

Pure Premium Quartz

very high quality, radiation hardened quartz for high performance devices



General

Chemical formula	SiO₂ Quartz-α
Handedness	Right
Density	$\rho = 2.65 \text{ g/cm}^3$
Crystal System	Trigonal -Hexagonal
	$a = 4.91 \text{ \AA}$ $\alpha = 90^\circ$ $b = 4.91 \text{ \AA}$ $\beta = 90^\circ$ $c = 5.41 \text{ \AA}$ $\gamma = 120^\circ$
Mohs Hardness	7
$T \text{ Quartz-}\alpha \rightarrow \beta$	573.3°C

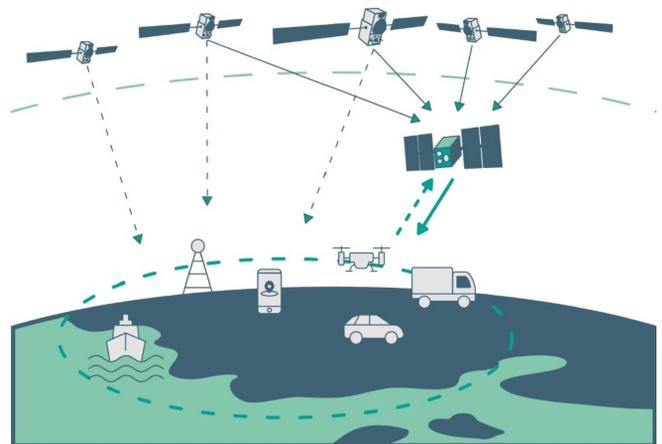
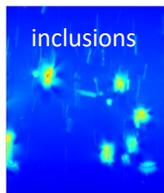
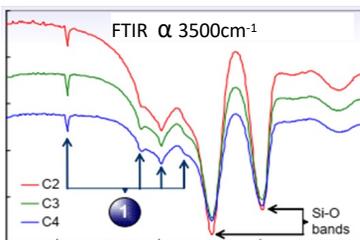
Characterization according to IEC 60758 standard

Infrared absorption	Grade Aa : $\alpha \text{ } 3500\text{cm}^{-1} < 0,026$	
Inclusions	Grade Ia	
Dislocations	$< 30/\text{cm}^2$	
Etch channels	Grade Ia $< 5/\text{cm}^2$	
Impurities	ppm weight	
	$Al = 0.05$ $Fe < 0.05$ $Na < 0.05$	$K < 0.05$ $Mg < 0.05$ $Ca < 0.05$ $Li < 0.05$

Applications

Product	device/applications
quartz crystal unit	high precision oscillators
IMU (Inertial Measurement Unit)	PNT (Position, Navigation, Time)
SAW resonators	sensors and filters
optical quartz plates	lenses, prisms...

www.cristalinnov.com



PNT ESA's project LEO

Mechanical and piezoelectric properties

Values from IEEE 1987 and definition of X+ axis from IEC60758

Elastic stiffness	GPa
C_{11}	87.49
C_{12}	6.23
C_{13}	11.91
C_{14}	-18.09
C_{33}	107.20
C_{44}	57.98
C_{66}	40.63

e_{ij}	C/m ²
e_{11}	-0.17
e_{14}	0.04

d_{ij}	pC/N
d_{11}	-2.3
d_{14}	0.67

Thermal properties

from Kosinski et al., 1992

Dilatation	$10^{-6} \cdot K^{-1}$
$\alpha_{11} = \alpha_{22}$	13.65
α_{33}	7.50

Optical properties

from Gifford, 1902

Optical index @ 590 nm	
n_0	1.5442
n_e	1.5533

Electrical properties

from IEEE 1987

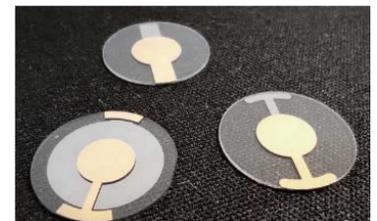
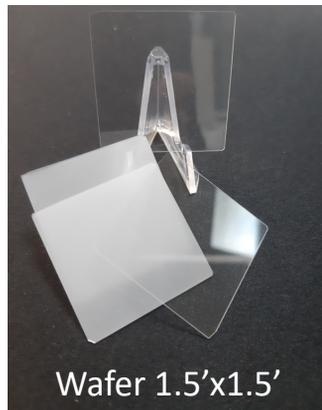
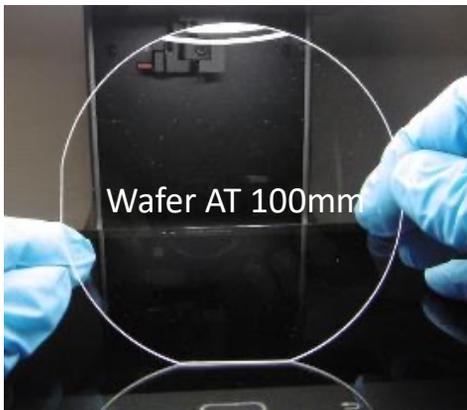
Permittivity (pF/m)	
ϵ_{11}	39.21
ϵ_{33}	41.03

Blanks, Wafers specifications

Orientation	X, Y, Z, AT, SC : precision down to 5'. On request, specific orientation
Dimensions	Wafers : up to 100mm Squares : up to 1,5''
Surface	Lapped, single or double face polished + deposition
Thickness	From 0,4 to few mm.
Flat	Any orientation X, Y or Z, precision down to 5'.
prism /lens	On request - type and form



Blanks SC



Parts for resonator