

BS EN 4115:2010



BSI Standards Publication

Aerospace series — Cushion, rubber for clamps — Dimensions, masses

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The UK participation in its preparation was entrusted to Technical Committee ACE/12, Aerospace fasteners and fastening systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

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EN 4115

April 2010

ICS 49.025.40; 49.030.99

Supersedes EN 4115:2001

English Version

**Aerospace series - Cushion, rubber for clamps - Dimensions,
masses**

Série aérospatiale - Profilé en élastomère pour colliers -
Dimensions, masses

Luft- und Raumfahrt - Profilgummi für Schellen - Maße,
Massen

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Foreword

This document (EN 4115:2010) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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1 Scope

This standard specifies the required characteristics for rubber cushions used on clamps according to EN 3730, EN 4113, EN 4114.

For temperature range and environmental conditions see Table 1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2261, *Aerospace series — Silicone rubber (VMQ) — Hardness 70 IRHD*

EN 2566, *Aerospace series — Fluorocarbon rubber (FPM) — Hardness 70 IRHD*¹⁾

EN 2693, *Aerospace series — Aluminium alloy AL-P5086- — H111 — Sheet and strip — $0,3\text{ mm} \leq a \leq 6\text{ mm}$*

EN 3825, *Aerospace series — Fluorosilicone rubber (FVMQ) — Hardness 60 IRHD*¹⁾

EN 3826, *Aerospace series — Fluorosilicone rubber (FVMQ) — Hardness 70 IRHD*¹⁾

EN 9100, *Quality Management Systems - Requirements for Aviation, Space and Defense Organizations*

¹⁾ Published as ASD Prestandard at the date of publication of this standard.

3 Required characteristics

3.1 Materials

According to Table 1.

Clamp: according to EN 2693.

Cushion: according to this European Standard.

Table 1 — Materials

Material code	Elastomer	Colour	Hardness (IRHD)	Temperature range ¹	Cushion application notes	Mass density g/cm ³
S	Silicone VMQ EN 2261	rust	70	– 55 °C to 200 °C (260 °C)	Environment of hot air, phosphate ester based fluids or other synthetic fluids and dielectrical use. Not for use with hydrocarbon based fluids.	1,23
F	Fluorosilicone FVMQ EN 3826 ²	blue	70	– 55 °C to 180 °C (200 °C)	Environment of hot air, hydrocarbon based fluids. Not for use with phosphate ester based fluids except occasional splash.	1,47
V	Fluorocarbon FPM EN 2566 ³	brown	70	– 20 °C to 200 °C (260 °C)	Fuels, oils and diester lubricants, synthetic fluids, hot air environment and dielectrical use. Not for use with phosphate ester based fluids except occasional splash.	2,05

¹ Approximate temperature limits (in brackets) are for short excursions only.

² Alternative EN 3825.

³ Alternative Fluorocarbon rubber (FPM) – Hardness 75 IRHD (Class 60C7).

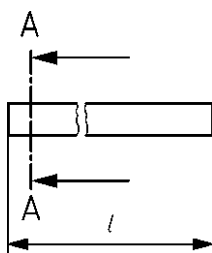
3.2 Configuration – Dimensions – Masses

See Figure 1 and Table 2.

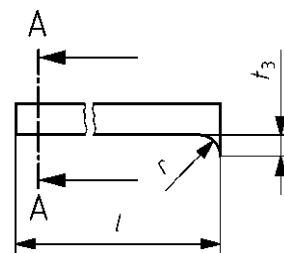
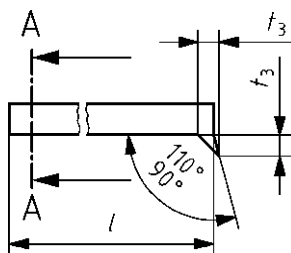
Dimensions are in millimetres.

All dimensions without tolerances are maximum values.

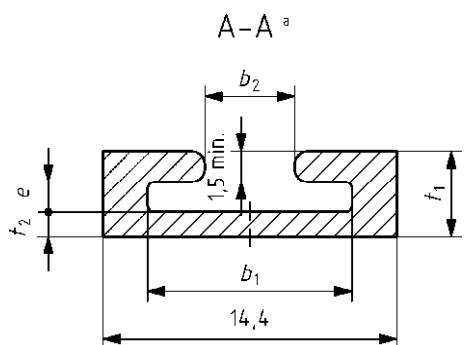
Cushions without wedge



Cushions with wedge (only moulded) possible forms (at manufacturer's option)

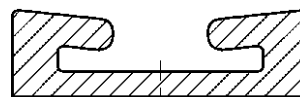


Length l results from the dimensions given in the corresponding dimensional standards of clamps.

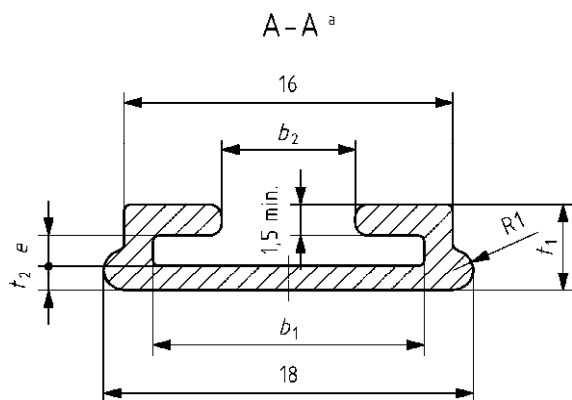


Cushion profile 1

A-A^a

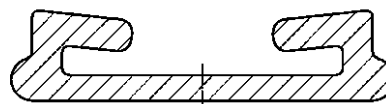


Valid deviation of form



Cushion profile 2

A-A^a



Valid deviation of form

Figure 1 — Configuration

Table 2 — Dimensions

Cushion profile type	Metal band profile ^a	Size code ^a		<i>b</i> ₁	<i>b</i> ₂ max.	Diameter code ^a	<i>e</i> min.	<i>r</i>	<i>t</i> ₁ max.	<i>t</i> ₂ ± 0,2	<i>t</i> ₃ ± 0,2	<i>Q</i> mm ²
		without wedge	with wedge									
1	9,5×0,8	1N	1K	10,0	4,4	03 to < 13	1,0	2,8	4,2	1,2	2,8	42
2	12,7×0,8	2N	2K	13,2	6,5	03 to < 18						1,2
	12,7×0,8		2L			18 to < 28	1,0	5,0	4,7	61		
	12,7×1,0	3N	3L			13 to < 28					1,2	5,0
	12,7×0,8	4N	4L			28 to < 48	1,0	5,0	5,2	63		
	12,7×1,0	5N	5L			48 to 86	1,2				5,0	5,2
	12,7×1,5	6N	6L			28 to 86	1,8	5,0	5,2			

^a See the relevant clamp standard.

3.3 Configuration – Dimensions – Masses

The corresponding unit mass of application of cushion is given by the formula:

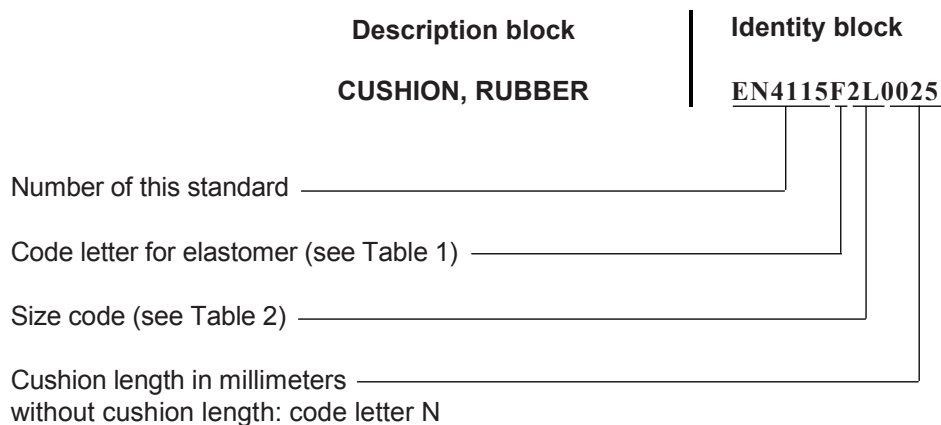
$$M = 0,001 \cdot \rho \cdot Q \cdot l + m$$

where

- m* Wedge mass (negligible, about 0,1 g to 0,3 g);
- l* Required cushion length in millimetres;
- Q* Cushion section in square millimetres (see Table 2);
- ρ Density in gramme per cubic centimeters;
- M* Cushion unit mass in grammes.

4 Designation

EXAMPLE



NOTE If necessary, the code I9005 shall be placed between the description block and the identity block.

5 Marking

See the relevant clamp standard.

6 Quality assurance

See EN 9100.

7 Technical specification

The technical specification concerning the cushioning material to be used is to be agreed between the manufacturer and the user, pending publication of material standards.

8 Packaging

The cushion rubber shall be packaged so that they are not damaged in transit.

The following information shall appear (on a label attached):

- name and address of manufacturer;
- description and identity block;
- number of order;
- date of delivery.

Bibliography

EN 3730, *Aerospace series — Clamps, saddle fixed and sliding version in aluminium alloy with rubber cushioning — Dimension, masses.*

EN 4113, *Aerospace series — Clamps, loop ("P" type) in corrosion resisting steel, passivated with rubber cushioning — Dimensions, masses.*

EN 4114, *Aerospace series — Clamps, loop ("P" type) in aluminium alloy with rubber cushioning — Dimensions, masses.*

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