



Final Report

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Objectives

The project is to test the performance of the Jiffy Tube product sold by RICO. This is used as a plug/bung for heat exchanger and condenser tubes which operate at elevated pressure. RICO will now be manufacturing this product in-house and therefore need to be able to provide accurate performance thresholds to use in marketing the product. The main objective is to develop an experimental test setup to validate the maximum operating pressure of the Jiffy Tube plugs, and to use this setup to provide some maximum pressure values.

Test Method

Heat exchanger tubes and both metal and Jiffy Tube plugs were provided by Rico for use in the project. A metal plug was drilled to allow a bicycle inner tube valve to be inserted and sealed in place. This metal plug was then hammered into one end of a titanium heat exchanger tube to ensure a good seal. A Jiffy Tube plug of the correct size was then inserted into the opposite end of the tube according to the manufacturer's instructions using a soft-faced mallet. A high pressure bicycle pump with integrated pressure gauge was then attached to the valve and used to incrementally increase the pressure inside the tube until the desired pressure was reached. The setup is shown below in Figure 1.



Figure 1: Experimental setup

Rico wished to evaluate the performance of the Jiffy Tube plug to 100 PSI – in order to account for errors in the pressure gauge (+/- 5 PSI) and to allow for a safety factor, the plugs were tested to a pressure of 130 PSI. Pressure tests were carried out at temperatures of between 15-25°C. The plugs were tested up to 130 PSI (+/- 5 PSI) and not necessarily to burst pressure. The test was repeated 8 times.

Results

Sample No.	Max pressure [PSI]	Did plug fail?	Observations
1	100	No	-
2	110	No	-
3	120	No	-
4	130	No	-
5	130	No	-
6	130	No	-
7	130	No	Leak
8	130	No	Leak

The final two tests resulted in a gradual reduction in pressure, suggesting a small leak had occurred. The source of the leak was identified as the seal around the bicycle valve on the test apparatus and not the Jiffy Tube.

Conclusions

All of the Jiffy Tube plugs tested withstood a pressure in excess of 100 PSI, with 5 tests of 130 PSI safely withstanding and maintaining this pressure. Based on these tests, environmental conditions, and appropriate fitting it can be confirmed that the Jiffy Tube plug will safely withstand a pressure of 100 PSI without failure. Longer term tests would be required to evaluate the pressure loss and leakdown resulting from sustained exposure to these pressures, and the effect of higher and lower temperatures on the pressure performance.

Note 5.12.14 - Jiffy Tube Plug has now been renamed to Rico “Plug-it” Tube Plug