



Destructive Testing of 40,000 psi Class Hose Shroud

Date: 8/13/2008

The Product to be tested: The hose shroud is an outer shield used on hand held water blasting control guns to protect an operator from a hose rupture at the point where the hose is connected to the gun. The fitting, which is typically crimped onto the end of the hose, is often subjected to excessive stresses from bending or dragging of the hose by operators. A sudden failure at this location so close to the body of the operator could cause severe injury or even death. For this reason a safety shroud designed to withstand a hose rupture at 1.5 times the operating pressure of the system is an essential part of the safety equipment for every water blast gun. Fig. 1 shows a safety shroud installed on a typical hand held control gun. The 40,000 psi safety shroud, which is also used for 20,000 psi applications, is made with three separate layers. The inner layer, which is closest to the high pressure hose, is a stainless steel woven mesh. This is covered with a layer of cordura, which is a nylon material used in the manufacture of soft sided luggage. The outer layer is a light weight fabric reinforced synthetic rubber hose material, which is durable and is intended to keep the assembly as clean as possible.

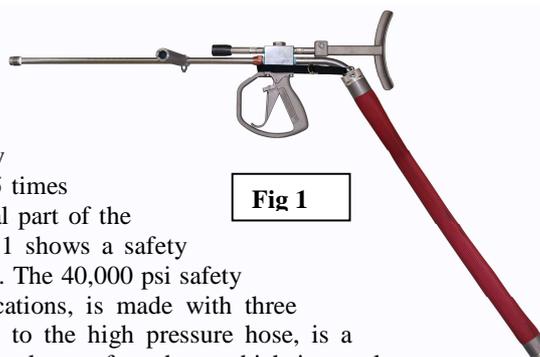


Fig 1

The testing procedure: The testing procedure was discussed with the engineering staff at Parker Hannifin Corporation, Parflex Division, in Stafford Texas. They also provided the testing facilities and measuring equipment. The objective was to burst a hose located inside a shroud at a pressure at least 1.5 times the working pressure of the equipment. In this case the safety shroud is designed for use with 40,000 psi rated hand guns, so the target burst pressure was set at 60,000 psi.



Fig.2

A sample of hose was chosen which was similar in size to the hoses used for 40,000 psi applications and which had a burst rating as near as possible to 60,000 psi. It is difficult to predict the exact pressure at which a hose will burst, but for the purposes of this test so long as the burst occurred close to the target pressure and exceeded it, that would be acceptable.

The Test: The hose was placed inside the shroud and pressure was applied until a burst occurred. Fig 2 shows the sample of hose after it burst. The burst occurred at a pressure of 64,400 psi, which is 1.61 times the working pressure.

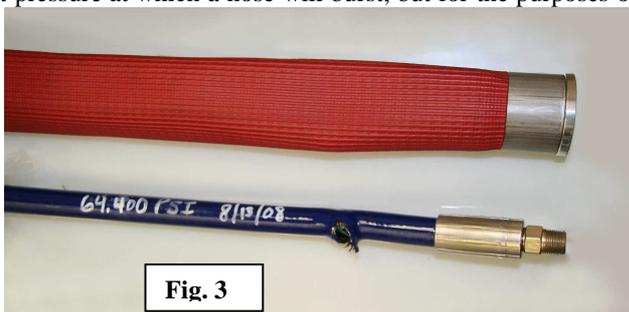


Fig. 3

The Results: In Fig.3 the burst hose is shown beside the shroud, which shows no damage on the outside. The burst occurred inside the shroud at a point just above the rupture in the hose. All that can be seen is a slight bulging of the outer cover of the shroud.



In Fig.4 the shroud has been cut open to show the damaged area immediately adjacent to the point where the hose burst occurred. The inner layer of stainless steel woven fabric shows considerable distortion, and the cordura layer also sustained some damage, but the outer layer of rubber hose was undamaged.

Conclusion:

The test clearly showed that this design of safety shroud could resist a hose burst at a pressure well above the working pressure of the equipment with which it is designed to be used.



Fig.4

This report was prepared by P. J. Goldsmith P.E. who witnessed the tests at the Parker Hannifin Corporation Offices in Stafford Texas.

