

<b>Specification</b> Physical and chemical properties	<b>PCP</b> <b>D 6117</b>
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- provisional -

## UV 415 BROWN

**D 6117**

Colour: brown

Application: dark tinted sunglare filter  
with high UV- absorption  
filter category 3 acc. to DIN EN 1836  
(for  $\tau_v > 18\%$  filter category 2)

For use as laminated glass component  
additional values for thickness  $d = 1\text{mm}$   
are indicated.

The subsequent properties are based primarily upon the measuring results of the very latest standards and measuring methods, which are defined in corresponding "Measuring and Test Procedures".  
We retain the right to change the data in keeping with the latest technical standards.  
Non-toleranced numerical values are reference values of an average production quality.

Values marked with  $\diamond$  do not apply to the type of glass or no values are available.

Requirements deviating from these specifications must be defined in writing in a **customer agreement**.

<b>Specification</b>		<b>PCP D 6117</b>				
Physical and chemical properties						
<b>1. Optical properties</b>						
<b>1.1 Refractive indices (20 °C)</b>						
Pretreatment of samples	$n_g$	1.5194				
[ x ] Condition as supplied	$n_F$	1.5153				
[ ] annealed at 40 °C/h	$n_F$	1.5147				
	$n_e$	1.5110				
	$n_d$	1.5090				
	$n_D$	1.5089				
	$n_C$	1.5069				
	$n_C$	1.5063				
<b>1.1.1 Abbe value</b>						
	$v_e$	60.4				
	$v_d$	60.7				
<b>1.2 Transmittance data</b>						
<b>1.2.1 Spectral transmittance <math>\tau(\lambda)</math></b>						
<b>1.2.1.1 <math>\tau(\lambda)</math> - curve</b>						
Plot of spectral transmittance $\tau(\lambda)$ for $d = 1.0$ mm and $2.0$ mm ( $\lambda = 300$ nm to $1500$ nm)		see annex				
<b>1.2.1.2 <math>\tau(\lambda)</math> - individual values in % as a function of thickness</b>						
	thickness in mm	1.0	2.0			
	$\tau(\lambda)_{\max}$ for the $\lambda$ - range 280 nm to 315 nm	< 0.001	< 0.001			
	$\tau(\lambda)_{\max}$ for the $\lambda$ - range 315 nm to 350 nm	< 0.001	< 0.001			
	$\tau_{380}$	< 0.005	< 0.001			
	$\tau_{415}$	2	< 1			
	$\tau(\lambda)_{\min}$ for the $\lambda$ - range 500 nm to 650 nm	32	11			
<b>1.2.1.3 Edge wavelength (<math>d = 2.0</math> mm)</b>						
	Edge wavelength $\lambda_c$ ( $\tau = 0.46$ ) in nm	◇				
<b>1.2.2 Luminous transmittance <math>\tau_v</math></b>						
<b>1.2.2.1 Luminous transmittance <math>\tau_{vD65}</math> in % at nominal thickness <math>d = 2.0</math> mm * nominal transmittance</b>			16.5* ± 2			
Solarization refer to 6.1						
Luminous transmittance as a function of thickness						
Thickness in mm	1.0	2.0	3.0	4.0	5.0	6.0
$\tau_{vD65}$ in %	38.6	16.5	◇	◇	◇	◇
$\tau_{vA}$ in %	40.2	17.8	◇	◇	◇	◇
$\tau_{vC}$ in %	38.7	16.5	◇	◇	◇	◇

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<b>1.2.2.2</b>	<b>Scale number / Filter category</b>		
	<i>N</i> for thickness $d = 1.0$ mm ( $\tau_{vD65} = 38.6$ %)	5 - 2	
	<i>N</i> for mean thickness $d = 1.6$ mm ( $\tau_{vD65} = 22.8$ %)	5 - 2.5	
	<i>N</i> for mean thickness $d = 2.3$ mm ( $\tau_{vD65} = 12.6$ %)	5 - 3.1	
	filter category for luminous transmittance $\tau_{vD65} = 38.6$ %	2	
	filter category for nominal transmittance $\tau_{vD65} = 16.5$ %	3	
<b>1.2.3</b>	<b>Special transmittance values in % as a function of thickness</b>		
<b>1.2.3.1</b>	<b>UV - transmittance</b>		
	thickness in mm	1.0	2.0
	$\tau_{UVA}$	<0.05	<0.05
	$\tau_{SUV}$	<0.05	<0.05
	$\tau_{SUVA}$	<0.05	<0.05
	$\tau_{SUVB}$	<0.05	<0.05
<b>1.2.3.2</b>	<b>IR - transmittance</b>	$\tau_{SIR}$	68.5    51.5
<b>1.2.3.3</b>	<b>Solar blue - light transmittance</b>	$\tau_{sb}$	23.1    6.3
<b>1.3</b>	<b>Colour</b>		
<b>1.3.1</b>	<b>Visual evaluation</b>	◇	
<b>1.3.2</b>	<b>Colorimetry</b>		
	$\tau_{vD65}$ in %	38.6	16.5
	Chromaticity coordinates	$X_{10}$	0.3641    0.4045
		$Y_{10}$	0.3795    0.4124
	Chromaticity coordinates (colour locus) are referred to the Standard Illuminant $D_{65}$ according CIE 10°-observer by the named luminous transmittances (refer to 1.2.2.1)		
<b>1.3.3</b>	<b>Signal light recognition</b>		
	$\tau_{vD65}$ in %	38.6	16.5
	Relative visual attenuation coefficient (quotient) $Q$ for signal light recognition referred by the named luminous transmittances (refer to 1.2.2.1)	$Q_{blue}$	0.92    0.88
		$Q_{green}$	0.95    0.90
		$Q_{yellow}$	1.09    1.18
		$Q_{red}$	1.14    1.30
<b>1.3.4</b>	<b>Yellowness index (<math>d = 10</math> mm)</b>		
	$Y_i$	◇	

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<b>Specification</b>		<b>PCP D 6117</b>	
Physical and chemical properties			
<b>2. Thermal properties</b>			
<b>2.1 Viscosities and corresponding temperatures</b>			
Designation	Viscosity lg $\eta$ in dPas	Temperature $\vartheta$ in °C	
Strain point	14.5	505	
Annealing point	13.0	529	
Softening point	7.6	679	
Forming temperature	6.0	760	
Forming temperature	5.0	829	
Forming temperature	4.0	919	
<b>2.2</b>	<b>Transformation temperature <math>T_g</math> in °C</b>	531	
<b>2.3</b>	<b>Coefficient of mean linear thermal expansion <math>\alpha(20\text{ °C};300\text{ °C})</math> in <math>10^{-6}\text{ K}^{-1}</math> (Static measurement)</b>	7.0	
<b>2.4</b>	<b>Fuseability</b>	◇	
<b>2.5</b>	<b>Mean specific heat capacity <math>c_p(20\text{ °C to }100\text{ °C})</math> in <math>\text{J}/(\text{g} \cdot \text{K})</math></b>	◇	

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<b>3. Mechanical properties</b>		
<b>3.1</b>	Density $\rho$ in g/cm <sup>3</sup> (annealed at 40 °C/h)	2.41
<b>3.2</b>	Stress optical coefficient $C$ in $1.02 \cdot 10^{-12}$ m <sup>2</sup> /N	◇
<b>3.3</b>	Breaking strength	disregard
<b>3.4</b>	Young´s modulus $E$ in kN/mm <sup>2</sup>	◇
<b>3.5</b>	Poisson´s ratio $\mu$	◇
<b>3.6</b>	Torsion modulus $G$ in kN/mm <sup>2</sup>	◇
<b>3.7</b>	Knoop hardness $HK$ 0.1/20	500

Form 0050/1e

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<b>4.</b>	<b>Chemical properties</b>	
<b>4.1</b>	<b>Hydrolytic resistance acc. to DIN ISO 719</b>	
	Hydrolytic class	HGB 4
	Equivalent of alkali (Na <sub>2</sub> O) per gram of glass grains in µg/g	546
<b>4.2</b>	<b>Acid resistance acc. to DIN 12 116</b>	
	Acid class	S 4
	Half surface weight loss after 6 hours in mg/dm <sup>2</sup>	1281
<b>4.3</b>	<b>Alkali resistance acc. to DIN ISO 695</b>	
	Class	A 3
	Surface weight loss after 3 hours in mg/dm <sup>2</sup>	406
<b>4.4</b>	<b>Hazardous Substances</b>	
	EC-directive 2002/95/EC (RoHS-directive)	on request
<b>5.</b>	<b>Electrical properties</b>	disregard
<b>6.</b>	<b>Other properties</b>	
<b>6.1</b>	<b>Solarization</b>	
	Reduction of luminous transmittance	
	$\tau_{vD65} = 16.5\%$ after UV-radiation	$\Delta \tau_{vD65}$ in %
		0.4
	<b>Measuring and Test Procedures</b>	
	The sample will be irradiated with a UV - F 400 floodlamp.	
	The irradiation time amounts to 7h; the distance between floodlamp and samplefastening is 14 cm.	
<b>7.</b>	<b>Annex (diagrams, curves)</b>	

# Specification

Physical and chemical properties

PCP

D 6117

## Spectral Transmittance

Type of Glass: UV 415 Brown

Thickness: 1.00 mm ———

Thickness: 2.00 mm ———

