

# Installation Hardware Instructions

## Standard Installation Kit for Welded Steel Pipe

For F-3500 & FB-3500 Series Insertion Electromagnetic Flow Meters



**For Use With Kits: INSTL1, INSTL5, INSTL18**

This kit must be installed prior to filling the system, or into a section of pipe that is isolated from pressure and flow. Once installed, this kit allows for insertion and removal of the flow meter without a system shutdown.

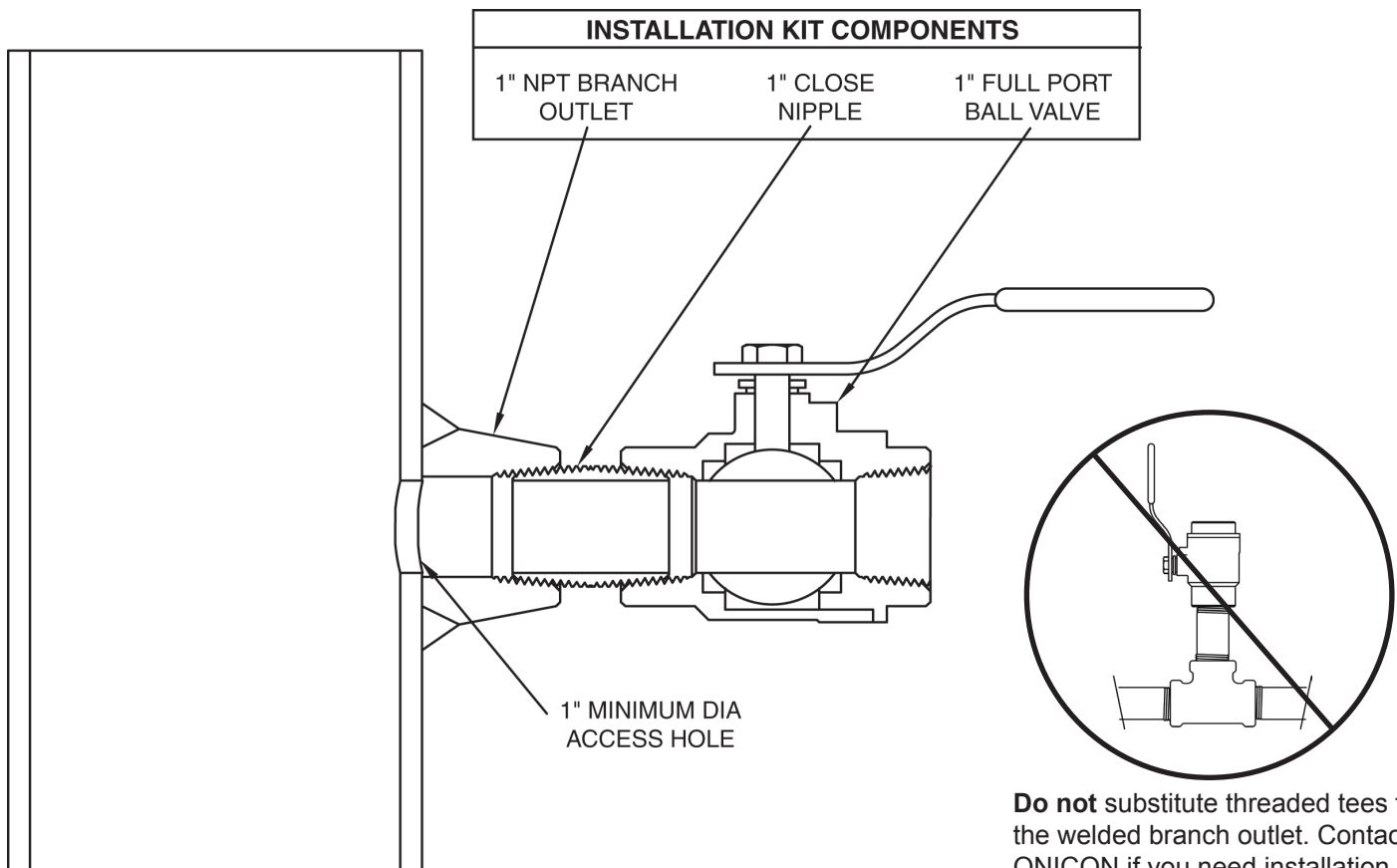
### Directions:

1. Identify an appropriate location for the flow meter (see pages 2-3).
2. Weld the branch outlet onto the pipe.
3. Drill a one inch (minimum) access hole, centered in the branch outlet.
4. Install the close nipple and ball valve as shown below; use a paste type thread sealant or Teflon® tape.
5. Flush and fill the system.

**NOTE:** Before installing the flow meter, read the entire installation manual.

### IMPORTANT NOTE

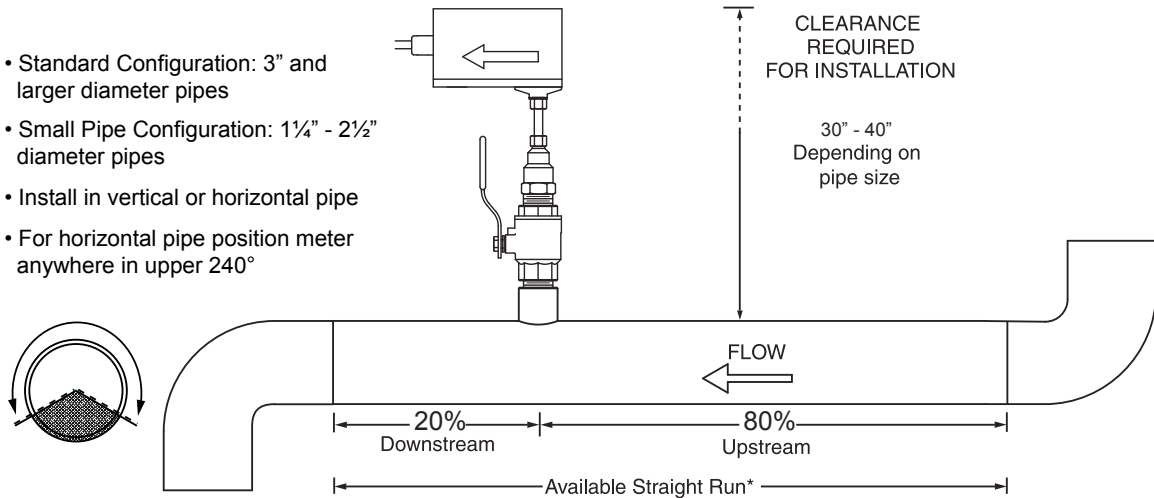
ONICON Insertion flow meters are precision measuring devices that must be installed according to the instructions contained in this document in order to maintain their accuracy and reliability. Failure to follow these instructions will result in erratic operation and reduced accuracy.



# FLOW METER SITE SELECTION GENERAL GUIDELINES

## F-3500 Series Insertion Electromagnetic Flow Meters

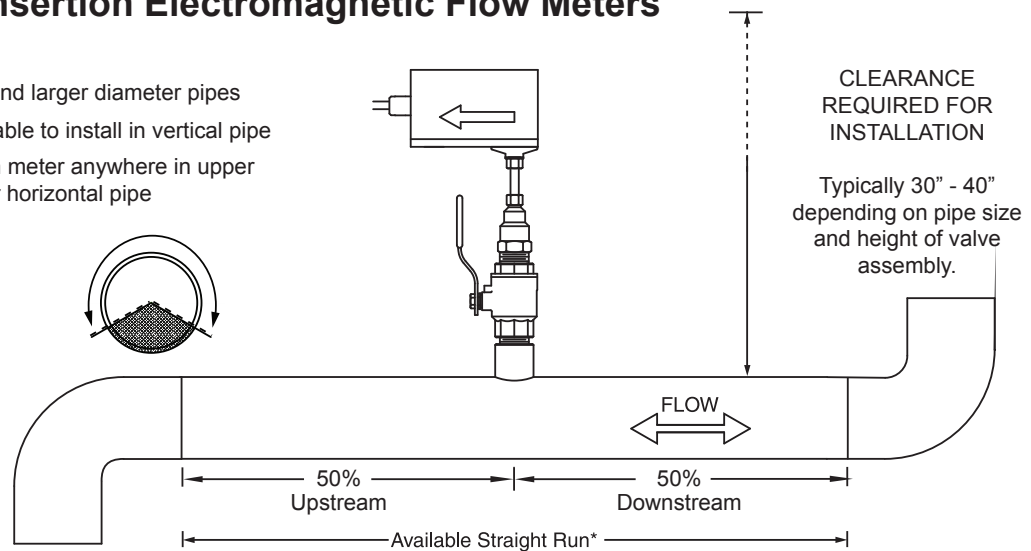
- Standard Configuration: 3" and larger diameter pipes
- Small Pipe Configuration: 1 1/4" - 2 1/2" diameter pipes
- Install in vertical or horizontal pipe
- For horizontal pipe position meter anywhere in upper 240°



\*See following page for straight run requirements.

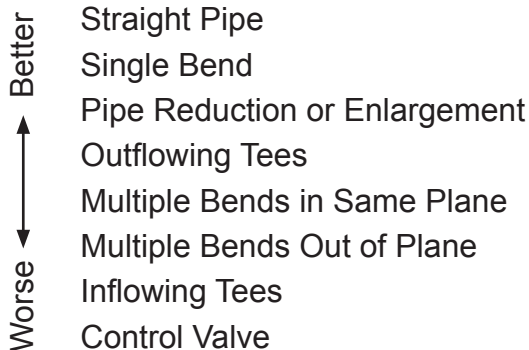
## FB-3500 Series Insertion Electromagnetic Flow Meters

- For 3" and larger diameter pipes
- Acceptable to install in vertical pipe
- Position meter anywhere in upper 240° for horizontal pipe



\*See page back page for straight run requirements.

## EVALUATING UPSTREAM PIPING CONDITIONS



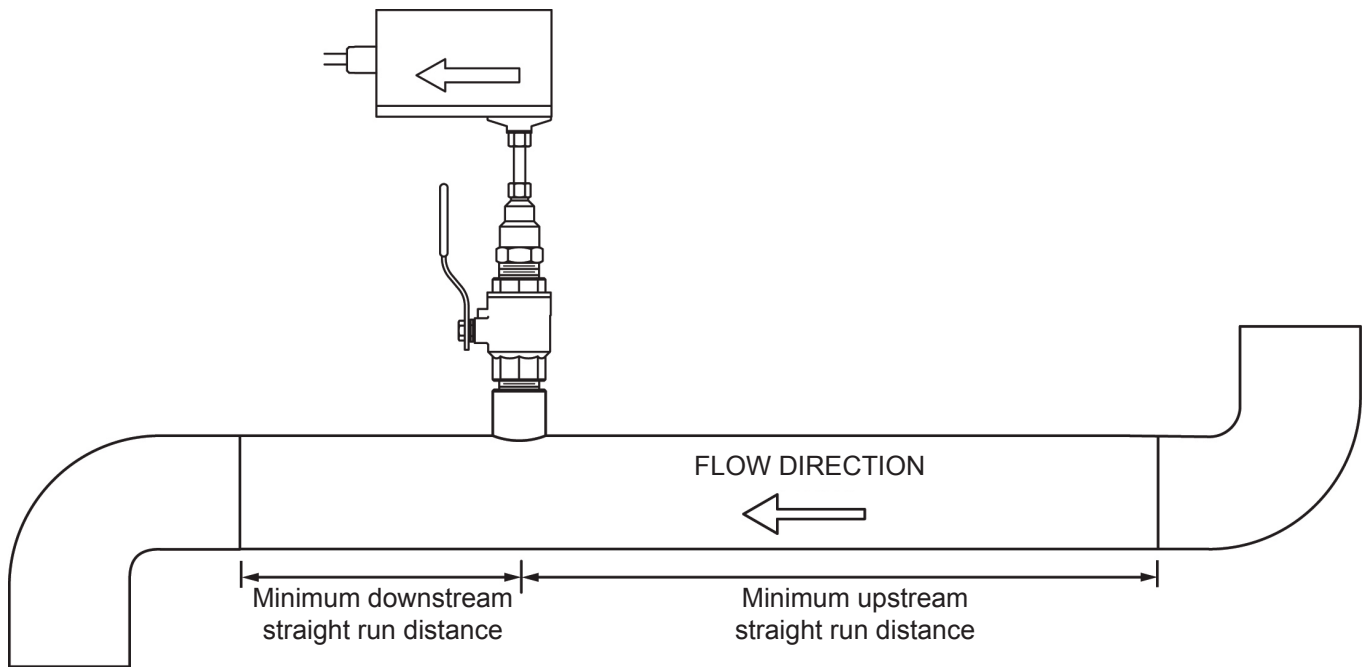
### How to determine the available straight pipe diameters:

For each application, locate the longest straight, unobstructed section of pipe (no bends, tees, valves, other insertion probes, size transitions). The longest straight pipe run in inches divided by nominal pipe size in inches equals "diameters of straight pipe." For closed loop applications, consider both the supply and return lines as possible locations.

# F-3500 - STRAIGHT RUN REQUIREMENTS

## GENERAL PRACTICES:

1. For best results, install the flow meter in a straight run of pipe, free of bends, tees, valves, transitions and obstructions.
2. Straight run requirements vary based on the nature of the upstream obstruction. See the table below for guidelines in determining upstream straight run requirements based on the nature of the obstruction. Please note that depending upon specific location details, more or less straight run may be required to produce a satisfactory flow profile.
3. If there is insufficient straight run, allow 80% of the run upstream and 20% of the run downstream. If the total length of straight run is less than 70% of the recommended distance, performance may seriously degrade, and consideration should be given to changing to the series F-3000 Inline Electromagnetic flow meter.



Upstream obstruction	Straight run required upstream of meter location	Straight run required downstream of meter location
Single bend preceded by $\geq 9$ diameters of straight pipe	10 Diameters	5 Diameters
Pipe size reduction / expansion in straight pipe run	10 Diameters	5 Diameters
Single bend preceded by $\leq 9$ diameters of straight pipe	15 Diameters	5 Diameters
Outflowing tee / Pump outflow	20 Diameters	5 Diameters
Multiple bends out of plane	30 Diameters	5 Diameters
Inflowing tee	30 Diameters	5 Diameters
Modulating valve	30 Diameters	5 Diameters

### IMPORTANT NOTE

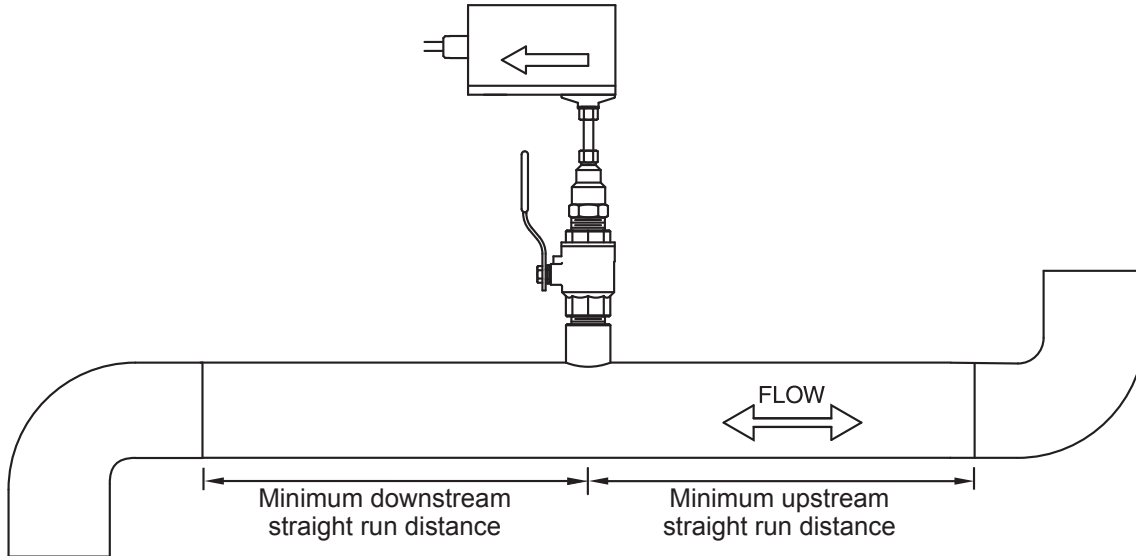
Always use the maximum available straight run. When more than the minimum required straight run is available place the meter such that the excess straight run is upstream of the meter location.

# FB-3500 - STRAIGHT RUN REQUIREMENTS



## GENERAL PRACTICES:

1. For best results, install the flow meter in a straight run of pipe, free of bends, tees, valves, transitions and obstructions.
2. Straight run recommendations vary based on the nature of the upstream obstruction (see below). Please note that depending upon specific location details, more or less straight run may be required to produce a satisfactory flow profile.



Obstruction on either side of meter	Straight run distance recommended between meter and obstruction
Single bend preceded by $\geq 9$ diameters of straight pipe	10 Diameters
Pipe size reduction / expansion in straight pipe run	10 Diameters
Single bend preceded by $\leq 9$ diameters of straight pipe	15 Diameters
Outflowing tee / pump outflow	20 Diameters
Multiple bends out of plane	30 Diameters
Inflowing tee	30 Diameters
Control / modulating valve	30 Diameters

## Insufficient Straight Run Site Selection Guidelines

If there is insufficient available straight run, allow 50% of the run upstream and 50% of the run downstream. If the total length of straight run is less than 20 diameters, performance may degrade and consideration should be given to changing to the F-3100 or F-3200 Inline Electromagnetic Flow Meters.

Some installations may work better with straight run optimized for flow in one direction. For example, with flow meters installed in the bypass line between de-coupled constant volume primary and variable secondary loops, it may be more important to accurately measure positive flow (from supply to return.) Negative flow measurements (from return to supply) are generally less critical, and it may be enough just to know that any negative flow is present. In this scenario, maximizing straight run for positive flow might be a preferred strategy.

### IMPORTANT NOTE

Always use the maximum available straight run. When more than the minimum required straight run is available, place the meter such that the excess straight run is upstream of the meter location.