

about Starna Cells, Inc....

The origin of the optical skills available from Starna, formed in 1971, can be traced back to the earlier part of the 20th century. Utilizing their optical expertise, the founders of the original company manufactured specialized optics and, during the early 1950s, had already developed the technique necessary for manufacturing the first *fully fused* form of spectrophotometer cells.

As a wholly owned subsidiary of the Starna international group of companies, Starna Cells provides many instrument manufacturers with specialized optical components and other private labeled products, including the Starna® brand of high quality spectrophotometer cells, accessories and the extensive range of NIST Traceable Liquid Reference Materials.

Starna products are distributed worldwide through the Starna network to instrument manufacturers, distributors and direct to end users. A dedicated technical applications and development team is ready to answer questions.

Cell Construction Specifications

All the cells Starna manufactures, unless specifically designed otherwise, are assembled using a fully fused method. This technique, pioneered and perfected by Starna, ensures that cells are fused into a single homogeneous unit by heat alone, using no intermediate adhesives. The cells achieve maximum physical strength as well as being unaffected by solvents.

All cells are carefully annealed to remove any residual strain left from the fusing process and, with few exceptions, can be used safely with pressure differentials of up to three atmospheres.

General Specifications:

Windows parallel to:	better than 3 minutes of arc
Window flatness to:	less than 4 Newton fringes
Window polish:	60/40 scratch/dig
Window thickness:	1.25mm

Material	Path lengths	Tolerance
Glass	up to 20mm	+/- 0.1mm
Glass	30 to 100mm	+/- 0.2mm
Special Optical Glass	up to 20mm	+/- 0.01mm
Special Optical Glass	30 to 100mm	+/- 0.02mm
Quartz	up to 0.05mm	+/- 0.002mm
Quartz	0.1 to 0.4mm	+/- 0.005mm
Quartz	0.5 to 20mm	+/- 0.01mm
Quartz	40 to 100mm	+/- 0.02mm

The cells can be used with most solvents and acidic solutions. Acids such as HF should be avoided as they will attack the quartz itself while most other acids will not affect the cells. Strongly basic solutions (pH 9.0 and above) will etch the surface of the windows and shorten the useful life of the cells.

Material Specifications

Starna offers five window materials, Optical Glass, Special Optical Glass and Pyrex® for the visible range, Spectrosil® Quartz for the far UV range and Infrasil® Quartz or equivalent for the near infrared. If a material required is not shown in this catalog, please contact us for availability. All materials used to construct the cells are suitable for use in the following wavelength range:

Optical Glass	334 through 2500 nm
Special Optical Glass	320 through 2500 nm
Pyrex®	320 through 2500 nm
Spectrosil® Quartz	170 through 2700 nm
Infrasil®	220 through 3800 nm

For fluorescent applications, Spectrosil® is recommended as it does not exhibit any background fluorescence. Some other materials, especially glass and lower grades of quartz may have some background fluorescence. Standard window thickness is 1.25mm, polished to a flatness tolerance of better than 4 Newton Fringes per centimeter in the viewing area. They are typically flat to better than 1 micron (0.001mm) over the whole window area. The scratch and dig specification for surface polish is 60/40. The meticulous care taken in the preparation and construction of regular quartz fluorescent cells allows for normal tolerances to be sufficiently stringent for use in laser applications.

Cell Matching

The high degree of accuracy maintained during production ensures a standard path length tolerance of +/- 0.01mm. The tolerance maintained for parallelism of the windows is better than 3 minutes of arc, therefore quartz cells vary little in transmission values. Slight differences in the transmission of new glass cells are due to variations in raw material transmission characteristics. The transmission of matched cells is measured and each cell is given a match code. These codes are only of real value when comparing new cells because the transmission characteristics may change as surface contamination or deterioration occurs during normal use. Thus, a new cell of a particular match code will not necessarily match an older cell of the same match code.

Cells which are commonly used (eg. 1-Q-10) are normally supplied from stock in unlimited quantities of the same match code. The less commonly used cells can usually be supplied in matched sets of two or four. In the case of Tablet Dissolution flow cells, matched sets of eight or more can be supplied.

Window Material	Matching Tolerance	Measured at Wavelength
Optical Glass	0.5 %	350 nm
Special Optical Glass	1.0 %	320 nm
Spectrosil Quartz	1.5 %	200 nm
Infrasil Quartz	1.5 %	240 nm