

PLASCORE DEFORMABLE BARRIER



**European Side Impact
Directive 96/27/EC**



MOBILE DEFORMABLE BARRIER

The Barrier consists of an impactor and a trolley. Following are the impactor characteristics.

CHARACTERISTICS OF THE IMPACTOR

Geometrical Characteristics

The impactor consists of six independent joined parts whose forms, sizes and positioning are shown in (figure 1).

The deformable impact zone shall be $1,500 \pm 10$ mm wide and 500 ± 5 mm high.

The ground clearance shall be 260 ± 5 mm measured in static condition before impact.

There shall be six deformable elements, divided into rows of three elements. All the elements shall have the same width (500 ± 5 mm) and the same height (250 ± 3 mm); the elements of the upper row shall be 440 ± 5 mm deep and those of the lower row 500 ± 5 mm deep.

2.1 Material Characteristics

The material of the impactor must be an aluminum honeycomb. Other materials can be used if equal results as described in paragraph 2.3 have been proved to the Technical Service. In any case the type of impactor must be indicated in the test report.

Deformation Characteristics

Deviation from the limits of the force-deflection corridors characterizing the rigidity of the impactor – as defined in this annex, figure 2 – may be allowed provided that:

The deviation occurs after the beginning of the impact and before the deformation of the impactor is equal to 150 mm;

The deviation does not exceed 50 per cent of the nearest instantaneous prescribed limit of the corridor;

Each displacement corresponding to each deviation does not exceed 35 mm of deflection and the sum of these displacements does not exceed 70 mm (see figure 2) and;

The sum of the energy derived from deviating outside the corridor does not exceed 5 per cent of the gross energy for that block.

Parts 1 and 3 are identical. Their rigidity is such that their force-deflection curves fall within the hatched area of figure 2, graph 2a.

Parts 5 and 6 are identical. Their rigidity is such that their force-deflection curves fall within the hatched area of figure 2, graph 2d.

The rigidity of part 2 is such that its force-deflection curve falls within the hatched area of figure 2, graph 2b.

The rigidity of part 4 is such that its force-deflection curve falls within the hatched area of figure 2, graph 2c.

The force-deflection of the impactor as a whole shall fall within the hatched area of figure 2, graph 2e.

The force-deflection curves shall be verified by a test detailed in annex 5 –appendix, consisting of an impact of the assembly against a dynamometric barrier at 35 ± 2 km/h.

The dissipated energy 1/ against part 1 and 3 during the test shall be equal to 10 ± 2 kJ for each of these parts.

The dissipated energy against parts 5 and 6 shall be equal to 3.5 ± 1 kJ for each of these parts.

The amount of energy indicated are the amounts of energy dissipated by the system when the extent to which the impactor is crushed is greatest.

The dissipated energy against part 4 shall be equal to 4 ± 1 kJ.

The dissipated energy against part 2 shall be equal to 14 ± 2 kJ.

Impactor deformation measured after the test at level B (figure 1) shall be equal To 330 ± 20 mm.

**European Side Impact Test Matrix
Energy Absorbed**

	<u>Standard</u>	<u>Test #1</u>	<u>Test #2</u>
Impact Velocity	35 ± 2 kmph	34.9 kmph	34.5 kmph
Cart Mass	950 ± 20 kg	943 kg	950 kg
Block Number			
1.	10 ± 2 kJ	9.9 kJ	10.6 kJ
2.	14 ± 2 kJ	13.6 kJ	14.3 kJ
3.	10 ± 2 kJ	9.0 kJ	10.4 kJ
4.	4 ± 1 kJ	3.6 kJ	3.9 kJ
5.	3.5 ± 1 kJ	3.3 kJ	3.5 kJ
6.	4.5 ± 5 kJ	42.8 kJ	46.2 kJ
Displacement	330 ± 20 mm	333 mm	332 mm

Figure 1

Design of the mobile deformable barrier impactor

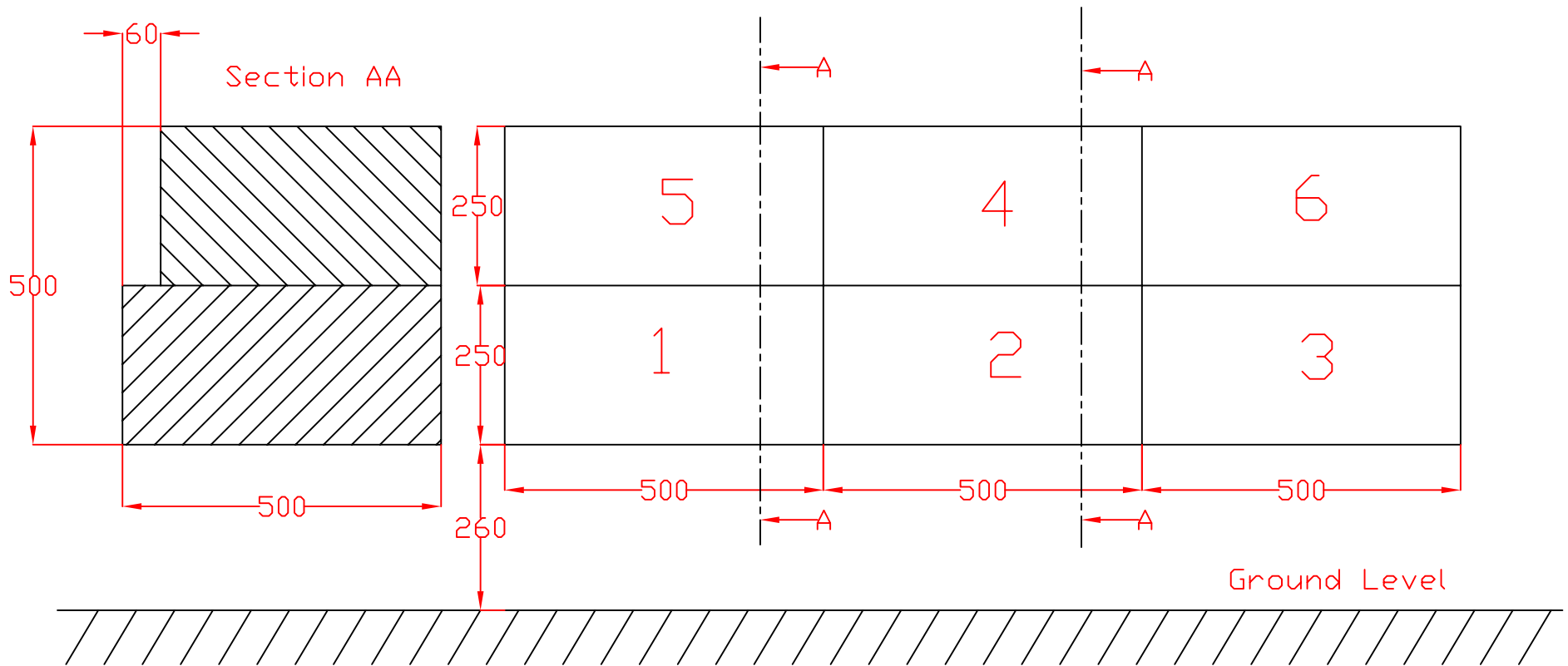
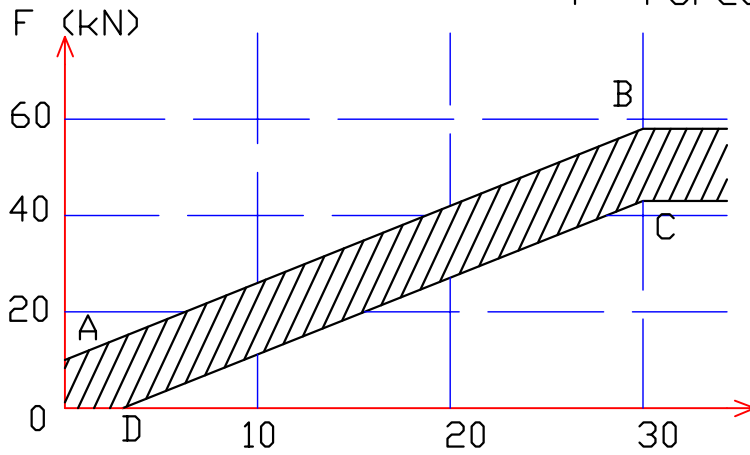


Figure 2
Force-Deflection Curve

d = Deflection (cm)
F = Force kN

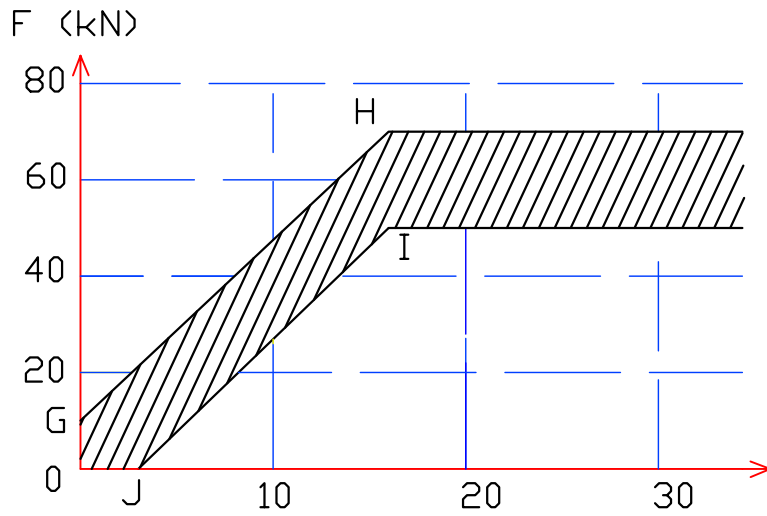
Blocks
1 & 3
(2A)



	d	F
A	0	10
B	30	58
C	30	43
D	3	0

Deflection (cm)

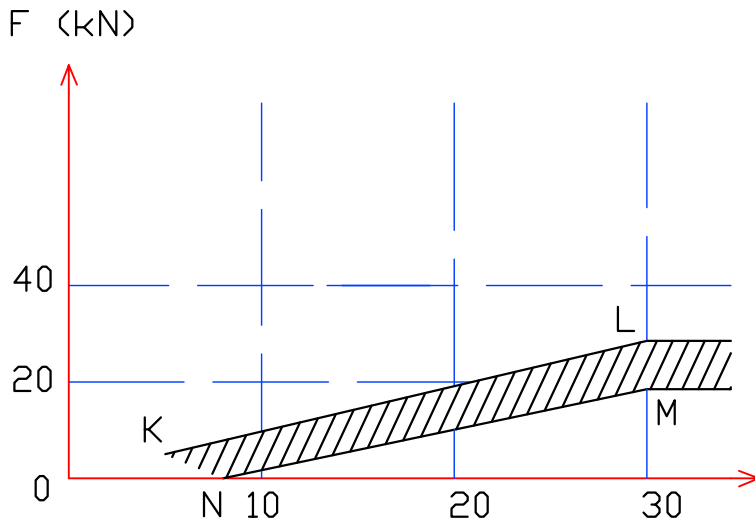
Block
2
(2B)



	d	F
G	0	10
H	16	70
I	16	50
J	3	0

Deflection (cm)

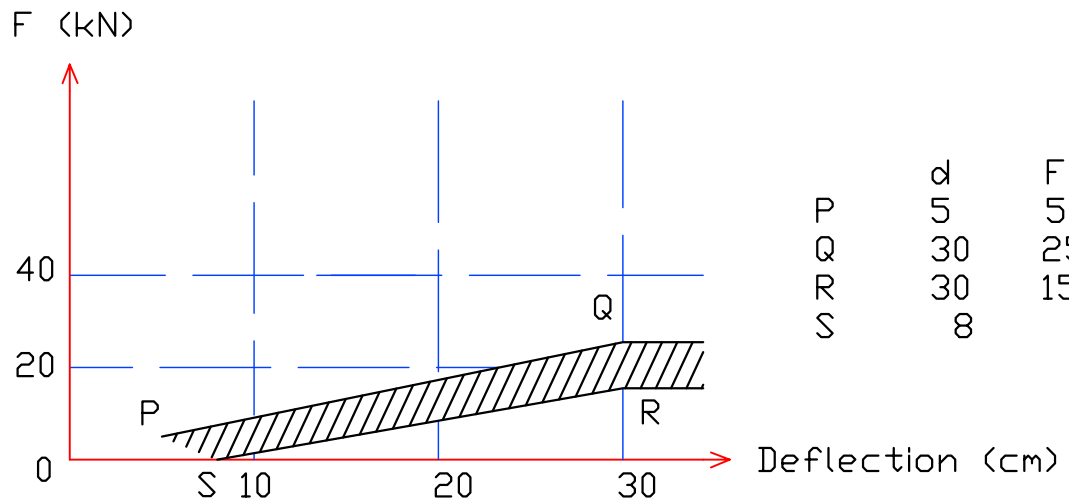
Block
4
(2C)



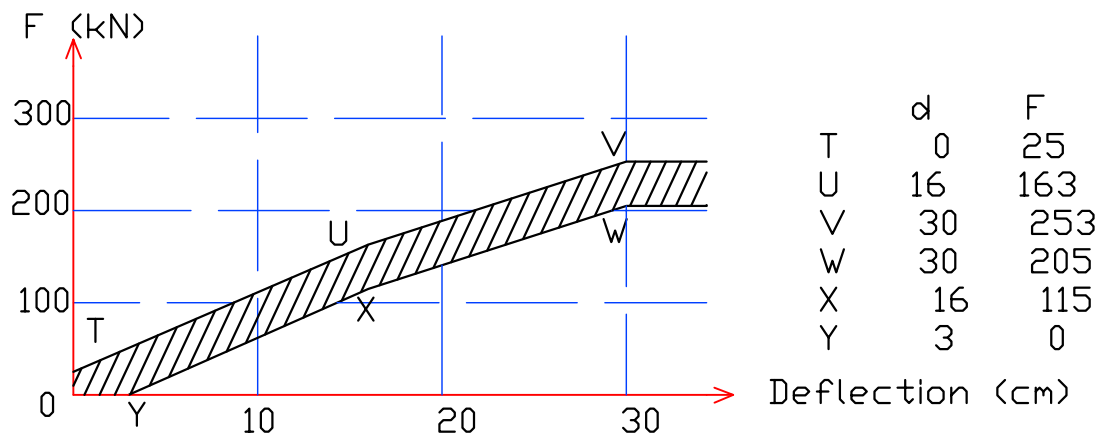
	d	F
K	5	5
L	30	28.5
M	30	18.5
N	8	0

Deflection (cm)

Block
5,6
(2D)



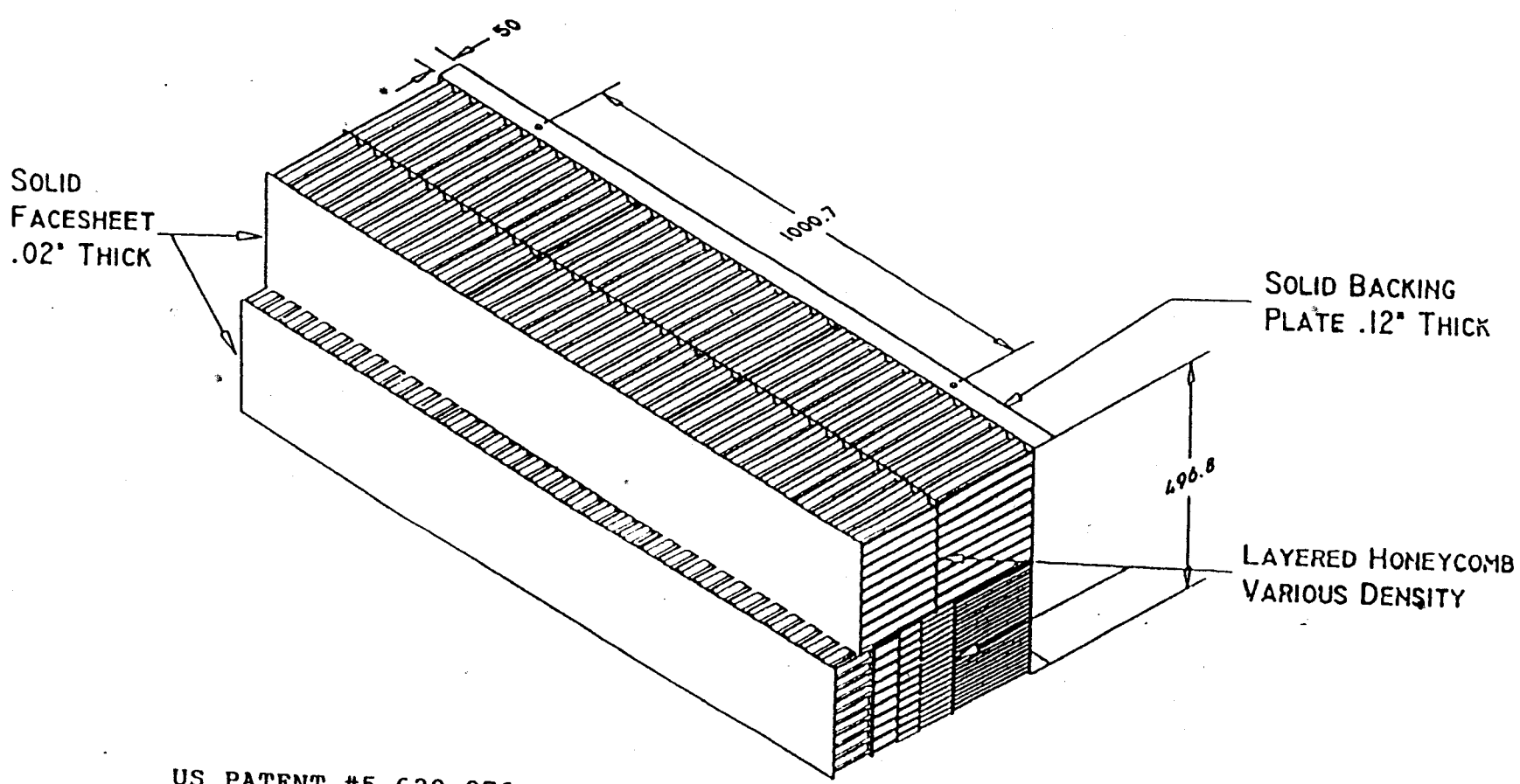
Total
(2E)



Note: During the verification test, the loads measured on parts 1 and 3 and on parts 5 and 6 respectively shall not differ by more than 10% for a given deflection

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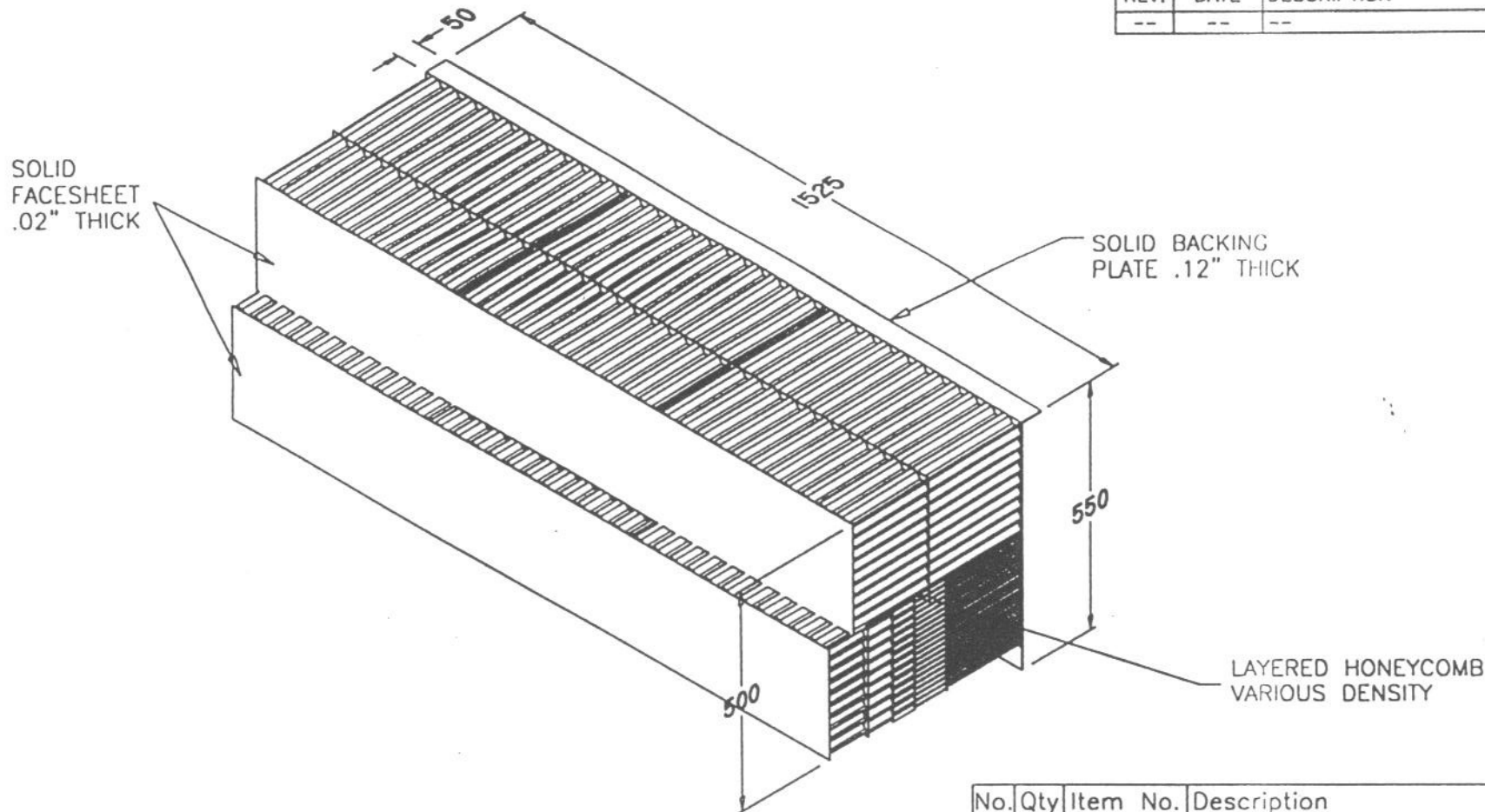
US PATENT #5,620,276

NO.	QTY	ITEM NO.	DESCRIPTION	FINISH
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND TOLERANCES ARE:			PLASCORE 615 N. FAIRVIEW STREET ZEELAND, MICHIGAN 43454 (616) 772-1220	
[XXXX] = CRITICAL DIM LEVEL 2 [XXXX] = CRITICAL DIM LEVEL 3 FRACTIONS: ± 1/16 DECIMALS: X±0.1 .X±0.06 .XX±0.03 .XXX±0.01 ANGLES: ± 2°			DWG TITLE - <h2 style="text-align: center;">MOVEABLE DEFORMABLE BARRIER</h2>	
SIZE	FSCM	DWG NUMBER		REV
A	38586	MDB - 1		-
DWN JT OTTO			DATE 4-25-96	
ENGRG			OC APP.	
SCALE NTS			SHEET 1 OF 1	
CAD MOD				

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 APPROVED BY: _____
 DATE: _____

REV.	DATE	DESCRIPTION	SIGNATURE
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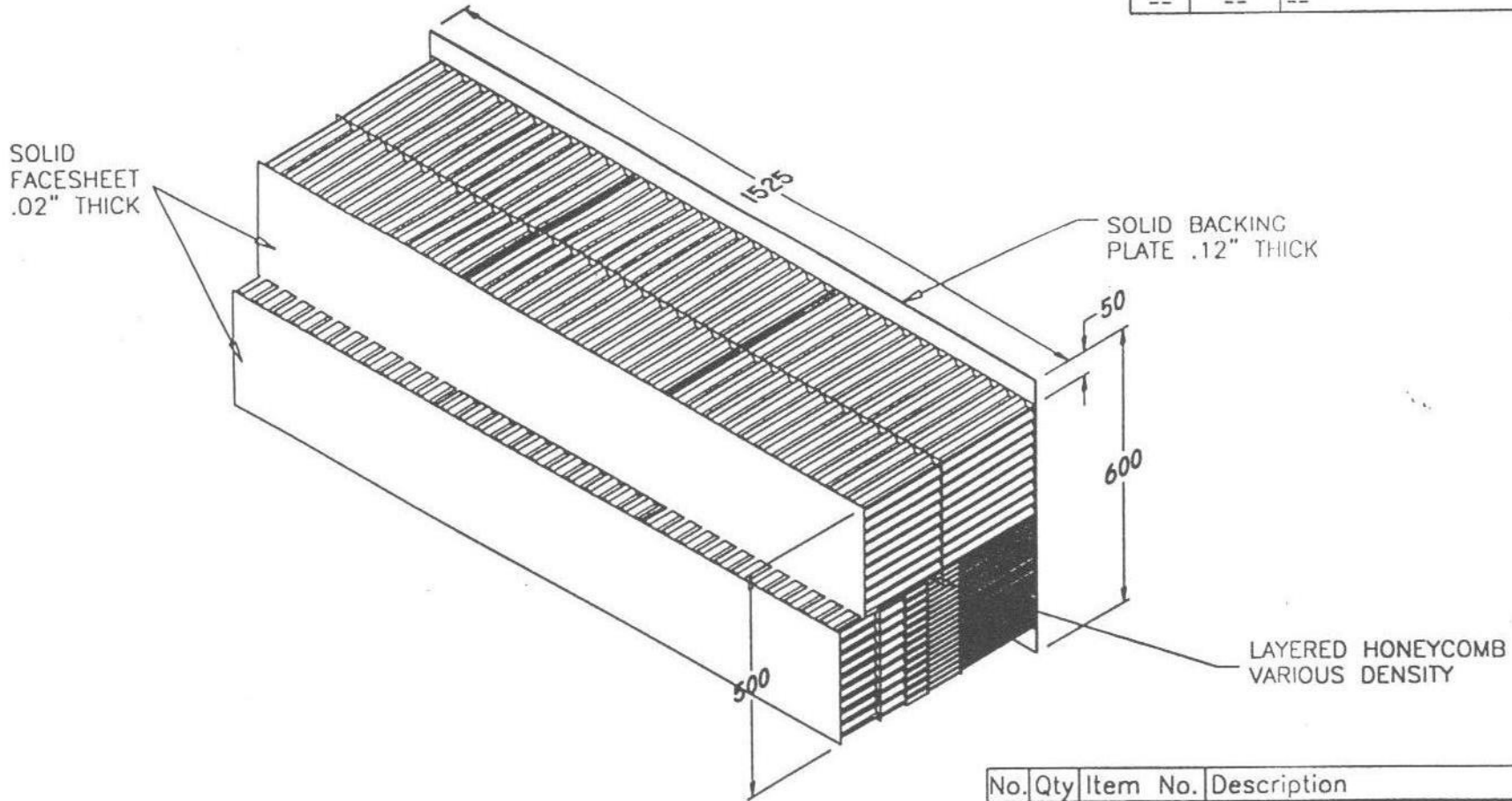
US PATENT #5,620,276

No.	Qty	Item No.	Description	Finish
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND TOLERANCES ON: [XXXXX] = CRITICAL DIM LEVEL 2 [XXXXX] ³ = CRITICAL DIM LEVEL 3 FRACTIONS: = ± 1/16 DECIMALS: X=±0.1 .X=±0.06 .XX=±0.03 .XXX=±0.01 ANGLES: = ± 2°				
PLASCORE 615 N. FAIRVIEW STREET ZEELAND, MICHIGAN 49464 (616) 772-1220			DWG TITLE: MOVEABLE DEFORMABLE BARRIER - 550 X 1525	
SIZE	FSCM	DWG NUMBER:		REV
A	39212	MDB-2		-
DRAWN BY: J.BUTCHER			DATE: 12-11-98	
ENGRG:			SCALE: NTS	
CAD#: MDB-2			QC APP.:	
			SHEET: 1 OF 1	

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PROJECT NAME: _____
 SUBMITTAL REVISION: _____
 APPROVED BY: _____
 DATE: _____

REV.	DATE	DESCRIPTION	SIGNATURE
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US PATENT #5,620,276

No.	Qty	Item No.	Description	Finish
			UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND TOLERANCES ON:	
			XXXXX = CRITICAL DIM LEVEL 2	
			XXXXX ³ = CRITICAL DIM LEVEL 3	
			FRACTIONS: = ± 1/16	
			DECIMALS: X=±0.1	
			.X=±0.06	
			.XX=±0.03	
			.XXX=±0.01	
			ANGLES: = ± 2'	
			CAD#: MDB-3	
		PLASCORE		615 N. FAIRVIEW STREET ZEELAND, MICHIGAN 49484 (616) 772-1220
DWG TITLE: MOVEABLE DEFORMABLE BARRIER - 600 X 1525				
SIZE	FSCM	DWG NUMBER:		REV
A	39212	MDB-3		-
DRAWN BY: J.BUTCHER			DATE: 12-11-98	
ENGRG:			SCALE: NTS	
QC APP.:			SHEET: 1 OF 1	

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