

# Technical Specifications

## **Introduction**

A response must be given for all 'must' requirements. Mark answers with an 'X' in the designated 'Yes' or 'No' column. An omitted response is normally regarded as if the requirement has not been fulfilled.

Notice: The 'must' requirements are of utmost importance and must be fulfilled for the tender to be considered.

For all requirements where the tenderer is prompted to give comment, this is to be done in the comments field or in a clearly designated appendix. Comments given are to be formulated so that these do not alter the marked requirement, i.e. it should be clear whether or not the requirement is fulfilled.

		To be answered by the tenderer		
1	General properties	Yes	No	Comment (optional)
1.1	Crystals must be produced according to the Czochralski process.	X		
	Crystals dimensions must conform to the drawing given in Appendix 2 to the Tender Dossier for types 3Left, 4Left, 4Right, 5Left, 5Right, 6Left, 6Right, 7Left, 7Right, 8Left.	X		
1.3	Crystals must be oriented with their front face to the seed part of ingot.	X		
1.4	The appearances of crystals must show no visible imperfections, coloring or cracks.	X		
1.5	All sides of the crystals must be polished.	X		
1.6	The polished surfaces must be polished with a roughness $Ra \leq 0.02 \mu\text{m}$ .	X		
1.7	The surface finish of chamfers must be made at a roughness of no more than $0.5 \mu\text{m}$ (lapping).	X		
1.8	Cracks on the chamfers prolonging in to the crystal must be no more than 0.5 mm in depth.	X		
2	Optical properties	Yes	No	Comment (optional)
2.1	Longitudinal transmission must be as follows (absolute values):	X		
2.1.1	$\geq 35 \% \text{ at } 360\text{nm}$	X		

2.1.2	$\geq 60\%$ at 420nm	X		
2.1.3	$\geq 70\%$ at 620nm	X		
2.2	Non-uniformity of the transversal transmission $\delta\lambda$ at the transmission value of $T = 50\%$ must be $\delta\lambda \leq 3$ nm for 5 measurements every 4 cm; the first one being at 1.5 cm from the front face.	X		
2.3	Light yield must be $\geq 16$ phe/MeV at $T=18^\circ\text{C}$ with a 2" photomultiplier tube with bialkali photocathode (for crystals with all sides polished).	X		
2.4	Decay time must be $\text{LY}(100\text{ns})/\text{LY}(1000\text{ns}) > 90\%$ at $T=18^\circ\text{C}$ .	X		
<b>3</b>	<b>Radiation hardness</b>	<b>Yes</b>	<b>No</b>	<b>Comment (optional)</b>
3.1	Radiation hardness must be evaluated by the measurement of the induced optical absorption in the crystal along its axis.	X		
3.2	Crystals must be kept at all times at a temperature $T = 20^\circ\text{C} \pm 5^\circ\text{C}$ between the irradiation and the completion of the measurements.	X		
3.3	The measurement must be performed 30 minutes after the end of irradiation.	X		
3.4	The induced absorption calculated through crystal optical transmission damage must be limited to $\Delta k \leq 1.1 \text{ m}^{-1}$ at $\lambda = 420 \text{ nm}$ due to lateral $^{60}\text{Co}$ irradiation.	X		
3.5	The totally accumulated dose must be 30 Gy at a rate of 50-500 Gy/h.	X		
3.6	Mean value of the $\Delta k$ distribution defined for each lot and based on the measurements of not less than 50% of the lot must be $\langle \Delta k \rangle \leq 0.75 \text{ m}^{-1}$ .	X		
<b>4</b>	<b>Price and delivery</b>	<b>Yes</b>	<b>No</b>	<b>Comment (mandatory)</b>
4.1	Delivery must take place as soon as possible. Specify when delivery can take place.	X		By December 12, 2022
4.2	The complete and final offered price for 52 crystals must be specified in CZK.	X		52 pcs – 48088 CZK/pc (DAP)