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Technical Bulletin

Hydraulic Testing of
FRP Composite Pipe

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Standard test procedures for FRP composite pipe are for the hydraulic test pressure to be at 1-1/2 times the normal **operating** pressure. Please note that this is the actual pressure at which the line will consistently operate, and not an arbitrarily higher design pressure.

Testing at higher hydraulic pressures can shorten the service life of the FRP composite pipe. Unlike a monolithic wall structure, such as steel pipe, fiberglass reinforced plastic pipe is a composite of a resin matrix and a reinforcement fiber (typically glass fibers). The composite gets its strength from the reinforcements and depends upon the chemical and mechanical "lock" of the resin matrix to the glass reinforcement fiber. At all pressures, there is minute movement in the FRP pipe wall, and potential for fracturing that bond interface. Thus, by testing at pressures higher than necessary, you may actually reduce the long term strength of the pipe.

It is because of this dis-bonding between the fiberglass reinforcement and the resin matrix under internal-hydraulic testing pressure that you often hear fiberglass equipment, during the first application of pressure, sounding like Rice Krispies - "snap, crackle and pop". In fact, one of the on-going quality assurance programs that is often conducted annually on FRP composite tanks is an acoustic emission test - to monitor the level of internal laminate noise - comparing the results of previous years with the "noise" of the current year.

Testing is primarily conducted to determine the integrity of the joints and to pick up any possible porosity of the pipe or fittings. This can be accomplished at the recommended 1-1/2 times the **operating** pressure. Testing at higher pressures offers no additional advantages. And, again, simply reduces the long term service life of the composite pipe.