BS EN 4138:2016

BSI Standards Publication

# Aerospace series — Screws, pan head, offset cruciform recess, coarse tolerance normal shank, medium length thread, in alloy steel, cadmium plated — Classification: 1 100 MPa (at ambient temperature) / 235 °C

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**National foreword**

This British Standard is the UK implementation of EN 4138:2016. It supersedes BS EN 4138:2009 which is withdrawn.

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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| Date | Text affected |
|---|---|

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 4138

March 2016

ICS 49.030.20

Supersedes EN 4138:2009

English Version

# Aerospace series - Screws, pan head, offset cruciform recess, coarse tolerance normal shank, medium length thread, in alloy steel, cadmium plated - Classification: 1 100 MPa (at ambient temperature) / 235 °C

Série aérospatiale - Vis à tête cylindrique, à empreinte cruciforme déportée, tige normale à tolérance large, filetage moyen, en acier allié, cadmiées - Classification: 1 100 MPa (à température ambiante) / 235 °C

Luft- und Raumfahrt - Flachkopfschrauben, mit Flügelkreuzschlitz, mittlere Gewindelänge, aus legiertem Stahl, verkadmet - Klasse: 1 100 MPa (bei Raumtemperatur) / 235 °C

This European Standard was approved by CEN on 27 September 2015.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

# Contents

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# European Foreword

This document (EN 4138:2016) 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of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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This document supersedes EN 4138:2009.

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## 1 Scope

This European Standard specifies the characteristics of screws, pan head, offset cruciform recess, coarse tolerance normal shank, medium length thread, in alloy steel, cadmium plated.

Classification: 1 100 MPa[1)] / 235 °C[2)]

## 2 Normative references

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

EN 2133, *Aerospace series — Cadmium plating of steels with specified tensile strength ≤ 1 450 MPa, copper, copper alloys and nickel alloys*

EN 2137, *Steel FE-PL75 — 1100 MPa ≤ $R_m$ ≤ 1250 MPa — Bars $D_e$ ≤ 100 mm — Aerospace series*

EN 2424, *Aerospace series — Marking of aerospace products*

EN 2442, *Steel FE-PL711 — 1100 MPa ≤ $R_m$ ≤ 1300 MPa — Bars and wires — $D_e$ ≤ 25 mm*[3)]

EN 3514, *Steel FE-PL711 — Hardened and tempered — 1100 MPa ≤ $R_m$ ≤ 1300 MPa — Bar and wire for bolts — $D_e$ ≤ 25 mm*

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

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

ISO 3353-1, *Aerospace — Lead and runout threads — Part 1: Rolled external threads*

ISO 5855-2, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts*

ISO 7689, *Aerospace — Bolts, with MJ threads, made of alloy steel, strength class 1 100 MPa — Procurement specification*

ISO 7913, *Aerospace — Bolts and screws, metric — Tolerances of form and position*

ISO 14275, *Aerospace — Drives, internal, offset cruciform, ribbed — Metric series*

ISO 14276, *Aerospace — Drives, internal, offset cruciform — Metric series*

TR 3775, *Aerospace series — Bolts and pins — Materials*

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1) Minimum tensile strength of the material at ambient temperature

2) Maximum temperature that the screw can withstand without continuous change in its original characteristics, after return to ambient temperature. The maximum temperature is determined by the surface treatment

3) For new design, see EN 3514

# 3 Required characteristics

## 3.1 Configuration — Dimensions — Masses

See Figure 1 and Table 1.

Dimensions and tolerances are expressed in millimetres and apply after surface treatment.

## 3.2 Tolerances of form and position

ISO 7913.

## 3.3 Materials

EN 2137 and EN 2442

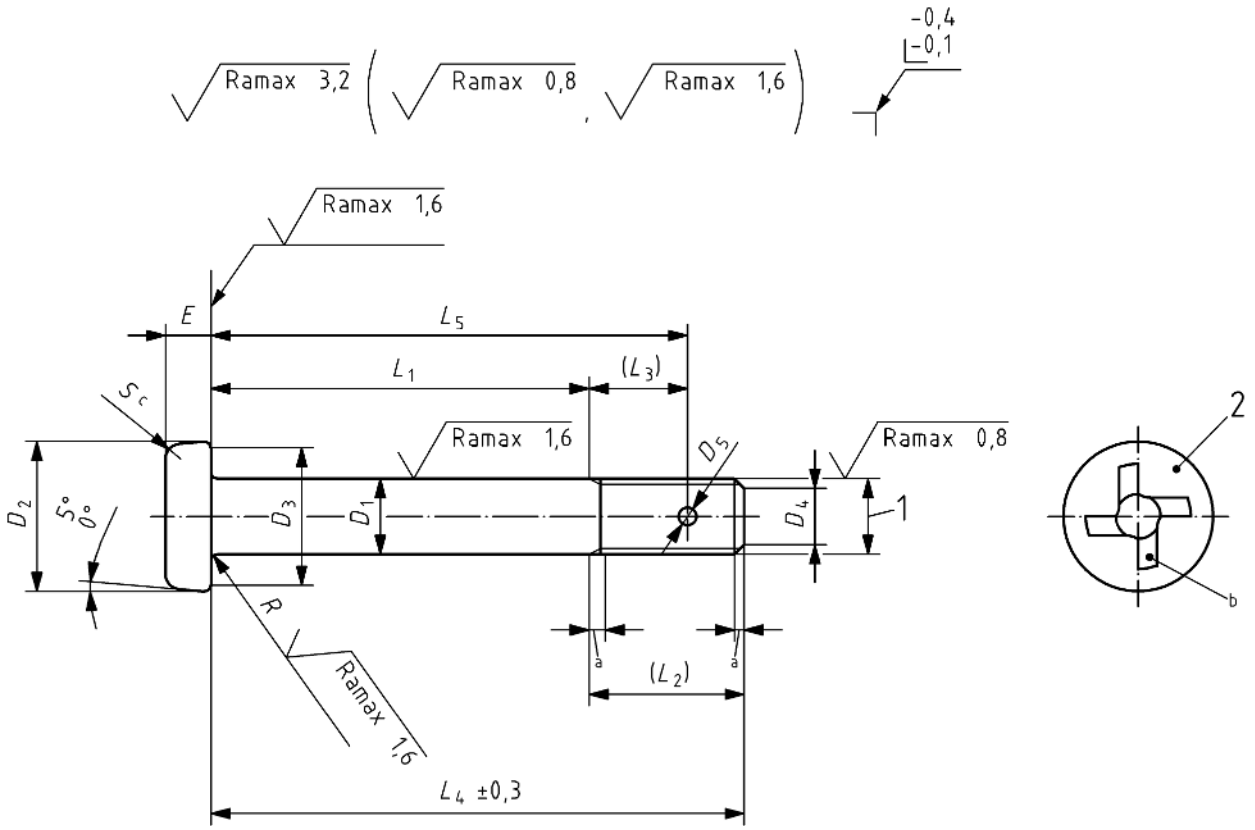
or

TR 3775: alloy steel, classification 1 100 MPa.

### 3.4 Surface treatment

EN 2133, thickness 8 µm to 14 µm, on all surfaces which can be contacted by a 20 mm diameter ball. On all other surfaces, a continuous deposit shall be present, but no value is specified.

Black colour option: code B.




**Key**

1 Thread

2 Marking

3 Conforms to ISO 3353-1

4 Drive

5 Shape optional

6 $L_4 = L_1 + (L_2)$

**Figure 1**

**Table 1**

| **Diameter code** | **Threads** [a] | $D_1$ | $D_2$ | $D_3$ | | $D_4$ | $D_5$ | $E$ | |
|---|---|---|---|---|---|---|---|---|---|
| | | h12 | $^{0}_{-0,3}$ | min. | nom. | Tol. | H13 | nom. | Tol. |
| 030 | MJ3×0,5 – 4h6h | 3 | 6 | 4,7 | 2,3 | $^{0}_{-0,5}$ | — | 1,8 | $^{0}_{-0,2}$ |
| 040 | MJ4×0,7 – 4h6h | 4 | 8 | 6,7 | 3,0 | | 1,1 | 2,4 | |
| 050 | MJ5×0,8 – 4h6h | 5 | 10 | 8,7 | 3,4 | ±0,5 | 1,5 | 3,0 | |
| 060 | MJ6×1 – 4h6h | 6 | 12 | 10,7 | 4,2 | | | 3,6 | $^{0}_{-0,3}$ |
| 070 | MJ7×1 – 4h6h | 7 | 14 | 12,7 | 5,2 | | 1,9 | 4,2 | |
| 080 | MJ8×1 – 4h6h | 8 | 16 | 14,7 | 6,2 | | | 4,8 | |
| 100 | MJ10×1,25 – 4h6h | 10 | 20 | 18,7 | 7,9 | | 2,4 | 6,0 | |
| 120 | MJ12×1,25 – 4h6h | 12 | 24 | 22,7 | 9,8 | | | 7,2 | |

| **Diameter code** | $L_1 \pm 0{,}2$ [b, c] | | $L_2$ | $L_3$ | $R$ | | $S$ | | Mass[d] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Length code | nom. | | | nom. | Tol. | max. | min. | [e] | [f] |
| 030 | 002 to 030 | 2 to 30 | 7,5 | — | 0,4 | $^{0}_{-0,2}$ | 1,2 | 0,3 | 0,792 | 0,055 |
| 040 | 002 to 040 | 2 to 40 | 10,0 | 6,0 | | | 1,6 | 0,4 | 1,922 | 0,099 |
| 050 | 003 to 050 | 3 to 50 | 12,0 | 7,5 | 0,5 | | 2,0 | 0,5 | 3,835 | 0,153 |
| 060 | 003 to 060 | 3 to 60 | 14,0 | 8,5 | 0,7 | | 2,4 | 0,6 | 6,620 | 0,222 |
| 070 | 004 to 070 | 4 to 70 | 15,0 | 9,5 | | | 2,8 | 0,7 | 10,959 | 0,302 |
| 080 | 004 to 080 | 4 to 80 | 16,5 | 10,5 | | | 3,2 | 0,8 | 15,214 | 0,395 |
| 100 | 005 to 100 | 5 to 100 | 20,5 | 13,0 | 0,8 | $^{0}_{-0,3}$ | 4,0 | 1,0 | 30,092 | 0,616 |
| 120 | 006 to 120 | 6 to 120 | 22,5 | 14,5 | 0,9 | | 4,8 | 1,2 | 52,957 | 0,887 |

[a] In accordance with ISO 5855-2.

[b] Increments:

1 for $L1 \leq 30$;

2 for $30 < L1 \leq 100$;

4 for $L1 > 100$.

[c] If greater lengths are required, they shall be chosen using the above increments. The length code corresponds to the length $L1$, completed by one or two zeros to the left, where necessary, to obtain a three digit code.

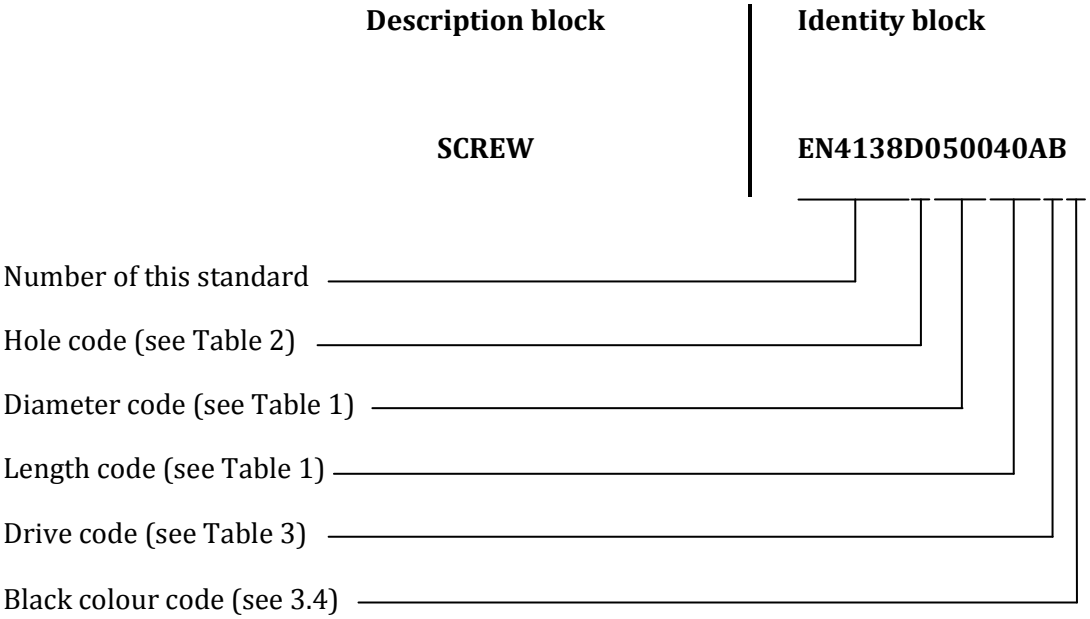
[d] Approximate values (kg/1 000 pieces), calculated on the basis of 7,85 kg/dm$^3$, given for information purposes only. They apply to screws without holes.

[e] Value for head and first $L4$.

[f] Increase for each additional millimetre of $L4$.

## 4 Designation

EXAMPLE




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

**Table 1**

| Hole | Code |
|---|---|
| with | D |
| without | — (hyphen) |

**Table 2**

| Drive | Code |
|---|---|
| ISO 14275 | None |
| ISO 14276 | A |

## 5 Marking

See Table 4 and Figure 1.

**Table 3**

| Diameter code | EN 2424 Style |
|---|---|
| 030 and 040 | N |
| 050 to 120 | B |

# 6 Technical specification

## 6.1 General

ISO 7689, except for clauses.

## 6.2 Approval of manufacturers

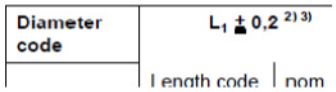
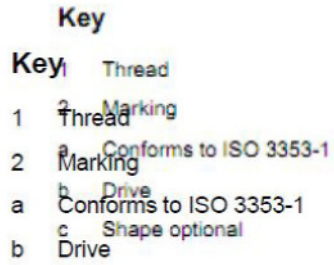
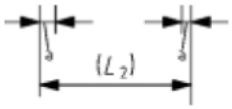
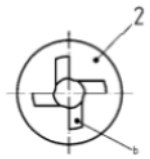
EN 9100.

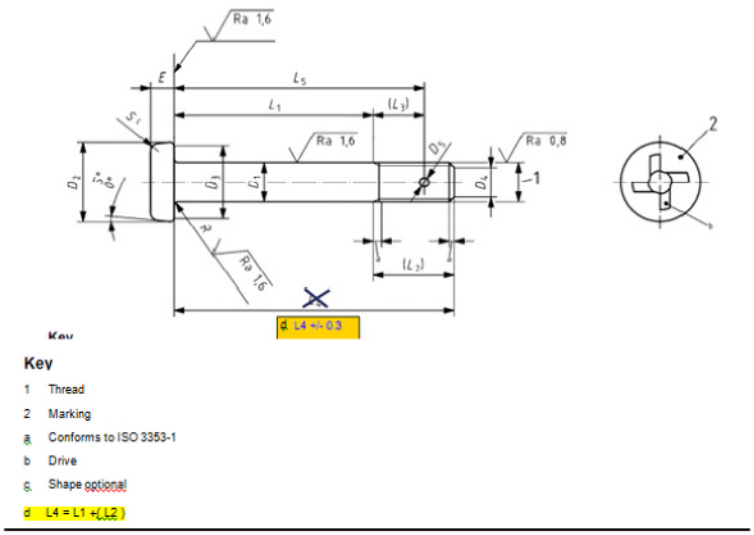
## 6.3 Qualification of screws

EN 9133.

# Annex A
(informative)

## Standard evolution form

| MODIFICATION | REASON AND VALIDATION |
|---|---|
|  | Minus looks like a bullet |
|  | 'a' references too small… |
|  | Mixture of texts |
|  | 'b' reference too small |
| *Replacement*<br>ISO 7994<br>*BY*<br>ISO14275 and ISO 14276 | |
| Roughness symbol inside and above the drawing<br>Add to all symbols: max<br>e.g. Ramax 3,2<br>Ramax 0,8 | Modify symbols according to ISO 1302. |

| MODIFICATION | REASON AND VALIDATION |
|---|---|
|  <br>**Key**<br>1 Thread<br>2 Marking<br>a Conforms to ISO 3353-1<br>b Drive<br>c Shape optional<br>d L4 = L1 +( L2 ) | $L_4$ is not defined and has no tolerance values. |
| 6.a) Approval of manufacturers: see EN 9100; | EN 2000 do not exist anymore and replaced by EN 9100 |

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