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| **Sr.No** | **Technical Specifications of Quartz Crystal Microbalance with Dissipation Technology** |
| **1** | This instrument will be used as a standard analysis tool that measures changes in mass, thickness, and viscoelastic properties of surface films via the Quartz Crystal Microbalance with Dissipation measurement technique. |
| **2** | **The measurement chamber**The measurement chamber must hold upto **4 measurement channels** allowing to perform measurements in flow and stagnant mode.Facilities for temperature-controlled measurements must be adjustable at least in the interval of 20 to 40 degrees Celsius. Temperature resolution equal to or better than 0.001˚C . Typical flow rates for filling the system: 100 - 400 µl/min and for the experiment: 25 - 150 µl/min |
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| **3** | **Control electronics unit(s)**The control electronics should contain all the functionality. The use of external units such as pumps, temperature regulators, frequency generators etc. should be avoided. |
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| **4** | **Frequency and dissipation characteristics** |
|  | Frequency range 1-72 MHz (up to the 13 th harmonic, 65 MHz for a 5 MHz sensor) |
|  | Maximum time resolution, 1 sensor, 1 frequency ~300 data points per second |
|  | Dissipation monitoring should be possible |
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| **5** | **Specifications Flow module (sample handling system) and Sensors** |
|  | 1)      Internal volume Total ~140 µl Flow channel ~100 µl, above sensor crystal ~40 µl |
|  | 2)      Type of measurements Flow or stagnant liquid measurements |
|  | 3)      Materials exposed to liquid Viton (O-ring and sealing), titanium |
|  | 4)      Sensors Compatible with all  14 mm sensors |
|  | 5)      Frequency - around 5 MHz |
|  | 6)      Sensor - AT cut |
|  | 7)      Minimum sample volume ~300 micro liters or less |
|  | 8)      Maximum Time resolution = 5 ms |
|  | 9)      Peristaltic pump  with the flow rate must be adjustable at least in the interval of 0.02 and 1 ml/min. - to be included |
|  | 10)  Cleaning All parts may be disassembled for separate cleaning |
|  | 11) Sensors consisting quartz crystals with the following coatings of the electrodes mustbe available eg. Gold, Au, TiO2, SiO2, Ti, Stainless steel, Polystyrene, Aluminium, etc |
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| **6** | **Software**The software should be easy to use in terms of logical menus and low learningthreshold. Input data, analysis software Multiple frequency and dissipation data.Output data, analysis software Modeled values of viscosity, elasticity, thicknessand kinetic constants. |
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| **7** | Warranty :The instrument should carry complete warranty of at least 12 months frominstallation date.  |