Product Information

B 270 – SUPERWITE
High-transparent Glass

Description

B 270 – Superwite is a clear high-transparent crown glass produced by melting chemically purest raw materials. This glass is marked by a high transmission in the range of the visible light as well as in the infrared and ultraviolet region (please refer to the transmission curve).
For many fields of application (e.g. cover panes for copying machines and micro reading devices, front covers for oscillograph tubes) B 270 – Superwite can be used without further surfacing.
B 270 – Superwite can easily be processed by usual precision optics methods.
B 270 – Superwite is available as blanks, strips, sheets and rods.
The specified technical data apply to all available types.

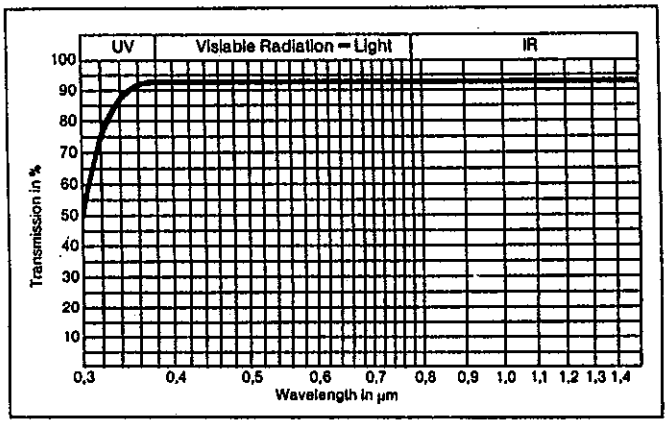
Fields of Application

Large area LCD covers.
Front covers for oscillograph tubes and other monitor tubes.
Optical elements for light sensors, measuring scales, controlling apparatus and devices.
Signal optics, Lighting optics in projectors.
Cover panes for copying machines and micro reading devices.
Substrates for photomasks for production of electronic elements.

Technical Data

Optical properties:

Refractive indices at 20 °C	
n_e (λ = 546 nm)	1.5252
n_d (λ = 588 nm)	1.5231
Stress-optical coefficient	
c (λ = 555 nm)	$2.70 \cdot 1.02 \cdot 10^{-12}$ m²/N



B 270 – SUPERWITE, Spectral Transmission, glass thickness 2.0 mm.

Thermal properties:

Mean linear thermal coefficient of expansion α (20 – 300 °C)	$93.3 \cdot 10^{-7}$/1 K
Transformation point (10^{13} d Pas)	533 °C
Softening point ($10^{7,6}$ d Pas)	708 °C
Forming point (10^{4} d Pas)	1006 °C

Chemical properties:

Hydrolytic class as per DIN 12111	3
Na_2O-donation in µg/g glass as per DIN 12111	143

Mechanical properties:

Density in g/cm³ at 23 °C	2.55

Product Range

Available types and sizes:

Types	Thickness in mm	Diameter in mm	max. length in mm	max. width in mm
Raw glass				
Blanks	—	5 – 300	—	—
Drawn glass	0.9 – 17	—	1680	900
Strip glass	17 – 60	—	800	400
Rods	—	20 – 50	1100	—
Processed glass				
Plate glass (Surfaces ground and polished)	1 – 14	—	700	600
Special filters (Surfaces optically ground and polished)	1 – 12	350	—	—

~~Young's~~ Modulus $E = 71.5$ kN/mm²
1.04×10^7 psi

Further information:

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B 270 - SUPERWITE
High Transmission Glass

1. Physical Properties *)

1.1.	Refractive Indices	n_g	=	1.5340
		$n_{F'}$	=	1.5297
		n_e	=	1.5251 ± 0.001*
		n_d	=	1.5230
		n_D	=	1.5229
		$n_{C'}$	=	1.5207

* ± 0.0003 upon request

1.2.	Abbe value	ν_e	=	58.3 ± 0.5

1.3.	Transmission			
1.3.1.	at 2 mm glass thickness	τ_{vD65}	=	91.7 %
		τ_{SIR}	=	89.0 %
		$\lambda_{0.05}$	=	294 nm
		$\lambda_{0.85}$	=	340 nm
		$\lambda_{0.46}$	=	312 nm
1.3.2.	at 15 mm glass thickness	τ_{vD65}	=	91.2 %

1.4.	Chromaticity coordinates at 2 mm glass thickness	$x_{(D65-10°)} = 0.314$ $y_{(D65-10°)} = 0.332$
1.5.	Stress-optical coefficient	$2.7 \cdot 1.02 \cdot 10^{-12} m^2/N$

1.6. Viscosities	$\log \eta$ (dPas)	T	
Strain point	14.5	505°C	
Annealing point	13.0	533°C	
Littleton point	7.6	708°C	±5 degrees
Flow point	5.0	891°C	
Working point	4.0	1.006°C	

1.7.	Transformation temperature	$T_g = 521°C$
1.8.1.	Mean thermal coefficient of expansion (20-300°C) as per DIN 52 328 or ISO/DP 7991	$\alpha_{20-300} = 9.5 \pm 0.1 \cdot 10^{-6} K^{-1}$
1.8.2.	Mean thermal coefficient of expansion measurement with 5°/min increase	$\alpha_{20-80} = 8.3 \cdot 10^{-6} K^{-1}$ $\alpha_{20-100} = 8.6 \cdot 10^{-6} K^{-1}$ $\alpha_{20-200} = 9.2 \cdot 10^{-6} K^{-1}$ $\alpha_{20-300} = 9.7 \cdot 10^{-6} K^{-1}$ $\alpha_{20-450} = 10.2 \cdot 10^{-6} K^{-1}$

Pretreatment of samples: annealing at 2°/min.

1.9.	Thermal conductivity	$\lambda = 1.06$ W/(m · K) for 90°C
1.10.	Specific thermal capacity (0 - 100°C)	$c_p = 0.869$ J/(g · K)
1.11.	Density	$\rho = 2.55 \pm 0.003$ g/cm³

1.12.	Young's modulus	$E = 71.5$ kN/mm² * $1.04 \cdot 10^7$ psi
1.13.	Poisson's ratio	$\mu = 0.219$
1.14.	Torsional rigidity modulus	$G = 29.3$ kN/mm² * $4.25 \cdot 10^6$ psi
1.15.	Knoop hardness	$HK_{100} = 542$
1.16.	Specific thermal stress	$\frac{\alpha \cdot E}{1 - \mu} = 0.86$ N/(mm² · K)
1.17.	Dielectric constant at 1 MHz	$\varepsilon_r = 7.0$
1.18.	Specific electric resistance at 1 kHz (DIN 52 326)	$\rho = 6.8\,\Omega \cdot$ cm (1.386°C) $\rho = 10.2\,\Omega \cdot$ cm (1.260°C)
1.19.	t_{k100}	301°C
1.20.	Dielectric loss factor (1 MHz)	$\tan\delta = 30 \cdot 10^{-4}$

1.21. Lead equivalent (15 mm panel thickness)

voltage	min. lead equivalent [1]
50 kV	0.24 mm Pb
80 kV	0.32 mm Pb
110 kV	0.33 mm Pb
150 kV	0.27 mm Pb

[1] Inaccuracy of measurement ±0.03 mm Pb

*1MPa = 1 N/mm² ≙ 145,038 lbf/in² (psi)

1.22.	General index of colour reproduction	R_a = 100
1.23.	Solar transmission value according to CIE (m = 1) for glass thickness of 2 mm	91.4 %
1.24.	Transmission in % for 2 mm and 15 mm thick B 270	see graphs 1 and 2
1.25.	Spectral transmission	see table 1

2. Chemical Properties

2.1. Resistance to alkaline solution as per DIN 52 322
Alkaline class 2
140 mg/dm²

Determination of the resistance to attack by alkali and classification into alkali classes, boiling of a specimen for three hours in a mixture of 400 ml 1 n Na_2CO_3 and 400 ml 1 n NaOH, determination of the weight loss and classification of alkaline classes. These are

class 1 0 - 75 mg/dm² weight loss
class 2 75 - 175 mg/dm² weight loss
class 3 above 175 mg/dm² weight loss

2.2. Resistance to acids as per DIN 12 116:
Acid class 2
1.4 mg/dm²

Determination of the acid resistance (gravimetric method, by boiling of a specimen for six hours in at least 1500 ml 6 HCl, determination of the weight loss and classification of acid classes.

...

These are	class	1	0	- 0,7	mg/dm²	half the weight loss
	class	2	0,7	- 1,5	mg/dm²	half the weight loss
	class	3	1,5	- 15	mg/dm²	half the weight loss
	class	4	above	15	mg/dm²	half the weight loss

2.3. Hydrolytic resistance according to DIN 12 111:
Hydrolytic class 3
170 µg Na_2O/g

Grain method for determination of the hydrolytic resistance of glass as a material at 98°C and classification of glass into hydrolytic classes, by heating 2 grs. of glass grains, grain size between 0.315 and 0.5 mm, submerged in 50 ml H_2O for 60 minutes at 98°C, titrating the cations in solution and calculating the hydrolytic class.

These are	class	1	0	- 41	µg Na_2O/g glass
	class	2	31	- 62	µg Na_2O/g glass
	class	3	62	- 264	µg Na_2O/g glass
	class	4	264	- 620	µg Na_2O/g glass
	class	5	620	- 1085	µg Na_2O/g glass

Specification

Physical and chemical properties of

B 270 Superwite

B 270 Superwite

D 0092

B 270 Superwite is a clear high transmission crown glass (modified soda-lime glass) available in form of sheets, optical rods, profiled rods and strips.

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". SCHOTT DESAG retains 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 ◊ 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**.

Date of release: **May 02, 00**

1.	**Optical properties**		
1.1	**Refractive indices** (20°C)		
	Pretreatment of samples	n_g	1.5341
	annealed at 40°C/h	$n_{F'}$	1.5297
		n_F	1.5292
		n_e	1.5251 ± 0.001*
		n_d	1.5230
		n_D	1.5229
	* ± 0.0003 upon request	$n_{C'}$	1.5207
		n_C	1.5203
	Further refractive indices in UV and IR (reference values)		see annex
1.1.1	**Abbe value**	v_e	58.3 ± 0.6
		v_d	58.5
1.2	**Transmittance data**		
1.2.1	**Spectral transmittance τ (λ)**		
1.2.1.1	**τ (λ) - curve**		
	Plot of spectral transmittance $\tau(\lambda)$ for		
	d = 2.0 mm und d = 15 mm (λ = 280 nm - 650 nm)		see annex
	d = 2.0 mm und d = 15 mm (λ = 280 nm - 2000 nm)		see annex
1.2.1.2	**τ (λ) - individual values in %**		see annex
1.2.1.3	**Edge wavelength (d = 2.0 mm)**		
	Edge wavelength	λ_C (τ = 0.46) in nm	312
	Solarization refer to 6.2		
	Additional data	λ_S (τ = 0.05) in nm	294
		λ_P (τ = 0.85) in nm	340
1.2.2	**Luminous transmittance τ_v**		
1.2.2.1	**Luminous transmittance as a function of thickness**		

thickness in mm	τ_{vD65} in %	τ_{vA} in %
2.0	91.7	91.7
4.0	91.6	91.6
15.0	91.0	91.0

Specification Physical and chemical properties	BOROFLOAT B270 superwhite

1.2.3	**Special transmittance values in % (d = 2.0 mm)**		
1.2.3.1	**UV - transmittance**	τ_{UVA}	84
		τ_{UVB}	19
1.2.3.2	**IR - transmittance**	τ_A	92.5
1.2.3.3	**Radiant transmittance**	τ_e	91.4
1.3	**Colour**		
1.3.1	**Visual evaluation**		disregard
1.3.2	**Colorimetry (d = 2.0 mm)**		
	Chromaticity coordinates (colour locus) are referred to the namend Standard Illuminant according to CIE 2°-observer	D_{65} x	0.314
		y	0.332
		A x	0.448
		y	0.408
1.3.3			disregard
1.3.4	**General colour rendering index R_a (d = 2.0 mm)**		100

Specification Physical and technical properties	FOF - TKT B 270 Superwite

2. Thermal properties

2.1 Viscosities and corresponding temperatures

Designation	Viscosity log η in dPas	Temperature ϑ in °C
Strain point	14.5	511
Annealing point	13.0	541
Softening point	7.6	724
Forming temperature	6.0	827
Forming temperature	5.0	915
Forming temperature	4.0	1033

2.2 Transformation temperature *Tg* in °C

533

2.3 Coefficient of thermal expansion α

2.3.1 Coefficient of mean linear thermal expansion

α in 10^{-6} K^{-1} for the indicated temperature range

(static measurement)

$\alpha_{(20°C\text{-}300°C)}$	9.4
$\alpha_{(20°C\text{-}200°C)}$	9.0
$\alpha_{(20°C\text{-}100°C)}$	8.2

2.3.2 Coefficient of mean linear thermal expansion

α in 10^{-6} K^{-1} for the indicated temperature range

(dynamic measurement)

$\alpha_{(20°C\text{-}100°C)}$	7.8
$\alpha_{(20°C\text{-}150°C)}$	8.4
$\alpha_{(20°C\text{-}200°C)}$	8.8
$\alpha_{(20°C\text{-}250°C)}$	9.1
$\alpha_{(20°C\text{-}300°C)}$	9.4
$\alpha_{(20°C\text{-}350°C)}$	9.6
$\alpha_{(20°C\text{-}400°C)}$	9.8
$\alpha_{(20°C\text{-}450°C)}$	10.0
$\alpha_{(20°C\text{-}500°C)}$	10.3

2.3.3	**Coefficient of mean linear thermal expansion α in 10^{-6} K^{-1} for the mentioned temperature intervals (dynamic measurement)**		see annex
2.4	**Fuseability**		
	Stress-free fusion with suitable SCHOTT DESAG lower segments is possible.		
2.5	**Mean specific heat capacity c_p (20°C-100°C) in J/ (g·K)**		0.86
2.6	**Thermal conductivity λ in W/ (m·K) for the indicated temperatures**		
		ϑ = 24.5°C	0.92
		ϑ = 89°C	1.01
		ϑ = 127°C	1.08
		ϑ = 167°C	1.15
2.7	**Specific thermal stress φ in N/ (mm²·K)**		0.86

3.	**Mechanical properties**	
3.1	**Density ρ in g/cm³**	2.55
3.2	**Stress optical coefficient C in $1.02 \cdot 10^{-12}$ m²/N**	2.7
3.3	**Breaking strength**	
	Admissible value for the bending strength σ_{zul} of technically annealed glasses as calculation basis (air) in N/mm²	30
	A higher mechanical strength can be realized by chemical toughening according to the ion exchange procedure (refer to annex 3.3.1) or by thermal toughening.	
3.3.1	**Chemical toughening**	
	Processing temperature ϑ in °C	420
	Processing time t in h	16
	Compressive stress Ds as birefringence in nm/cm	7200
	Penetration depth Nz up to neutral zone in µm	48
	Further information	see annex
3.3.2	**Thermal toughening**	
	Recommended minimum thickness d in mm for toughened safety glass for building purposes according to DIN 1249 T10 - 1990	4.0
3.4	**Young´s modulus E in kN/mm²**	71.5
3.5	**Poisson´s ratio μ**	0.219
3.6	**Torsion modulus G in kN/mm²**	29.3
3.7	**Knoop hardness HK_{100}**	542

Specification Physical and chemical properties	ECP TK1 B 270 Superwite

4.	**Chemical properties**	
4.1	**Hydrolytic resistance acc. to DIN ISO 719**	
	Hydrolytic class	HGB 3
	Equivalent of alkali (Na_2O) per gram of glass grains in µg/g	170
4.2	**Acid resistance acc. to DIN 12 116**	
	Acid class	2
	Half surface weight loss after 6 hours in mg/dm²	1.4
4.3	**Alkali resistance acc. to DIN ISO 695**	
	Class	A 2
	Surface weight loss after 3 hours in mg/dm²	140
5.	**Electrical properties**	
5.1	**Dielectric constant (Permittivity) ε_r at 1 MHz**	7.0
5.2	**Dissipation factor tan δ bei 1 MHz**	$30 \cdot 10^{-4}$
5.3	**Electric volume resistivity ρ_D in $\Omega \cdot$ cm at the specified temperatures**	
5.3.1	**ρ_D for alternating current 50 Hz and 3 kHz**	
	ϑ = 1260°C	10.2
	ϑ = 1386°C	6.8
5.3.2	**ρ_D for direct current**	
	ϑ = 250°C	10^9
	ϑ = 350°C	$1.6 \cdot 10^7$
	ϑ = 400°C	$2 \cdot 10^6$
5.4	**Temperature t_{k100} in °C for a specific electric volume resistivity of 10^8 $\Omega \cdot$ cm**	301

6.	**Other properties**	
6.1	**Lead equivalent in mm Pb at 15 mm glass thickness for X-rays**	
	Voltage 50 kV/0.16 mm Cu total filtering	0.24
	Voltage 80 kV/0.16 mm Cu total filtering	0.32
	Voltage 110 kV/0.40 mm Cu total filtering	0.33
	Voltage 150 kV/0.70 mm Cu total filtering	0.27

Measuring and Test Procedures

For X-radiation (constant voltage) the lead equivalent is defined by the total filtering specified in the table (refer also to DIN 6845).

The exposed area has a diameter of 50 mm. The absorption of radiation in the sample piece is compared to lead absorbers of such a thickness that the same attenuation of the dose performance is reached in both cases.

As detector, a scintillation dosimeter (scintillator 44 mm diameter, 15 mm height) is used.

The measuring inaccuracy is ± 0.03 mm.

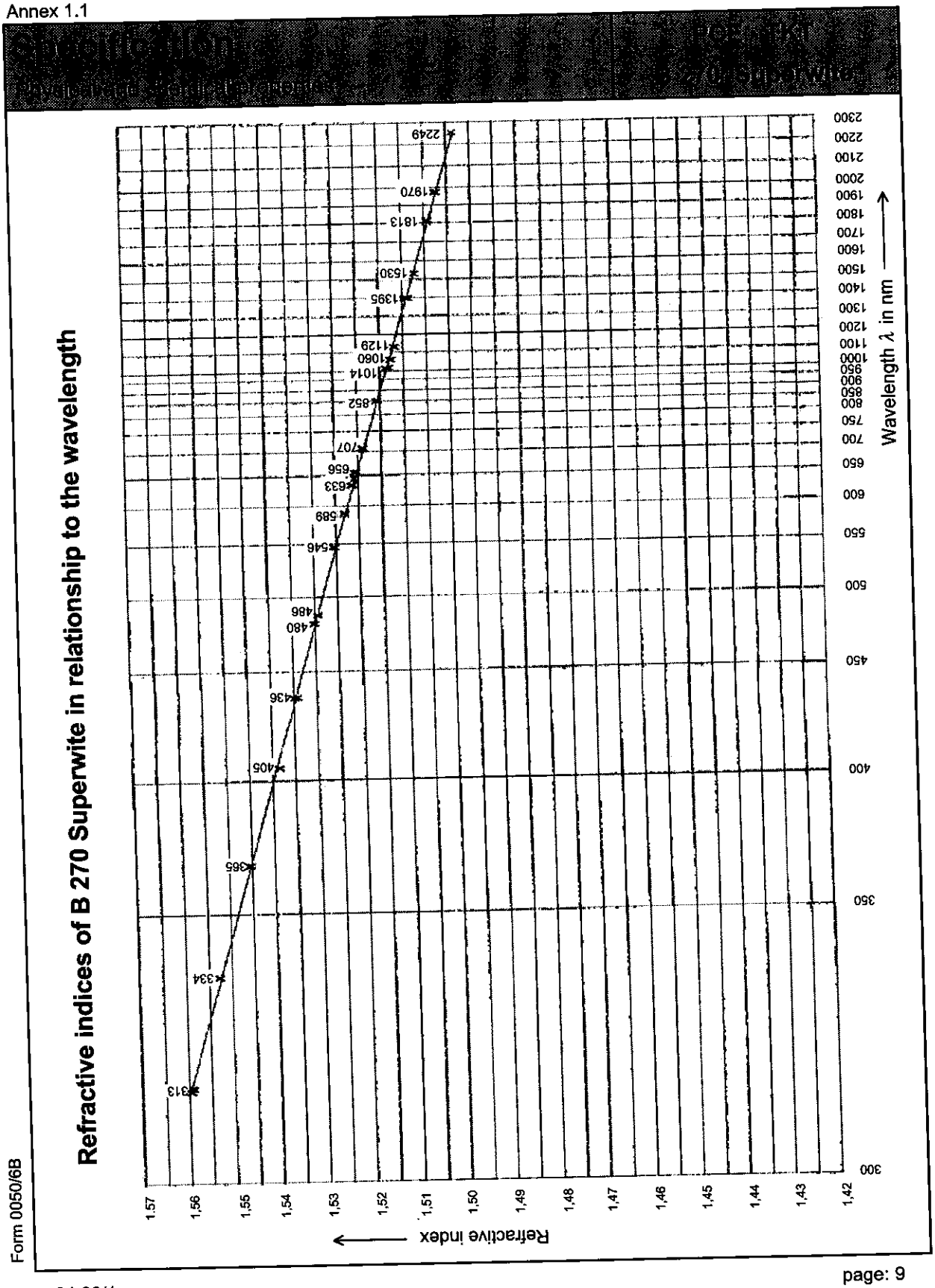
6.2	**Solarization**		
	Shifting of the edge wavelength λ_C (τ = 0.46) after UV-radiation in the direction of longer wavelength	$\Delta \lambda_C$ in nm	2

Measuring and Test Procedures

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.

7. **Annex** (diagrams, curves)

Annex 1.1



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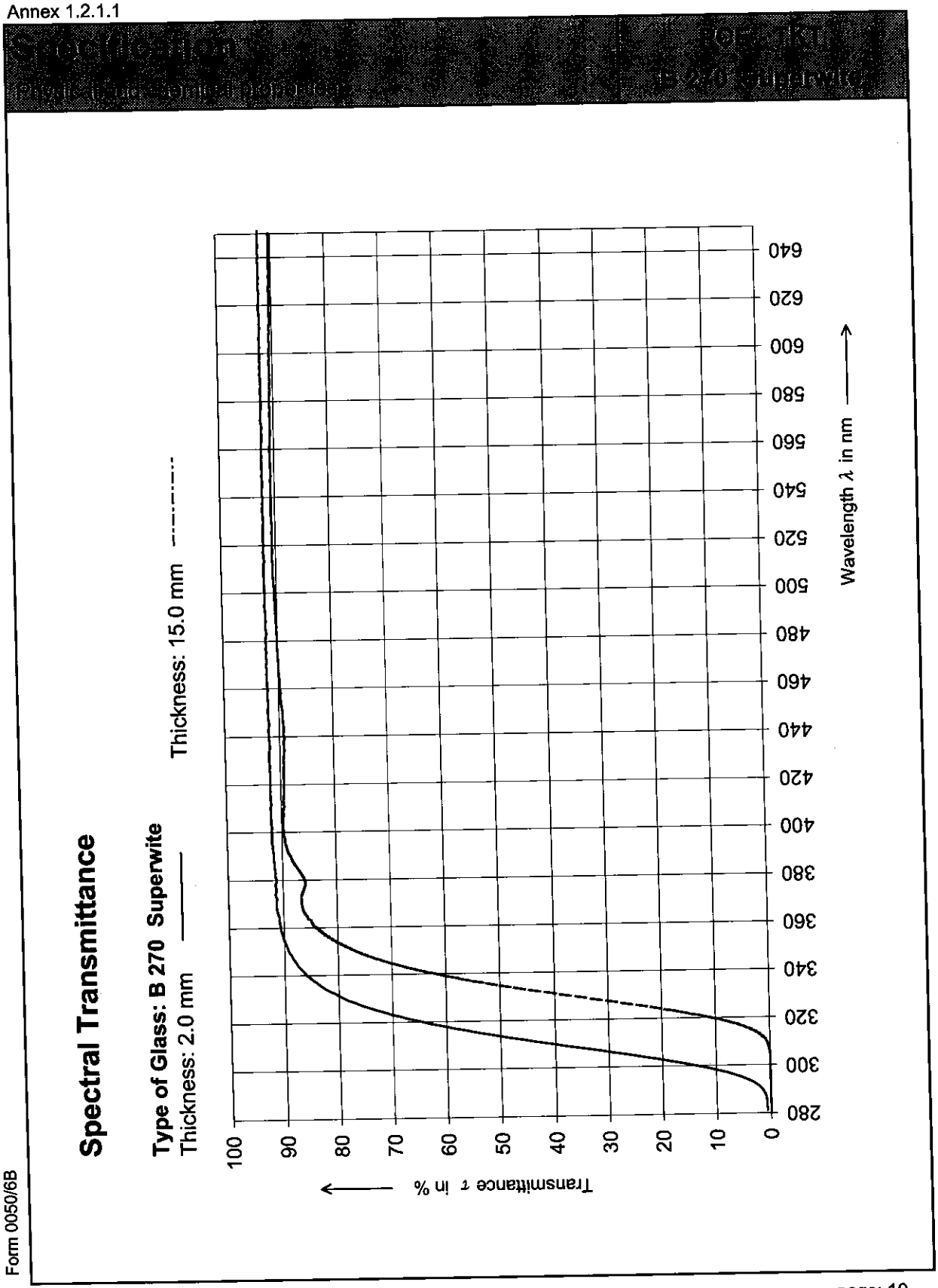
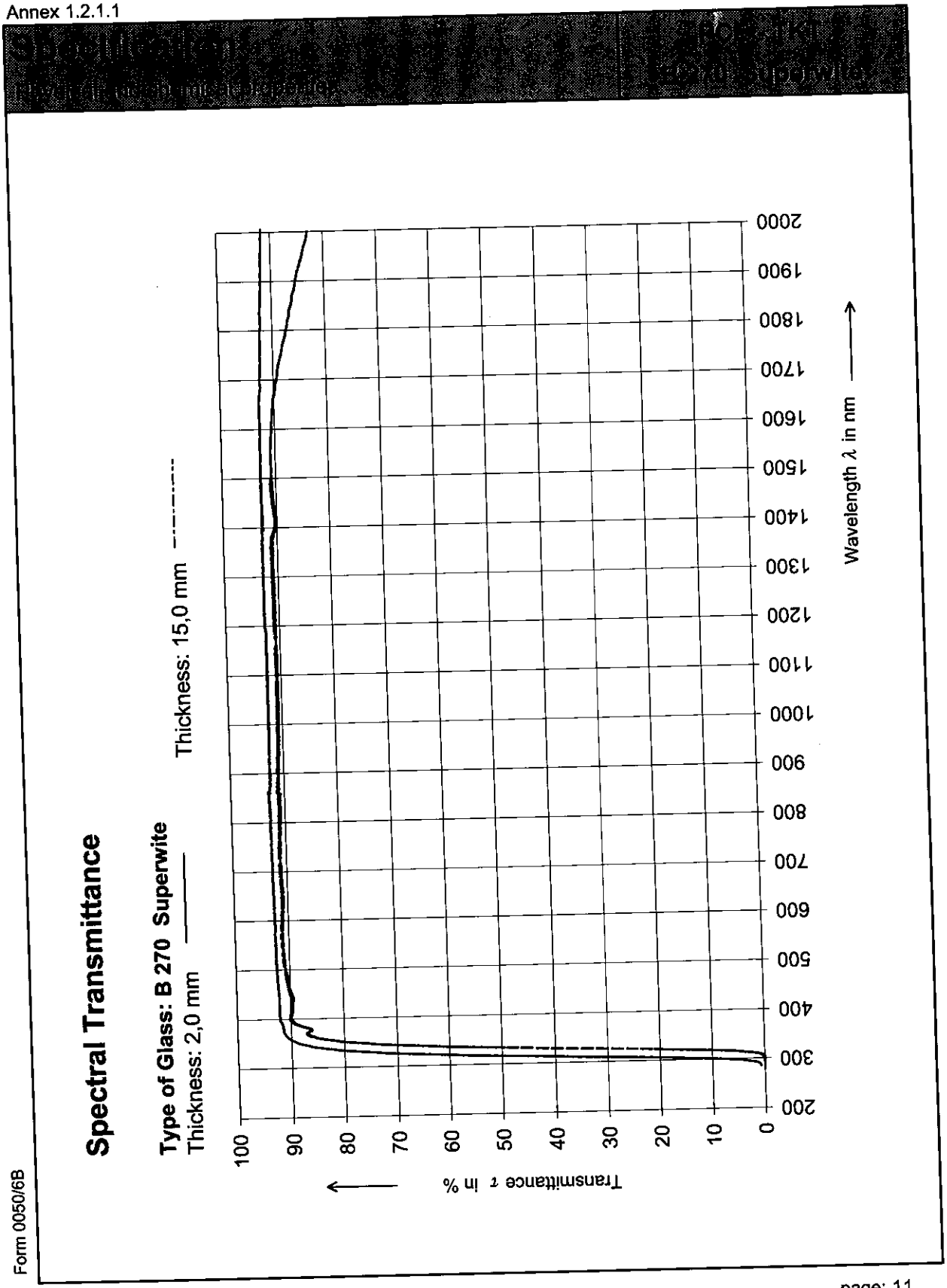

Spectral Transmittance
Type of Glass: B 270 Superwite
Thickness: 2.0 mm
Thickness: 15.0 mm
Transmittance τ in %
Wavelength λ in nm
100
90
80
70
60
50
40
30
20
10
0
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
580
600
620
640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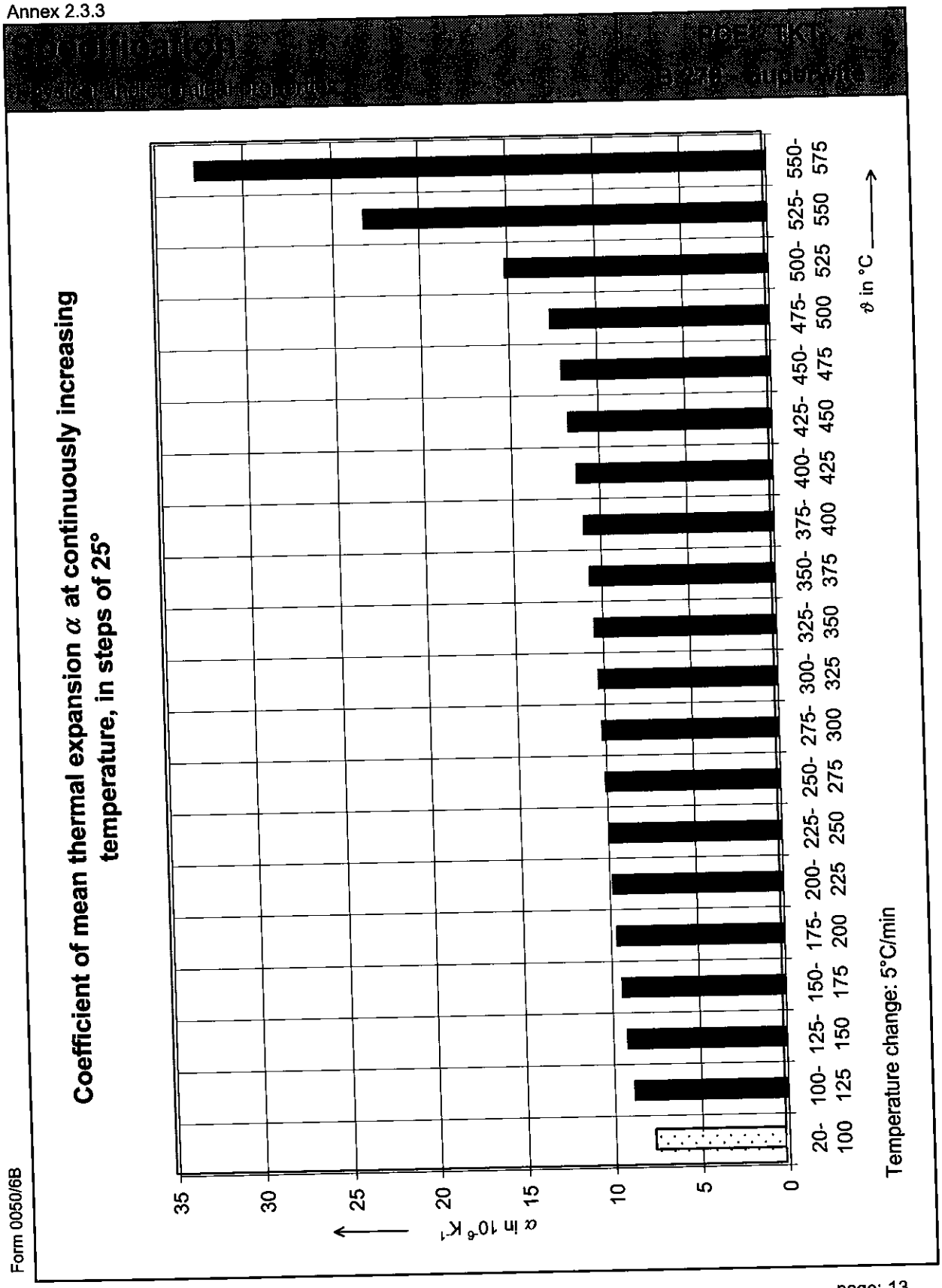
100
90
80
70
60
50
40
30
20
10
0
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

Annex 1.2.1.2

Spectral transmittance τ (λ) in % for the named thickness

λ in nm	thickness in mm													
	1	2	3	4	5	6	7	8	9	10	15	20	25	30
300	35.1	13.5	5.2	2.0	0.8	0.3	0.1	0.0	0.0	0.0				
310	60.0	39.6	26.1	17.2	11.4	7.5	4.9	3.3	2.2	1.4				
320	76.0	63.4	52.9	44.1	36.8	30.7	25.6	21.4	17.8	14.9	10.9	5.4	2.6	1.3
330	84.2	77.8	71.8	66.3	61.3	56.6	52,3	48.3	44.6	41.2	34.6	25.0	18.1	13.1
340	88.0	84.9	81.9	79.0	76.3	73.6	71.0	68.5	66.1	63.8	59.6	51.8	44.9	39.0
350	89.8	88.4	87.1	85.7	84.4	83.1	81.8	80.6	79.3	78.1	75.1	70.4	65.9	61.8
360	90.6	89.9	89.2	88.5	87.9	87.2	86.5	85.9	85.2	84.6	83.0	80.4	77.8	75.4
370	90.8	90.4	89.9	89.4	89.0	88.5	88.0	87.6	87.1	86.7	85.6	83.8	82.0	80.3
380	90.9	90.4	90.0	89.5	89.1	88.6	88.1	87.7	87.2	86.8	85.4	83.6	81.7	79.9
390	91.2	91.0	90.7	90.5	90.3	90.1	89.9	89.7	89.5	89.2	88.6	87.7	86.8	85.9
400	91.3	91.2	91.0	90.9	90.7	90.6	90.5	90.3	90.2	90.0	89.5	88.9	88.2	87.6
410	91.3	91.2	91.1	91.0	90.8	90.7	90.6	90.4	90.3	90.2	89.7	89.1	88.5	87.9
420	91.4	91.2	91.1	91.0	90.8	90.7	90.6	90.4	90.3	90.2	89.6	88.9	88.3	87.7
430	91.4	91.2	91.1	91.0	90.8	90.7	90.6	90.4	90.3	90.2	89.4	88.8	88.1	87.4
440	91.4	91.3	91.1	91.0	90.8	90.7	90.6	90.4	90.3	90.1	89.5	88.8	88.1	87.4
450	91.4	91.3	91.2	91.1	90.9	90.8	90.7	90.5	90.4	90.3	89.7	89.1	88.5	87.9
460	91.5	91.4	91.3	91.2	91.1	91.0	90.9	90.8	90.7	90.6	90.0	89.5	89.0	88.5
470	91.5	91.4	91.4	91.3	91.2	91.1	91.0	90.9	90.8	90.8	90.3	89.9	89.4	89.0
480	91.6	91.5	91.4	91.3	91.3	91.2	91.1	91.1	91.0	90.9	90.5	90.1	89.8	89.4
490	91.6	91.5	91.5	91.4	91.4	91.3	91.2	91.2	91.1	91.1	90.8	90.5	90.2	89.9
500	91.6	91.6	91.5	91.5	91.4	91.4	91.4	91.3	91.3	91.2	90.9	90.6	90.4	90.1
510	91.6	91.6	91.5	91.5	91.4	91.4	91.4	91.3	91.3	91.2	90.9	90.7	90.4	90.2
520	91.7	91.6	91.6	91.5	91.5	91.4	91.4	91.3	91.3	91.2	91.1	90.9	90.7	90.5
530	91.7	91.6	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.4	91.2	91.0	90.8	90.6
540	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.2	91.0	90.9	90.7
550	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.2	91.0	90.9	90.7
560	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.2	91.0	90.8	90.6
570	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.2	91.0	90.8	90.6
580	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.1	90.9	90.6	90.4
590	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	91.0	90.8	90.5	90.3
600	91.7	91.7	91.6	91.6	91.5	91.5	91.5	91.4	91.4	91.3	90.9	90.7	90.4	90.1
610	91.7	91.7	91.6	91.5	91.5	91.4	91.3	91.3	91.2	91.1	90.9	90.6	90.3	90.0
620	91.7	91.7	91.6	91.5	91.5	91.4	91.3	91.3	91.2	91.1	90.8	90.4	90.0	89.7
630	91.8	91.7	91.6	91.5	91.5	91.4	91.3	91.3	91.2	91.1	90.7	90.3	90.0	89.6
640	91.7	91.7	91.6	91.5	91.4	91.3	91.2	91.1	91.0	90.9	90.6	90.2	89.8	89.4
650	91.7	91.7	91.6	91.5	91.4	91.3	91.2	91.1	91.0	90.9	90.6	90.2	89.8	89.4
660	91.8	91.7	91.6	91.5	91.5	91.4	91.3	91.3	91.2	91.1	90.7	90.3	89.9	89.5
670	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.7	90.3	90.0	89.6
680	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.7	90.3	90.0	89.6
690	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.8	90.4	90.1	89.7
700	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.8	90.4	90.1	89.7
710	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.8	90.4	90.1	89.7
720	91.8	91.7	91.6	91.6	91.5	91.4	91.3	91.2	91.2	91.1	90.8	90.4	90.1	89.7
730	91.8	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.8	90.4	90.1	89.7
740	91.8	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.8	90.4	90.1	89.7
750	91.8	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.8	90.4	90.1	89.7
760	91.8	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.8	90.4	90.1	89.7
770	91.8	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.8	90.4	90.0	89.6
780	91.8	91.7	91.7	91.6	91.5	91.4	91.3	91.2	91.1	91.1	90.7	90.3	89.9	89.5
790	91.9	91.8	91.7	91.6	91.6	91.5	91.4	91.4	91.3	91.2	90.7	90.2	89.8	89.4
800	91.8	91.8	91.7	91.6	91.5	91.4	91.3	91.2	91.1	91.0	90.6	90.2	89.7	89.3

Annex 2.3.3



Form 0050/6B

Annex 3.3.1

Chemical toughening parameter

Glass and chemical toughening parameters		
Transformation temperature	°C	533
Glass thickness	mm	3
Processing time	h	16
Processing temperature	°C	420
Salt bath (* weight percentages)	KNO_3 in % *	99.5
	$SiO_2 \times H_2O$ in % *	0.5

Chemical toughening results *		
Penetration depth	µm	48
Birefringence	nm/cm	7200

* measured across at a sample piece ground down to 0.3 mm ± 0.05 mm

Ball drop test acc. FDA	% failed	not carried out
Ball drop test acc. DIN	% failed	not carried out