

**J140J**  
**Friction Loss Testing**  
**SGMc July 28,1998**

**Purpose:**

To determine the friction loss of the J140J Ball valve at various flow rates. The J140J is a 2.5" inlet 2.5" outlet inline ball valve. The hole through the ball on this model is 1.375".

**Method:**

The valve was installed on a test apparatus at the Task Force Tips facility. Various sizes of smooth bore nozzles were attached to the outlet of the valve. A highly accurate magnetic style flow meter was used to set flow rates into these different fixed orifices. For each flow rate the pressure BEHIND the valve was measured both with and without the valve in place. The difference between these two measurements would then be equal to the friction loss introduced by the valve. In each test the same pressure gage and the same flow meter was used. This increased the accuracy of the tests by eliminating the need to make absolute measurements, only the friction loss difference between using the valve and not using the valve became significant..

**Results:**

The results were as follows;  
At 250 GPM the loss was 3 PSI  
At 325 GPM the loss was 5 PSI  
At 400 GPM the loss was 10 PSI

**Conclusions:**

The primary use of this valve is on hand lines such that the line may be shut down in a "Break and Extend" type of operation. The flows expected of the hose line are typically 250 GPM where the loss was found to be 3 PSI. There are similar valves on the market that have a 2" hole through the ball valve as opposed to the 1.375" hole in the J140J valve. Clearly a 2" hole would give lower friction loss at 250 GPM than would the 1.375" hole of the J140J. The cross sectional area of a 2" hole compared to a 1.375" hole is DOUBLE therefor based on hydraulics and the squared law it could be ASSUMED that the friction loss at 250 GPM for a 2" valve would be on the order of 4 times less or less than 1 PSI. The J140J is smaller, lighter, and more durable than a comparable valve with a two " hole. The conclusion is that it is much more practical to provide the hose crew with a lighter and less bulky and more durable valve (the J140J) at the cost of an extra two PSI from the pumper which is easily obtainable.