

## **The Use and Handling of Digiquartz® Buffer Tubes**



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“The standard by which other standards are measured”

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by  
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Buffer tubes are coiled pieces of tubing that are attached to the transducer pressure port. The buffer tube serves as a mechanical isolator to prevent shock or vibration from being transmitted directly to the transducer. The buffer tube also provides a means to connect the transducer to the measurement system. All Paroscientific “Digiquartz” sensors include buffer tubes. Some configurations have external buffer tubes; other configurations have internal buffer tubes. Buffer tubes are installed at the factory and are an integral part of the shock isolation system which also includes a rubber boot and outer housing. Table 1 shows the buffer tube configuration of Digiquartz® products.

Product	Location
Series 1000	internal
Series 2000	external
Series 3000	external
Series 4000	external
Series 4000KR	internal
Series 5300	external
Series 6000	external
Series 9000	internal
Model 8DP & 8CDP	internal
Model 8B & 8CB	internal
Model 181KT	external

**Table 1. Buffer Tube Configuration by Product**

Excessive mechanical shock can result in a non-repairable failure of the sensor. The diameter and material type of buffer tubes are generally determined by the pressure media and the full scale pressure range. Paroscientific has over 30 years of experience of properly designing and installing buffer tubes and has developed special tooling to form buffer tubes to prevent crimping and breakage. Customers should follow the installation instructions for connecting to the measurement system and **never** try to remove or modify an external buffer tube from the transducer end.

Paroscientific performs helium leak tests and/or proof pressure tests on each completed assembly to ensure they are leak-free. When the pressure medium is a liquid, then an inert oil (Dow Corning FS1265 300CS) is used to fill the internal “wetted” surfaces of the sensor and buffer tube to provide a continuous fluid interface. All depth sensors are oil-filled. See Digiquartz® application note entitled “Accuracy, Performance and Handling of Oil-Filled Digiquartz® Pressure Instrumentation” at <http://www.paroscientific.com/pdf/oilfilled.pdf> The oil-filling procedure is normally performed with the buffer tube attached to the transducer.

There are two basic types of buffer tubes.

Nylon Buffer Tubes are normally used on sensors in the pressure range of 2 to 400 psi. Nylon tubes have the advantage of providing the highest shock protection and have the largest internal diameter of any of

our buffer tubes. This larger diameter minimizes capillary (meniscus) effects on oil-filled buffer tubes. Liquid pressure measurements (requiring oil-filled buffer tubes) are not recommended for any sensor below 100 psi, but are available at customer request. Nylon tubes also provide electrical isolation.

Stainless Steel Buffer Tubes are used in the pressure range of 2 to 20,000 psi. Stainless steel tubes can sustain higher pressures and temperatures than nylon tubes. Stainless steel buffer tubes are normally not oil-filled in pressure ranges below 100 psi.

Paroscientific can design and fabricate custom buffer tubes to help customers with unique requirements. Contact our sales and application engineers at [support@paroscientific.com](mailto:support@paroscientific.com) or (425) 883-8700 in the USA for your specific requirements.