



**SLOVENSKI STANDARD**  
**SIST EN 4115:2010**

**01-junij-2010**

**Nadomešča:**

**SIST EN 4115:2002**

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**Aeronavtika - Prevleka iz gume za objemke - Mere, mase**

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

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

Série aérospatiale - Profilé en élastomère pour colliers - Dimensions, masses  
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**ICS:**

|        |   |   |
|--------|---|---|
| 49.060 | Letalska in vesoljska<br>električna oprema in sistemi | Aerospace electric<br>equipment and systems |
|--------|---|---|

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 4115**

April 2010

ICS 49.025.40; 49.030.99

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

This European Standard was approved by CEN on 16 January 2010.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 4115:2010 (E)****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*<sup>1)</sup>

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*<sup>1)</sup>

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

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

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<sup>1)</sup> 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 <sup>1</sup> | Cushion application notes   | Mass density g/cm <sup>3</sup> |
|---------------|--|--------|-----------------|--------------------------------|---|--------------------------------|
| 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 <sup>2</sup> | 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 <sup>3</sup>    | 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                           |

<sup>1</sup> Approximate temperature limits (in brackets) are for short excursions only.

<sup>2</sup> Alternative EN 3825.

<sup>3</sup> Alternative Fluorocarbon rubber (FPM) – Hardness 75 IRHD (Class 60C7).

EN 4115:2010 (E)

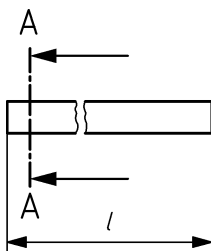
3.2 Configuration – Dimensions – Masses

See Figure 1 and Table 2.

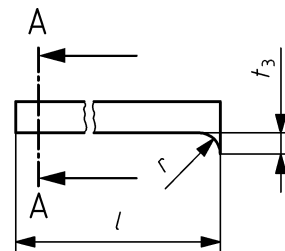
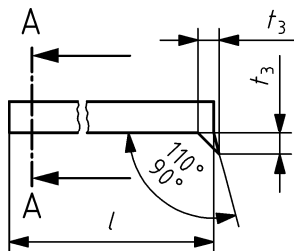
Dimensions are in millimetres.

All dimensions without tolerances are maximum values.

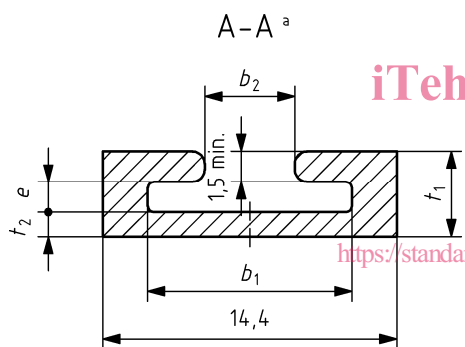
Cushions without wedge



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.



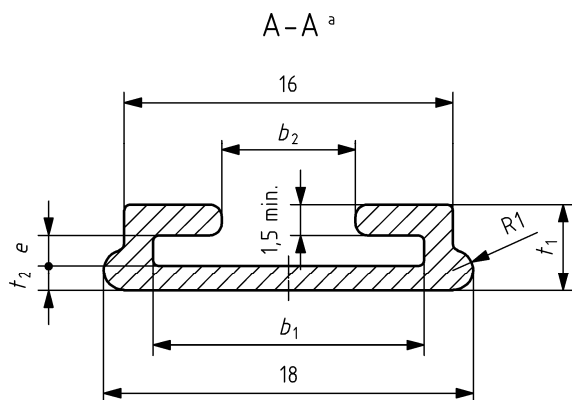
Cushion profile 1

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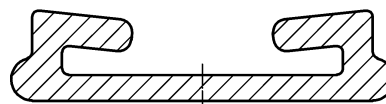


Valid deviation of form



Cushion profile 2

A-A<sup>a</sup>



Valid deviation of form

Figure 1 — Configuration



Table 2 — Dimensions

| Cushion profile type | Metal band profile <sup>a</sup> | Size code <sup>a</sup> |            | $b_1$ | $b_2$<br>max. | Diameter code <sup>a</sup> | $e$<br>min. | $r$ | $t_1$<br>max. | $t_2$<br>$\pm 0,2$ | $t_3$<br>$\pm 0,2$ | $Q$<br>mm <sup>2</sup> |
|----------------------|---------------------------------|------------------------|------------|-------|---------------|----------------------------|-------------|-----|---------------|--------------------|--------------------|------------------------|
|                      |                                 | 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           | 62                 |                    |                        |
|                      | 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           | 61                 |                    |                        |
|                      | 12,7×1,0                        | 5N                     | 5L         |       |               | 48 to 86                   | 1,2         |     |               | 5,0                | 5,2                | 62                     |
|                      | 12,7×1,5                        | 6N                     | 6L         |       |               | 28 to 86                   | 1,8         | 5,0 | 5,2           |                    |                    | 63                     |

<sup>a</sup> See the relevant clamp standard.

### 3.3 Configuration – Dimensions – Masses

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

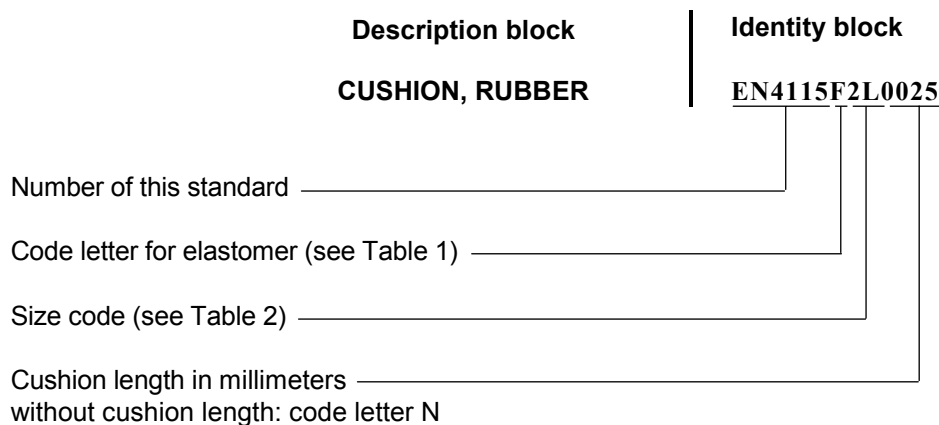
$$M = 0,001 \cdot \rho \cdot Q \cdot l + m$$

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);
- $\rho$  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.