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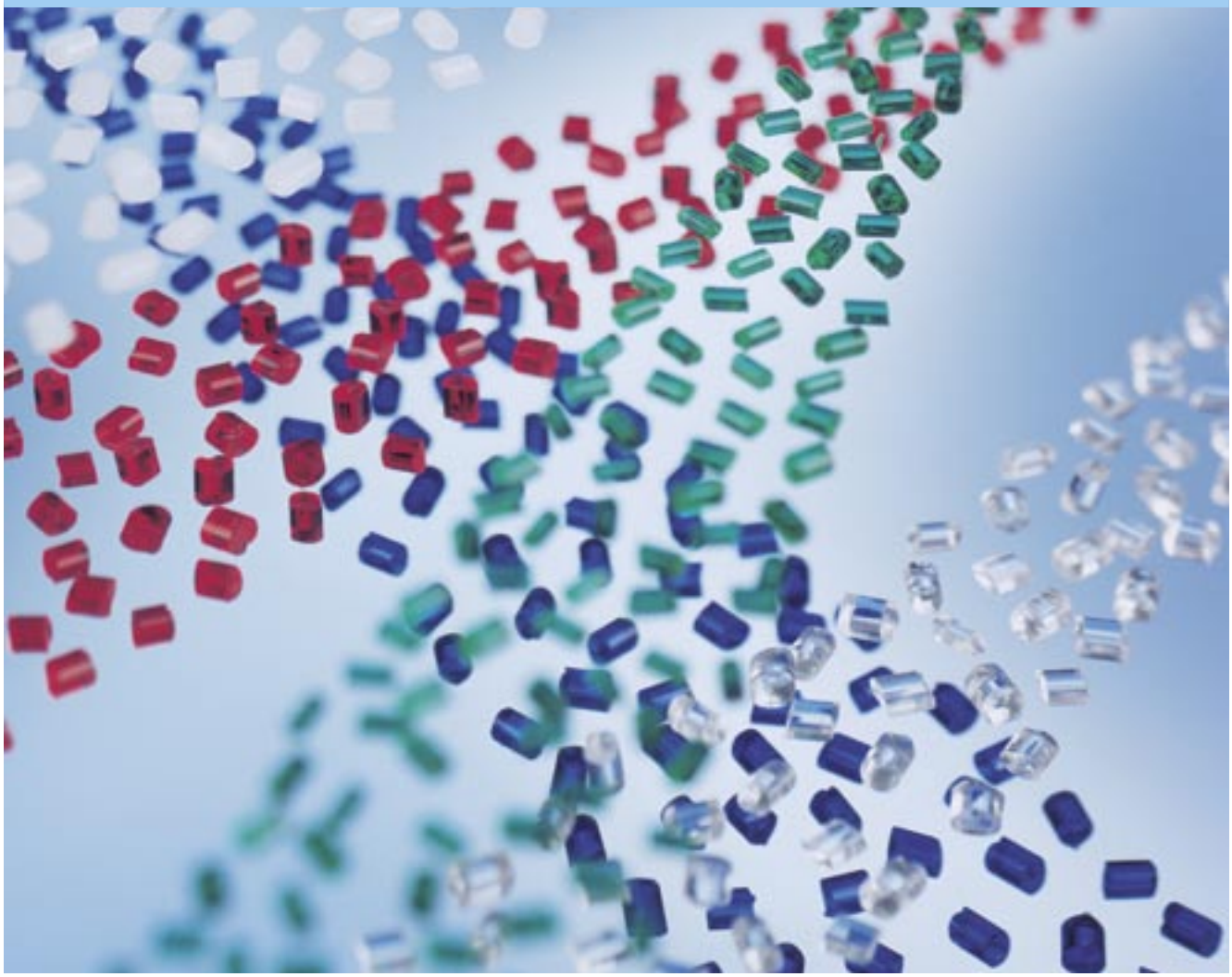
creating essentials

Sales Range

Molding Compounds

PLEXIGLAS® • PLEXALLOY® • PLEXIFIX® • CYROLITE®



October 2004

PLEXIGLAS®
Molding Compounds
the original from Röhm

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General Remarks

PLEXIGLAS® molding compounds are thermoplastics based on polymethyl methacrylate (PMMA), standardized to DIN 7745/ISO 8257.

PLEXIGLAS® molding compounds are characterized by a number of physical and technical properties which are indispensable for manufacturing high-quality parts by injection molding, injection blow molding and extrusion.

PLEXIGLAS® crystal-clear molding compound grades are so highly transparent that molded parts and semifinished products manufactured from them provide the maximum possible light transmission of 92%, i.e. show only the physically unavoidable reflection loss of 4% at each surface.

This unique clarity makes it possible to obtain particularly pure colors with an outstanding degree of precision. In white and other colors, this in turn provides properties of unparalleled quality for lighting engineering, such as excellent diffusion combined with relatively low light loss.

As confirmed by tests in all of the world's climates, PLEXIGLAS® molding compounds show unsurpassed resistance to weathering and aging. They do not turn yellow or wear away under chemical attack, show no deterioration of their properties and are not subject to decay.

Owing to their chemical composition, PLEXIGLAS® molding compounds are uniquely suitable for chemical and physical recycling.

In addition to their pleasant feel and sound, molded parts and semifinished products made from PLEXIGLAS® (PMMA) present the greatest surface hardness and thus the best abrasion resistance of all thermoplastics. This enables them to conserve their high gloss even after prolonged use.

The crystal-clear molding compounds PLEXIGLAS® 6N, 7N, 7M, 7H, 8N and 8H conform to FDA Regulation CFR 21 § 177.1010 (1st April 2004), EEC Directive 2004/19/EG (1st March 2004) concerning the amendment of the directive 2002/72/EC, as well as to the Recommendation XXII of the BfR (2001/09/01, German Institute for Risk Assessment, formerly BgVV). They also comply with the German Prescription on Foodstuffs and Articles of Daily Use (2003/03/07). Please consult us on other grades of colored molding compounds.

Röhm GmbH & Co. KG has been certified to DIN ISO 9001/EN 29001 since June 1993. Moreover the quality management system of Business Line Molding Compounds has satisfied the stringent automotive standards ISO TS 16949:2002 (of the Association of the German Automotive Industry). All manufacturing processes for PLEXIGLAS® molding compounds are subjected to a continuous improvement process and are monitored by a modern quality management system.

PLEXIGLAS® Standard Molding Compounds

PLEXIGLAS® 6N

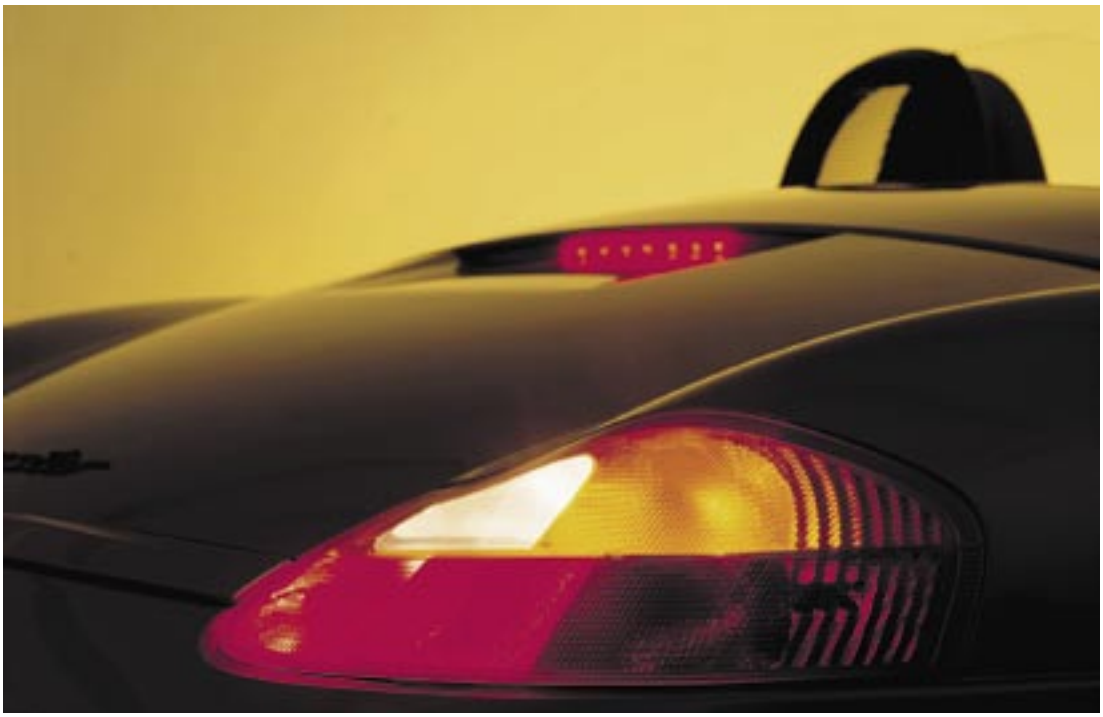
- molding compound with good flow and an acceptable heat deflection temperature under load
- application: injection molding of thin-walled parts with long flow paths

PLEXIGLAS® 7N

- molding compound with good flow (somewhat inferior to PLEXIGLAS® 6N) and an adequate heat deflection temperature under load
- application: injection molding of optical and technical items such as nameplates, covers, magnifying glasses, lenses, housewares and many other uses

PLEXIGLAS® 8N

- molding compound with a high heat deflection temperature under load
- slightly inferior flow to PLEXIGLAS® 7N
- application: injection molding of technical items to satisfy higher demands on heat deflection temperature under load (e.g. lighting industry, automotive industry [taillights, etc.])



PLEXIGLAS® 7H

- variant of PLEXIGLAS® 7N with higher molecular weight and improved stress crack resistance. Somewhat tougher than PLEXIGLAS® 7N at the same heat deflection temperature under load.
- application: extrusion of profiles and sheets for lighting engineering

PLEXIGLAS® 7M

- variant of PLEXIGLAS® 7H with improved flow
- application: extrusion of profiles and sheets for lighting engineering

PLEXIGLAS® 8H

- variant of PLEXIGLAS® 8N with higher molecular weight and improved stress crack resistance. Somewhat tougher than PLEXIGLAS® 8N at the same heat deflection temperature under load.
- application: extrusion of profiles and sheets for lighting engineering

Molding Compounds with Special Additives

Standard molding compounds with special properties such as increased UV absorption or UV transmission are available on request.

PLEXIGLAS® Specialty Molding Compounds

Impact-Modified PLEXIGLAS® zk Molding Compounds

zk molding compounds are suitable for extruding and coextruding profiles and sheets, as well as for injection molding.

zkBR Series

With its special optical characteristics and balanced property spectrum, the zkBR series is the basis for impact-modified PLEXIGLAS® molding compounds.

Increasing impact strength ↓

PLEXIGLAS® zk4BR
PLEXIGLAS® zk5BR
PLEXIGLAS® zk6BR

zkHC Series

This series is characterized by even higher stress crack resistance than that of PLEXIGLAS® zkBR molding compounds.

Increasing impact strength ↓

PLEXIGLAS® zk4HC
PLEXIGLAS® zk5HC
PLEXIGLAS® zk6HC

zkHF Series

The special feature of this series of PLEXIGLAS® molding compounds as compared with other impact-modified grades is its excellent flow.

Increasing impact strength ↓

PLEXIGLAS® zk5HF
PLEXIGLAS® zk6HF

zk Series

These grades show much higher impact strength than the above-mentioned molding compounds.

Increasing impact strength ↓

PLEXIGLAS® zk20
PLEXIGLAS® zk30
PLEXIGLAS® zk40
PLEXIGLAS® zk50

PLEXIGLAS® hw Molding Compound (High Heat Deflection Temperature under Load)

PLEXIGLAS® hw55

PLEXIGLAS® hw55 is particularly suited for injection-molded technical parts for applications subjected to high thermal stress.

PLEXIGLAS® hw55 is a copolymer based on methyl methacrylate (MMA) with comonomer constituents. These provide a high heat deflection temperature under load for a PMMA molding compound, combined with ease of processing.

PLEXIGLAS® df Molding Compounds (Light-Diffusing)

Molding compounds with very good light diffusion at minimum light loss.

Increasing impact strength ↓

PLEXIGLAS® df21
PLEXIGLAS® df22
PLEXIGLAS® df23

Available in grades PLEXIGLAS® 7H, 7N, 8N and zk6BR.
Application: P-O-P displays, lighting, advertising and decorative items, and many other uses

PLEXIGLAS® Molding Compounds – Optical Quality

PLEXIGLAS® oq

On request, the standard molding compound PLEXIGLAS® 7N is supplied in „tested optical quality“ for premium articles.

PLEXIGLAS® DQ508

PLEXIGLAS® DQ508 is a specially developed PMMA molding compound that is excellently suited as a substrate for manufacturing the DVD14 and DVD18 by the *surface transfer process*.

PLEXALLOY® Molding Compounds

PLEXALLOY® molding compounds are particularly suitable for injection molding of technical parts. Due to their superior brilliance, high-gloss surfaces (Class A) can be obtained. They are normally supplied on opaque colors.

Applications: Automotive body parts (e. g. pillar posts, spoilers, mirror housings etc.)

PLEXALLOY® NTA-1

- Impact-modified, heat resistant compound based on polymethyl methacrylate (PMMA).

PLEXALLOY® NTA-3

- Higher heat resistant compound based on polymethyl methacrylate (PMMA).

Special Grades

Molding Compound for Textured Surfaces:

PLEXIGLAS® st

- molding compound that provides a textured surface in extrusion, injection blow molding and extrusion blow molding processes

Molding Compound for Easy Mold Release:

PLEXIGLAS® le

- molding compound which is used for particularly complex mold shapes to minimize the risk of demolding fracture
- The mold release agent causes no haze.

Auxiliary Agents:

PLEXIFIX® sp cylinder/barrel cleaning agent

- PLEXIFIX® sp is a cylinder/barrel cleaning agent of high molecular weight, based on polymethyl methacrylate (PMMA).
- PLEXIFIX® sp is used both for switching from one type of plastic to another and for changing colors. It remains rubbery-elastic even at high temperatures.
- PLEXIFIX® sp can be used sparingly because of its good cleaning effect.

CYROLITE® Molding Compounds

are impact-modified thermoplastic molding compounds based on methyl methacrylate, butadiene and styrene, i.e. a pure MBS copolymer without acrylonitrile. For a multiphase plastic, they show remarkable clarity and light transmission. The melt viscosity is within the same range as that of standard PLEXIGLAS® molding compounds.
CYROLITE® can be injection molded, extruded, injection blow-molded and extrusion blow-molded.

CYROLITE® G-20-100

- can be sterilized by means of gamma rays and ETO
- is crystal-clear and highly light-transmitting
- keeps its impact strength even at low temperatures
- application: for disposable medical devices and housewares

CYROLITE® G-20 HIFLO

- differs from CYROLITE® G-20-100 in its particularly good flow

CYROLITE® GS-90

- shows excellent behavior when exposed to gamma radiation
- is highly resistant to isopropyl alcohol

CYROLITE® CG-97

- with greatest possible resistance to chemicals, greases and PVC plasticizers

CYROLITE® MED2

- with optimized resistance to greases and alcohols

Colors

Standard Colors

Standard colors are identified by a five-digit number after the color name. The digits stand for:

1st digit / main color:
(in analogy to RAL)

0 = white
1 = yellow
2 = orange
3 = red
4 = purple
5 = blue
6 = green
7 = gray
8 = brown
9 = black and clear

2nd digit / type of color
Odd numbers: transparent colors
Even numbers: translucent to opaque colors

3rd to 5th digit:
serial number

Matched and newly developed colors are also identified by a five-digit alphanumerical combination after the color name.

1st digit / main color:
in analogy to RAL, see above

2nd digit / characterization
V = experimental color

3rd to 5th digit:
serial number

Color	No.	Remarks	8N	7H
White	06162			•
White	06501			•
White	06521			•
White	06531			•
Yellow	13115	AMECA	•	
Orange	23085	AMECA	•	
Orange	23105	AMECA	•	
Red	33661	AMECA	•	
Red	33681	AMECA	•	
Red	33691	AMECA	•	
Red	33701	AMECA	•	
Red	33721	AMECA	•	
Red	33780	AMECA	•	
Blue	53351	AMECA	•	
Gray	7V205	AMECA	•	
Gray	7V265	AMECA	•	
Gray	7V272	AMECA	•	
Gray	7V274	AMECA	•	
Black	90114	IR-transmitting	•	
Black	90084		•	

AMECA
(Automotive Manufacturers Equipment Compliance Agency)

The marked grades and colors are listed with AMECA and can therefore be employed for automotive signal purposes. They meet the requirements of SAE J 576.

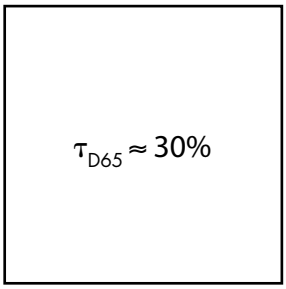
Special Colors

We offer a variety of special colors in addition to our standard ones. Amongst others, these include further colors for signalling applications and lighting engineering, as well as ones with good hiding power for coextrusion.

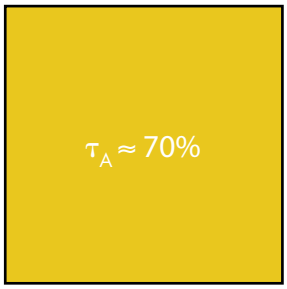
Further information on the availability of special colors can be sent on request.

Example of an order:
PLEXIGLAS® 7H molding compound White 06531

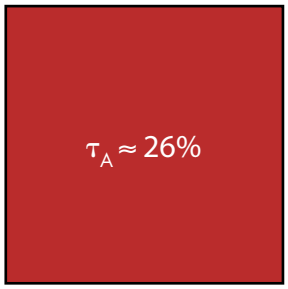
Colors



White 06501

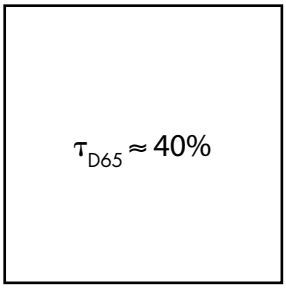


Yellow 13115



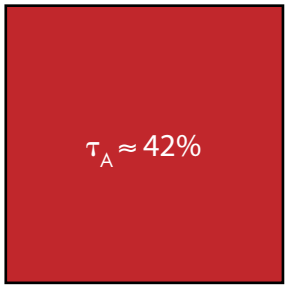
Red 33691

Gray 7V265

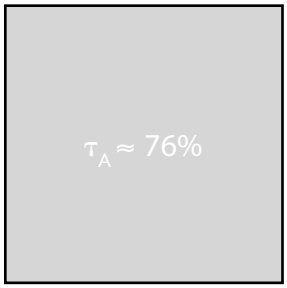


White 06521

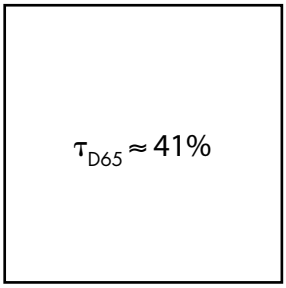
Orange 23085



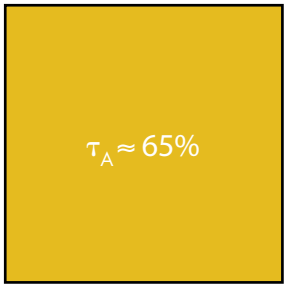
Red 33721



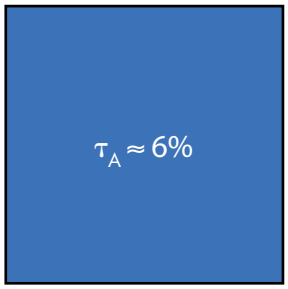
Gray 7V269



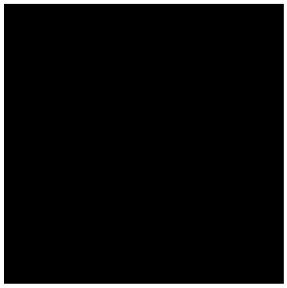
White 06230



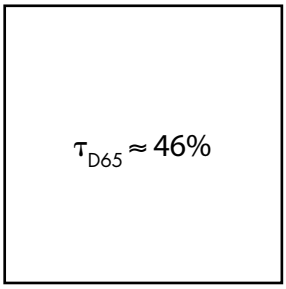
Orange 23105



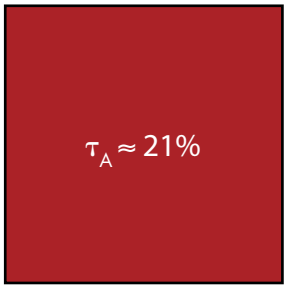
Blue 53351



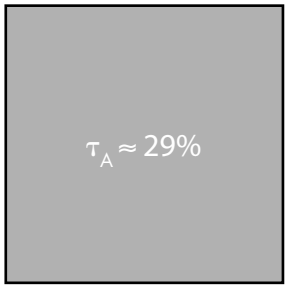
Black 90114



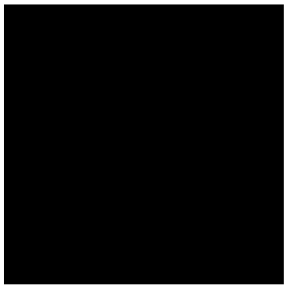
White 06531



Red 33661



Gray 7V205



Black 90084

τ_A or τ_{D65} = transmittance (at 3 mm thickness)
Owing to printing technique, the colors shown here are only approximative.
The color coordinates are available on request.

Properties of Selected Molding Compounds

Typical Properties	Unit	Test Method	PLEXIGLAS® 6N	PLEXIGLAS® 7N	PLEXIGLAS® 8N	PLEXIGLAS® 7H	PLEXIGLAS® 7M	PLEXIGLAS® 8H
Mechanical								
Tensile modulus (1 mm/min)	MPa	ISO 527	3200	3200	3300	3200	3200	3300
Yield stress (50 mm/min)	MPa	ISO 527						
Yield strain (50 mm/min)	%	ISO 527						
Nominal strain at break	%	ISO 527						
Stress at break (5 mm/min)	MPa	ISO 527	67	73	77	76	69	78
Strain at break (5 mm/min)	%	ISO 527	3	3.5	5.5	5.5	4	6.5
Charpy impact strength (23 °C)	kJ/m^2	ISO 179/1fU	20	20	20	20	20	20
Thermal								
Vicat softening temperature (B/50)	°C	ISO 306	96	103	108	103	104	108
Temp. of deflection under load (0,45 MPa)	°C	ISO 75		100	103	100		
Flammability UL 94 (at 1.6 mm nom. thickn.)	Class	IEC 707	HB	HB	HB	HB	HB	HB
Rheological								
Melt volume rate, MVR (230/3,8)	$cm^3/10$ min	ISO 1133	12	6	3	1.4	2.9	0.8
Optical								
Transmittance, τ_{D65}	%	DIN 5036	92	92	92	92	92	92
Refractive index		ISO 489	1.49	1.49	1.49	1.49	1.49	1.49
Other								
Density	g/cm^3	ISO 1183	1.19	1.19	1.19	1.19	1.19	1.19

All listed technical data are typical values intended for your guidance.
They are given without obligation and do not constitute a materials specification.
We will be pleased to state the properties of other grades of PLEXIGLAS® molding compound on request.
The properties of PLEXIGLAS® molding compounds are available on CAMPUS diskettes.

	PLEXIGLAS® zk4BR	PLEXIGLAS® zk5BR	PLEXIGLAS® zk6BR	PLEXIGLAS® zk4HC	PLEXIGLAS® zk5HC	PLEXIGLAS® zk6HC	PLEXIGLAS® zk5HF	PLEXIGLAS® zk6HF	
	2800	2400	1800	2900	2500	2000	2500	1900	
	71	62	45	68	63	47	55	45	
	4.5	4.5	5	4.5	5	5.5	4.5	5	
	19	27	54	17	28	48	25	50	
	25	50	80	25	55	80	50	75	
	102	100	95	102	100	97	96	94	
	99	98	93						
	HB	HB	HB	HB	HB	HB	HB	HB	
	4.5	3.3	1.6	1.1	0.7	0.4	8.1	4.2	
	92	92	91	92	92	91	92	91	
	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	
	1.18	1.17	1.16	1.18	1.17	1.16	1.17	1.16	

	PLEXIGLAS® zk20	PLEXIGLAS® zk30	PLEXIGLAS® zk40	PLEXIGLAS® zk50	PLEXIGLAS® hw55	PLEXALLOY® NTA-1	PLEXALLOY® NTA-3
	2400	2000	1600	950	3600	2700	2900
	62	51	42	25		68	60
	4.5	4.5	4.5	5		5	0
	22	27	30	>50		10	2.6
					80		
					3.5		
	25	55	80	n. b.*	20	33	16
	102	98	94	75	119	110	116
	100	96	92	73	109		
	HB	HB	HB	HB	HB	HB	HB
	2	1.4	0.7	0.1	1.2	3	2
	91	90	90	89	90		
	1.49	1.49	1.49	1.49	1.51		
	1.17	1.15	1.13	1.12	1.19	1.18	1.18

*n. b. = no break

Delivery

Physical Forms

PLEXIGLAS® molding compounds are supplied in injection molding and extrusion quality as pellets of uniform size.

Terms of Delivery

Please inquire about minimum order quantities of our molding compounds: plexiglas.polymers@degussa.com

Packaging

- 25 kg, two-ply polyethylene bag
- 500 kg carton with polyethylene lining
- further forms of packaging, such as silos, on request

No charge is made for standard packaging.

All forms of packaging ensure that the molding compound is delivered in such a way that it normally requires no predrying. If correctly stored, the protection offered by the packaging means that very little moisture is absorbed even after several months' storage.

Inspection and Other Certificates

On request, PLEXIGLAS® standard molding compound in crystal-clear and signal colors can be supplied with an inspection certificate (according to EN 10204-3.1 B).

Availability

PLEXIGLAS® molding compound in crystal-clear and standard colors is normally available at short notice.

All other molding compounds are manufactured to order, subject to certain minimum quantities.

Color matching and new colors on request, at a charge.

Degussa AG
Business Line Molding Compounds

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www.plexiglas.de
www.roehm.com

® = registered trademark

Degussa's PMMA Molding Compounds are marketed under the PLEXIGLAS® trademark worldwide except the Americas (marketed in the Americas under ACRYLITE® trademark of Cyro Industries).

10/1004/06062 (en)