

CLAMP-ON ULTRASONIC FLOW AND ENERGY METERS FOR LIQUIDS

Ultra ultrasonic flow and energy meters clamp onto the outside of pipes and do not contact the internal liquid. The technology has inherent advantages over alternate devices including: low-cost installation, no pressure head loss, no moving parts to maintain or replace, no fluid compatibility issue, and a large, bi-directional measuring range that ensures reliable readings even at very low and high flow rates. Ultra is available in a variety of configurations that permit the user to select a meter with features suitable to meet particular application requirements.



The Ultra is available in two versions: a stand-alone flow meter, and an energy flow meter used in conjunction with dual clamp-on RTDs. The energy flow meter measures energy usage in BTU, MBTU, MMBTU, Tons, kJ, kW, MW and is ideal for retrofit, hydronic and other HVAC applications.

FEATURES

- May be used to measure clean liquids as well as those with small amounts of suspended solids or aeration (e.g., surface water, sewage).
- Bi-directional flow measurement system. Totalizer options include forward, reverse and net total.
- Modbus RTU over RS485 communications; Ethernet connection includes BACNet®/IP, EtherNet/IP™ and Modbus TCP/IP protocols.
- Large, easy-to-read digital display.
- Rugged, aluminum enclosure ensures a long service life in harsh environments.
- Certified for hazardous area installation in North America and Europe.

BENEFITS

- Reduced material costs: clamp-on sensor eliminates the need for in-line flanges, pipe fittings, strainers, and filters.
- Reduced installation time: the Ultra may be installed and fully operational within minutes.
- Reduced maintenance costs: with no moving parts, there is nothing on the Ultra to wear down – no repair kits or replacement parts are needed.
- No need to shut down the process for installation or maintenance due to clamp-on sensor design

Dynasonics®

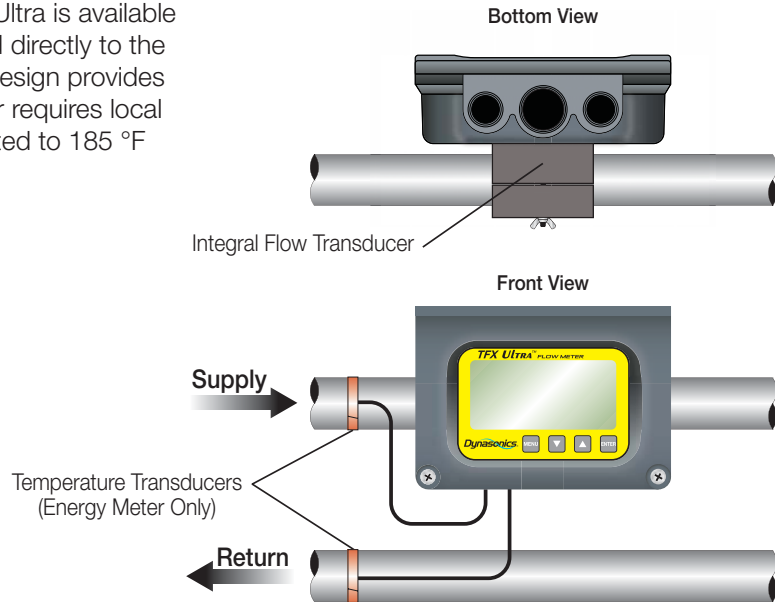


Meter with Integral Flow Transducer

For pipe/tubing sizes of 2" (50 mm) and lower, Ultra is available with a clamp-on transducer mounted and wired directly to the flow meter display/electronics enclosure. This design provides a convenient installation in areas where the user requires local indication. PVC constructed transducers are rated to 185 °F (85 °C) and CPVC are rated to 250 °F (121 °C).

Common Features:

- Rate-Total Backlit Display
- 4-20mA Output
- 0-1,000 Hz Rate Pulse and Dual Alarm Outputs (Flow Meter Model Only)
- USB Programming Port
- RS485 Modbus Network Connection
- Remote Totalizer Reset

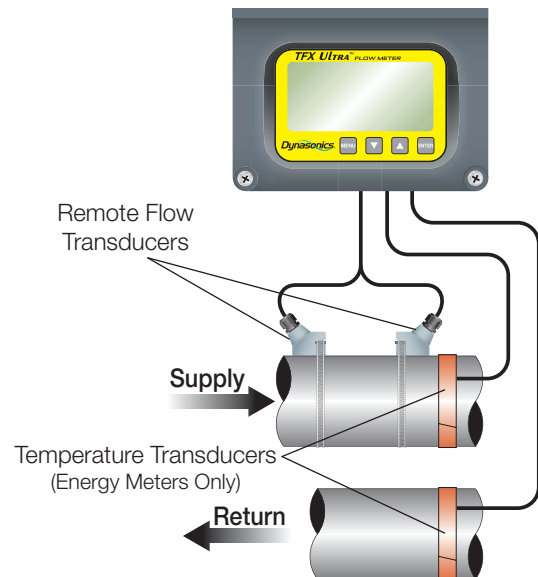


Meter with Remote Flow Transducer

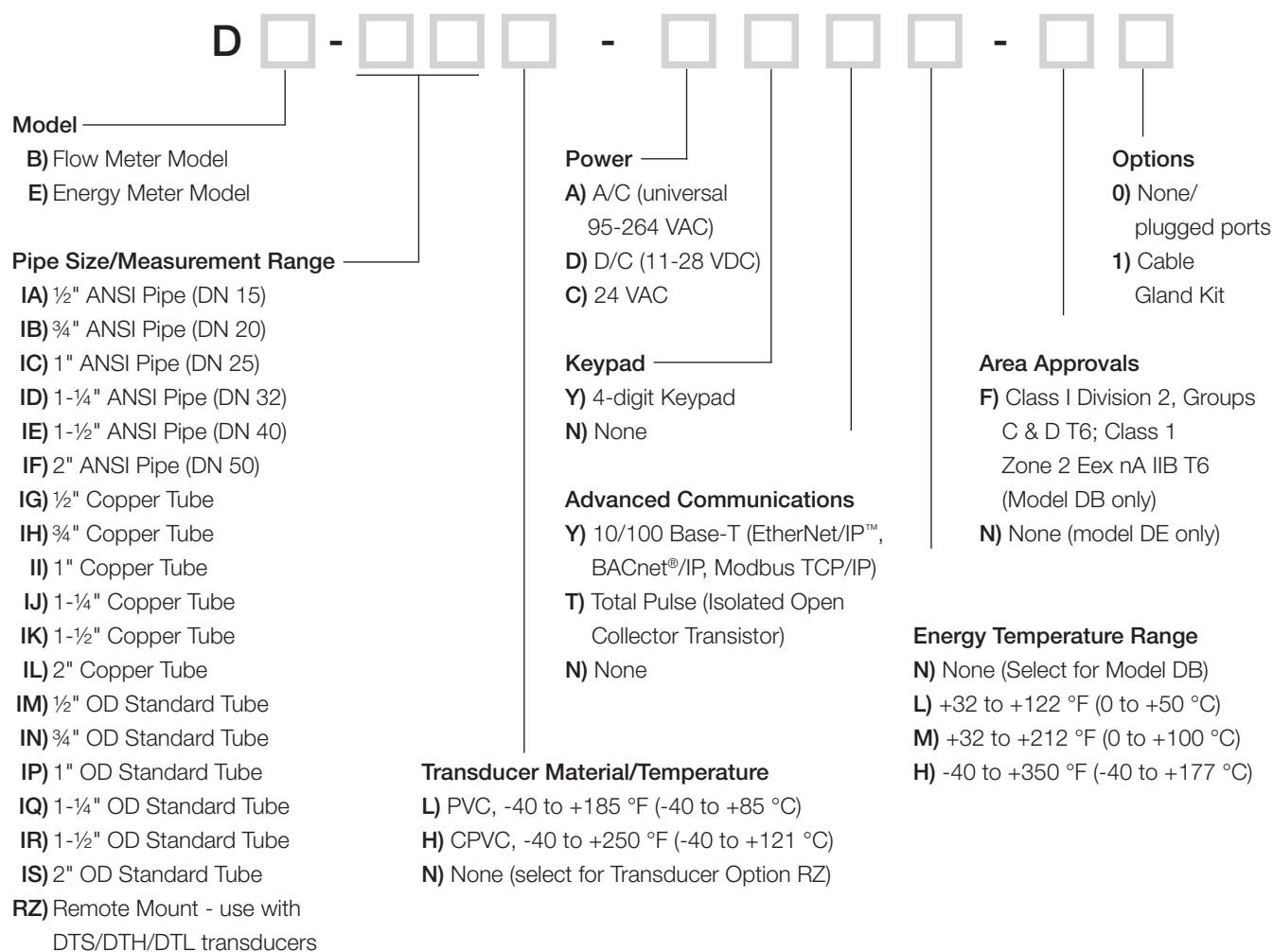
The Ultra is available with remote mounted transducers that permit separation of up to 990 feet (300 m). This design is utilized when pipes are located in areas that are not convenient for viewing, or on piping systems with severe vibration. PVC constructed transducers are rated to 185 °F (85 °C), CPVC are rated to 250 °F (121 °C) and PTFE are rated to 350 °F (176 °C).

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Part Number Construction



Specifications

System

Liquid Types	Most clean liquids or liquids containing small amounts of suspended solids or gas bubbles
Velocity Range	Bi-directional to greater than 40 FPS (12 MPS)
Flow Accuracy	DTN/DTH/DTL: 1% of reading at rates > 1 FPS (0.3 MPS); ± 0.01 FPS (0.003 MPS) at rates < 1 FPS (0.3 MPS) DTS/DTC: 1" (25 mm) and larger - 1% of reading from 4-40 FPS (1.2-12 MPS); ± 0.04 FPS (0.012 MPS) at rates < 4 FPS (1.2 MPS) DTS/DTC: ¾" (19 mm) and smaller - 1% of Full Scale (refer to Dimensional Specifications page)
Temperature Accuracy (Energy Meters Only)	Option A: +32 to +122 °F (0 to +50 °C); Absolute: 0.22 °F (0.12 °C) Difference: 0.09 °F (0.05 °C) Option B: +32 to +212 °F (0 to +100 °C); Absolute: 0.45 °F (0.25 °C) Difference: 0.18 °F (0.1 °C) Option C: -40 to +350 °F (-40 to +177 °C); Absolute: 1.1 °F (0.6 °C) Difference: 0.45 °F (0.25 °C) Option D: -4 to +85 °F (-20 to +30 °C); Absolute: 0.22 °F (0.12 °C) Difference: 0.09 °F (0.05 °C)
Sensitivity	Flow: 0.001 FPS (0.0003 MPS) Temperature: Option A: 0.03 °F (0.012 °C); Option B: 0.05 °F (0.025 °C); Option C: 0.1 °F (0.06 °C); Option D: 0.03 °F (0.012 °C)
Repeatability	0.5% of reading
Installation Compliance	General Safety (all models): UL 61010-1, CSA C22.2 No. 61010-1; (power options A and D only) EN 61010-1 Hazardous Location (power supply options A and D only): Class I Division 2 Groups C, D, T4; Class II, Division 2, Groups F, G, T4; Class III Division 2 for US/CAN; ATEX II 2 G Ex nA II T4: UL 1604, CSA 22.2 No. 213, EN 60079-0 and EN 60079-15 CE: EN61326-1:2006 on meter systems with integral flow transducers, transducers constructed with twinaxial cable (all transducers with cables 100 ft. (30 m) and shorter) or remote transducers with conduit

Transmitter

Power Requirements	AC: 95-264 VAC 47-63 Hz @ 17 VA max. or 20-28 VAC 47-63 Hz @ 0.35 A max. DC: 10-28 VDC @ 5 W max. Protection: auto resettable fuse, reverse polarity and transient suppression
Display	Two line LCD, LED backlight; Top row 0.7 inch (18mm) height, 7-segment; Bottom row 0.35 inch (9 mm) height, 14-segment Icons: RUN, PROGRAM, RELAY1, RELAY2 Flow rate indication: 8-digit positive, 7-digit negative max.; auto decimal, lead zero blanking Flow accumulator (totalizer): 8-digit positive, 7-digit negative max. (reset via keypad press, ULTRALINK™, network command or momentary contact closure)
Enclosure	Type 4 (IP65) Construction: powder-coated aluminum, polycarbonate, stainless steel, polyurethane, nickel-plated steel mounting brackets Size (electronic enclosure only): 6.0" W x 4.4" H x 2.2" D (152 mm W x 112 mm H x 56 mm D) Conduit Holes: (2) ½" NPT female; (1) ¾" NPT female; Optional Cable Gland Kit
Temperature	-40 °F to +185 °F (-40 °C to +85 °C)
Configuration	Via optional keypad or PC running ULTRALINK™ software (Note: not all configuration parameters are available from the keypad – i.e. flow and temperature calibration and advanced filter settings)
Engineering Units	Flow Meter: Feet, gallons, cubic feet, million gallons, barrels (liquid and oil), acre-feet, lbs., meters, cubic meters, liters, million liters, kg Energy Meter: BTU, MBTU, MMBTU, Tons, kJ, kW, MW and the Flow Meter list from above
Inputs/Outputs	USB 2.0: for connection of a PC running ULTRALINK™ configuration utility RS485: Modbus RTU command set 10/100 Base-T: RJ45, communication via Modbus TCP/IP, EtherNet/IP™ and BACnet®/IP 4-20mA: 12-bit, internal power, can span negative to positive flow/energy rates Energy Meter Model Only: Total Pulse Option: Opto isolated open collector transistor Flow Meter Model Only: 0-1,000 Hz: open-collector, 12-bit, can span negative to positive rates; square-wave or turbine meter simulation outputs Two Alarm Outputs: open-collector, configure as rate alarm, signal strength alarm or totalizer pulse

Transducers

Type	Compression mode propagation, clamp-on
Construction	DTN/DTC/DTL: NEMA 6* (IP67), CPVC, Ultem®, Nylon cord grip, PVC cable jacket; -40 to +250 °F (-40 to +121 °C) DTN/DTL: NEMA 6P* (IP68) option, CPVC, Ultem®, Nylon cord grip, Polyethylene cable jacket; -40 to +250 °F (-40 to +121 °C) DTH: NEMA 6* (IP67), PTFE, Vespel®, Nickel-plated brass cord grip, PFA cable jacket; -40 to +350 °F (-40 to +176 °C) DTS: NEMA 6* (IP67), PVC, Ultem®, Nylon cord grip, PVC cable jacket; -40 to +185 °F (-40 to +85 °C) *NEMA 6 units: to a depth of 3 ft. (1 m) for 30 days max. NEMA 6P units: to a depth of 100 ft. (30 m) seawater equivalent density indefinitely.
Frequency	DTS/DTC: 2 MHz DTN/DTH: 1 MHz DTL: 500 KHz
Cables	RG59 Coaxial, 75 ohm or Twinaxial, 78 ohm (optional armored conduit)
Cable Length	990 feet (300 meter) max. in 10 ft. (3 m) increments; Submersible Conduit limited to 100 feet (30 m)
RTDs	Energy Meters Only: Platinum 385, 1,000 ohm, 3-wire; PVC jacket cable
Installation	DTN (-N option) /DTS/DTH/DTC: General and Hazardous Location (see Installation Compliance above) DTN Transducer and IS Barrier (-F option): Class I Div. 1, Groups C&D T5 Intrinsically Safe Ex ia; CSA C22.2 No.'s 142 & 157; UL 913 & 916

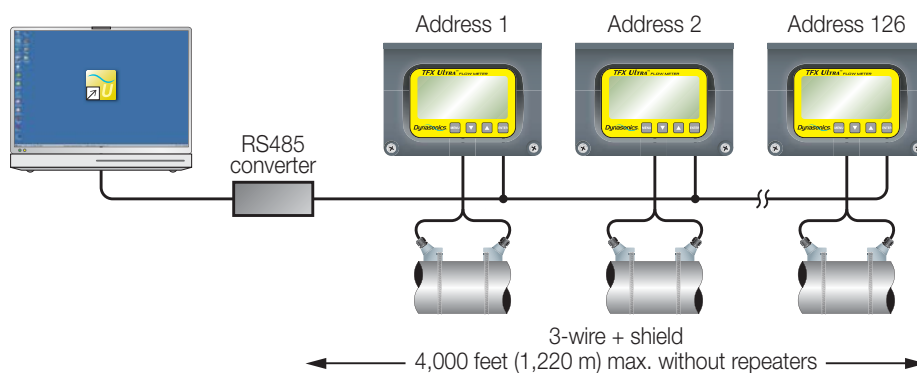
Software Utilities

ULTRALINK™	Utilized to configure, calibrate and troubleshoot Flow and Energy meters. Connection via USB A/B cable; software is compatible with Windows 2000, Windows XP, Windows Vista® and Windows® 7
EnergyLink	Utilized to monitor a network of Flow and Energy meters. Connection via RS485. Operates within Microsoft Excel® 2003, Microsoft Excel® 2007, Microsoft Excel® 2010. (32-bit O.S. only)

Network Options

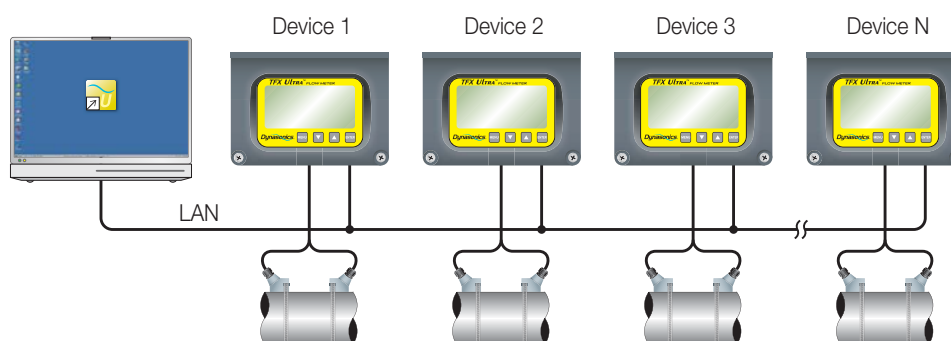
RS485 Network

All meters come equipped with RS485 drivers and utilize a Modbus RTU command set (data can be returned in single-precision, double-precision, integer or floating point values). Up to 126 Ultra products can be run on a single daisy-chain network and be individually queried for flow rate, positive flow accumulator, negative flow accumulator, supply temperature, return temperature and signal strength. Flow accumulators can be cleared at discrete addresses or globally. The RS485 network is also compatible with the EnergyLink, direct to Excel®, application detailed below.



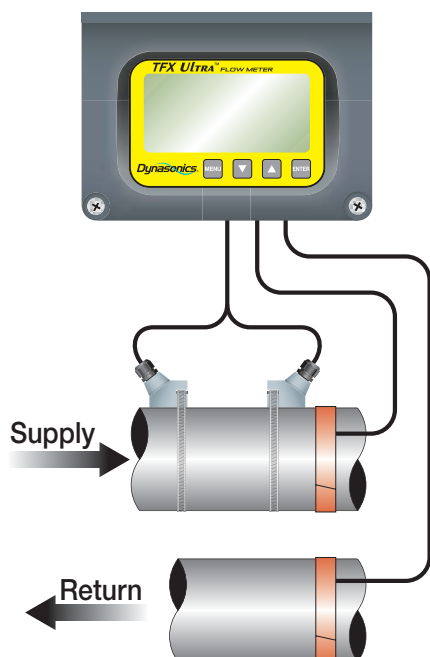
10/100 Base-T Network

If equipped with the optional Ethernet communications module, the Ultra can be plugged into a LAN and queried for flow rate, positive flow accumulator, negative flow accumulator, supply temperature, return temperature and signal strength. The module contains Modbus TCP/IP, EtherNet/IP™ and BACnet®/IP network compatibility.



Compliance

General Safety - All Models

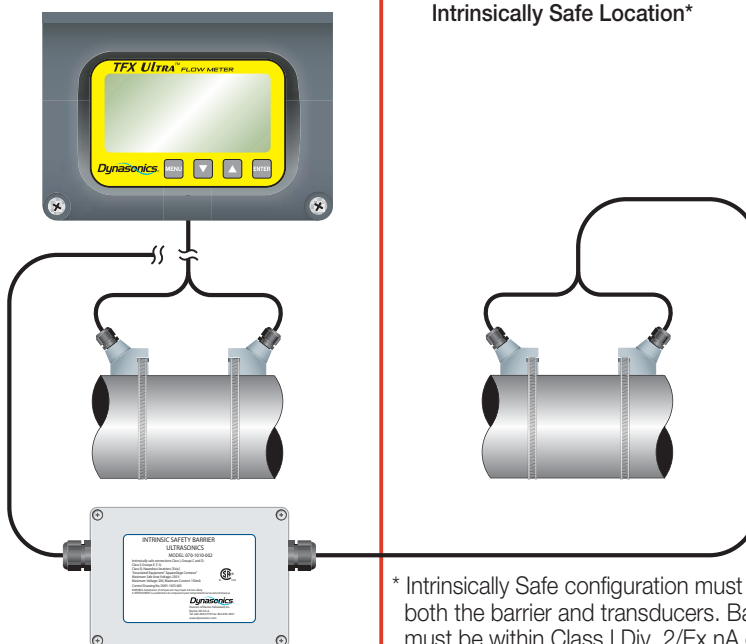


Hazardous Location Installation - Power Supply A and D only

Class I Div. 2/Ex nA

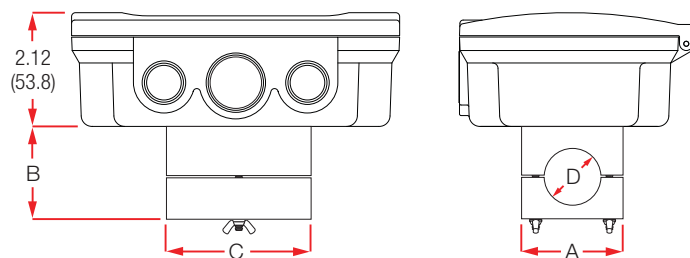
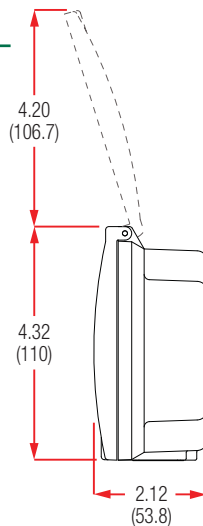
Class I Div. 1/Ex ia

Intrinsically Safe Location*



* Intrinsically Safe configuration must contain both the barrier and transducers. Barrier must be within Class I Div. 2/Ex nA or General Safety location.

Remote System



Pipe Size	Pipe Material	A	B	C	D	Measuring Range
½"	ANSI/DN	2.46 (62.5)	2.36 (59.9)	2.66 (67.6)	0.84 (21.3)	2 - 38 GPM 8 - 144 LPM
	Copper	2.46 (62.5)	2.36 (59.9)	3.33 (84.6)	0.63 (15.9)	1.8 - 27 GPM 7 - 102 LPM
	Tubing	2.46 (62.5)	2.28 (57.9)	3.72 (94.5)	0.50 (12.7)	1.5 - 18 GPM 6 - 68 LPM
¾"	ANSI/DN	2.46 (62.5)	2.57 (65.3)	2.66 (67.6)	1.05 (26.7)	2.75 - 66 GPM 10 - 250 LPM
	Copper	2.46 (62.5)	2.50 (63.5)	3.56 (90.4)	0.88 (22.2)	2.5 - 54 GPM 10 - 204 LPM
	Tubing	2.46 (62.5)	2.50 (63.5)	3.56 (90.4)	0.75 (19.0)	2.5 - 45 GPM 10 - 170 LPM
1"	ANSI/DN	2.46 (62.5)	2.92 (74.2)	2.86 (72.6)	1.32 (33.4)	3.5 - 108 GPM 13 - 409 LPM
	Copper	2.46 (62.5)	2.87 (72.9)	3.80 (96.5)	1.13 (28.6)	3.5 - 95 GPM 13 - 320 LPM
	Tubing	2.46 (62.5)	2.75 (69.9)	3.80 (96.5)	1.00 (25.4)	3.5 - 85 GPM 13 - 320 LPM
1-¼"	ANSI/DN	2.80 (71.0)	3.18 (80.8)	3.14 (79.8)	1.66 (42.2)	5 - 186 GPM 19 - 704 LPM
	Copper	2.46 (62.5)	3.00 (76.2)	4.04 (102.6)	1.38 (34.9)	4.5 - 152 GPM 17 - 575 LPM
	Tubing	2.46 (62.5)	3.00 (76.2)	4.04 (102.6)	1.25 (31.8)	4 - 136 GPM 15 - 514 LPM
1-½"	ANSI/DN	3.02 (76.7)	3.42 (86.9)	3.33 (84.6)	1.90 (48.3)	6 - 250 GPM 23 - 946 LPM
	Copper	2.71 (68.8)	2.86 (72.6)	4.28 (108.7)	1.63 (41.3)	5 - 215 GPM 19 - 814 LPM
	Tubing	2.71 (68.8)	3.31 (84.1)	4.28 (108.7)	1.50 (38.1)	5 - 200 GPM 19 - 757 LPM
2"	ANSI/DN	3.70 (94.0)	3.42 (86.9)*	5.50 (139.7)	2.375 (60.3)*	8 - 420 GPM 30 - 1590 LPM
	Copper	3.70 (94.0)	3.38 (85.9)*	5.50 (139.7)	2.125 (54.0)*	8 - 375 GPM 30 - 1419 LPM
	Tubing	3.21 (81.5)	3.85 (98.0)	4.75 (120.7)	2.00 (50.8)	8 - 365 GPM 30 - 1381 LPM

* Varies due to U-bolt configuration

A technical diagram showing the top view of a pipe with a sensor or probe inserted into it. The diagram is labeled "TOP VIEW OF PIPE". Three dimensions are indicated with red arrows and labels: "A" is the horizontal distance from the centerline of the pipe to the tip of the probe; "B" is the vertical distance from the top edge of the pipe to the centerline; and "C (Min Clearance)" is the total vertical distance from the top edge of the pipe to the tip of the probe, representing the minimum clearance required.

	A	B	C
DTN	2.95 (74.9)	2.75 (69.8)	3.00 (76.2)
DTH	2.95 (74.9)	2.75 (69.8)	3.00 (76.2)
DTL	3.40 (86.4)	2.94 (74.7)	3.20 (81.3)

The image shows two technical drawings of mechanical fixtures. The left drawing is a U-shaped fixture with a width labeled 'A' and a height labeled 'D'. The right drawing is a plate fixture with a width labeled 'C' and a height labeled 'E'. Both fixtures have a central vertical rod passing through them.

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