

Administrative Services  
Purchasing Department

**CITY OF FORT COLLINS  
INVITATION TO BID  
BID 6056 UTILITIES WATER METERS: 3/4"  
BID OPENING: 3:00 p.m. (our clock), June 20, 2007**

Sealed bids will be received and publicly opened at the office of the Director of Purchasing and Risk Management, PO Box 580, 215 North Mason St., 2nd floor, Fort Collins, Colorado 80522, at the time and date noted on the bid proposal and/or contract documents. If delivered, they are to be sent to 215 North Mason Street, 2<sup>nd</sup> Floor, Fort Collins, Colorado 80524. If mailed, the address is P.O. Box 580, Fort Collins, 80522-0580.

**Bids must be received at the Purchasing Office prior to 3:00 p.m. (our clock), June 20, 2007.**

Questions regarding bid submittal or process should be directed to Ed Bonnette, CPPB, C.P.M., Buyer (970) 416-2247.

**A copy of the Bid may be obtained as follows:**

1. Download the Bid from the Purchasing Webpage, Current Bids page, at:  
<https://secure2.fcgov.com/bsol/login.jsp>.
2. Come by Purchasing at 215 North Mason St., 2nd floor, Fort Collins, and request a copy of the Bid.

**Special Instructions**

All bids must be properly signed by an authorized representative of the company with the legal capacity to bind the company to the agreement. Bids may be withdrawn up to the date and hour set for closing. Once bids have been accepted by the City and closing has occurred, failure to enter into contract or honor the purchase order will be cause for removal of supplier's name from the City of Fort Collins' bidders list for a period of twelve months from the date of the opening. The City may also pursue any remedies available at law or in equity. Bid prices must be held firm for a period of forty-five (45) days after bid openings.

Submission of a bid is deemed as acceptance of all terms, conditions and specifications contained in the City's specifications initially provided to the bidder. Any proposed modification must be accepted in writing by the City prior to award of the bid.

Only bids properly received by the Purchasing Office will be accepted. All bids should be clearly identified by the bid number and bid name contained in the bid proposal.

No proposal will be accepted from, or any purchase order awarded, to any person, firm or corporation in default on any obligation to the City.

Bids must be furnished exclusive of any federal excise tax, wherever applicable.

Bidders must be properly licensed and secure necessary permits wherever applicable.

Bidders not responding to this bid will be removed from our automated vendor listing for the subject commodities.

The City may elect where applicable, to award bids on an individual item/group basis or on a total bid basis, whichever is most beneficial to the City. The City reserves the right to accept or reject any and all bids, and to waive any irregularities or informalities.

*Sales prohibited/conflict of interest:* no officer, employee, or member of City Council, shall have a financial interest in the sale to the City of any real or personal property, equipment, material, supplies or services where such officer or employee exercises directly or indirectly any decision-making authority concerning such sale or any supervisory authority over the services to be rendered. This rule also applies to subcontracts with the City. Soliciting or accepting any gift, gratuity, favor, entertainment, kickback or any items of monetary value from any person who has or is seeking to do business with the City of Fort Collins is prohibited.

*Freight terms:* unless otherwise noted, all freight is F.O.B. Destination, Freight Prepaid. All freight charges must be included in prices submitted on proposal.

*Discounts:* any discounts allowed for prompt payment, etc., must be reflected in bid figures and not entered as separate pricing on the proposal form.

*Purchasing restrictions:* your authorized signature of this bid assures your firm's compliance with the City's purchasing restrictions. A copy of the resolutions is available for review in the Purchasing Office or the City Clerk's Office. Request Resolution 91-121 for cement restrictions.

*Collusive or sham bids:* any bid deemed to be collusive or a sham bid will be rejected and reported to authorities as such. Your authorized signature of this bid assures that such bid is genuine and is not a collusive or sham bid.

*Bid results:* for information regarding results for individual bids send a self-addressed, self-stamped envelope and a bid tally will be mailed to you. Bid results will be posted in our office 7 days after the bid opening.

James B. O'Neill II, CPPO, FNIGP  
Director of Purchasing and Risk Management

BID PROPOSAL  
BID #6056 UTILITIES WATER METERS: 3/4"

**BID OPENING: WEDNESDAY JUNE 20, 2007 3:00p.m. (OUR CLOCK)**

WE HEREBY ENTER OUR BID FOR THE CITY OF FORT COLLINS' REQUIREMENTS FOR UTILITIES 3/4" WATER METERS PER THE BID INVITATION AND ANY REFERENCED SPECIFICATIONS:

The City of Fort Collins is requesting bids using the following **BIDDING GUIDELINES:**

- 1) Bidder is to fill in the Unit Price for each item, and multiply it out by the Quantity Requested, to fill in the Extended Cost. Please fill in BID TOTAL, ALL ITEMS at the bottom of the Bid Sheet.
- 2) All items bid must include freight F.O.B. Destination, Freight Prepaid. All freight charges must be included in prices submitted on proposal. Any discount allowed by Vendor for prompt payment, etc. must be reflected in the Per Unit Bid Price.  
***Delivery is requested in two shipments; 4-6 weeks apart.***
- 3) Lead Time (after Receipt of Order) must be included for each item bid.  
***Please indicate fastest available delivery date on your bid response; the City of Fort Collins reserves the right to include delivery time as an award criteria for this Bid. Delivery is requested in two shipments; 4-6 weeks apart.***
- 4) ***Only Specified Brands are acceptable. Vendors responding must be Factory-Authorized Distributors for the Northern Colorado Region, for all Makes and Models they bid on.*** The City of Fort Collins will be the final judge as to whether the items submitted meet the stated specifications.

If you have any questions please contact Ed Bonnette, C.P.M., CPPB, Buyer, at 970-416-2247.

**PLEASE GO TO [www.fcgov.com/purchasing](http://www.fcgov.com/purchasing) TO REGISTER IN OUR E-PROCUREMENT SYSTEM FOR FUTURE BID OPPORTUNITIES! BE SURE TO SELECT ALL APPROPRIATE COMMODITY CODES!**

Solicitations for this Bid are sent out electronically under the City's listing for the following Commodity Codes:

**890-44: Meters, Water**

Bid #6056 Utilities 3/4" Water Meters Bid Sheet

QTY	DESCRIPTION	MFR' S #	UNIT PRICE	EXTENDED PRICE	LEAD TIME
3,000	<p>METER 3/4", CITY OF FORT COLLINS #0608-5467, SHORT LAYING LENGTH (7 1/2" LONG) BRONZE MAIN CASE, 8 DIGIT SERIAL NUMBER STAMPED IN CASE. PLASTIC DISC CHAMBER, ENCODER REGISTER WITH REGISTER COVER AND WALL MOUNT TOUCH PAD, 8 TO 10 DIGIT PRE-PROGRAMMED UNIQUE ENCODER REGISTER NUMBER, MEASURING IN U.S. GALLONS WITH 6 NUMERAL WHEEL REGISTRATION, CAST IRON BOTTOM CAP.</p> <p>METERS SHALL MEET THE ESTABLISHED ANSI/NSF 61-2001 FOR MECHANICAL DEVICES, SECTION 8. METERS SHALL BEAR THE NSF 61 CERTIFICATION MARK. REGISTER PINS NOT INSTALLED ON NEPTUNES.</p> <p>ACCEPTABLE METER MANUFACTURERS: NEPTUNE T-10, BADGER MODEL 35 (NO SUBSTITUTES)</p>	<p>Please circle the Make and Model you are bidding on.</p> <p>Bid must be for one or the other.</p> <p>No Substitutes!</p> <p>The following are the City's Approved Standards:</p> <p>Neptune T-10</p> <p><u>Badger Model 35</u></p>	\$91.00	\$273,000.00	3-4 weeks ARO
<b>BID TOTAL, ALL ITEMS</b>				\$273,000.00	

Items marked "Must Be, No Substitutes" must be the manufacturer and item indicated, to be considered. The City of Fort Collins will be the final judge as to whether or not items meet the stated specification.

FIRM NAME: NATIONAL Meter & Automation, Inc

ADDRESS: 9800 East Easter Avenue, Suite 130  
Centennial, Co 80112

EMAIL ADDRESS: NFRANKS@XMAAE.COM PHONE: 303-339-9100

BIDDER'S NAME: Noel Frakes

SIGNATURE: Noel Frakes - President



# Badger Meter Warranty For Non-Leaded Bronze Disc Meters

## PRODUCTS COVERED

This warranty shall apply to all Recordall® Non-Leaded Bronze Disc Meters, models 25 through 170 when used to measure potable water; and the registers, generators, and encoders used with these meters (collectively "Product"), sold on or after September 1, 2006. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. ("Badger<sup>®</sup>") distributors, hereafter referred to as "Customer" and does NOT apply to consumers.

## MATERIALS AND WORKMANSHIP

Badger warrants Product to be free from defects in materials and workmanship appearing within the earlier of the following timeframes:

### Housings

Twenty (20) years after installation; or twenty (20) years and six (6) months after shipment from Badger.

### Local Registers Supplied with the Meters Listed Herein

Twenty-five (25) years after installation; or twenty-five (25) years and six (6) months after shipment from Badger.

### AOE and RTI Encoders Supplied with the Meters Listed Herein

Ten (10) years after installation; or ten (10) years and six (6) months after shipment from Badger.

### Remote Registers Supplied with the Meters Listed Herein

Five (5) years after installation; or five (5) years and six (6) months after shipment from Badger.

### Generators

Fifteen (15) years after installation; or fifteen (15) years and six (6) months after shipment from Badger.

### Pit-Stop Generators

One (1) year after installation; or one (1) year and six (6) months after shipment from Badger.

## AWWA NEW METER ACCURACY

The meter product will meet or exceed new meter accuracy standards set forth in AWWA Standard C700-02 for the following periods:

### Model 25 Recordall 5/8" and 5/8" x 3/4"

Five (5) years from date of shipment or registration of 750,000 gallons, whichever occurs first.

### Model 35 Recordall 3/4"

Five (5) years from date of shipment or registration of 750,000 gallons, whichever occurs first.

### Model 55 Recordall 1"

Three (3) years from date of shipment or registration of 1,000,000 gallons, whichever occurs first.

### Model 70 Recordall 1"

Three (3) years from date of shipment or registration of 1,100,000 gallons, whichever occurs first.

### Model 120 Recordall 1-1/2"

Two (2) years from date of shipment or registration of 1,600,000 gallons, whichever occurs first.

### Model 170 Recordall 2"

Two (2) years from date of shipment or registration of 2,100,000 gallons, whichever occurs first.

## AWWA REPAIRED METER ACCURACY (AWWA M6 MANUAL)

The meter product will meet or exceed repaired meter accuracy standards set forth in AWWA Manual M-6, Chapter 5 (1999) Table 5.3 for the following periods:

### Model 25 Recordall 5/8" and 5/8" x 3/4"

Fifteen (15) years from date of shipment or registration of 2,500,000 gallons, whichever occurs first, with a 25 gpm safe maximum operating capacity and a 15 gpm maximum rate for continuous operation.

### Model 35 Recordall 3/4"

Fifteen (15) years from date of shipment or registration of 2,500,000 gallons, whichever occurs first, with a 35 gpm safe maximum operating capacity and a 25 gpm maximum rate for continuous operation.

### Model 55 Recordall 1"

Fifteen (15) years from date of shipment or registration of 3,000,000 gallons, whichever occurs first, with a 55 gpm safe maximum operating capacity and a 40 gpm maximum rate for continuous operation.

### Model 70 Recordall 1"

Fifteen (15) years from date of shipment or registration of 3,250,000 gallons, whichever occurs first, with a 70 gpm safe maximum operating capacity and a 50 gpm maximum rate for continuous operation.

### Model 120 Recordall 1-1/2"

Fifteen (15) years from date of shipment or registration of 5,600,000 gallons, whichever occurs first, with a 120 gpm safe maximum operating capacity and a 80 gpm maximum rate for continuous operation.

### Model 170 Recordall 2"

Fifteen (15) years from date of shipment or registration of 10,400,000 gallons, whichever occurs first, with a 170 gpm safe maximum operating capacity and a 100 gpm maximum rate for continuous operation.

Badger Meter Inc., 4545 W. Brown Deer Road, P.O. Box 245036, Milwaukee, Wisconsin 53224-9536

**BADGER METER EXTENDED LOW FLOW METER ACCURACY**

Badger Meter further warrants the meter product to meet or exceed the following extended low flow accuracies in excess of AWWA standard:

**Model 25 Recordall 5/8" and 5/8" x 3/4"**

Badger warrants Product low flow accuracy of 98.5% at a rate of 1/4 gpm for five (5) years from date of shipment or registration of 675,000 gallons, whichever occurs first.

**Model 35 Recordall 3/4"**

Badger warrants Product low flow accuracy of 97% at a rate of 3/8 gpm for five (5) years from date of shipment or registration of 675,000 gallons, whichever occurs first.

**Model 55 Recordall 1"**

Badger warrants Product low flow accuracy of 95% at a rate of 1/2 gpm for three (3) years from date of shipment or registration of 575,000 gallons, whichever occurs first.

**Model 70 Recordall 1"**

Badger warrants Product low flow accuracy of 95% at a rate of 3/4 gpm for three (3) years from date of shipment or registration of 1,100,000 gallons, whichever occurs first.

**Model 120 Recordall 1-1/2"**

Badger warrants Product low flow accuracy of 95% at a rate of 1 1/4 gpm for two (2) years from date of shipment or registration of 1,440,000 gallons, whichever occurs first.

**Model 170 Recordall 2"**

Badger warrants Product low flow accuracy of 95% at a rate of 1 1/2 gpm for two (2) years from date of shipment or registration of 1,890,000 gallons, whichever occurs first.

**PRODUCT RETURNS**

Any Product proved to Badger's satisfaction to have failed the foregoing warranties will, at Badger's option, be repaired or replaced without charge to the Customer. Badger's obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger's receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing original product and reinstalling the repaired or replacement Product.

**UNITS OF LIABILITY**

This warranty shall not apply to Product repaired or altered by any party other than Badger. The foregoing

warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C700-02 and AWWA M6 Manual. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in Badger Product technical literature and Installation and Operation Manuals (IOMs), or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration, or other circumstances which are beyond Badger's reasonable control. With respect to Product not manufactured by Badger, the warranty obligations of Badger shall in all respects conform and be limited to the warranty extended to Badger by the supplier.

**THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of title).**

Any description of the Product, whether in writing or made orally by Badger or Badger's agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger or Badger's agents regarding use, application, or suitability of the Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger.

**Exclusion of Consequential Damages and Disclaimer of Other Liability.** Badger's liability with respect to breaches of the foregoing warranty shall be limited as stated herein. Badger's liability shall in no event exceed the contract price. **BADGER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL, AND CONTINGENT DAMAGES WHATSOEVER.**

Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.

Recordall®, RTR® and Badger® are registered trademarks of Badger Meter, Inc.

**Recordall®  
Cold Water  
Bronze Disc Meter**

Size 3/4" (DN 20mm)

**Technical  
Brief**

**DESCRIPTION**

Badger Meter offers the Recordall Disc meter in Cast Bronze and a Low Lead Alloy. The Low Lead Alloy (Trade Designation: M35 LL) version complies with NSF/ANSI Standard 61 and carries the NSF-61 Mark on the housing. All components of the Low Lead Alloy meter, i.e., disc, chamber, housing, seals, etc., comprise the certified system.

**APPLICATIONS:** For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

**OPERATION:** Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register dial face.

**OPERATING PERFORMANCE:** The Badger® Recordall® Disc meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates (100 ± 1.5%), and maximum continuous operation flow rates as specifically stated by AWWA Standard C700.

**CONSTRUCTION:** Badger Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber, and permanently sealed register. The water meter is available in bronze and Low Lead Alloy with externally-threaded spuds. A corrosion-resistant thermoplastic material is used for the measuring chamber.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters also minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

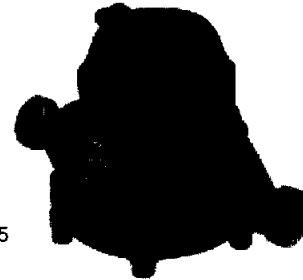
**MAGNETIC DRIVE:** Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading, remote or automatic meter reading options.

**SEALED REGISTER:** The standard register consists of a straight-reading odometer-type totalization display, 360° test circle with center sweep hand and flow finder to detect leaks. Register gearing consists of self-lubricating thermoplastic gears to minimize friction and provides long life. Permanently sealed; dirt, moisture, tampering and lens fogging problems are eliminated. Multi-position register simplifies meter installation and reading. Generator-type remote reading and automatic meter reading systems are available for all Recordall Disc meters. All reading options are removable from the meter without disrupting water service.

**TAMPER-PROOF FEATURES:** Customer removal of the register to obtain free water can be prevented when the optional tamper detection seal wire screw or TORX® tamper resistant seal screw is added to the meter. Both can be installed at the meter site or at the factory.

**MAINTENANCE:** Badger Recordall Disc meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location. As an alternative to repair by the utility, Badger offers various maintenance and meter component exchange programs to fit the needs of the utility.

**CONNECTIONS:** Tailpieces/Unions for installations of meters on various pipe types and sizes, including misaligned pipes, are available as an option.



Model 35

**SPECIFICATIONS**

<b>Typical Operating Range (100% ± 1.5%)</b>	3/4-35 GPM (.17 to 7.9 m³/hr)
<b>Low Flow (Min. 97%)</b>	3/8 GPM (.085 m³/hr)
<b>Maximum Continuous Operation</b>	25 GPM (5.7 m³/hr)
<b>Pressure Loss at Maximum Continuous Operation</b>	5 PSI at 25 GPM (.37 bar at 5.7 m³/hr)
<b>Maximum Operating Temperature</b>	80°F (26°C)
<b>Maximum Operating Pressure</b>	150 PSI (10 bar)
<b>Measuring Element</b>	Nutating disc, positive displacement
<b>Register Type</b>	Straight reading, permanently sealed magnetic drive standard. Remote reading or Automatic Meter Reading units optional.
<b>Register Capacity</b>	10,000,000 Gallons, 1,000,000 Cubic Feet, 100,000 m³. 6 odometer wheels.
<b>Meter Connections</b>	Available in bronze and thermoplastic to fit 3/4" spud thread bore diameter sizes. See table below.

**METER SPUD AND CONNECTION SIZES**

Size Designation	x	"L" Laying Length	"B" Bore Dia.	Coupling Nut and Spud Thread	Tailpiece Pipe Thread (NPT)
3/4"	x	7½"	3/4"	1" (3/4")	3/4"
3/4"	x	9"	3/4"	1" (3/4")	3/4"
3/4" x1"	x	9"	3/4"	1¼" (1")	1"

**MATERIALS**

<b>Meter Housing</b>	Cast Bronze, Low Lead Alloy
<b>Housing Bottom Plates</b>	Bronze, Cast Iron, Low Lead Alloy
<b>Measuring Chamber</b>	Thermoplastic
<b>Disc</b>	Thermoplastic
<b>Trim</b>	Stainless Steel, Bronze
<b>Strainer</b>	Thermoplastic
<b>Disc Spindle</b>	Stainless Steel
<b>Magnet</b>	Ceramic
<b>Magnet Spindle</b>	Stainless Steel
<b>Register Lid and Shroud</b>	Thermoplastic, Bronze
<b>Generator Housing</b>	Thermoplastic



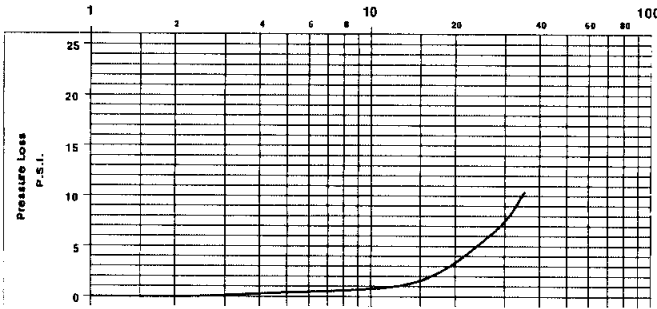
**BadgerMeter, Inc.**

**RD-T-3/4**

9-06

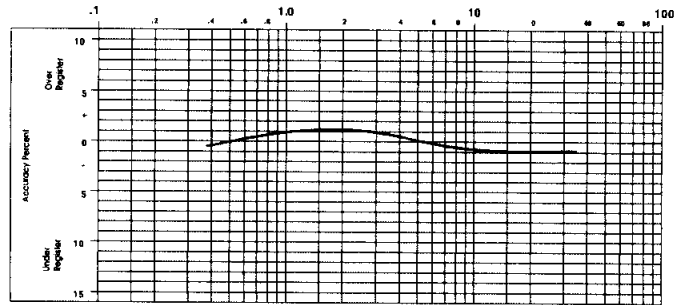
**PRESSURE LOSS CHART**

Rate of Flow, in Gallons per Minute



**ACCURACY CHART**

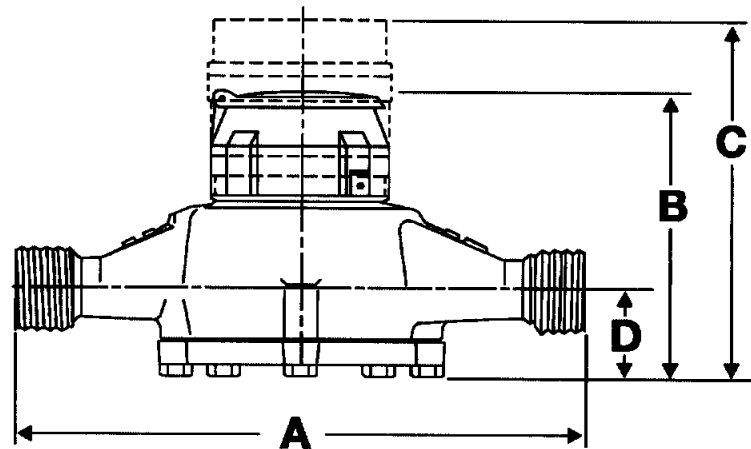
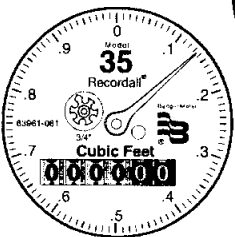
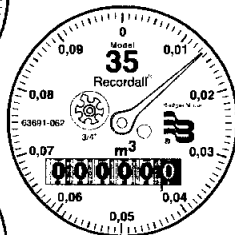
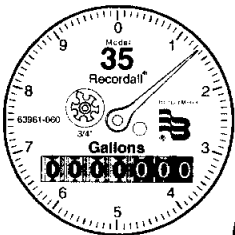
Rate of Flow, in Gallons per Minute



METER SIZE	METER MODEL	A LAYING LENGTH	B HEIGHT REG. / RTR	C HEIGHT GEN.	D CENTERLINE BASE	WIDTH	APPROX. SHIPPING WEIGHT
3/4" (20mm)	35	7 1/2" (190mm)	5 1/4" (133mm)	6 5/8" (168mm)	1 5/8" (41mm)	5" (127mm)	5 1/2 lb. (2.5kg)
3/4" (20mm)	35	9" (229mm)	5 1/4" (133mm)	6 5/8" (168mm)	1 5/8" (41mm)	5" (127mm)	5 3/4 lb. (2.6kg)
3/4" x 1" (20mm)	35	9" (229mm)	5 1/4" (133mm)	6 5/8" (168mm)	1 5/8" (41mm)	5" (127mm)	6 lb. (2.7kg)

**Sweep Hand Registration**

MODEL	GALLON	CU. FT.	CU. METER
M35	10	1	.1



RTR® and Recordall® are registered trademarks of Badger Meter, Inc. TORX® is a registered trademark of Camcar, Division of Textron, Inc.



Please see our website at [www.badgermeter.com](http://www.badgermeter.com) for specific contacts.



**BadgerMeter, Inc.**

P.O. Box 245036, Milwaukee, WI 53224-9536  
 (800) 876-3837 / Fax: (888) 371-5982  
[www.badgermeter.com](http://www.badgermeter.com)

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Model ADE™

Absolute Digital Encoder

# Technical Brief

## DESCRIPTION

**APPLICATIONS:** The Absolute Digital Encoder (ADE) is designed for use with all Recordall® Disc, Turbo, Compound and Fire Service Meters to provide connectivity with ORION®, Badger® ERT®, Badger Touch, and Badger Meter, Inc. approved AMR technology solutions.

**RESOLUTION:** Digital output from the ADE includes the option of either 4, 5 or 6 dial resolution.

**MOUNTING:** The ADE in its shroud assembly uses a bayonet mount compatible with all Recordall disc, turbo, compound and fire series meters. A Torx® seal screw is provided to allow positioning of the register for the most convenient reading and to secure the register to the meter body in a tamper resistant mode. The ADE can be removed from the meter without disrupting water service.

**MAGNETIC DRIVE:** Direct drive high-strength magnetic coupling through the meter body to the wetted magnet provides reliable and dependable register coupling.

**SEALED REGISTER:** The ADE local register consists of a six-digit straight-reading mechanical odometer totalizer (located in the 12 o'clock position), a 360° test circle with sweep hand, and a flow finder to detect leaks. The register gearing is self-lubricating thermoplastic to minimize friction and provide long, reliable life. Permanent sealing eliminates moisture, dirt, and other contaminants. (The leak rate of the seal is less than 10<sup>-6</sup> cc/sec as tested by a helium mass spectrometer.)

**TAMPER-PROOF FEATURES:** Customer removal of the ADE can be prevented by using a tamper resistant Torx seal screw. Torx seal screws are provided as standard accessories with the ADE. Optional tamper detection seal wire screws are also available.

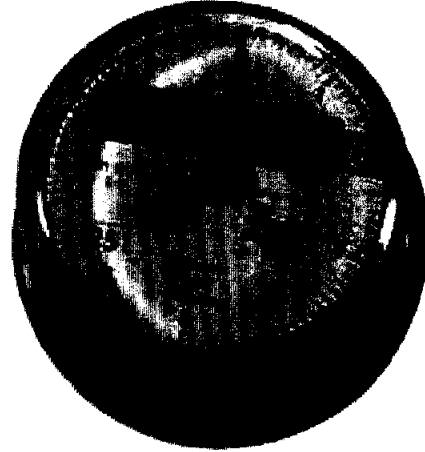
**CONSTRUCTION:** The housing of the ADE is constructed of a strengthened glass lens top and a copper alloy metal bottom. Internal construction materials are thermoplastic for long-life and high reliability. The integrity of the adhesive seal joining the glass top to the metal base provide unmatched protection in water meter applications. A corrosion and tamper resistant Torx seal screw is provided to secure the ADE to the meter. The shroud assembly is thermoplastic.

**TEMPERATURE:** The operating range of the ADE is -20° C to 49° C (-5°F to 120°F). The water meter should not be subjected to temperatures below freezing.

**MOISTURE:** The ADE achieves true water resistance due to the adhesive technology used in the sealing process. Leak rates less than 10<sup>-6</sup> cc/sec. as tested by a helium mass spectrometer, are comparable to a true hermetic seal. Due to this unique sealing process, the ADE exceeds all applicable requirements of AWWA Standard C707 regarding moisture intrusion. Register fogging and condensation are no longer an issue.

**WIRE CONNECTIONS:** The ADE is provided as either a factory prewired assembly or as a register with pre-sized wire harness available for connection in the field. Operation of the ADE is dependent of the wire length limitations of connected MRT equipment.

**ELECTRICAL:** The electronic circuitry is designed to provide immunity to electrical surges and transients per IEC801-2, IEC801-4 Severity Level 4.



## SPECIFICATIONS

<b>Transmitter/Register</b>	Straight reading, permanently sealed, magnetic drive
<b>Unit of Measure</b>	U.S. Gallons, Cubic Feet, Cubic Meters, clearly identified on register face
<b>Number Wheels</b>	Six with 3/16" high numerals font type
<b>Test Circle</b>	360° circle with ten major increments with ten divisions each
<b>Weight</b>	11 Ounces
<b>Humidity</b>	0% to 100% Condensing
<b>Temperature</b>	-20°C to 49°C (-5°F to 120°F)
<b>Signal Output</b>	Industry Standard ASCII Format
<b>Visual Resolution</b>	1/100th of Test Circle
<b>Electronic Resolution</b>	4, 5 or 6 Dial Resolution
<b>Signal Type</b>	Two wire asynchronous for Touch Solutions Three wire synchronous for AMR Solutions
<b>Power Source</b>	External

**OPERATING CHARACTERISTICS:** The ADE reading is obtained directly from the position of the register's odometer wheel stack utilizing a non-contact frictionless form of absolute encoding. The encoder provides accurate readings by using internal light sources to determine the exact position of the number wheel. This technology eliminates electrical contacts and wipers that could wear out and provides greater long-term performance. No batteries are required to maintain the reading.

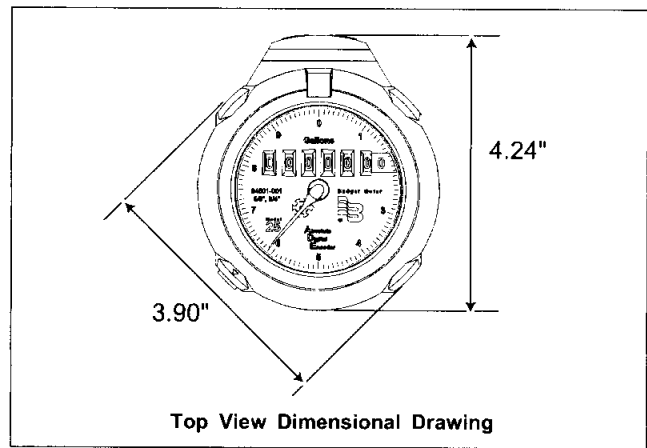
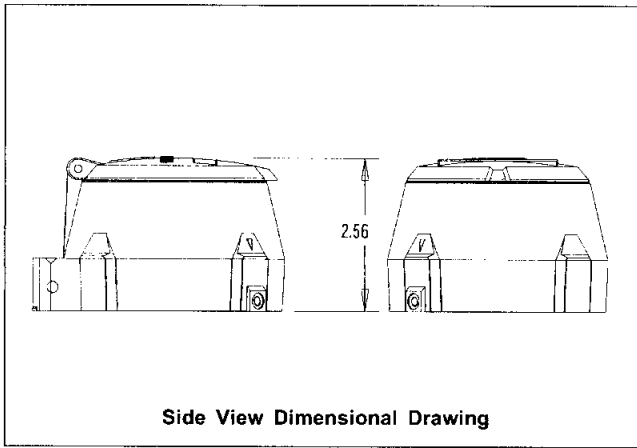
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BadgerMeter, Inc.

ADE-T-01

9-03



**MEASUREMENT RESOLUTION:** The minimum electronic resolution of the ADE is as noted below (6 Dial Reading). To verify the correct resolution for your application, contact Badger Meter Customer Service.

RECORDALL® Disc Series	Size	6 Dial Resolution Gallons	6 Dial Resolution Cubic Feet (Ft³)	6 Dial Resolution Cubic Meters (m³)
M25	5/8"	10	1	0.1
M25	3/4"	10	1	0.1
M35	3/4"	10	1	0.1
M40	1"	10	1	0.1
M70	1"	10	1	0.1
M120	1 1/2"	100	10	1
M170	2"	100	10	1

RECORDALL Turbo Series	6 Dial Resolution Gallons	6 Dial Resolution Cubic Feet (Ft³)	6 Dial Resolution Cubic Meters (m³)
1 1/2"	100	10	1
2"	100	10	1
3"	100	10	1
4"	100	10	1
6"	1000	100	10
8"	1000	100	10
10"	1000	100	10
12"	10000	1000	10
16"	10000	1000	10
20"	10000	10000	10

Fire Service Meters	6 Dial Resolution Gallons	6 Dial Resolution Cubic Feet (Ft³)	6 Dial Resolution Cubic Meters (m³)
3"	100	10	1
4"	100	10	1
6"	1000	100	10
8"	1000	100	10
10"	1000	100	10

RECORDALL Compound Series	6 Dial Resolution Gallons	6 Dial Resolution Cubic Feet (Ft³)	6 Dial Resolution Cubic Meters (m³)
2" High Side (Turbine)	100	10	1
2" Low Side (PD)	10	1	0.1
3" High Side (Turbine)	100	10	1
3" Low Side (PD)	10	1	0.1
4" High Side (Turbine)	100	10	1
4" Low Side (PD)	10	1	0.1
6" High Side (Turbine)	100	10	1
6" Low Side (PD)	10	1	0.1

Resolution stated as individual high and low readings.

**CAUTION**

The ADE should only be connected to a Badger Meter, Inc. approved product. Connection to an unapproved product will void the ADE warranty.



Please see our website at  
[www.badgermeter.com](http://www.badgermeter.com)  
for specific contacts.

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Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding bid obligation exists.



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## DESCRIPTION

**APPLICATIONS:** The BadgerTouch™ Single Remote Module coupled with the Absolute Digital Encoder (ADE™) is a complete electronically encoded close-proximity automated meter reading system, specifically designed for single point remote meter installations. This system can be used with all Badger Meter Recordall Disc, Turbo Series, and Compound meters available today.

**COMMUNICATION:** Communication is accomplished by using compatible reading devices programmed to read BadgerTouch or Sensus™ protocols, such as the VersaProbe™ or Metre Pro's™ reading wands, to interrogate the BadgerTouch remote module. The remote module responds with its serial number, water meter reading, and transmits data in approximately 2.5 seconds. In the event a tamper condition exists, the data collector will not receive a reading.

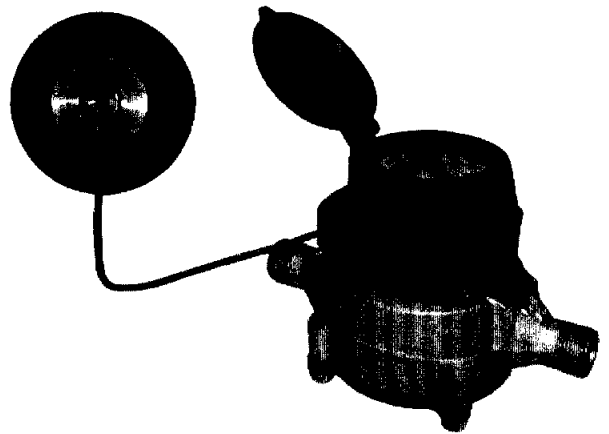
**PERFORMANCE:** The Badger Meter BadgerTouch automated meter reading system offers operating performance in a variety of applications under most climatic conditions. For consistent results, interrogation equipment should be placed in direct contact with the remote read pad.

**METER READING VALIDATION:** Further validation of the meter reading can be made automatically by the data collector based on comparison of high-low audit fields in the record. If the meter reading is not between these predetermined limits, an error message is displayed on the data collector display.

**WIRE CONNECTIONS:** The BadgerTouch Remote Module can be installed in new or existing installations where remote meter reading is required. The remote module is connected to the recommended wire that runs between the module and the ADE. A set of terminal screws on the remote module makes this connection. The ADE is provided prewired with either a 3', 6', 10' 15' or 25' length of wire that is ready for connection in existing installations. Please see figure 1 for more information on connections. To provide best results, a maximum of 75 feet of wire (Belden #9770) between the remote module and the ADE is allowed. Other wire types may also affect performance. If an additional length of wire is used in addition to that provided with the ADE, a set of gel splices must be made.

**CONSTRUCTION:** The Badger Meter BadgerTouch remote module enclosure is constructed of a high impact plastic enclosure designed for most remote locations. All internal electronic components are encapsulated to provide environmental protection. The ADE provides permanent glass/metal packaging in a plastic shroud and lid for long lasting, highly reliable encoded meter reading information collection.

**LICENSE REQUIREMENTS:** This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate a BadgerTouch meter reading system.



## SPECIFICATIONS

**Temperature:**

**Operating** -5° F to +120° F (-20° C to +49° C)

**Storage** -5° F to +120° F (-20° C to +49° C)

**Humidity** 0% to 100% Condensing

**Ultraviolet** Remote enclosure is UV protected for outdoor installation

**Construction** The remote module has a high impact weather proof plastic enclosure containing encapsulated electronics and reading coil. The ADE is constructed of a permanently sealed glass and copper design.

**Hardware** Two terminal screws for connecting the ADE lead wire to the remote module

Noncorrosive tamper resistant TORX® seal screw mounted on ADE shroud and remote housing (optional seal screw available)

**Weight** 6 ounces (not including the ADE)



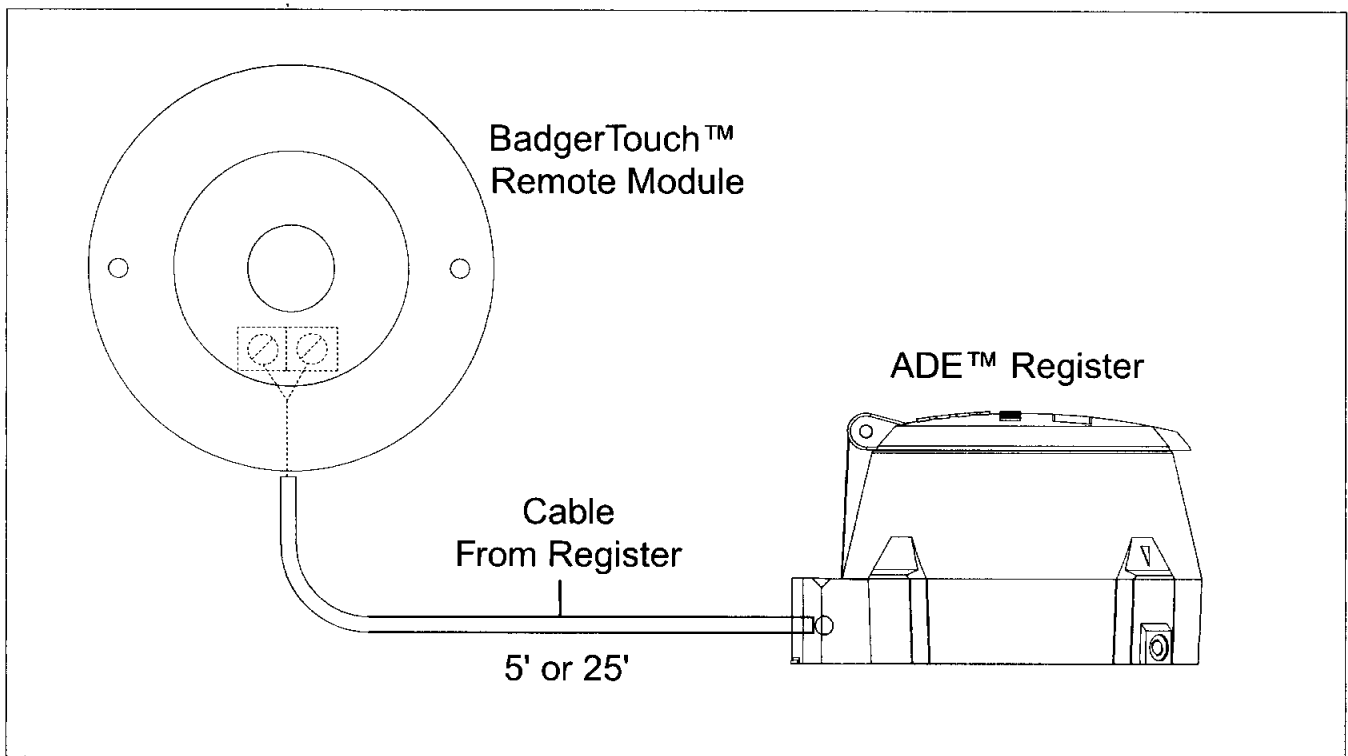


FIGURE 1. BADGERTOUCHE™ SINGLE REMOTE CONFIGURATION

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