Bayblend® W85 XF

- **(PC+ASA) blend**
- **Non-reinforced**
- **Injection molding grade**
- **Excellent weathering and aging resistance**

Characterization

Bayblend® W85 XF is an amorphous thermoplastic polymer blend based on polycarbonate (PC) and a styrene-acrylonitrile copolymer (ASA) modified with acrylate rubber.

Delivery form

Bayblend® W85 XF is supplied in the form of granules in 25-kg polyethylene sacks, in large cartons with a polyethylene inliner, in big bags or by silo truck.
The product is available in natural color or in a large number of opaque color shades.

The production plants for Bayblend® have been certificated to DIN ISO by the appropriate quality organizations.
The certificates can be found in the INTERNET at http://www.bayermaterialscience.com (Customer Services/Certificates/Quality).

Applications

The main area in which Bayblend® W85 XF is used is for automotive parts that require an elevated light aging and weathering stability. Its use obviates the need to paint or laminate these parts.
Typical applications include trim components, such as external mirror housings, ventilation systems, triangular window surrounds, side protection moldings, glove compartment lids, rear aprons, interior mirror housings, instrument frames, head-rest trim, radiator grills, loudspeaker covers, central consoles, column trim, headlamp housings, spoilers, upper door trim and trim for motorized two-wheel vehicles and windshields.
Further areas of application are to be found in electrical engineering, including lamp housings.

Properties (see also table)

Bayblend® W85 XF is noted for its excellent light aging and weathering stability, its resistance to aging, and also its high heat resistance and sound mechanical strength and toughness level, plus its very good flow properties.

Mechanical properties

Bayblend® W85 XF displays a very high impact and notched impact strength over a broad range of temperatures. Although its low-temperature notched impact strength is lower than that of comparable (PC+ABS) blends, it is still high for a (PC+ASA) blend.
Bayblend® W85 XF displays ductile fracture behavior down to -10/-20 °C in the multiaxial penetration test.

The stiffness and strength values attained in the tensile test are higher than for Bayblend® grades with a comparable heat resistance.

Thermal properties

Bayblend® W85 XF displays a high heat resistance when subjected to short-term thermal loading.
The Vicat softening temperature (VST/B 120) is in the region of 132 °C.

When components are subjected to a low level of mechanical stressing, no major dimensional changes are to be expected on short-term exposure to temperatures of up to 120 °C.
The maximum permanent service temperature will depend on the molded part geometry, the type of stressing and the range of requirements.

The melting range starts at approximately 200 °C, while thermal decomposition commences at about 300 °C.

The coefficient of linear thermal expansion (ISO 11359-1,-2) displays only a low level of anisotropy and is around 0.7 •10^{-4}/K in the range of between 23 and 55 °C.

Rheological properties

Its excellent flowability is one particular advantage of Bayblend® W85 XF, and this is even some 10 % higher than for the easy-flow grade, Bayblend T85 XF, which is made of a general-purpose PC+ABS.

The outstanding flow behavior makes it possible to produce even large molded parts using thin-wall technology.

The flow length/wall thickness diagrams can be found in the Appendix.

Burning behaviour

Bayblend® W85 XF has a UL 94 HB recognition (all colors) at a wall thickness of 0.85 mm.

In addition, at a wall thickness of 1.0 mm or more, this product satisfy the requirements of FMVSS 302 with regard to the permissible burning rate (max. 101.6 mm/min).

Chemical resistance

At room temperature, molded parts in Bayblend® are resistant to mineral acids, a large number of organic acids and also aqueous saline solutions. Bayblend® parts are not resistant to bases, aromatics, ketones, esters, chlorinated hydrocarbons and a number of greases and oils. The resistance to chemicals is conditioned inter alia by the temperature, loading duration and the internal and external stress status of the molded part.

Weatherability

With most thermoplastics, UV radiation in conjunction with atmospheric oxygen causes a yellowing of the plastic's surface and a deterioration in mechanical properties, especially in the toughness at low temperatures.

Bayblend® W85 XF displays different behavior in this respect. It has a high resistance to light aging and weathering. This is due to its elastomer component, which is made up of an acrylate rubber. Unlike butadiene rubber, as is used in ABS or (PC +ABS), for example, the acrylate rubber has no free double bonds, giving it a considerably higher resistance to UV radiation and the action of atmospheric oxygen. Even if exposed to UV radiation or, indeed, heat, for a prolonged period of time, the surface finish will thus not be impaired and the mechanical properties will also be largely retained.

Examples of weathering and UV resistance are set out in the annex.

Emissions characteristics

Bayblend® W85 XF has low emission values, which means that it generally satisfies the emissions requirements of the European automotive industry for components used in vehicle interiors. Since the automotive industry requires the emissions rating to be determined on the component rather than the material, it is important to remember that the emission characteristics are substantially influenced by the injection molding process and the design of the part and the mold (especially the gating system). In order to obtain the best possible emission values it is advisable to follow our design and processing recommendations.

Processing

Processing is generally performed by injection molding. All modern injection molding machines may be used.

Pre-treatment/drying

It is essential for Bayblend® to be dried prior to processing. For injection molding, there must be less than 0.02 % residual moisture in the granules. Moisture in the plastic melt can lead to surface defects in the form of streaks and also to hydrolytic degradation (reduction in mechanical properties). Drying is best conducted in dry-air dryers.

Drying conditions:
2-4 h at 110 °C (dry-air dryer)

Excessively long drying times should be avoided, since color changes cannot otherwise be ruled out.

Melt temperature[1)]: 260 to 280 °C

The optimum processing temperature must be established as a function of the molded part. It is advisable to check the actual melt temperature on the ejected press cake using a thermometer. Overheating, and also excessively long residence times for the melt in the barrel must be avoided, since this can lead to material damage, i.e. to a reduction in toughness, or to surface defects in the form of streaks on the injection-molded part. Thermal decomposition of the material commences at around 300 °C.

1) see also disclaimer at the end of this Technical Information

Mold temperature: 70 to 110 °C

With a uniform mold temperature, this is the optimum temperature range for the production of low-stress parts with a very good surface quality.
While lower temperatures permit shorter cycle times, they result in poorer-quality molded parts (surface finish (gloss, weld lines), weld-line strength, warpage, shrinkage and tolerances).

Screw speed

The screw speed should be controlled in such a way that the circumferential velocity of the screw is between 0.1 and 0.3 m/s.

Injection velocity

A relatively high injection velocity is recommended on account of the low level of cooling during mold filling. This will ensure a glossy surface, low-visibility weld lines and a high weld-line strength.

Shrinkage

Molding shrinkage is virtually identical in all axes, in between a range of 0.55 to 0.75 %. In addition to the geometry of the part, shrinkage is primarily dependent on the level of holding pressure and the time for which this acts, as well as on the temperature of the melt and the mold and on the cooling conditions prevailing in the mold. Postshrinkage depends essentially on the storage temperature and time and is generally less than 0.1 %.

Further literature

Information on processing can also be found in the following technical publications:

"Processing Data for the Injection Molder",
"The Injection Molding of High-Quality Molded Parts".

Finishing

- Forming: hot-forming processes, such as thermoforming, bending, stamping.
- Machining: sawing, drilling, milling, filing, punching. The use of carbide-tipped tools is recommended.
- Joining: screw connections, gluing, welding.
- Post-treatment: painting, printing, foam-coating, metallizing.

Recycling

After use, single-sort molded parts in Bayblend® W85 XF which do not contain any pollutants can be mechanically recycled.
Molded parts which are not pollutant-free can be chemically recycled or incinerated with energy recovery.
Parts should be marked in accordance with DIN EN ISO 11469. For parts in Bayblend® W85 XF the labeling is:

>PC+ASA<

Further details may be found in our Technical Information PCS-1164 en.

Further literature

Brochure:
"Bayblend® - the polycarbonate blend"
Product range-typical values-properties-processing

Special notes

The information given in Safety Data Sheet No. 112000022992 must be observed.

The safety data sheet is available to registered customers on the Internet at
http://www.bayerone.bayer.com
or can be sent out by request.
It contains details of labeling, handling and storage, as well as information on composition, product safety and toxicological/ecological profiles.

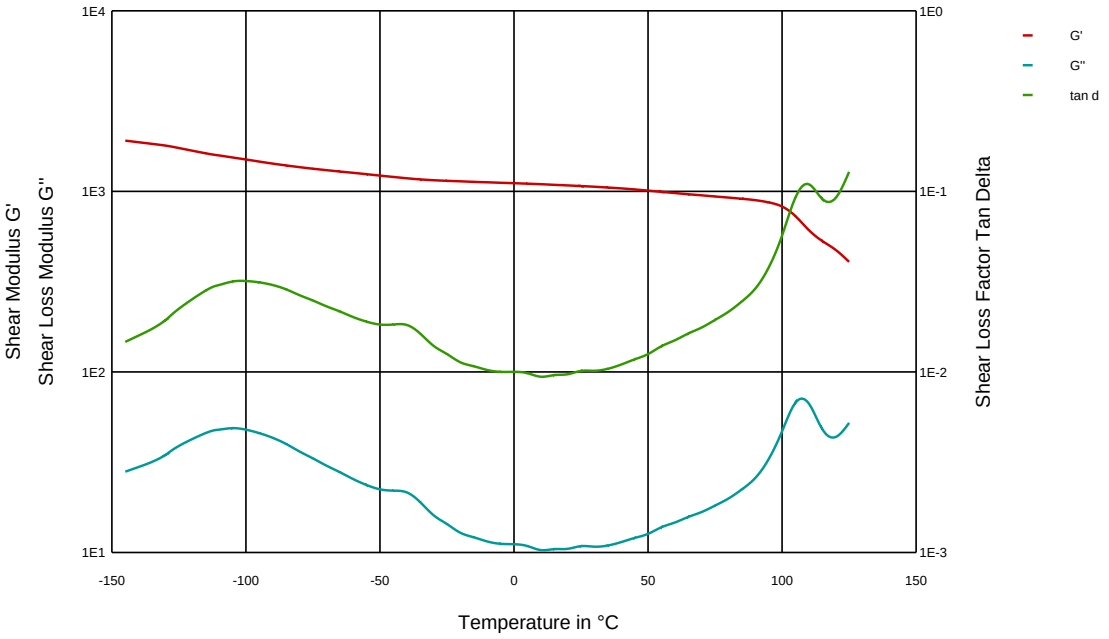

Fig. 1: Shear modulus as a function of temperature to ISO 6721-7 for Bayblend® W85 XF.

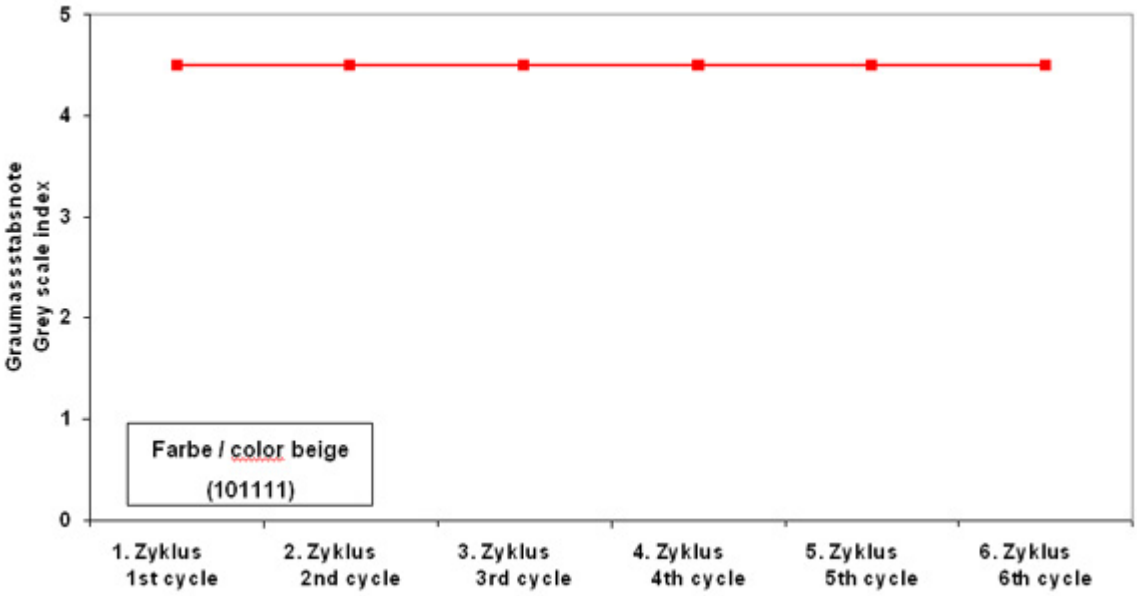

Fig. 2: Light aging resistance of Bayblend® W85 XF as per VDA 75202.

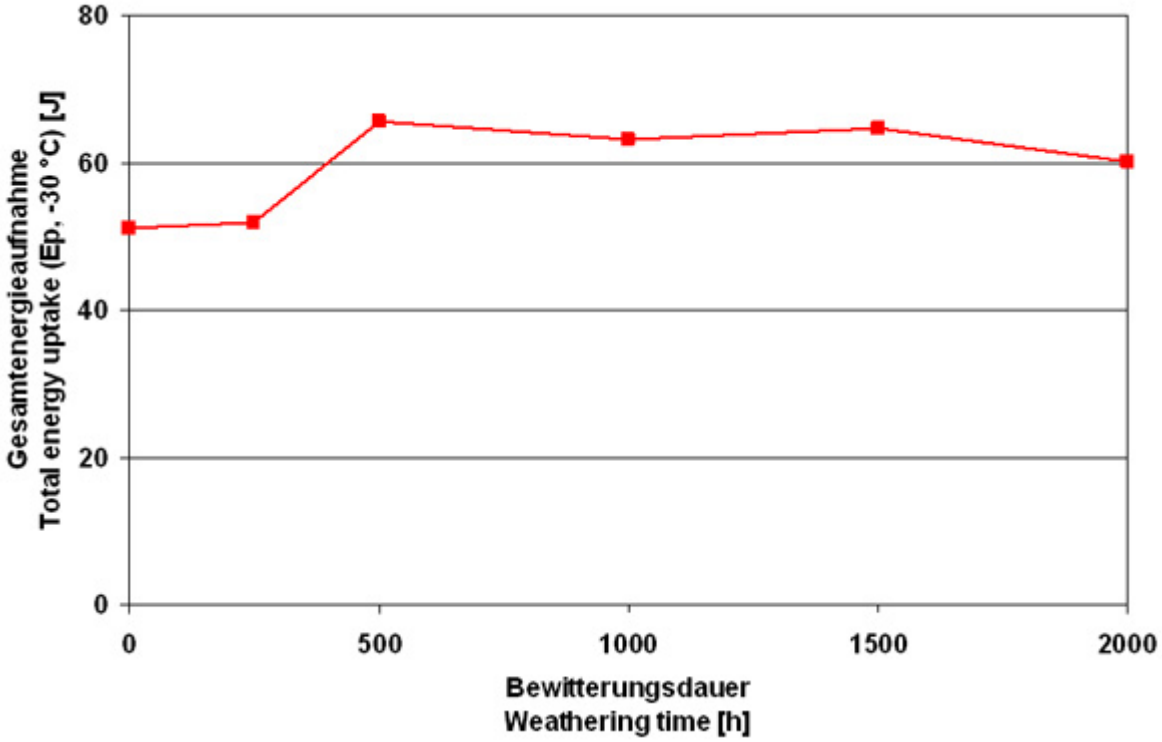

Fig. 3: Overall energy absorption at -30 °C in the penetration test to ISO 6603-2 after the weathering of Bayblend® W85 XF to ISO 4892-2A.

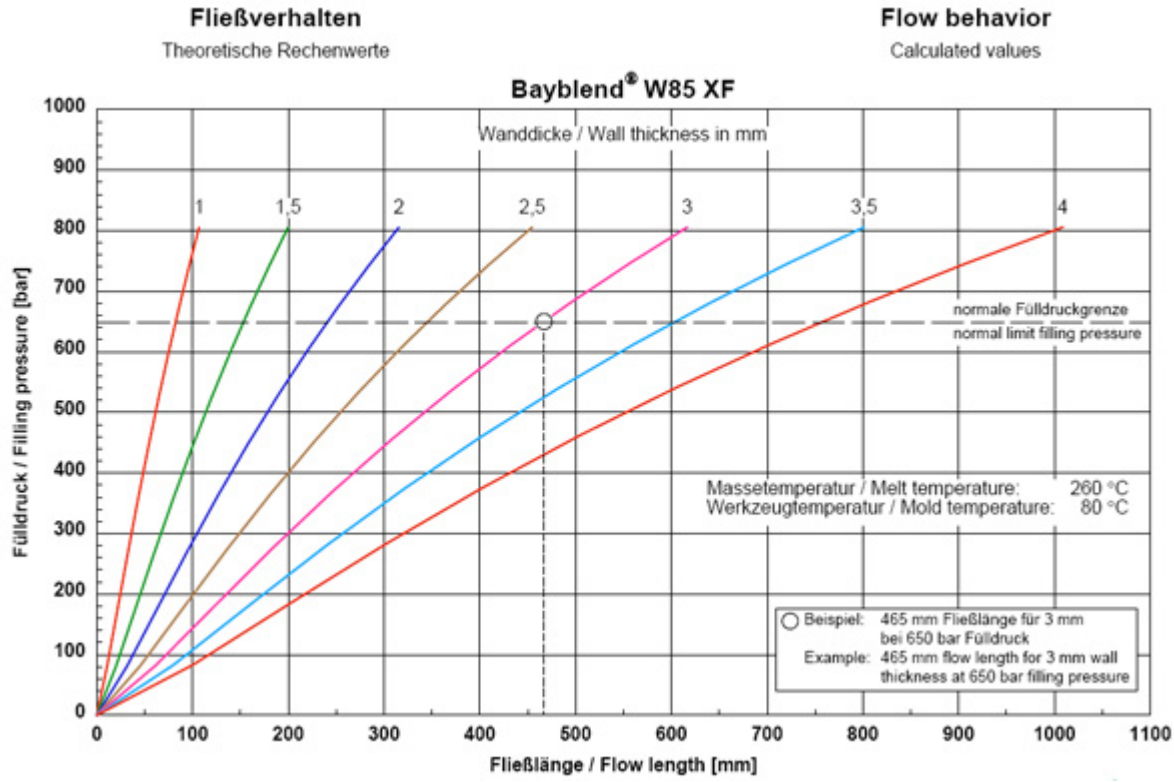

Fig. 4: Flow length/wall thickness diagram for Bayblend® W85 XF.

Typical Values

	Property	Test Condition	Unit	Standard	Bayblend® W85 XF
Rheological properties					
C	Melt volume-flow rate	260 °C; 5 kg	cm³/10 min	ISO 1133	27
	Molding shrinkage, parallel	150x105x3; 260 °C / MT 80 °C	%	b.o. ISO 2577	0.55 - 0.75
	Molding shrinkage, normal	150x105x3; 260 °C / MT 80 °C	%	b.o. ISO 2577	0.55 - 0.75
	Melt viscosity	1000 s^-1^; 260 °C	Pa·s	b.o. ISO 11443-A	225
Mechanical properties (23 °C/50 % r. h.)					
C	Tensile modulus	1 mm/min	MPa	ISO 527-1,-2	2450
C	Yield stress	50 mm/min	MPa	ISO 527-1,-2	63
C	Yield strain	50 mm/min	%	ISO 527-1,-2	5.0
	Stress at break	50 mm/min	MPa	ISO 527-1,-2	62
	Strain at break	50 mm/min	%	b.o. ISO 527-1,-2	> 50
	Izod impact strength	23 °C	kJ/m²	ISO 180-U	N
	Izod impact strength	-30 °C	kJ/m²	ISO 180-U	N
	Izod notched impact strength	23 °C	kJ/m²	ISO 180-A	45
	Izod notched impact strength	-20 °C	kJ/m²	ISO 180-A	15
Thermal properties					
C	Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	109
C	Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	127
C	Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	130
	Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	132
C	Coefficient of linear thermal expansion, parallel	23 to 55 °C	10^{-4}/K	ISO 11359-1,-2	0.7
C	Coefficient of linear thermal expansion, transverse	23 to 55 °C	10^{-4}/K	ISO 11359-1,-2	0.7
C	Burning behavior UL 94	0.85 mm	Class	UL 94	HB
Electrical properties (23 °C/50 % r. h.)					
C	Relative permittivity	100 Hz	-	IEC 60250	3.1
C	Relative permittivity	1 MHz	-	IEC 60250	2.8
C	Dissipation factor	100 Hz	10^{-4}	IEC 60250	25
C	Dissipation factor	1 MHz	10^{-4}	IEC 60250	105
C	Volume resistivity		Ohm·m	IEC 60093	1E14
C	Surface resistivity		Ohm	IEC 60093	1E16
C	Electrical strength	1 mm	kV/mm	IEC 60243-1	35
C	Comparative tracking index CTI	Solution A	Rating	IEC 60112	225
Other properties (23 °C)					
C	Water absorption (saturation value)	Water at 23 °C	%	ISO 62	0.5
C	Water absorption (equilibrium value)	23 °C; 50 % r. h.	%	ISO 62	0.2
C	Density		kg/m³	ISO 1183-1	1160
Processing conditions for test specimens					
C	Injection molding-Melt temperature		°C	ISO 294	260
C	Injection molding-Mold temperature		°C	ISO 294	80
C	Injection molding-Injection velocity		mm/s	ISO 294	240

C These property characteristics are taken from the CAMPUS plastics data bank and are based on the international catalogue of basic data for plastics according to ISO 10350.

Impact properties: N = non-break, P = partial break, C = complete break

colored fields = UL recognition

Note melt viscosity: Determination of true viscosity using the method of representative viscosity.

Editor: Global Innovations - Polycarbonates
Bayer MaterialScience AG
D-51368 Leverkusen, Germany
www.bayermaterialscience.de
pcs-info@bayermaterialscience.com