PD CEN/CLC/TR 17603-31-16:2021

BSI Standards Publication

Space Engineering — Thermal design handbook

Part 16: Thermal Protection System

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National foreword

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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 2021

ISBN 978 0 539 17018 4

ICS 49.140

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 August 2021.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/CLC/TR 17603-31-16

August 2021

ICS 49.140

English version

Space Engineering - Thermal design handbook - Part 16 Thermal Protection System

Ingénierie spatiale - Manuel de conception thermique - Partie 16 : Protection Thermique des véhicules spatiaux

Raumfahrttechnik - Handbuch für thermisches Design - Teil 16: Thermalschutzsysteme

This Technical Report was approved by CEN on 28 June 2021. It has been drawn up by the Technical Committee CEN/CLC/JTC 5.

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Ref. No. CEN/CLC/TR 17603-31-16:2021 E

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European Foreword

This document (CEN/CLC/TR 17603-31-16:2021) 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 16603-31.

This Technical report (TR 17603-31-16:2021) originates from ECSS-E-HB-31-01 Part 16A.

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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).

1 Scope

The thermal protection system (TPS) of a space vehicle ensures the structural integrity of the surface of the craft and maintains the correct internal temperatures (for crew, electronic equipment, etc.) when the vehicle is under the severe thermal loads of re-entry. These loads are characterised by very large heat fluxes over the relatively short period of re-entry.

The design of thermal protection systems for re-entry vehicles is very complex due to the number and complexity of phenomena involved: the flow around the vehicle is hypersonic, tridimensional and reactive, and its interaction with the vehicle's surface may induce chemical reactions which are not fully understood.

Two TPS concepts for re-entry vehicles, ablative and radiative are examined and there is also an anlyisis of existing systems using them.

The Thermal design handbook is published in 16 Parts

TR 17603-31-01	Thermal design handbook – Part 1: View factors
TR 17603-31-02	Thermal design handbook – Part 2: Holes, Grooves and Cavities
TR 17603-31-03	Thermal design handbook – Part 3: Spacecraft Surface Temperature
TR 17603-31-04	Thermal design handbook – Part 4: Conductive Heat Transfer
TR 17603-31-05	Thermal design handbook – Part 5: Structural Materials: Metallic and Composite
TR 17603-31-06	Thermal design handbook – Part 6: Thermal Control Surfaces
TR 17603-31-07	Thermal design handbook – Part 7: Insulations
TR 17603-31-08	Thermal design handbook – Part 8: Heat Pipes
TR 17603-31-09	Thermal design handbook – Part 9: Radiators
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