

State of California
Department of Food and Agriculture
Division of Measurement Standards

Certificate Number: 5019(b)-01
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California Type Evaluation Program
Certificate of Approval
for Wholesale and Vehicle Tank Meters

For:

Wholesale and Vehicle Tank Meter
Positive Displacement
Model: TSXXY (See Table Below)
Sizes: 1, 1-1/2, 2 and 3 inch
Generic Name: Stealth Series

Submitted by:

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Standard Features and Options

TSXXY Positive Displacement Meter	ELNC Register
<ul style="list-style-type: none">• Veeder-Root register, preset printer• Air eliminator• Strainer• Preset valve• Check valve	<ul style="list-style-type: none">• ELNC register with battery power and right angle drive or meter bracket• Category 1, physical seal (see Sealing on Page 3)• Reed switch pulser• Hall effect pulser

These devices were evaluated under the California Type Evaluation Program (CTEP) and were found to comply with the applicable requirements of California Code of Regulations for "Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Effective Date: December 28, 2001

Mike Cleary, Director

**Tuthill Transfer Systems
Wholesale and Vehicle Tank Meter
Model: TSXXY**

Application: This system is suitable for stationary and vehicle tank meter applications. The products tested are listed in the "Test Conditions" on Page 3. The table below lists the product subgroups, viscosities, and specific gravity ranges tested.

Product Family	Product Subgroup	Typical Products	Viscosity Centipoise	Specific Gravity	% Abrasive Solids
Petroleum Products	Refined Petroleum Products	Diesel Fuel, Distillate, Gasoline	3.0 to 110.0	0.68 to 1.1	None
	Aviation Fuels	Avgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8	3.0 to 7.0	0.68 to 0.85	None
	Lubricating Oils	SAE Grades	22 to 106	0.87 to 0.89	None
Agricultural Liquids – Herbicides	Herbicides, Thin Liquids	Roundup	74.0	1.110	Nil
	Herbicides, Flowables	Harness	189.0	1.169	Nil
Liquid Feeds, Agricultural Liquids	Liquid Feeds	Alimet	128.0	1.220	4%
Liquefied Compressed Gases	LPG	Propane, Butane, Ethane, Freon	0.1 to 0.5	0.3 to .65	None

Model Designation For TSXXY:

TS	XX (Flow Rate and Meter Size)	Y (Material)
Base Model	06: 2 – 20 gpm (3/4") 10: 2 – 40 gpm (1") 15: 3 – 60 gpm (1-1/2") 20: 5 – 100 gpm (2") 30: 40 – 200 gpm (3")	A: Aluminum C: Stainless E: Cast Iron

Model Designation For ELNC - XXXXY:

ELNC	X	X	X	X	Y
Basic Model	Case designation 1 = 8-1/2" bolt pattern for V-R register adaptors 2 = 6-1/2" bolt pattern for bracket mounting 3 = 3/8" bolt pattern with a conduit entry 4 = 3-3/8" for mounting on cover mounted signal sensor	0 = From reed switch sensor (battery powered ELNC only) 1 = From hall effect or other solid state pulsar	0 = Battery powered 1 = Extended life battery pack 2 = 110/220 VAC powered 3 = 2/24 VDC powered	1 = Reset and non-reset totalizers 2 = Same as above plus rate display	These may be followed by a letter suffix, A or B option. A= Pulse output (1 or 10 pulses per unit) B= Amplified pulse output, (1 or 10 pulses per unit)

**Tuthill Transfer Systems
Wholesale and Vehicle Tank Meter
Model: TSXXY**

Identification: A permanent metal ID badge is riveted to the meter body. A permanent metal ID badge is riveted to the left side of the register housing.

Operation:

- The measuring element is two elliptical shaped rotors geared together.
- Normal flow through meter is left to right facing the register.

NOTE: If the register turns backwards, the position of the adjuster drive gear (behind an official seal) needs to be reversed.

Sealing: The meter calibration adjustment and mechanism for reversing the register drive rotation can be sealed with a wire security seal threaded through two drilled head screws that secure the access plate to the meter casing. The electronic register is sealable with a physical security seal to the meter assembly. The electronic register cover plate is sealed to prevent access to the calibration mechanism of the register.

Test Conditions: This certificate supersedes Certificate of Approval Number 5019(a)-00 and is issued to include the new family product subgroup, LPG, to the product family table listed in the "Application" section and to include a new meter size. Two systems were installed at a stationary location using a separate pump feed system to each meter using ELNC-3001 electronic register for the 3/4" meter and a Mid Com SRG-402 electronic register with temperature compensation on the 2" meter. A required throughput for permanence test was completed using both TS meters with propane. The previous test conditions are listed below for reference.

Certificate of Approval Number 5019(a)-00: This certificate superseded Certificate of Approval Number 5019-00 and was issued to include the product subgroup, lubricating oils, to the product family table listed in the "Application" section. A permanence test was completed using a Model TS20A meter with SAE 40W and SAE 10W hydraulic oil. Each product's gravity was obtained from the manufacturer and a weigh scale was tested for accuracy with National Institute of Standards and Technology traceable field standards. The meter was tested gravimetrically as per gravimetric test methods.

Certificate of Approval Number 5019-00: This certificate was issued to include the products Roundup and Harness (agricultural liquid herbicides product family) and an electronic register with electronic calibration. The equipment manufacturer name has changed to Tuthill Transfer Systems which will maintain responsibility for the Fluid Power Products, Inc. equipment (Certificates of Approval Numbers 4640-97, 4640(a)-98, and 4640(b)-98). A new series of model numbers was also established. Two systems were installed at a stationary location using a separate pump feed system to each meter for each product. Each product's gravity was obtained from the manufacturer and a weigh scale was tested for accuracy with National Institute of Standards and Technology traceable field standards. The meter was tested gravimetrically as per gravimetric test methods, NCWM Publication 14. Model TS15C with Veeder-Root register was tested with Harness Xtra herbicide. Three tests at three different flow rates were conducted at 42 gpm, 24 gpm, and 4 gpm. A Model TS15C with ELNC register was tested with Roundup herbicide. Three tests at three different flow rates were conducted at 44 gpm, 24 gpm, and 4 gpm. Subsequent tests were performed after 30 days of use.

Certificate of Approval Number 4640(b)-98: This certificate was issued to include the product Alimet (agricultural liquid feed), the Reed switch pulser option, and the Hall Effect pulser option. A Model 598-0150 HEFS (2") meter was installed on a vehicle tank truck and submitted for evaluation. Accuracy tests were conducted at 23 gpm, 40 gpm, and 78 gpm. Similar tests were conducted on the meter after 200 000 gallons of throughput. Alimet was the product used for the evaluation

Tuthill Transfer Systems
Wholesale and Vehicle Tank Meter Measuring Units
Model: TSXXY

Certificate of Approval Number 4640(a)-98: This certificate superseded Certificate of Approval Number 4640-97 and was issued to include refined petroleum products and aviation fuels.

Certificate of Approval Number 4640-97: This certificate was issued based on field evaluations of two Model 591.0150.VR1 (2") meters installed on one tank truck. One meter was dedicated to gasoline and the other to diesel motor fuel. An initial evaluation was conducted and then after over 200 000 gallons of throughput through both meters, subsequent tests were performed. Accuracy tests were conducted at three different flow rates. Evaluations of vapor elimination performance were also conducted.

The results of the evaluations indicate the devices comply with applicable requirements.

Type Evaluation Criteria Used: Title 4, California Code of Regulations, 2001 Edition

Tested By: Tom Michel (CA) 4640-97, 4640(a)-98, 4640(b)-98; Dan Reiswig (CA), Michael Horan (IN) 5019-00; Charlie Nelson (CA) 5019(b)-01

Information Reviewed By: D. Reiswig (CA) 5019-00, 5019(a)-00