



1(7)

TEST REPORT

TS*76/761/EEC*89/517/EEC*TS115*02



Test report relating to after market plastic film mounted on headlamps on motor vehicles.

There are no EEC directives with regard to such plastic films. In this report the influence of the film when tested in accordance with Directive 76/761/EEC, including amendments until 89/517EEC is mapped. Report revision *01 includes also tests of the ability of the film to protect the glass from damages due to rock explosions and thermal stress. Report revision *02 includes corrections of proof errors.

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A. General Information

Make (name of manufacturer): ABENUM AB

Type and commercial description: Toplight

Name and address of manufacturer: ABENUM AB
Torekällgatan 8
S-151 72 Södertälje

Test report valid for: 0.20 +/- 0.03 mm thick polyurethane film with acrylic adhesive and the following physical properties:
Hardness 80 +/- 5 Shore A
Tensile strength 48 MPa
Elongation at break 400 %

B. Test Information

Testobject arrived to laboratory at: 15 June 1998

Date of test: 15-17 June and 7 August 1998

Tested at: The Swedish Motor Vehicle Inspection
Lerkrogsvägen 4
S-126 79 HÄGERSTEN
SWEDEN

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Tested by:

Lars Avellan and Magnus Nilsson
European Vehicle Approval Service

Measuring equipment:

- Hagner Photometer mod. S3
- Detector no 94111
- Power supply Tti TSX 3510P
- Voltage measurement Fluke 865 with voltage resolution 0.001 V.
- Saturnus Headlamp marked:
E₂₆ E₁₀ E₁₀
001 70301 20001
- Vertical screen according to directive
- Polluting agent according to directive mixed direct before test.
- Steel bullet 22 mm diameter. Weight 43.5 gram
- Lufkin Measuring tape
- Thermometer Almemo 2290-8 with temperature probes.

C. Test results from 76/761/EEC with amendments until 89/517/EEC (All paragraph numbers according to the Directive)

Annex 1

- 5.1 - 5.4 N.A.
- 5.5 Tests is done in accordance with annex 1 and 7.
- 6.1 Done in accordance with directive.

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- 6.2 The cut of line for dipped beam is easily found but less sharp than without plastic film.
All other requirements fulfilled.
- 6.3 The measurements with plastic film where done after the film had been mounted on the lighted beam for a few hours.

Point on measuring screen	Limit Value (Lux)	Change in measuring value with and without plastic film (Lux)
B 50 L	< 0.3	Increasing 0.2
B 75 R	>6.0	Decreasing 0.1
B 50 R	>6.0	Decreasing 1.2
B 25 L	>1.5	Increasing 0.1
Zone III	<0.7	Increasing 0.17
Zone IV	>2.0	Increasing 1.2
Zone I	<20.0	Increasing 1.3

All other requirements in this paragraph fulfilled

Point on measuring screen	Limit Value (Lux)	Change in measuring value with and without plastic film (Lux)
E_{\max}	>32	Decreasing 2.2
Within 1125 mm	>16	Decreasing 2.9
Within 2250 mm	>4	Increasing 1.3

All other requirements in this paragraph fulfilled

- 6.5 The measurements where done according to directive
- 7 - 10 N.A.

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Annex VII

1 - 1.1.1.2 The tests were done according to directive

1.1.2.1 No negative effect found.

1.1.2.2 All values were within 10 % of the values before test. The change in values were rather positive than negative.

1.2 - 1.2.1.3 Visual inspection:
Very tiny scratches could be observed.

Photometric test:

Dipped-beam:

Changes up to 38 % were found. Max 10 % is allowed in the directive.

Main-beam:

The value changed 2 %. Max 10 % is allowed.

2 - 3 N.A.

Other observations The film must be thoroughly mounted and stabilised for some hours on a warm head lamp to give the values above.

D.1. Tests of the ability of the film to protect the glass from damages due to rock explosions.

The steel bullet, with a weight of 43.50 gram, was dropped from different heights on 167 mm diameter standard head-lamps of mark Saturnus with and without protective plastic film. The bullet was directed towards the centre of the headlamp with a precision of +/- 10 mm. During test the lamp was fed with 12 Volt 7.02 Ampere (84.2 Watt) in a 21.8 °C environment. The surface temperature of the headlamp was 66 °C.

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Test no.	Height of fall	Protective film	Kinetic energy of bullet at impact	Test result
1	1 m	No	0.43 J	No cracks
2	1.5 m	No	0.64 J	No cracks
3	2.0 m	No	0.85 J	No cracks
4	2.4 m	No	1.02 J	No cracks
5	2.7 m	No	1.15 J	Cracked
6	3.1 m	Yes	1.32 J	No cracks
7	3.1 m	No	1.32 J	Cracked
8	3.1 m	No	1.32 J	Cracked
9	3.5 m	Yes	1.49 J	No cracks
10	4.1 m	Yes	1.75 J	No cracks
11	5.9 m	Yes	2.51 J	No cracks

D.2. Tests of the ability of the film to protect the glass from damages due to thermal stress.

235 +/- 5 grams of cold water was poured warmed head-lamps. The surface temperature of the head-lamps where varied.

Test no	Water temp	Electrical power	Surface temperature	Protective film	Test result
1	6.3 °C	84 Watt	66.0 °C	No	Fulfilled
2	6.3 °C	100 Watt	80.7 °C	No	Failed (cracked)
3	8.0 °C	100 Watt	88.0 °C	Yes	Fulfilled
4	4.3 °C	113 Watt	113.0 °C*	Yes	Fulfilled

* High temperature accomplished with insulation of head-lamp.

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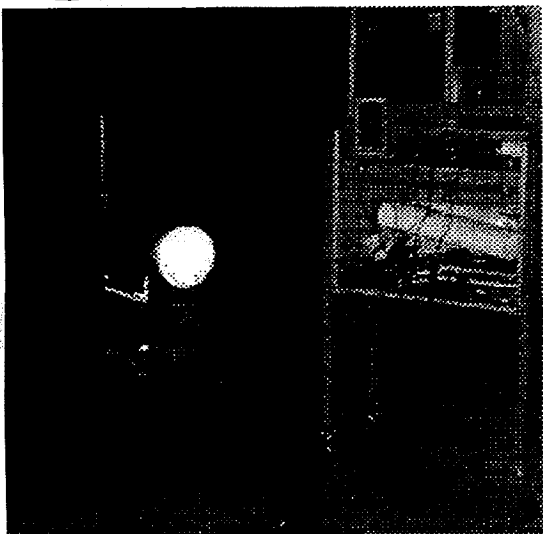
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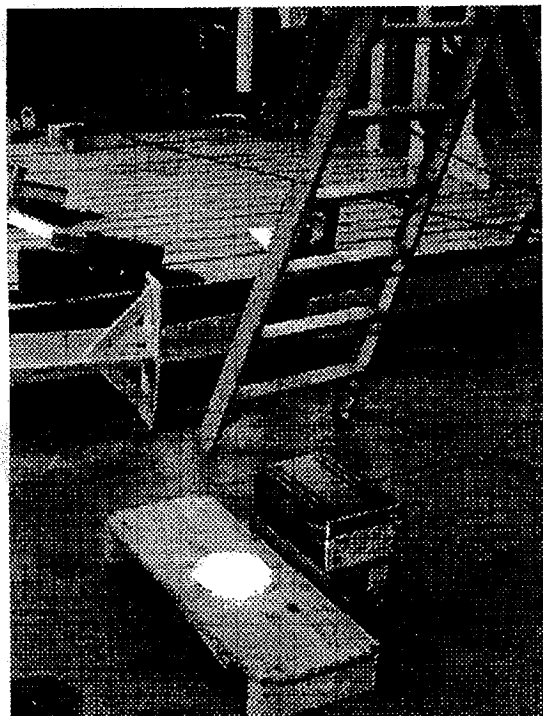
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Optical test



Fall test

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Place:

STOCKHOLM

Date:

03 September 1998

Signature:

Lars Avellán

Magnus Nilsson

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