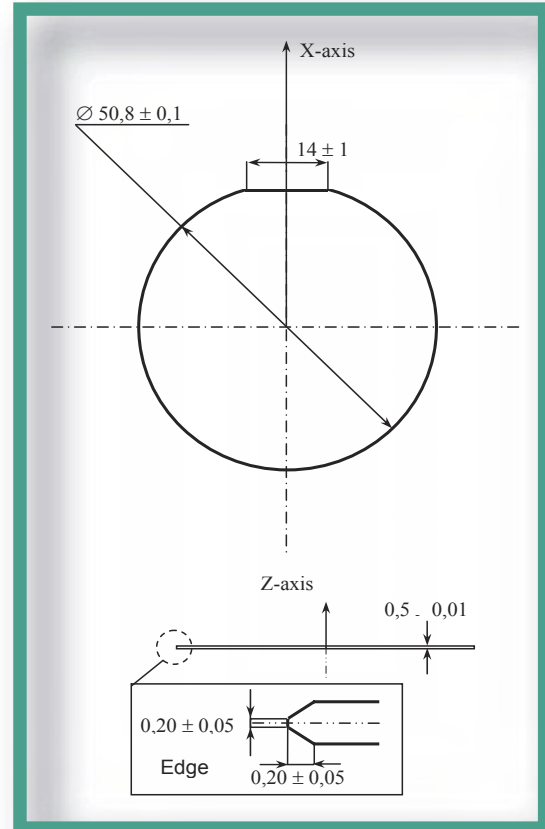
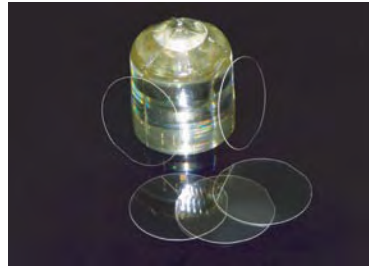


# Lithium Niobate - $\text{LiNbO}_3$

## High quality nonlinear optical substrate



### Wafer parameters

Orientation	
Wafer surface is normal to the Z-axis within $\pm 10'$ .	
Flat is normal to the X-axis within $\pm 10'$ (Secondary flat if any for using)	
Size	
Diameter	50,8 mm $\pm$ 0,1 mm
Thickness	500 $\mu$ m $\pm$ 10 $\mu$ m
Reference Flat	14 $\pm$ 1 mm
Bow	Equal to or less then 20 $\mu$ m
Edge	Is rounded
Surfaces	
Surfaces finish	Mirror polished. Free of visible cracks and scratches

### Material quality

Crystal Structure	Hexagonal (a=5,148 Å, c=13,863 Å)
Space Group	R3c
Density	4,64 g/cm <sup>3</sup>
Composition	Congruent $\pm$ 0,05 mol-% Li <sub>2</sub> O
Growth Method	CZ
Melting Point	1252 °C
Curie Temperature	$\sim$ 1142 °C
Hardness	5 Mohs
Thermal expansion (x10 <sup>-6</sup> /°C)	$\alpha_{11}$ : 15.4 $\alpha_{33}$ : 7.5
Index of Refraction	$\eta_o$ =2.286 $\eta_e$ =2.203 at 632.8 nm
Transmission wavelength	0.4 ~ 2.90 $\mu$
Nonlinear coefficient. Electro-optical coefficient	$d_{33}$ =34.45, $d_{31}$ = $d_{15}$ =5.95, $d_{22}$ =13.07 (pmV <sup>-1</sup> ) $\gamma_{13}$ =8.6, $\gamma_{22}$ =3.4, $\gamma_{33}$ =30.8, $\gamma_{51}$ =28.0, $\gamma_{22}$ =6.00 (pmV <sup>-1</sup> )
Transparency Range Transmissivity	370 ~ 5000 nm > 68 % @ 632.8 nm

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4119 Twilight Ridge, San Diego, CA 92130, USA Tel.: (858) 876-3133 Fax.: (858) 630-2376  
E-mail.: sales@dmphotonics.com URL.: www.dmphotonics.com

