

Connecting**Chemistry**



## **POLYMERS DACH**

Integrated Head Rest  
for Child Car Seats in  
NYLAFORCE® B 50

Product Information

## Integrated Head Rest for Child Car Seats

The more stringent requirements for head supports on child seats led to the selection of NYLAFORCE® B 50 for the development and manufacture of the integrated headrest for the “RECARO start” child’s seat.

The forces of acceleration occurring during a side impact crash require a material with high kinetic absorption properties combined with the highest strength. On the one hand the head supports may not break in case of a crash, on the other a high level of dimensional stability (stiffness) must be guaranteed. Qualities that in principle are contradictory but which are mastered without difficulty by NYLAFORCE® B 50.

Despite the high level of glass fibre reinforcement, processing NYLAFORCE® B 50 presents no problems. Moreover, the material stands out thanks to its high thermal resistance and low moisture absorption compared with standard polyamides.

## NYLAFORCE® Features

- High-glass fiber reinforced construction materials based on PA 6 and PA 66
- Predestined for the substitution of metals
- For technical applications with the highest demands on strength and stiffness
- Outstanding physical and mechanical properties
- No PA 6 / PA 66 on the market with comparable mechanical values
- High tensile modulus and thus high dimensional stability
- High tensile strength with a still very high degree of elasticity
- Outstanding dimensional stability and low warpage
- Depending on the tool geometry, significant cycle time reduction possible
- Better processing properties than partially aromatic polyamides
- Also suitable for extrusion
- Universal application profile



# Physical and mechanical Properties

PROPERTY	STANDARD	UNIT	NYLAFORCE® B 50
Glass fibre reinforcement	–	%	50
Density	ISO 1183	g/cm <sup>3</sup>	1.57
Tensile strength dry 23 °C	ISO 527	MPa	250
Tensile strength conditioned 23 °C	ISO 527   ISO 1110	MPa	170
Tensile strength dry 80 °C	ISO 527	MPa	140
Tensile strength dry 120 °C	ISO 527	MPa	105
Elongation at break dry 23 °C	ISO 527	%	3.2
Elongation at break conditioned 23 °C	ISO 527   ISO 1110	%	5.5
Elongation at break dry 80 °C	ISO 527	%	7.4
Elongation at break dry 120 °C	ISO 527	%	7.6
Tensile modulus dry 23 °C	ISO 527	MPa	17 500
Tensile modulus conditioned 23 °C	ISO 527   ISO 1110	MPa	12 000
Tensile modulus dry 80 °C	ISO 527	MPa	7 600
Tensile modulus dry 120 °C	ISO 527	MPa	7 400
Charpy impact strength unnotched dry 23 °C	ISO 179/1eU	kJ/m <sup>2</sup>	100
Charpy impact strength unnotched conditioned 23 °C	ISO 179/1eU   ISO 1110	kJ/m <sup>2</sup>	k. B.
Charpy Schlagzähigkeit - 30 °C	ISO 179/1eU	kJ/m <sup>2</sup>	k. B.
Charpy impact strength notched dry 23 °C	ISO 179/1eA	kJ/m <sup>2</sup>	19
Charpy impact strength notched conditioned 23 °C	ISO 179/1eA   ISO 1110	kJ/m <sup>2</sup>	30
Charpy impact strength notched - 30 °C	ISO 179/1eA	kJ/m <sup>2</sup>	16
Melting temperature	ISO 3146 (10K/min)	°C	221
Heat deflection temperature HDT/A	ISO 75	°C	>200
Surface resistivity	DIN IEC 60093	Ohm	>10 <sup>12</sup>
Volume resistivity	DIN IEC 60093	Ohm*m	>10 <sup>12</sup>
Flammability (3 mm)	UL 94	–	HB
Humidity absorption	similar to ISO 62	%	1.5
Water absorption	similar to ISO 62	%	4.8
Moulding shrinkage	ISO 294 <sup>1)</sup>	%	0.1 - 0.5

1) Internal test method in accordance with ISO 294 (test specimen 60 mm x 60 mm x 2 mm).

# Processing Advice

## NYLAFORCE®

can be processed on most customary types of injection moulding machine. The same processing conditions as for glass fibre reinforced polyamides can fundamentally be employed. Due to the high processing temperatures and abrasive-ness of reinforced materials, the plasticising unit and hot runner system should be made of wear-resistant steel. Preference should be given to open nozzles over shut-off nozzles. To achieve a homogeneous melt temperature and a constant part geometry, use should be made of suitable plasticising screws with a non-return valve. The required shot size should be between 10 % and 70 % of the machine's rated capacity.

## Material drying

NYLAFORCE® is supplied in moisture-proof containers, with a maximum moisture content of 0.2 %, and can be directly processed in this state. We recommend that it be stored in a dry room. In order to achieve an optimum part quality and avoid processing problems due to moisture that has been absorbed in the meantime, we recommend that the material be pre-dried until it has a residual moisture content of approx. 0.1 %. Drying should be performed in a dry-air dryer (dew point less than - 20 °C) or in a vacuum drying cupboard at 80 °C to 90 °C for 4 to 12 hours. Circulating-air dryers are not suitable for NYLAFORCE®. Once it has been dried, the material must be protected against renewed absorption of moisture from the environment.

## Recommended Machine Parameters and Tool Temperature

PARAMETER	RANGE	RECOMMENDATION
Melt temperature	250 °C to 320 °C	290 °C
Dosing speed	10 m/min. to 20 m/min.	15 m/min.
Back pressure	20 bar to 80 bar	40 bar
Filling pressure	800 bar to 1500 bar	1200 bar
Injection speed	high	high
Tool temperature	80 °C to 140 °C	140 °C

The specified values are given as a guide only. The values actually required will be a function of the geometry and the desired quality of the injection moulded part, in particular.

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