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# Research Crystals

## MAXIMUM STABILITY IN DEMANDING APPLICATIONS

The standard AT-cut, 1 in. (25.4 mm) diameter crystal, pioneered by INFICON, is used primarily in research applications with the INFICON RQCM (Research Quartz Crystal Microbalance). These research crystals are designed for use with INFICON's rugged, easy to use crystal holders and are used for in-situ monitoring of deposited films or liquids.

**Geometry:** AT-cut quartz has superior mechanical and piezoelectric properties. The 1 in. (25.4 mm) diameter allows optimal distance between the active area of the crystal and the mounting o-ring. This improves the overall stability of the crystal by reducing the frequency changes due to mounting stress.

**Finish:** INFICON 1 in. (25.4 mm) research crystals are available with either an unpolished or polished finish. Polished crystals allow for a good correlation between theory and measurement during liquid immersion experiments.

### APPLICATIONS

- Metal plating
- Gas-phase mass detection
- Electro-chemistry
- Micro-rheology
- Protein adsorption/desorption
- Biofilm formation

### FEATURES AT A GLANCE

- Accurate
- Reliable
- Stable
- Wide variety of electrode materials available

**Electrode Material:** INFICON 1 in. (25.4 mm) research crystals are available in a variety of electrode materials including Gold, Platinum, and Titanium. Crystals with custom electrode materials are available on request. INFICON also offers Gold electrode crystals with an additional SiO<sub>2</sub> outer layer to create a hydrophilic surface needed for some biological applications.

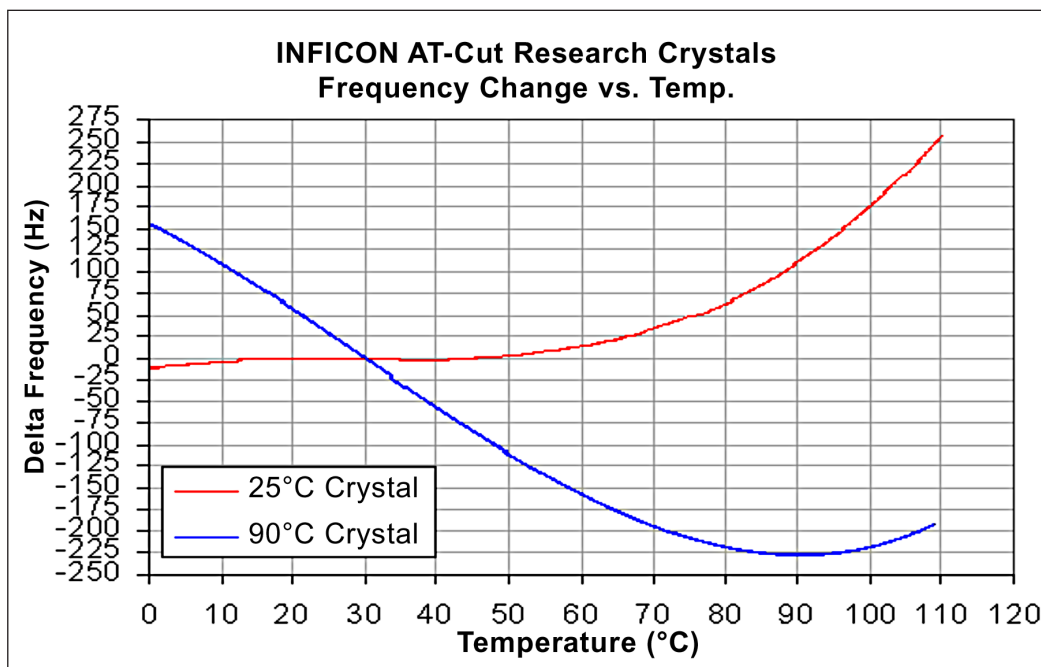
**Temperature:** Even though AT-cut crystals are designed to minimize the change in frequency due to temperature, the effect of temperature can be significant when attempting to resolve small mass (frequency) changes over long periods of time. INFICON offers AT-cut crystals optimized for two operating temperatures, 90°C and 25°C. These crystals have very good frequency stability when operating close to their specified temperature (see Figure 1).

Contact INFICON today to request a quote for custom crystals to accommodate your special requirements.

## SPECIFICATIONS

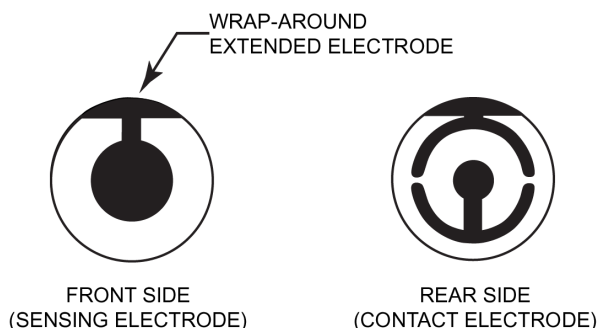
|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| Frequencies:              | 5 MHz and 9 MHz                                                  |
| Frequency Range:          | 4.976 – 5.020 MHz<br>8.976 – 9.036 MHz                           |
| Resistance:               | 5 MHz, ~10 Ohms<br>9 MHz, ~7 Ohms                                |
| Crystal Diameter:         | 1 in. (25.4 mm)                                                  |
| Crystal Contour:          | Plano-Plano                                                      |
| Crystal Orientation:      | AT-Cut, for frequency stability over temperature                 |
| Compatibility:            | INFICON/Maxtek liquid probes and crystal holders                 |
| Front Electrode Diameter: | 0.5 in. (12.7 mm)                                                |
| Packaging:                | Individually packaged/sold                                       |
| Crystal Thickness:        | 5 MHz, 0.013 in. (333 $\mu$ m)<br>9 MHz, 0.007 in. (185 $\mu$ m) |
| Surface Roughness:        | 50 Å (polished)                                                  |

Figure 1



## ORDERING INFORMATION

## INFICON 1 in. (25.4 mm) Diameter Crystals – Electrode Configuration



## 1 in. (25.4 mm) Crystals, AT-Cut, 90°C

| Part No./Finish |            | Frequency | Electrode Material (Front)                                    |                   |
|-----------------|------------|-----------|---------------------------------------------------------------|-------------------|
| Polished        | Unpolished |           | Adhesion Layer                                                | Sensing Electrode |
| 149211-1        | 149211-2   | 5 MHz     | Chromium                                                      | Gold              |
| 149238-1        | 149238-2   | 5 MHz     | Titanium                                                      | Gold              |
| 149240-1        | 149240-2   | 5 MHz     | Titanium                                                      | Platinum          |
| 149241-1        | 149241-2   | 5 MHz     | Chromium                                                      | Platinum          |
| 149242-1        | —          | 5 MHz     | Titanium                                                      | Silver            |
| 149243-1        | —          | 5 MHz     | Titanium                                                      | Aluminum          |
| 149248-1        | —          | 5 MHz     | Titanium (No adhesion layer)                                  |                   |
| 149250-1        | —          | 5 MHz     | Chromium                                                      | Nickel            |
| 149252-1        | —          | 5 MHz     | Chromium                                                      | Iron              |
| 149255-1        | —          | 9 MHz     | Chromium                                                      | Gold              |
| 149270-1        | —          | 5 MHz     | Titanium                                                      | SiO <sub>2</sub>  |
| 149280-1        | —          | 5 MHz     | Chromium (No adhesion layer)                                  |                   |
| 149296-1        | —          | 9 MHz     | Titanium                                                      | Gold              |
| 750-1030-G1     | —          | 5 MHz     | Aluminum (No adhesion layer)                                  |                   |
| 750-1031-G1     | —          | 5 MHz     | Uncoated<br>(Chromium/Gold contact electrode and wrap-around) |                   |
| 750-1035-G1     | —          | 5 MHz     | Uncoated<br>(Titanium/Gold contact electrode and wrap-around) |                   |

## 1 in. (25.4 mm) Crystals, AT-Cut, 25°C

| Part No./Finish |             | Frequency | Electrode Material (Front)   |                   |
|-----------------|-------------|-----------|------------------------------|-------------------|
| Polished        | Unpolished  |           | Adhesion Layer               | Sensing Electrode |
| 149257-1        | —           | 5 MHz     | Titanium                     | Gold              |
| 149272-1        | —           | 9 MHz     | Chromium                     | Gold              |
| 149273-1        | —           | 5 MHz     | Chromium                     | Gold              |
| 149274-1        | —           | 5 MHz     | Titanium                     | Platinum          |
| 149275-1        | —           | 5 MHz     | Titanium                     | Silver            |
| 149276-1        | —           | 5 MHz     | Titanium                     | Aluminum          |
| 149277-1        | 149277-2    | 5 MHz     | Titanium/Gold/Titanium       | SiO <sub>2</sub>  |
| 750-1029-G1     | 750-1033-G1 | 5 MHz     | Titanium (No adhesion layer) |                   |
| 750-1037-G1     | —           | 9 MHz     | Titanium                     | Platinum          |
| 750-1039-G1     | —           | 9 MHz     | Titanium/Gold/Titanium       | SiO <sub>2</sub>  |
| SPC-1193-P1     | —           | 5 MHz     | Titanium/Gold                | Iron              |

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