



**HIGH ACCURACY**  
measurement instruments

## PRODUCT DATASHEET

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## 3 Section and Flow Conditioning Plate Meter Tubes

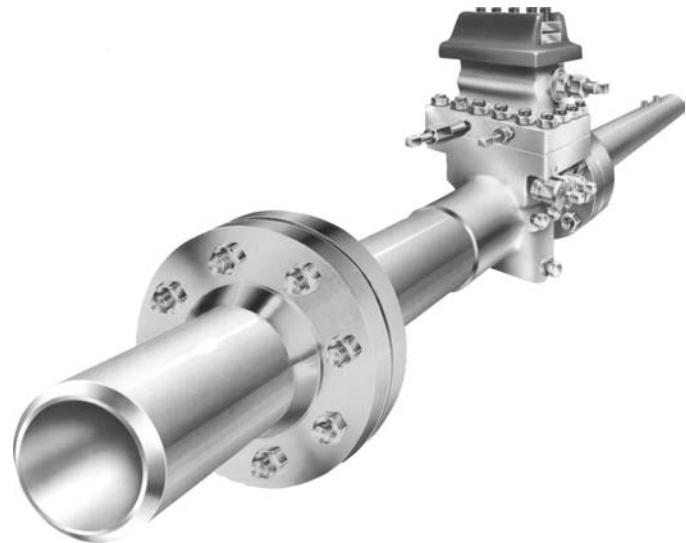
### Instruments You Can Trust

Daniel Meter Tubes are more than just fabricated pipe with an orifice fitting. They are accurate, dependable instruments because of Daniel's dedicated approach to quality. Extra steps taken during every phase of meter tube design and production separate Daniel Meter Tubes from all the rest.

**The Daniel 3 section meter tube** is available with any style Senior or Junior orifice fitting, Simplex plate holder or orifice flanges. The assembly contains an inlet spool of the minimum length prescribed by the 14.3 standard. The second section begins with a concentric, flange mounted tube bundle meeting the 2000 API 14.3 requirements and a  $\frac{1}{2}$ " thick spacer plate to ease tube removal for inspection. The outer end of section 2 contains the orifice flange or fitting. The third or downstream section follows and contains 2 branch connections and is extra long to allow for the addition of extra branch connections in the field, if desired. The standard meter tube has flanged outer ends (beveled shown). Other end connections are available on request.

**Inspection/Testing:** Daniel maintains rigid inspection procedures during manufacturing of meter tubes. Micrometer and internal surface roughness readings are recorded and supplied with each meter tube. Customer or third party inspectors are welcome to verify these readings. Radiography of welds is another service that is available.

**Fabrication:** Fabrication of your instrument includes attaching the orifice fitting to the meter tube to make an integral primary measuring element. For welding operations, Daniel uses automatic welding machines and rotating positioners. Highly skilled, "code qualified" welders are employed to turn out highest quality on each job. Special internal jigs and fixtures are used to insure smooth inlet and outlet surfaces without steps or offsets. All welds receive expert grinding by experienced craftsmen.



### Features:

- Dowel pin alignment, close tolerance male/female flange or knock out dowel pins insure that the bores of sections two and three are matched without offsets.
- One  $\frac{1}{2}$ " and one  $\frac{3}{4}$ " branch connection on the downstream for thermowell or other uses standard.
- Beveled, flanged or reduced ends as well as any available weld fitting can be furnished on the ends of the tubes.
- Hydrostatically tested after manufacture.
- Each orifice fitting is tested for tap hole and orifice plate seal integrity after the meter tube has been pressure tested.

**Material Selection:** Daniel uses special cold drawn seamless tubing or honed pipe in the fabrication of meter tubes. The strict requirements for internal roundness and surface finish preclude the use of standard commercial pipe in most cases. Daniel maintains a large inventory of this special pipe to rapidly complete your order.

**3 Section Meter Tube Catalog Numbers**

**2"-12" with Senior Fitting**

**10" & 12" with Junior Fitting**

Pressure Rating	Flange by Weld (Flangnek)	Flange by Flange (Flanged)	Weld by Weld (Weldnek)*	Flange by Weld (Flangnek)	Flange by Flange (Flanged)	Weld by Weld (Weldnek)*
150#	3M-011	3M-101	N/A	3M-021	3M-201	N/A
300#	3M-013	3M-103	N/A	3M-023	3M-203	N/A
600#	3M-015	3M-105	3M-185	3M-025	3M-205	3M-285
<b>High Pressure 3 Section Meter Tubes</b>						
900#	3M-016	3M-106	3M-186	3M-026	3M-206	3M-286
1500#	3M-017	3M-107	3M-187	3M-027	3M-207	3M-287
2500#	3M-018	3M-108	3M-188	3M-028	3M-208	3M-288

**2"-8" with Simplex**

Pressure Rating	Flange by Weld (Flangnek)	Weld by Weld (Weldnek)*
150#	3M-071	N/A
300#	3M-073	N/A
600#	3M-075	3M-705
<b>High Pressure</b>		
900#	3M-076	3M-706
1500#	3M-077	3M-707
2500#	3M-078	3M-708

**2"-12" with Orifice Flanges**

Raised Face Weldneck	
N/A	
3M-30RW	
3M-60RW	
<b>High Pressure</b>	
3M-90RW	
3M-150RW	
3M-250RW	

\*Two Section Meter Tubes When Using Weldnek Fittings

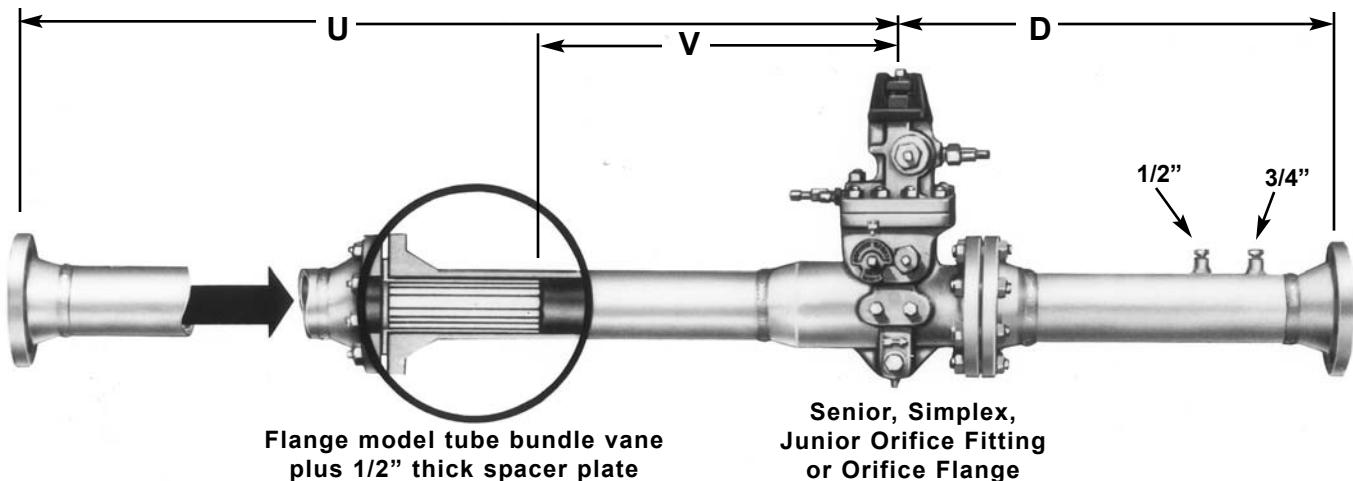
Senior and Simplex fittings are also available in 10,000 psi rating in some sizes. All units are also available with Ring Type Joint (RTJ) flanges on request. Sizes larger than 12" available on request.

**Packing/Shipping:** Daniel bolts together all meter tubes, when size permits, before shipment. This saves the user time and field labor costs. Fittings are protected by heavy lumber, and the tube flanges by special-cut protectors.

**Painting/Coating:** The Daniel standard paint is a basic enamel type. Special coatings such as multi-coat offshore systems are available on request.

**A SPECIAL NOTE:** The use of factory original Daniel parts will assure your Senior, Junior and Simplex Orifice fittings will stay within original specifications and operate properly.

### 3-Section Meter Tube with Tube Bundle



#### Standard Lengths

Size	"U" Upstream	"D" Downstream	"V" (vane location)
2*	N/A	N/A	N/A
3	7'-5"	4'-0"	13 D
4	9'-9"	4'-0"	13 D
6	14'-8"	5'-0"	13 D
8	19'-8"	5'-0"	13 D
10	24'-10"	6'-0"	13 D
12	29'-8"	7'-0"	13 D

Note: Straightening vanes are not available in 2" line size (See Daniel Profiler DAN-1852-2M)

Lengths shown are suitable for any piping configuration and up to .67 beta ratio. Daniel meter tubes can be supplied in many combinations and configurations. Any of the orifice fittings, plate holders or orifice flanges can be included in a meter tube. Each 3 section standard meter tube is equipped with a flange mounted tube bundle straightener\* in accordance with April 2000 API 14.3 and a 1/2" thick spacer to facilitate tube removal for inspection. Downstreams are longer than minimum required to allow for field installation of additional branch connections if required.

\*Not available in some sizes/schedules.

To specify a 3 section meter tube, use the designation "3M" followed by the type orifice holding device. Ex. 4" 600# 3 section meter tube with flanged ends using a Senior fitting, flange neck style is specified as 4"-3M-015. The same unit with a weldneck style Simplex is specified as 4"-3M-705. When ordering, specify pipe schedule and end configuration. Larger size and custom meter tube designs are available on request.

The **Daniel Flow Conditioning Plate** three section meter tube is available with any style Senior or Junior orifice fitting, Simplex plate holder or orifice flanges. The assembly contains an inlet spool of the minimum length determined during testing to the API 14.3 standard. The flange union between the first and second sections contains the Profiler™ and a ½" thick spacer plate to facilitate tube removal for inspection. The outer end of section 2 contains the orifice flange or fitting. The third or downstream section fol

lows and contains 2 branch connections. Other or additional connections can be supplied in this section on request. These meter tubes are for use in any piping configuration with beta ratios to .67. Downstream sections are extra long to allow for the addition of extra branch connections in the field, if desired. The standard meter tube has beveled outer ends. Flanges or other end connections are available on request.

**Flow Conditioning Plate Meter Tube Catalog Numbers**  
**2"-12" with Senior Fitting**      **10" & 12" with Junior Fitting**

Pressure Rating	Flange by Weld (Flangnek)	Flange by Flange (Flanged)	Weld by Weld (Weldnek)*	Flange by Weld (Flangnek)	Flange by Flange (Flanged)	Weld by Weld (Weldnek)*
150#	3MP-011	3MP-101	N/A	3MP-021	3MP-201	N/A
300#	3MP-013	3MP-103	N/A	3MP-023	3MP-203	N/A
600#	3MP-015	3MP-105	3MP-185	3MP-025	3MP-205	3MP-285

**2"-8" with Simplex**

Pressure Rating	Flange by Weld (Flangnek)	Weld by Weld (Weldnek)*
150#	3MP-071	N/A
300#	3MP-073	N/A
600#	3MP-075	3MP-705

**2"-12" with Orifice Flanges**

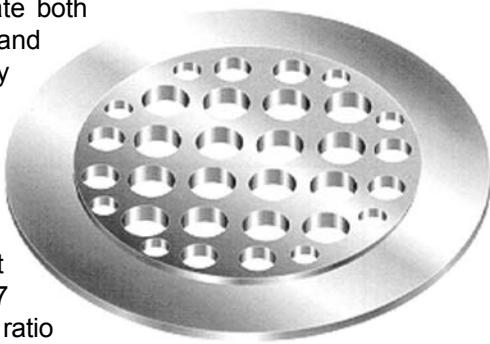
Raised Face Weld Neck
N/A
3MP-30RW
3MP-60RW

\*Two Section Meter Tube When Using Weldnek Fittings

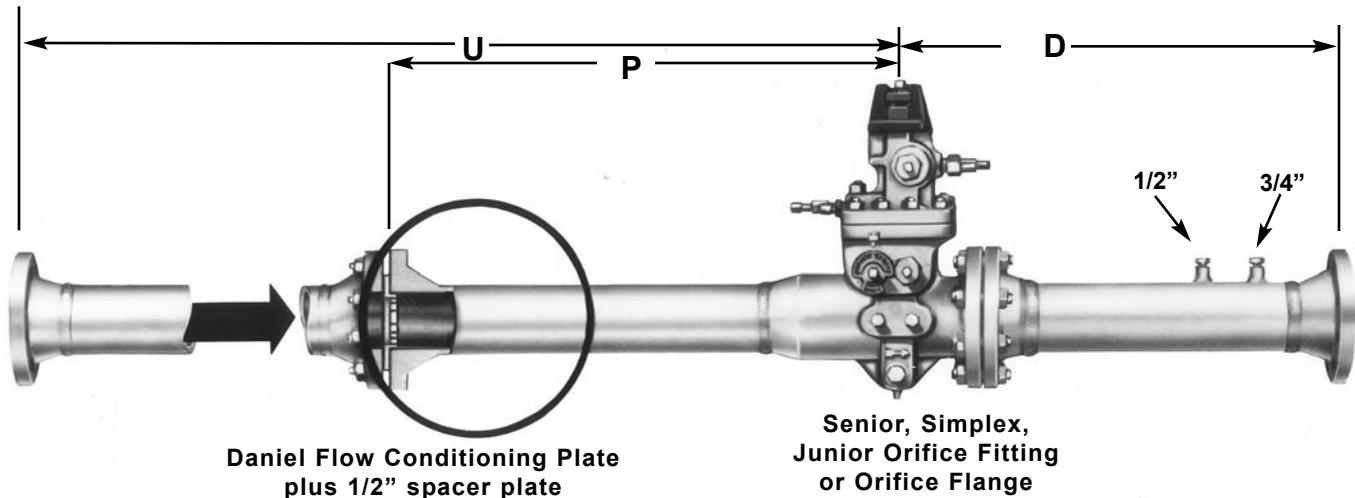
**Consult Factory for High Pressure Applications**

**Daniel Flow Conditioning Plate**

The Daniel Flow Conditioning Plate has been tested and shown to be in full compliance with the requirements of API 14.3 April 2000. The Flow Conditioning Plate both removes swirl and creates a fully developed flow profile at the orifice. Use of this unit allows shortened upstream straight pipe lengths of 17 diameters. Beta ratio limit is .67 as with the tube bundle. Available in flange mounted model only. Also available in RTJ style on request.



### 3-Section Meter Tube With Daniel Flow Conditioning Plate



**Standard Lengths**

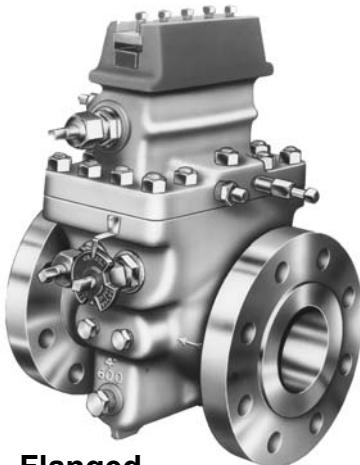
Size	"U" Upstream	"D" Downstream	"P" Profiler Locations
2	3'-0"	3'-0"	7.5 D
3	4'-5"	4'-0"	7.5 D
4	5'-9"	4'-0"	7.5 D
6	8'-8"	5'-0"	7.5 D
8	11'-7"	5'-0"	7.5 D
10	14'-7"	6'-0"	7.5 D
12	17'-5"	7'-0"	7.5 D

Lengths shown are suitable for any piping configuration and up to .67 beta ratio. Reference API 14.3, April 2000. Daniel meter tubes can be supplied in many combinations and configurations. Any Senior, Junior, Simplex or orifice flange can be included in a meter tube. Each Flow Conditioning Plate meter tube is equipped with a flange mounted Conditioning Plate and a 1/2" thick spacer\* to facilitate tube removal for inspection. Upstream lengths shown are minimum, but can be increased any amount to meet installation requirements. Downstreams are longer than minimum to allow for field installation of additional branch connections if required.

To specify a 3 section Flow Conditioning Plate meter tube, use the designation "3MP" followed by the type orifice holding device. Example 4" 600# 3 section meter tube with beveled ends using a Senior fitting, flangeneck style is specified as 4"-3MP-015. The same unit with a weldneck style Simplex is 4"-3MP-705. When ordering, specify pipe schedule and end configuration. Larger size, higher pressure rating and custom meter tube designs are available on request.

\*Not used with RTJ Style

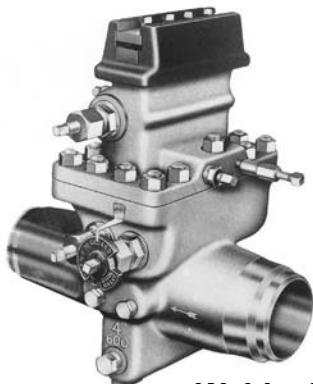
## Orifice Fitting Styles



**Flanged**



**Flangnek**



**Weldnek**

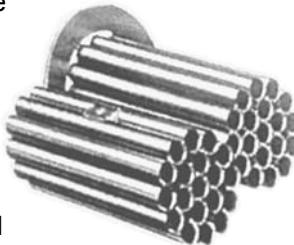
## Meter Tube End Modifications

Several common and frequently used end modifications are shown here to illustrate types available. Daniel will custom build risers, flanges, ells, reducers and couplings, expertly fabricated to meet your specifications. When ordering special end tube modifications, please specify full information for both upstream and downstream tube sections.



## 19 Tube Concentric Bundle

Available in either line mounted or flange mounted styles. These units effectively remove swirl that has been introduced by upstream piping components. Individual tubes and bundle diameter are sized to meet the requirements of API 14.3 April 2000. These units allow the use of a 29D upstream meter tube section in any piping configuration with a .67 beta ratio limit.



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