



Bühler Measuring Quartzes.

**Choose the right Crystal/
Quartz for your application.**

Gold

Gold is the most widely used electrode material. It performs well in a large variety of applications. Gold provides good adhesion, low rate noise, and good crystal life. Gold crystals have an indefinite shelf life.

Alloy

An alloy electrode provides excellent adhesion for materials used in optical coatings and also acts to absorb the tensile and compressive stresses common in some films, maximizing crystal life and reducing rate noise.

Silver

Silver electrodes have high thermal conductance, enabling them to transfer heat arriving from the hot evaporation source to the water-cooled sensor body to keep the crystal from getting too hot. Silver crystals provide good adhesion for materials used in optical coatings, delivering good crystal life and low rate noise.

Silver tarnishes due to interaction with hydrogen sulfide in air. Because of this, the shelf life of silver crystals is typically limited to six months after opening the package.

Electrode Material	Advantages	Disadvantages
Gold (Standard Type)	<ul style="list-style-type: none"> – Does not oxidize – Indefinite shelf life – Most widely used, good for a large number of applications 	<ul style="list-style-type: none"> – Crystal life may be shorter than silver or alloy in some applications, including materials used in optical coatings.
Silver (Sputtering Type)	<ul style="list-style-type: none"> – Best transfer of heat arriving at crystal to cooled sensor body (high thermal conductance) 	<ul style="list-style-type: none"> – Shelf life depends on oxidation and exposure to sulfur content in air (tarnishing effect) – Not widely used
Alloy (High-Stress Coatings)	<ul style="list-style-type: none"> – Longest life (2x) for materials used in optical films or for high stress semiconductor materials – Higher activity values compared to gold and silver 	<ul style="list-style-type: none"> – Alloy electrodes will oxidize, shorter shelf life compared to gold ~ 6 months – No added benefit when depositing “normal” stress materials (non-high-stress metals)

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Frequency	5 MHz or 6 MHz depends on monitoring system
Size	14 mm
Electrode	Double anchor (others are available on request)

Precision Optical Coatings

Precision optical coating applications typically require multi-layer stacks of dielectric materials.

The applications include bandpass optical filters with a sharp cutoff for dense wave division multiplexing and other fiber-communication applications, high-quality, anti-reflectance optics for cameras, telescopes, rifle scopes, microscopes, medical instruments, binoculars, night vision optics devices and semiconductor photolithography.

Dielectric materials include aluminum oxide (Al₂O₃), calcium fluoride (CaF₂), magnesium fluoride (MgF₂), tantalum pentoxide (Ta₂O₅), titanium dioxide (TiO₂), thorium fluoride (ThF₄), silicon monoxide (SiO), silicon dioxide (SiO₂), zirconium dioxide (ZrO₂), and many more. These materials cause a higher level of stress to the crystal and an Alloy crystal is recommended.

For some applications, when the source or sensor shutter opens, there is a large increase in the amount of heat arriving at the crystal, resulting in a sudden jump in crystal temperature and film stress. Both of which cause a spike in rate and thickness. For these applications, **Precision TS Gold** are recommended.

Part No.	Material	Frequency MHz	Electrode	Description
LONT-40840-001	Gold	5 MHz	Double	Measuring Quartz Precision Gold 5 MHz
LONT-40810-001	Silver	5 MHz	Double	Measuring Quartz Precision Silver 5 MHz
LONT-40806-001	Alloy	6 MHz	Double	Measuring Quartz Precision Alloy 6 MHz
LONT-40747-001	Gold	6 MHz	Double	Measuring Quartz Precision TS Gold 6 MHz
LONT-40808-001	Gold	6 MHz	Double	Measuring Quartz Precision Gold 6 MHz
LONT-40809-001	Silver	6 MHz	Double	Measuring Quartz Precision Silber 6 MHz

Ophthalmic

Standard Optical Coatings typically have fewer than eight layers controlled by the crystal. They include ophthalmic and simple camera lenses as well as basic anti-reflective display coatings. This application typically uses Gold crystals.

Part No.	Material	Frequency MHz	Electrode	Description
LONT-40816-001	Alloy	6 MHz	Double	Measuring Quartz Ophthalmic Alloy 6 MHz
LONT-40746-001	Gold	6 MHz	Double	Measuring Quartz Ophthalmic Gold 6 MHz

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