



BSI Standards Publication

# Space engineering — Structural materials handbook

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Part 1: Overview and material properties and applications

## National foreword

This British Standard is the UK implementation of CEN/TR 17603-32-01:2022.

The UK participation in its preparation was entrusted to Technical Committee ACE/68, Space systems and operations.

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

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Published by BSI Standards Limited 2022

ISBN 978 0 539 18734 2

ICS 49.140

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2022.

### Amendments/corrigenda issued since publication

Date	Text affected
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TECHNICAL REPORT

**CEN/TR 17603-32-01**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

January 2022

ICS 49.140

English version

## Space engineering - Structural materials handbook - Part 1: Overview and material properties and applications

Ingénierie spatiale - Manuel des matériaux structuraux  
- Partie 1: Vue d'ensemble, propriétés des matériaux et  
applications

Raumfahrttechnik - Handbuch der  
Konstruktionswerkstoffe - Teil 1: Übersicht und  
Materialeigenschaften und Anwendungen

This Technical Report was approved by CEN on 22 November 2021. It has been drawn up by the Technical Committee CEN/CLC/JTC 5.

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## European Foreword

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This document (CEN/TR 17603-32-01:2022) has been prepared by Technical Committee CEN/CLC/JTC 5 "Space", the secretariat of which is held by DIN.

It is highlighted that this technical report does not contain any requirement but only collection of data or descriptions and guidelines about how to organize and perform the work in support of EN 16603-32.

This Technical report (CEN/TR 17603-32-01:2022) originates from ECSS-E-HB-32-20 Part 1A.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any TR covering the same scope but with a wider domain of applicability (e.g.: aerospace).

## Introduction

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The Structural materials handbook is published in 8 Parts.

A glossary of terms, definitions and abbreviated terms for these handbooks is contained in Part 8.

The parts are as follows:

TR 17603-32-01	Part 1	Overview and material properties and applications	Clauses 1 - 9
TR 17603-32-02	Part 2	Design calculation methods and general design aspects	Clauses 10 - 22
TR 17603-32-03	Part 3	Load transfer and design of joints and design of structures	Clauses 23 - 32
TR 17603-32-04	Part 4	Integrity control, verification guidelines and manufacturing	Clauses 33 - 45
TR 17603-32-05	Part 5	New advanced materials, advanced metallic materials, general design aspects and load transfer and design of joints	Clauses 46 - 63
TR 17603-32-06	Part 6	Fracture and material modelling, case studies and design and integrity control and inspection	Clauses 64 - 81
TR 17603-32-07	Part 7	Thermal and environmental integrity, manufacturing aspects, in-orbit and health monitoring, soft materials, hybrid materials and nanotechnologies	Clauses 82 - 107
TR 17603-32-08	Part 8	Glossary	

## 1.1 Scope

### 1.1.1 General

The structural materials handbook, SMH, combines materials and design information on established polymer matrix composites with provisional information on the emerging groups of newer advanced materials and their composites. Design aspects are described, along with factors associated with joining and manufacturing. Where possible, these are illustrated by examples or case studies.

### 1.1.2 Polymer composites

The polymer composite materials described are those having continuous fibre reinforcement in a polymer matrix, i.e.:

- Continuous fibre reinforcement, [See: [2-3]]
  - Carbon
  - Aramid
  - Glass
- Thermosetting polymer matrix, [See:[2-4]]:
  - Epoxy, [See:2.4,3.2].
  - Polyimide, [See:6.12].
  - Bismaleimide, [See:6.6].
- Thermoplastic polymer matrix, e.g. PEEK, PEI, PES, [See: 6.17].

### 1.1.3 Advanced materials

Information on the characteristics and applications is given for:

- Magnesium alloys and their composites, [See: Clause 44].
- Aluminium alloys and their composites, [See: Clause 46].
- Titanium alloys and their composites, [See: Clause 47].
- Superalloys and their composites, [See: Clause 48].
- Intermetallic materials, [See: Clause 49].