KCl (Potassium Chloride)

Potassium chloride (KCl) is used in IR spectroscopy as well as in high power CO2 laser applications. It refers to salt crystals (like KBr and NaCl). KCl is a soft and stable to thermal influence monocrystal. Due to material hygroscopicity the polished parts require storage in desiccator or in sealed package with silica gel in a warm room.

Application:

- IR spectroscopy
- CO_2 laser optics

Product types:

- Plane-parallel windows and wedges
- Lenses

Specifications

Tab.1. Typical specification of KCl optical components

Specification	Typical	State-of-the-art
Sizes	See table in the article Plane Windows and Wedged Windows	Up to 100 mm
Diameter tolerance, mm	+0/-0.25	RFQ
Thickness tolerance, mm	±0.25	RFQ
Thickness matching, mm	-	RFQ
Surface quality, scr/dig	60/40	RFQ
Surface flatness, λ @ 633nm per inch*	2	RFQ
Parallelism (wedge tolerance)	5 arc min	RFQ
Coating	none	protecting

** For "thick" windows: while Diameter/Thickness ratio ≤8*

Transmission Spectrum

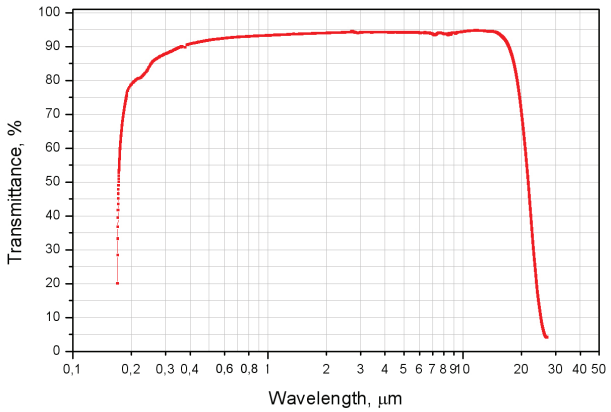

Fig. 1. The measurements were carried out on Perkin Elmer Lambda-35 spectrophotometer and on BrukerVertex-70 Fourier-spectrometer.

Tab.2. Refractive index

λ, µm	n	λ, µm	n	λ, µm	n
0.20	1.7187	11.00	1.4524	20.00	1.3947
0.51	1.4962	12.00	1.4480	21.00	1.3854
1.18	1.4783	13.00	1.4431	22.00	1.3754
5.00	1.4705	14.00	1.4378	23.00	1.3646
6.00	1.4684	15.00	1.4320	24.00	1.3530
7.00	1.466	16.00	1.4256	25.00	1.3406
8.00	1.4629	17.00	1.4188	26.00	1.3272
9.00	1.4600	18.00	1.4113	27.00	1.3128
10.00	1.4564	19.00	1.4033	28.00	1.2973

Tab.3. Optical properties

Transmission range, microns	0,22 — 21
Colour	бесцветный
Reflection losses @ 11 µm (2 surfaces), %	8.3
Restrahlen peak, µm	63.1
dN/dT, 10^{-6}/C	-33.2
Absorption coefficient, @ 3.8 µm, 10^{-4} cm^{-1}	1.6

Tab.4. Physical and mechanical properties

Class / Structure	Cubic FCC, NaCl type, Fm3m, (100) cleavage
Density @300K, g/cm^3	1.98
Molecular Weight	74.55
Melting Point, °C	776
Thermal Conductivity @322K, W/(mxK)	6.53
Thermal Expansion @300K, 10^{-6}/C	36
Hardness, Knoop with 200g indenter	9.3 (in 100)
	7.2 (in 110)
Specific Heat Capacity, J/(kg×K)	690
Dielectric Constant for 10^6 Hz @300K	4.64
Debye temperature, K	235
Bandgap, eV	8.5
Young Modulus (E), GPa	29.67
Shear Modulus (G), GPa	6.24
Bulk Modulus (K), GPa	17.36
Elastic Coefficient	C11 = 40.2, C12 = 6.7, C44 = 6.29
Apparent Elastic Limit, MPa	2.3 (330psi)
Poisson Ratio	0.216

Tab.5. Chemical stability / Solubility

in water (at 0 °C)	34.7 g/100cm^3 hygroscopic
in acids	soluble
in organic solvents::	
spirits	insignificantly soluble

Please pay your attention that this article is for your information only. We do not supply KCl in ingots as well as semi-finished products. Our standard products are polished parts.

For further information on our KCl optical components please see the following: Windows for IR-spectroscopy, Packaging or fill in our request form.

16 Domostroitelnaya str.
194292 St. Petersburg, Russia
www.tydex.ru

Phone: 7-812-3318702
Fax: 7-812-3092958
E-mail: optics@tydex.ru

TYDEX®