

Specifications

Mainline Propeller Meters

Model 101 / 102 Flanged Tube Type, Sizes 3" (DN 80mm) Through 36" (DN 900mm)

SCOPE

The meters must conform to American Water Works Standard C-704, as most recently revised, except as modified herein.

TYPE DESCRIPTION

The meter shall be propeller type, magnetic drive, and flanged tube design. The basic design shall include two components consisting of the meter tube and meter head assembly.

The meter head assembly shall be connected to the tube by means of a flanged connection designed for easy removal from the tube for inspection, repair, or replacement. A flanged connection-type seal shall be used to seal the meter head to the tube body. Stainless steel fasteners shall be employed for securing the meter head assembly to the meter tube.

The meter head assembly shall include a permanently, hermetically sealed register, bronze gear box, "316" grade, one-piece separator spindle with ceramic sleeve bearings, and an axially-mounted propeller which shall rotate and accurately measure the water passing through the meter.

OPERATING CHARACTERISTICS & PERFORMANCE

The size of the meter shall be determined by the nominal size of the opening of the inlet and outlet flanges of the meter.

The meters shall comply with the following flow and accuracy requirements by nominal size:

Size	Normal Operating Range In GPM(M ³ /h)	Intermittent Max. Rating	Min. Low GPM Flow @ 95%
3" (80mm)	100 (23) - 250 (57)	312 (71)	80 (18.2)
4" (100mm)	125 (28) - 500 (114)	625 (142)	82 (18.6)
6" (150mm)	220 (50) - 1200 (273)	1500 (341)	160 (36.3)
8" (200mm)	250 (57) - 1650 (375)	2060 (468)	190 (43.2)
10" (250mm)	330 (75) - 2500 (568)	3125 (710)	260 (59.0)
12" (300mm)	350 (80) - 3500 (795)	4375 (994)	275 (62.4)
14" (350mm)	450 (102) - 4500 (1022)	5625 (1277)	350 (79.5)
16" (400mm)	550 (125) - 5500 (1249)	6875 (1561)	450 (102.2)
18" (450mm)	725 (165) - 7250 (1647)	9060 (2058)	550 (124.9)
20" (500mm)	850 (193) - 9000 (2044)	11250 (2555)	700 (159.0)
24" (600mm)	1300 (295) - 13000 (2952)	16250 (3690)	1000 (227.1)
30" (750mm)	2100 (477) - 18600 (4224)	23250 (5280)	1600 (363.4)
36" (900mm)	3000 (681) - 24000 (5450)	30000 (6812)	2400 (545.0)

Within the meter's normal operating range listed, the meter shall accurately record 100% (+) or (-) 2% of actual throughput. The meter shall perform properly when extended intermittent flows exceed the normal operating range upper flow limit by as much as 25% as listed in this section.

The entire meter assembly shall be rated to operate properly, without any performance deterioration, at a maximum operating pressure rating of 150 psig (10 bar) or 300 psig (20 bar).

METER TUBE

The propeller meter tube shall be cast of ductile iron (3" and 4" sizes) or fabricated steel (6" - 36" sizes) with flanged ends, faced and drilled. The meter tube shall have the same nominal inside diameter throughout its length to offer minimum flow obstruction. The meter tube shall be furnished with integral straightening vanes in the tube inlet port so as to minimize the swirl upstream of the meter and to evenly direct water flow past the propeller.

Meter tube coatings shall be as follows:

- 3" - 12" sizes shall be FDA approved fusion-bonded epoxy applied internally and externally
- 14" - 36" sizes shall be epoxy painted finish End flanges shall conform to ANSI as specified or as follows:

Max. Pressure Rating 150 PSIG (10 Bar)	Max. Pressure Rating 300 PSIG (20 Bar)
3" Round, AWWA Class 150	4" Round, Ductile Iron
4"-12" Round, AWWA Class D	6"-36" Round, Steel
14"-36" Round, AWWA 150 Class	All sizes AWWA Class 300

REGISTERS

The meter shall be equipped with a sealed, direct reading (DR) register with a visible low flow indicator and sweep hand. As an option the meter may be equipped with a Hall Effect Transmitter (HET). The HET shall also be hermetically sealed and shall simultaneously provide an electronic pulse output of 60 or 600 pulses, depending on meter size. The HET requires three (3) wire shielded cable, and must be supplied with 12-24 volts VDC, 10 milliamps maximum. Output current sink 20 milliamps maximum. The HET must be capable of interfacing with various Act-Pak instruments as specified under separate direction.

Access to the register assembly for inspection, replacement, or testing shall not require any disruption of service.

CALIBRATION

Accuracy level adjustments shall be accomplished by use of “change gears” located directly below the register assembly. Access to the change gears shall be considered external to the meter line pressure. Modification to the propeller shall not be acceptable for calibration purposes.

MAGNETIC DRIVE

Permanent ceramic magnets, mounted concentrically, shall be utilized to couple the axial rotation of the propeller to the axial drive shaft assembly.

RIGHT ANGLE GEARING / BRONZE GEAR BOX

A right angle bevel gear connection shall be used to convert from a horizontal drive to a splined, stainless steel vertical upshaft, connecting the propeller drive magnet rotation up through the sealed register magnetic coupling. All gearing shall be housed in a stationary, one-piece bronze gear box. The gear box shall be oil filled and factory sealed to provide lubrication. The bronze bevel gears shall be completely separated from the measured water.

BEARING MATERIALS

The radial bearing surfaces shall be made of ceramic material and shall be designed to provide extended performance life and prolonged accuracy. A one-piece ceramic bearing cartridge shall be positioned on the center hub of the propeller and retained in position by a “C” clip fastener. A ceramicsleeved separator spindle of “316” grade stainless steel shall provide the mating ceramic surface and proper positioning of the propeller in the water way.

The thrust bearings shall be constructed of hardened tungsten carbide. The thrust bearings shall include a thrust pin located at the end of the separator spindle and a thrust disc located in the inlet portion of the propeller. Access for inspection or replacement of the thrust disc shall be provided through a threaded connection located on the propeller inlet.

Reverse flow protection shall be provided by means of a retainer nut and washer affixed to the separator spindle.

PROPELLER

The propeller shall be conical shaped, three-bladed, and molded of polypropylene or other superior thermoplastic material. The propeller shall be considered resistant to normal water flow conditions and corrosion factors. The propeller assembly shall be easily removed for inspection or replacement.

GUARANTEE AND MAINTENANCE PROGRAM

Meters shall be guaranteed against defects in materials and workmanship for a period of one (1) year from date of shipment.

The meter supplier shall also submit a current price schedule of its factory maintenance program offering. The maintenance price schedule shall be printed on a brochure which shall be nationally advertised and shall include offerings for both complete factory calibrated meter head assemblies and repair parts.

INTENT

Subject specifications are designed to create guidelines for selecting a critical metering device. Ease of installation, operational features, readability and maintenance are of prime concern. A design which best reflects longevity of operation of all elements and a high degree of sustained accuracy through the entire range of the meter is to be considered mandatory.

RECOMMENDATION

Sensus Metering Systems N.A.

Mainline Propeller Meter, Model 101 / 102