

BS EN 2840:2013



BSI Standards Publication

**Aerospace series —
Acrylonitrile-butadiene
rubber (NBR) — Mineral oil
resistant — Hardness 50 IRHD**

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 2840:2013.

The UK participation in its preparation was entrusted to Technical Committee ACE/65, Non-metallic materials for aerospace purposes.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013.
Published by BSI Standards Limited 2013.

ISBN 978 0 580 80157 0

ICS 49.025.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2013.

Amendments issued since publication

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

EUROPEAN STANDARD

EN 2840

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2013

ICS 49.025.40

English Version

**Aerospace series - Acrylonitrile-butadiene rubber (NBR) -
Mineral oil resistant - Hardness 50 IRHD**

Série aéronautique - Élastomère acrylonitrile butadiène
(NBR) - Résistant aux huiles minérales - Dureté 50 DIDC

Luft- und Raumfahrt - Acrylnitril-Butadien-Elastomer (NBR)
- Beständig gegen Mineralöle - Härte 50 IRHD

This European Standard was approved by CEN on 27 October 2012.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
1 Scope.....	4
2 Normative references.....	4
3 Application of the material.....	4
3.1 General	4
3.2 Typical use	4
3.3 Temperature range.....	4
4 Properties	4
5 Designation	6
6 Technical specification	6

Foreword

This document (EN 2840:2013) 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 August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

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 organisations 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 European Standard specifies the properties of acrylonitrile-butadiene rubber (NBR) ¹⁾, mineral oil resistant, hardness 50 IRHD, for aerospace applications.

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 3207, *Aerospace series — Rubber compounds — Technical specification*

ISO 1629, *Rubber and latices — Nomenclature*

ISO 1817, *Rubber, vulcanized — Determination of the effect of liquids*

3 Application of the material

3.1 General

The suitability of the material for a specific application shall be determined by complementary tests carried out on the finished product as the properties specified in this standard are obtained from standard test specimens.

3.2 Typical use

For applications where resistance to petroleum based hydraulic fluids and lubricants is required.

3.3 Temperature range

— Continuous service : from – 40 °C to 120 °C;

— Intermittent service : from – 40 °C to 150 °C.

4 Properties

See Table 1 and Table 2 according to EN 3207.

For qualification, all tests shall be performed.

For batch acceptance, the tests identified with footnote "a" in Table 1 and Table 2 shall be performed.

1) Symbol as per ISO 1629.

Table 1 — Test methods

Line	Column		
	1 Properties	2 Units	3 Requirements
1	Hardness	IRHD	50 ^{+ 5} _{- 4} ^a
2	—	—	—
3	Density	Mg/m ³	a, b
4	—	—	—
5	Tensile strength	MPa	10 min. ^a
6	—	—	—
7	Elongation at break	%	400 min. ^a
8	—	—	—
9	Modulus at ... % strain	MPa	—
10	—	—	—
11	Tear strength	N/mm	—
12	—	—	—
13	Resistance to low temperatures TR 10	°C	- 25 max.
14	Crystallization	Point	—
15	Compression set		—
15.1	After 24 h to 125 °C	%	35 max. ^a
15.2	After 70 h to 125 °C		40 max.
16	—	—	—
17	Ozone resistance Ozone concentration : (... ± ...) pphm Elongation of test piece : ... % Time : ... h Temperature : ... °C	—	—
18	—	—	—
19	Corrosion and adhesion on metals Time : 168 h Temperature : 100 °C	—	no corrosion no adhesion
20	Corrosion and adhesion on metals		
20.1	Time : ... h Temperature : ... °C Humidity : ... %	—	—
20.2	Time : ... h Temperature : ... °C Humidity : ... %	—	—
21	—	—	—
22	—	—	—
23	—	—	—
24	—	—	—
25	—	—	—
26	—	—	—
27	—	—	—
28	—	—	—
29	—	—	—
30	—	—	—

^a Test for batch accepted.

^b The value determined for each batch shall not differ from that determined at qualification by more than 0,02 Mg/m³.

Table 2 — Tests

Line	Column					
	1	2	3	4	5	
1	Test media	–	Air	Oil No. 1, see ISO 1817	Oil No. 3, see ISO 1817	
2	Conditions of exposure in test media	Units	70 h/125 °C	70 h/125 °C	70 h/125 °C	
3	Permitted variation of the properties compared to the initial value	Volume	%	–	0 –15 ^a	+25 +5 ^a
4		Mass	%	–	–	–
5		Tensile strength	%	– 10 ^a	– 10	– 10
6		Elongation at break	%	– 45 ^a	– 40	– 30
7		Hardness	IRHD	– 12 0 ^a	+ 20 0	0 – 15
8	–	–	–	–	–	

^a Test for batch acceptance.

5 Designation

EXAMPLE

Description block

RUBBER

Identity block

EN2840

Number of this standard _____

6 Technical specification

See EN 3207.

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

Useful Contacts:

Customer Services

Tel: +44 845 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 845 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com



...making excellence a habit.™