



VÚSAPL, joint-stock co., TESTING LABORATORY SECTION

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ACCREDITED TESTING LABORATORY



Reg. No. 005/S-043

A - accredited tests

U - unaccredited tests

Physical-mechanical department

## TEST REPORT NO. 0402/2008

No. of pages: 5

**Title of the test:**

1. Determination of tensile properties
2. Determination of flexural properties
3. Determination of Charpy unnotched impact strength
4. Determination of water absorption
5. Flammability

**Customer:** SK 06, Ing. Andočová  
Chief of OCV

**Order number:** SK 19/2008 - code 232 (S06/08/0003/2502)

**Identification and description of the sample:** Central registry sample No. - 1026C  
extruded PMMA sheets, identified by the customer as sample  
No. S 21/2008

**Manner of delivering the sample:** Sample delivered by the customer personally

**Date of the delivery:** July 10, 2008

### RESULTS

The test results are given as an arithmetic mean  $\bar{x}$  of parallel measurements together with indicating standard deviations of the mean values  $s$  or uncertainties of the measurements (U) using distribution coefficient  $k = 2$  for supplementary probability of 95%.

#### 1. Determination of tensile properties according STN EN ISO 527-2: 1997 - A

Type of testing: force measuring  
Date of the test conducting: August 4, 2008  
The test conducted by: Černá

Testing machine: tensile testing machine ZWICK 1474  
Speed of testing [mm/min]: 5  
Initial length [mm]: 50  
Distance between grips [mm]: 90



Specimen type: 1B  
 Preparation of test specimens: by cutting  
 Number of test specimens: 10  
 Conditioning: STN EN ISO 291, 23/50-2

Table 1 Tensile properties

Identification of the sample	Modulus of elasticity in tension [MPa]		Tensile stress at break [MPa]		Tensile strain at break [%]	
	x	s	x	s	x	s
S 21/2008 Machine direction	3563,4	168,6	64,1	5,5	4,2	1,4
S 21/2008 Cross direction	3526,3	180,0	65,1	3,2	3,9	0,97

**2. Determination of flexural properties according STN EN ISO 178: 2004 - A**

Type of testing: deflections measurement  
 Date of the test conducting: August 1, 2008  
 The test conducted by: Kinerová

Testing machine: tensile testing machine UTS  
 Speed of testing [mm/min]: 2  
 Length of span between supports [mm]: 64  
 Specimen type: STN EN ISO 178  
 Length of test specimen [mm]: 80  
 Preparation of test specimens: by cutting  
 Number of test specimens: 7  
 Conditioning: STN EN ISO 291, 23/50-2

Table 2 Flexural properties

Identification of the sample	Flexural strength [MPa]		Flexural modulus [MPa]	
	x	s	x	s
S 21/2008	110,7	2,1	3109,4	92,5



**3. Determination of Charpy unnotched impact strength according  
STN EN ISO 179-1: 2002 - A**

Type of testing: impact strength  
Date of the test conducting: August 1, 2008  
The test conducted by: Kinerová

Testing machine: pendulum type ZWICK 5102  
Nominal pendulum energy [J]: 4  
Velocity of impact [m/s]: 2,9

Preparation of test specimens: by cutting  
Specimen type: 1fU  
Length of test specimen [mm]: 80  
Number of test specimens: 10  
Conditioning: STN EN ISO 291, 23/50-2

Table 3 Unnotched impact strength

Identification of the sample	Complete break	Unnotched impact strength [kJ/m <sup>2</sup> ]	
		x	s
S 21/2008	10	13,6	0,31

**4. Determination of water absorption according STN EN ISO 62: 2001 - A**

Type of testing: gravimetry  
Date of the test conducting: August 4, 6, 2008  
The test conducted by: Kinerová

Testing machine: analytical balance with 0,1g instrument accuracy  
Method: 1  
Medium: water  
Exposure time in the water [h]: 24  
Temperature [°C]: 23

Preparation of test specimens: by cutting  
Specimen type [mm]: 50 x 50 x thickness  
Number of test specimens: 5  
Conditioning: temperature: 50°C  
time: 24 h



Table 4 Water absorption

Identification of the sample	Water absorption [%]	
	x	s
S 21/2008	0,24	0,004

**5. Fire hazard testing concerning UL-94: 1981, STN EN 60695-11-10:2001 - A**  
**Test method: A – test in horizontal position**

Test type: measurement of burning time and speed  
Testing date: July 29, 2008  
The test conducted by: Záhorec

Test device: flammability testing box  
Preparation of test specimens: by cutting  
Conditioning: 50 % / 23 °C / 48 h  
Number of test specimens: 3

Table 5 Flammability

Identification of the sample	Thickness (mm)	Burning rate for each individual specimen (mm/min)			x	s	Classification
		1	2	3			
S 21/2008	4	22,0	16,3	18,2	18,8	1,68	HB 40

**Interpretation:** Extruded PMMA sheets concerning STN EN 60695-11-10:2001, Test method: A – test in horizontal position are classified to class HB 40 with burning rate 18,8 mm/min.

**TLS DECLARATION**

The test result relates only to that particular test subject. The test report can only be reproduced in its entirety; the part of it can be reproduced only with written agreement of the head of TLS.

An user of the accredited laboratory services must not use the accreditation label of the laboratory in any case.

The verification of the measuring apparatus is carried out in accordance with Metrological regulations of TLS.

**Test result complaint**

Test results or procedures presented in this test report can be complained in writing within 15 days from a delivery day to the customer.



**Sample saving**

These samples which were subjected of the testing are saved by the laboratory usually within 30 days from the test report delivery to the customer.

**Date of the test report issue:** August 13, 2008

**The test report elaborated by:** Soňa Šugrová

**Supervised by:**

  
**Emilia Černá**  
Chief of the Physical-mechanical department

**Approved by:**

  
**Dipl. Ing. Dagmar Škerlíková**  
Chief of TLS

