

Rokor Co., Ltd. has developed a precise method of grading Kyropulos (KY) sapphire based on determination of light scatter levels.

For all grades of KY sapphire:

- Appearance: Colorless
- Purity: $\geq 99.996\%$
- UV stability: no coloration at UV irradiation
- NO cracks
- NO inclusions, block marks and twins visible under polarized light

Light scatter grading

Grade	Application (reference)	Bubbles / Dispersion Centers				Accumulations of Bubbles		
		Size, μm	Min distance between each, mm	Σ size, $\mu\text{m}/\text{cm}^3$	Admissible quantity, $1/\text{cm}^3$	Size, μm	Min distance between each, mm	Admissible quantity, $1/\text{cm}^3$
Optical Grade								
1	High power laser	No Bubbles / Dispersion Centers						
2	Laser	< 10	10	50	2	No		
3	Premium optical	< 20	10	100	2	No		
4	Standard optical	20-50 < 20	10 2	200 No limit	2 No limit	No		
4 a	LED & Semiconductor	< 200 20-50 < 20	50 10 2	200 No limit	4 No limit	300	20	1
4 b	View ports & Large size parts (>150mm)	Bubbles must be not visible to the naked eye under normal day light.						
Mechanical Grade								
5	Wafer carriers	< 200 20-50 < 30	20 10 2	200 No limit	2 No limit	500	10	1
5 a	Mechanical & Isolator	< 200 20-50 < 30	20 10 2	200 No limit	2 No limit	1000	5	5
5 b	Test of equipment & cutting tools	< 500 < 200 20-50 < 30	20 20 10 2	200 No limit	2 No limit	2000	2.5	10

NOTE: bubbles above are maximum case scenarios; typically material is largely free of inclusions

Inspection method for crystal defects:

- Polarized light
- Cold light source (high intensity light)

The Rokor Staff will help you choose the most economical sapphire grade to satisfy your surface quality, transmitted wave front error and transmission requirements.