	1.0 Wall	Yes	2 Rows with Spacer	34.10	314.47	40.32	7.80	113.45	188.69	
5	102853	1.2 Wall	No	2 Rows with Spacer	33.90	310.79	36.12	8.60	125.17	188.54	
6	102855	1.2 Wall	Yes	2 Rows with Spacer	33.80	308.93	33.84	9.13	70.65	257.08	
7	102670	1.8 Wall	No	1 Row	33.60	305.32	62.87	4.86	72.34	106.63	
8	102691	1.8 Wall	Yes	1 Row	34.00	312.64	62.87	4.97	101.42	97.53	
					Mean	34.10	314.48	47.24	6.97	101.42	169.03
					Range	0.40	7.39	31.72	3.91	56.95	51.02
					Std Dev	0.20	3.69	12.55	1.51	21.92	21.36

## Acceleration vs. Displacement

