

DOMININGHAUS

PLASTICS
FOR
ENGINEERS

TA
455
P5
D6413
1993
ENGI

IP Bridge Exhibit 2006

Hans Dominghaus

Plastics for Engineers

Materials, Properties,
Applications



Hanser Publishers, Munich Vienna New York Barcelona

05189251
ENGINEERING

The Author:
Dipl.-Ing. Hans Domininghaus
Dreieich-Buchsschlag, Germany

Translated and revised version of
"Die Kunststoffe und ihre Eigenschaften", 3rd Edition
© 1988 VDI-Verlag GmbH, Düsseldorf

Translated by *Dr. John Haim*, Bondway Publishing, Turners Hill, W. Sussex RH10 4YY
and *Dr. David Hyatt*, University of North London, London N2 6 HT

The use of general descriptive names, trademarks, etc. in this publication, even if the former are not especially identified, is not to be taken as a sign that such names, as understood by the Trade Marks and Merchandise Marks Act, may accordingly be used freely by anyone.

While the advice and information in this book are believed to be true and accurate at the date of going to press, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Die Deutsche Bibliothek – CIP-Einheitsaufnahme

Domininghaus, Hans:

Plastics for engineers : materials, properties, applications ;
[translated and revised version] / Hans Domininghaus.
[Transl. by John Haim and David Hyatt]. – Munich ; Vienna ; New York ;
Barcelona : Hanser , 1993

Einheitssacht.: Die Kunststoffe und ihre Eigenschaften <engl.>

ISBN 3-446-15723-9

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying or by any information storage and retrieval system, without permission in writing from the publisher.

Copyright © Carl Hanser Verlag, Munich, Vienna, New York, Barcelona 1993
Printed in Germany

In vi
time
Carl

wou
toda
it de
form
Briti
of b
of su
nam
so-c

deve
the :

phy
whc
in a
but

text
Mu
all t

Aut

Table 69 Guide values for the physical properties of polyarylether

Properties	Units		mod. Polyphenyleneether							
			Noryl		GFN 3		Lauranyl			
	SI	US	SI	US	SI	US	SI	US		
Density	g/cm ³	lb/in ³	1.06	0.038	1.27	0.0457	1.07	0.0387	1.26	0.0454
Water absorption (23°C/78°F, 24h)	%	%	0.07	0.07	0.06	0.07	<0.1	<0.1	<0.1	<0.1
<i>Mechanical</i>										
Yield stress	N/mm ²	psi	55	7820	-	-	52	74000	100	14200
Elongation at yield	%	%	6-7	6-7	-	-	4	4	1.5	1.5
Tensile strength	N/mm ²	psi	50	7110	120	17100	45	6400	100	14200
Elongation at break	%	%	50	50	2-3	2-3	28	28	2	2
Tensile modulus of elasticity	N/mm ²	psi	2500	356000	9000	1280000	2500	356000	9000	1280000
Impact strength (Izod)	J/m	J/m	-	-	-	-	-	-	-	-
Impact strength (Charpy)	kJ/m ²	kJ/m ²	-	-	-	-	-	-	-	-
Notched impact strength	J/m	J/m	200	200	80	80	no break	no break	12	12
Notched impact strength	kJ/m ²	kJ/m ²	>15	>15	8-10	8-10	11	11	5	5
Ball indentation hardness (30 s)	N/mm ²	psi	100	14000	137	14000	100	137	180	180
Rockwell hardness	scale	scale	M 78	M 78	M 93	M 93	-	-	-	-
<i>Thermal</i>										
Service temperature in air without mechanical loading	°C	°F	120	248	130	266	120	248	130	266
short-term	°C	°F	100	212	110	230	100	212	110	230
long-term	°C	°F	140	284	140	284	-	-	-	-
Glass transition temperature	°C	°F	135	275	150	302	115	239	145	293
Heat deflection temperature	°C	°F	130	266	144	291	90	194	137	279
Vicat, Method B	°C	°F	-	-	30 · 10 ⁻⁶	17 · 10 ⁻⁶	105	221	145	291
ISO, Method A	K ⁻¹	in/in/°F	60 · 10 ⁻⁶	33 · 10 ⁻⁶	-	-	60 · 10 ⁻⁶	33 · 10 ⁻⁶	30 · 10 ⁻⁶	17 · 10 ⁻⁶
Method B	W/mK	BTU/in/°F	-	-	-	-	-	-	-	-
Coefficient of linear expansion	W/mK	BTU/in/°F	0.22	1.5	0.28	1.9	0.18	1.2	0.22	1.5
Specific heat capacity	Q/cm	Ω	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵
Thermal conductivity	Q/cm	Ω	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴
<i>Electrical</i>										
Volume resistivity	Q cm	Ω	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	>10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵
Surface resistance	Q	Ω	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴
Dielectric constant 50 Hz	Q cm	Ω	2.6	2.6	2.9	2.9	2.6	2.6	2.9	2.9
1 MHz	Q cm	Ω	2.6	2.6	2.9	2.9	2.6	2.6	2.9	2.9
Dissipation factor 50 Hz	Q cm	Ω	0.0004	0.0004	0.0009	0.0009	0.001	0.001	0.001	0.001
1 MHz	Q cm	Ω	0.0009	0.0009	0.0015	0.0015	0.001	0.001	0.001	0.001
Dielectric strength	Q cm	Ω	22	22	22	22	80	80	80	80
Tracking resistance	Q cm	Ω	HB	HB	HB	HB	HB	HB	HB	HB
Fire performance to UL 94	Q cm	Ω	HB	HB	HB	HB	HB	HB	HB	HB

Mech
Short
proc
ure de
437.
temp

20000-
psi

15000-

10000

5000

0

Trans
blenc
confi
glass

Creepl
glass
show
(in ai

Beha
even
fiber

Beha
load
Nory
are a

Har

Frict
at a
stain
0.26