

**Aerospace series - Washers, concave, in alloy steel,  
cadmium plated**

This document is a preview generated by EVS

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 2648:2014 sisaldab Euroopa standardi EN 2648:2013 inglisekeelset teksti.	This Estonian standard EVS-EN 2648:2014 consists of the English text of the European standard EN 2648:2013.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.12.2013.	Date of Availability of the European standard is 18.12.2013.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 49.030.50

### **Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele**

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Aru 10, 10317 Tallinn, Eesti; [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

### **The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation**

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:  
Aru 10, 10317 Tallinn, Estonia; [www.evs.ee](http://www.evs.ee); phone 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

## Aerospace series - Washers, concave, in alloy steel, cadmium plated

Série aérospatiale - Rondelles concaves, en acier allié, cadmiées

Luft- und Raumfahrt - Scheiben, für Neigungsausgleich, aus legiertem Stahl, verkadmet

This European Standard was approved by CEN on 28 September 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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-CENELEC 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

## Contents

Page

Foreword.....	3
1 <b>Scope</b> .....	4
2 <b>Normative references</b> .....	4
3 <b>Required characteristics</b> .....	4
4 <b>Designation</b> .....	6
5 <b>Marking</b> .....	6
6 <b>Qualification</b> .....	6

This document is a preview generated by EVS

## Foreword

This document (EN 2648:2013) 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 June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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.

This document supersedes EN 2648:1995.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This standard specifies the characteristics of concave washers, in alloy steel, cadmium plated, maximum operating temperature 235 °C.

They are intended to be used with nuts to EN 2647.

## 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  $\leq 1\,450$  MPa, copper, copper alloys and nickel alloys*

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

EN 2448, *Aerospace series — Steel FE-PL1503 (35CrMo4) —  $900\text{ MPa} \leq R_m \leq 1\,100\text{ MPa}$  — Bars —  $D_e \leq 40\text{ mm}$*

EN 2542, *Aerospace series — Steel FE-PL1502 (25CrMo4) — Annealed — Bar and wire —  $D_e \leq 40\text{ mm}$  — for prevailing torque nuts*

EN 2647, *Aerospace series — Nuts, hexagonal, self-locking, ball seat, in alloy steel, cadmium plated, MoS<sub>2</sub> lubricated — Classification: 900 MPa (at ambient temperature) / 235 °C*

EN 3330, *Aerospace series — Steel FE-PL1503 (35CrMo4) — Annealed — Bar and wire —  $D_e \leq 40\text{ mm}$  — for prevailing torque nuts*

## 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 Materials

Steel FE-PL1502 (25CrMo4), chemical composition in conformity with EN 2542, characteristics after manufacture:  $1\,250\text{ MPa} \leq R_m \leq 1\,400\text{ MPa}$ ,  $40 \leq \text{HRC} \leq 43$ .

Or steel FE-PL1503 (35CrMo4), chemical composition in conformity with EN 3330 or EN 2448 or equivalent, characteristics after manufacture:  $1\,250\text{ MPa} \leq R_m \leq 1\,400\text{ MPa}$ ,  $40 \leq \text{HRC} \leq 43$ .

### 3.3 Surface treatment

EN 2133, 8  $\mu\text{m}$  to 14  $\mu\text{m}$ .