PENFLEX

# ENGINEERING BULLETIN #120

## How Many BTUs Can be "Handled" by Corrugated Hose?

**Sometimes our customers who are making assemblies for a heat generating system ask if the corrugated hose which they consider for an application will be able to handle a certain number of BTUs. Though it seems like unrelated question, there still should be an answer to it.**

First let's look at the definition of a BTU. BTU stands for British Thermal Unit and is the amount of heat energy needed to raise the temperature of one pound of water by one degree Fahrenheit. This is the standard measurement used to state the amount of energy that a fuel has as well as the amount of output of any heat generating device or system. All combustible materials have a BTU rating—that is amount of heat energy they produce when burned.

For instance:

- 1 cubic foot of natural gas yields about 1,030 BTU
- 1 pound of coal yields about 10,150 BTU
- 1 gallon of diesel fuel yields about 138,000 BTU

So, if a heat generating system working on natural gas has rating of 8 Million BTU/hour it means that it uses, or burns, 7,767 $ft^3$ of natural gas in one hour.

**8,000,000 BTU/hr ÷ 1,030 BTU = 7,767 $ft^3$/hr**

Therefore, a hose used in the pipe system that supplies gas to a burner in such a system would have to transfer 7,767 $ft^3$ of natural gas in one hour, or—in other words–it would have to handle 8 Million BTU/hour.

Such transfer corresponds to a Flow Rate of about 130 $ft^3$/min (7,767 $ft^3$/hr ÷ 60 minutes), and the answer to the above-mentioned question comes to finding if a given Flow Rate is acceptable for the hose in question.

For maximum permissible flow rates for a given size of hose, please refer to the table below:

## MAXIMUM PERMISSIBLE FLOW RATES IN CORRUGATED HOSE

| | | GAS | | LIQUID | |
|---|---|---|---|---|---|
| Product ID | Hose ID (in.) | CFH ( $ft^3$/hour) | CFM ( $ft^3$/min.) | CFH ( $ft^3$/hour) | CFM ( $ft^3$/min.) |
| 7xx-004 | 1/4″ | 283.0 | 4.72 | 141.5 | 2.36 |
| 7xx-006 | 3/8″ | 544.5 | 9.08 | 272.3 | 4.54 |
| 7xx-008 | 1/2″ | 923.5 | 15.4 | 461.8 | 7.70 |
| 7xx-012 | 3/4″ | 1884.0 | 31.4 | 942.0 | 15.70 |
| 7xx-016 | 1″ | 3308.0 | 55.2 | 1654.0 | 27.6 |
| 7xx-020 | 1-1/4″ | 5160.0 | 86 | 2580 | 43.0 |
| 7xx-024 | 1-1/2″ | 8040.0 | 134 | 4020.0 | 67.0 |
| 7xx-032 | 2″ | 11775.0 | 196.3 | 5887.5 | 98.2 |
| 7xx-048 | 3″ | 26500.0 | 441.67 | 13250.0 | 221.0 |
| 7xx-064 | 4″ | 47100.0 | 785.0 | 23400.0 | 390.0 |
| 7xx-080 | 5″ | 72960.0 | 1216.0 | 36600.0 | 610.0 |
| 7xx-096 | 6″ | 105000.0 | 1750.0 | 52500.0 | 875.0 |
| 7xx-128 | 8″ | 180000.0 | 3000.0 | 90000.0 | 1500.0 |
| 7xx-160 | 10″ | 276000.0 | 4600.0 | 138000.0 | 2300.0 |

Where the flow rates exceed those in the table, an interlocked metal hose liner or larger hose I.D. is recommended.

If you have any questions or comments, please contact us.