Department of Environmental Protection

2600 Blair Stone Road ♦ Tallahassee, Florida 32399-2400

DEP Form: 62-762.901(9)
Form Title: Storage Tank Equipment Registration Form
Effective Date: July 2019
Incorporated in Rule 62-762.851, F.A.C.

Storage Tank System Equipment Registration Form

Fill out completely

General Information

Company Name: Meco, Inc
Contact Name: Renee Powell
Company Address: 8425 El Paso Street
City, State: La Mesa, CA Zip: 91942
E-mail: renee@mecoincorporated.com
Contact Number: 619-778-3739
Product Name: Meco AST Overfill
Model Number(s): 200400AR
Product Type: AST OVERFILL ALARM
Rule(s) citation that registration is being requested within Chapter 62-761 (UST), and/or 62-762 (AST), F.A.C.: Overfill protection section

Write a brief description of equipment registration request including product limitations:

Previously registered under EQ 905. Need to register this overfill alarm with Florida. Overfill alarm for above ground storage (AST). Certified intrinsically safe to ANSI/UL 913. Meets NFPA 30A, UL 2244 and UFC requirements.

Information Checklist (Choose Yes, No, or N/A - Not Applicable):

		Yes	No	N/A
1.	Third-party Certification by a Nationally Recognized Testing Laboratory? (Required)	✓		
2.	Documentation of third-party evaluation that the equipment meets DEP Rules?	✓		
3.	Documents included about the qualifications of the Nationally Recognized Testing Laboratory?	✓		
4.	Technical information and drawings included?	✓		
5.	Installation instructions included?	✓		
6.	Annual Operability Testing Requirements (Rules 62-761.500, 62-762.501, & 62-762.502 F.A.C.)?	✓		
7.	Integrity Testing Requirements (Rules 62-761.700, 62-762.701, & 62-762.702, F.A.C.)?	✓		
8.	Compatible with fuel blends containing >10% ethanol or >20% biodiesel?	✓		
9.	Has the product been approved or registered in other countries or states? (If so provide list)	✓		
10.	Any requirements for company-certified installers or trainers?		✓	
11.	Was this product(s) previously approved or registered by the Department? If yes, EQ-____		✓	
12.	Any changes or modifications to the equipment since the last submittal to DEP?			✓

Document Information: Provide supporting documents indicated as "Yes" above including this form via email to Tanknotify@floridadep.gov, or documents can be sent to FDEP, Division of Waste Management, 2600 Blair Stone Road, MS 4560, Tallahassee, FL 32399.

Write a brief description of equipment installation and performance in the U.S.:

See attached installation instructions. These instructions are on our website and are included with every unit.

Equipment Registration Certification:

To the best of my knowledge and belief, all information submitted on this form is true, accurate and complete.

Renee Powell, CEO — Printed Name and Title

Renee S. Powell — Signature (right click to sign)

01/20/2026 — Date

For Department Use Only:

Date Application Received: 1/20/2026 Application complete: Yes: X No: ☐

EQ- 1045 Date of complete or incomplete letter sent: 1/21/2026 Date Equipment Requires Renewal: 1/21/2031

Storage tank system equipment requires renewal every 5 years in accordance with subsection 62-762.851(2), F.A.C.

CERTIFICATE OF COMPLIANCE

Certificate Number	20190820-MH27310
Report Reference	MH27310-20100830
Issue Date	2019-AUGUST-20

Issued to:	MROZ ENGINEERING CO INC, DBA MECO INC Suite 208, 8240 Pkwy Dr LA MESA, CA 91942
This certificate confirms that representative samples of	Tank Accessories for Flammable and Combustible Liquids Certified for Canada Overfill protection devices of the audible type, Class I Model(s) Meco Alarm PN200400 Have been investigated by ULC in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	CAN/ULC-S661, Standard For Overfill Protection Devices For Flammable And Combustible Liquid Storage Tanks
Additional Information:	See the ULC Online Certifications Directory at https://iq.ulprospector.com for additional information.

This *Certificate of Compliance* does not provide authorization to apply the ULC Mark. Only the *UL Follow-Up Services Procedure* provides authorization to apply the ULC Mark.

Only those products bearing the ULC Mark should be considered as being ULC Certified and covered under UL's Follow-Up Services.

Look for the ULC Certification Mark on the product.

Gunsimar Paintal, ULC Mark Certification Program Manager

Underwriters Laboratories of Canada Inc.

CERTIFICATE OF COMPLIANCE

Certificate Number	20190820-MH27310
Report Reference	MH27310-20100830
Issue Date	2019-AUGUST-20

This is to certify that representative samples of the product as specified on this certificate were tested according to the current ULC requirements.

Gunsimar Paintal, ULC Mark Certification Program Manager

Underwriters Laboratories of Canada Inc.

SGS® SGS U.S. Testing Company Inc.
5555 Telegraph Road • Los Angeles, CA 90040 • Tel: 323-838-1600 • Fax: 323-722-8251

CLIENT: **MROZ ENGINEERING COMPANY, INC. d.b.a. MECO, INC.**
6326 Lake Dora Avenue
San Diego, CA 92199

Attn.: Kenneth Mroz

Test Report No: 159157	**Date:** November 8, 2001

SAMPLE ID: MecoAlarm Assembly P/N 200400 circuit and circuit board re-evaluation for added components for an alarm turn-off feature.

DATE OF RECEIPT: Entered into SGS USTC sample tracking system on July 10, 2001 as STN 33510.

TESTING PERIOD: October 4, 2001 through October 11, 2001

AUTHORIZATION: Client's Purchase Order Number 900380 dated July 6, 2001

REFERENCES: ANSI/UL 913-88, "Intrinsically Safe Apparatus and Associated Apparatus for in Class I, II, and III, Division 1, Hazardous Locations", Fourth Edition dated July 29, 1988.

SGS U.S. Testing Company Report No. 108694 dated October 19, 1998.

TESTS REQUESTED: Intrinsic Safety evaluations of above sample to the requirements of ANSI/UL 913-88, Intrinsically Safe Apparatus and Associated Apparatus, for Division 1, Class I, Groups C, and D

TEST RESULTS: Results starting on page 3 and concluding on page 9.

CONCLUSION: Considering the tests and evaluations that were conducted, the MecoAlarm Assembly P/N 200400 circuit and circuit board re-evaluation for added components for an alarm turn-off feature was found to comply with the requirements of ANSI/UL 913-88 for Division 1, Class I, Groups C, and D. In addition, they are permitted in Division 2, Class I, Groups C, and D.

Prepared by
Chris Lund
Chris Lund
Project Engineer

Signed for and on behalf of
SGS U.S. Testing Company Inc.
John Lomash
Branch Director

CLIENT: MROZ ENGINEERING COMPANY, INC. d.b.a. MECO, INC.

GENERAL INFORMATION FOR EVALUATIONS:

FUNDAMENTAL REQUIREMENTS: The energy available from an intrinsically safe apparatus or circuit shall not be capable of igniting a specified flammable mixture by arcing (electrical sparks) or by hot surfaces while the sample is operating normally.

IGNITION SOURCES: Spark ignition, if there is sufficient energy flow, can only occur at the actual point of the physical interruption. The energy is combination from the power supply(s), from a charged capacitor or inductor, or from energy supplied by the materials at the point of sparking. The interruption may be from a switch, poor connection, or some other mechanical means such as the fusing of a wire. Thermal ignition can result by a component or surface that heats to the point of causing ignition or breaks into flame such as an over heated component or fusing of a wire.

HAZARDOUS LOCATION: An area that is or may become explosive by the mixing of air with ignitable liquid vapors, fumes, gases, dusts, or flyings. The hazard is always presumed to be dangerous and is defined in Article 500 of the National Electrical Code, ANSI/NFPA 70-1987.

TEST CONDITIONS: Test conditions are considered to have an ambient temperature of 40°C (104°F), an oxygen concentration of 21-percent or less, and a pressure of one (1) atmosphere.

NORMAL ENERGY: Normal energy is the energy drawn when the voltage, components, and adjustments set to the most unfavorable settings or tolerances. It is also to include the maximum energy draw from opening or shorting of any one-field wires or the shorting of any two-field wires. For battery powered apparatus the voltage is to be the maximum open circuit voltage on a fresh primary or recharged battery. The battery current is to be the maximum initial current.

FAULT: A defect or electrical breakdown, whether artificially induced or not, of any component, spacing, or insulation that adversely affects the electrical or thermal characteristics of an intrinsically safe circuit. When a fault is applied and it causes a chain reaction of failures or breakdowns, both the initial and subsequent failures are considered one fault. The most unfavorable normal, single or double fault condition will be applied to the test sample for evaluation purposes.

TEST FACTORS: Test factors are artificial increases to the available energy. They provide a cushion of safety for the day-to-day variations that occur in the manufacturing processes but may not be seen in the test samples. For a comparison evaluation, Section 5, normal operation will include an energy factor of 0.8 for less than two faults or 0.9 times for two or more faults. For spark ignition evaluation, Section 8, the normal operation will include a 1.5-times energy increase for up to one fault, and no increase for two or more faults.

THERMAL RISE TESTS: Thermal rise is the final, stabilized temperature of component(s) under test, for normal or fault conditions, which ever is worst. A normalized temperature rise greater than 100°C will require an NFPA temperature code on the label. A temperature code aids in determining the lowest ignition point of materials that may be safely used with the sample(s) under evaluation.

COMMENTS: The sample(s) were tested or reviewed to applicable sections in the controlling standards. Nothing should to be construed regarding sections not specifically evaluated, tested, and reported herein. The standards often have more than one method to test a sample. All approved methods yield a safe product. Deliberately increasing test severity does not make a product safer than a safe one. Thus, all tests were to the most unfavorable conditions consistent with the provisions of the standards.

SGS® SGS U.S. Testing Company Inc.

CLIENT: MROZ ENGINEERING COMPANY, INC. d.b.a. MECO, INC.

ANSI/UL 913-88 EVALUATION AND/OR TESTING

DRAWING PACKAGE: The following drawings were used during the evaluation and test of the supplied samples. Components referenced by letters and numbers, such as R9 or C2, refer to components on the drawing(s):

Drawing Title	Drawing No.	Revision	Date	Page	Rev No.	Rev. Date	Ref.
200411C	200410	C	6/4/01	1 of 1	-	-	Dwg-1

RESULTS: Updated drawing showing added components.

SECTION 1.5 – TYPES OF INTRINSIC EVALUATIONS: There are two types of intrinsic safety evaluations, system, or entity. In the system evaluation, the sample is a stand-alone or can be a combination of an associated apparatus to an apparatus, or apparatus to apparatus. The entity is a general evaluation of a single sample to predetermined electrical limits. Both will have a control drawing showing the proper connection and installation including any special requirements to maintain intrinsic safety after it is connected.

RESULTS: This evaluation is a modification to the main board to add an "auto turnoff" of the alarm circuit.

SECTION 2.2 – EVALUATION OF AN INTRINSICALLY SAFE SYSTEM

SECTION 2.2.1 – NORMAL ENERGY, APPLICATION OF FAULTS AND TEST ENERGY: Circuits are to be analyzed as to normal, faulted and test current per Sections 2.1 to 2.14 below.

SECTION 2.1.1.1 -- NORMAL OPERATION: Normal energy is what is drawn from the power source under the conditions below. The resulting current could be resistive, resistive-capacitive or resistive-inductive depending on circuit components. (1) For normal operation the supply voltage is set to rated maximum, all components related to maximum power modified to their worst-case operation, and all adjustments to worst case. Nominal line voltages are 120, 240 or 480 and are increased 10-percent for normal operation. For battery operation, the initial peak voltage from a fresh primary or a secondary battery immediately after a full charge is used. (2) Environmental conditions are to be within stated limits. (3) Components are adjusted to their plus or minus tolerance in a manner that increases energy draw from the source. (4) Adjustments are made at the most unfavorable settings. (5) Opening any one of the field wires, shorting of any two-field wires, or grounding of any one of the field wires.

RESULTS: (1) The sample can be powered from two different sources. One is a 3-cell battery with a nominal voltage of 9.0-volts and a theoretical maximum, for this type of battery, is 11.1-volts. The other is a an auxiliary power supply producing 12.7-volts when the input voltage is set 10% higher than the nominal 115-volts having a shorted output current of 0.58-amps. The auxiliary voltage 12.7 will be used as the maximum voltage throughout the evaluation process. Data taken from SGS U.S. Testing Job Number 108694, report date of 10/19/98. (2) The average laboratory temperature was 24°C, and the average relative humidity was 53%. The sample is rated from sample is rated from -40°C to 70°C and the sample is rated from 0% to 95% relative humidity. (3) The worst resistive-inductive component was the R9 of Dwg-1 resistor in the auxiliary power supply limiter, with a tolerance-adjusted value of 44.65-ohms and a current of 0.28-amps. The worst inductive-resistive component was the L1 of Dwg-1 inductor in the piezoelectric sounder driver circuit, with a tolerance-adjusted value of 51.7-mH and a current of 0.09-amps. The worst capacitance-resistive component was the C1 of Dwg-1 capacitor in the DC blocking circuit, with a tolerance-adjusted value of 0.11-µF at 12.7-volts. (4) Sample does not have adjustments. (5) The external leads were evaluated in data taken from SGS U.S. Testing Job Number 108694, report dated October 19, 1998.

SECTION 2.1.1.2 – TEST ENERGY AVAILABLE AFTER FAULTS: Test factors are artificial energy increases providing a cushion of safety to the normal test energy. In a resistive circuit, a circuit having an inductance less than 5-µH, the energy is to be increased by a factor of 1.5 by the following methods, in order of preference. Increasing the current through limiting resistance to practicable levels, increase the main voltage source, increase other supply voltages, or increase the setting of voltage limiting devices; In resistive-inductive circuits the 1.5 energy factor is achieved by increasing the current by reducing the values of limiting resistance as practicable, and then by increasing the voltage. For resistive-capacitive circuits, the energy is to be increased by a factor of 1.5 by raising the voltage by a factor of 1.22. Finally, the energy factor can be accomplished by any method of equivalent severity, for example, the use of more easily ignited test gases. When the sample is battery operated, adding cells identical to those used in the battery pack achieve the energy increase. They are to be added in parallel or series to meet the method described above. The increase can also be emulated by a suitable power supply taking care to match internal battery resistance. Note: If separate cells are not available, batteries may be doubled for an energy factor of 2, instead of the usual 1.5, with the acceptance criteria remaining the same.

RESULTS: After the faults were applied, the test energy was calculated. The worst resistive-inductive circuit was auxiliary power supply limiter. The current was 0.28-amps at 12.7-volts. For inductive-resistive circuits the worst energy was piezoelectric sounder driver circuit. The current was 0.09-amps at 12.7-volts. The 1.5 energy factor was applied to the current, first choice Section 8.6.1, for a final value of 0.14-amps at 12.7-volts. The worst capacitive-resistive energy was the DC blocking circuit at 12.7-volts. The 1.22 energy factor per Section 8.6.4 was applied to the voltage for a final value of 15.5-volts.

SECTION 2.1.2 TO 2.1.3 – APPLICATION OF FAULTS: Faults are an electrical breakdown defect of any component, spacing, or insulation that adversely affects the electrical or thermal characteristics of an intrinsically safe circuit. It can also include known problems (weakness) of components or materials. A fault can be a short, open, or grounding of the circuit(s). A maximum of two faults are to be applied to the sample. When an applied fault causes collateral breakdowns they are not counted towards the fault maximum and increased current is to be taken. Circuits in which no fault or only one fault can occur, must pass the requirements for normal operation and have an additional 1.5-factor applied to it. If double faults are applied, the 1.5-factor is not required.

RESULTS: Sample construction and materials did not indicate the need for application of faults.

SECTION 2.2 – EVALUATION PROCEDURES

GENERAL SECTION 2.2.1 -- CIRCUITS TO BE ANALYZED: (1) All circuits are to be analyzed to ascertain circuit parameters per Sections 2.1 to 2.1.4.

SECTION 2.2.1 to 2.2.2-- CIRCUIT TO BE ANALYZED: (1) All circuits are to be analyzed to ascertain circuit parameters per Sections 2.1 to 2.1.4. (2) For intrinsically safe equipment, each possible ignition point is to be evaluated per section 2.2.4 as follows: (a) circuit interruptions such as connectors, switches, relays, etc. (b) short circuits or grounds due to spacing, selection of materials, or construction practices. Though not limited to these, any source of sparking or heating is to be considered.

SECTION 2.2.3 -- DETERMINATION of POSSIBLE ARC IGNITION METHOD: For intrinsically safe apparatus each possible ignition point is to be evaluated for by (1) spark ignition test, or : (2) comparing calculated and/or measured parameters such components as resistors, inductors, capacitors, diodes, semiconductor devices for signally and in circuits for comparison with Section 5, Figures 1 through 8.

RESULTS: The sample parameters were calculated for 13-resistors, 1-inductor, 7-capacitors, and 8-solid state devices. The above components were computed for maximum energy and the maximum values were within the limits of Figures 1 through 8, therefore the sample was comparison tested. Note where identical components were employed only one device was computed unless interposing, nonfaultable components reduced the actual applied voltage and/or current. Capacitors were voltage rated at their working voltage plus half their surge voltage. Capacitors and solid state devices that were rated at 3-times the applied voltage were considered nonfaultable if they were not safety affecting.

SECTION 2.2.4 -- POSSIBLE IGNITION POINTS: (a) circuit interruptions such as connectors, switches, relays, etc. (b) short circuits or grounds due to spacing, selection of materials, or construction practices.

RESULTS: Voltage and current levels were found within the boundaries of UL913 Figures 1-8.

SECTIONS 2.2 to 2.2.4(2) – OVERALL AND FINAL ARC IGNITION ANALYSIS: The results of the two methods to evaluate the possibility of having sufficient current or thermal energy under normal or fault conditions are denoted below. Class I, Groups C and D

The sample was comparison evaluated. The safe ignition current or voltage limits were obtained from Section 5.

For resistive circuits with less than 5µH, the maximum calculated intrinsically safe current was 0.284-amps. The maximum measured resistive current was 12.7-volts and was less than the calculated safe current. The sample complied with the limits for Division 1, Class I, Groups C, and D.

For an inductive-resistive circuit with an intrinsically safe inductive current was 0.100-amps. Since the maximum inductive current measured was and was less than the calculated safe current, the sample meets inductive requirements Class I, Groups C and D.

For a capacitive-resistive circuit the safe voltage was 47.2-volts. Since the maximum capacitive voltage measured of 12.7-volts is less than the safe voltage the sample passes for Class I, Groups C and D.

SECTION 2.5 -- APPARATUS INDUCTANCE AND CAPACITANCE DETERMINATION: The maximum internal inductance or capacitance is to be determined for both normal and fault conditions by inspection, analytical computation, or verification of vendor values by testing to Section 7.14.

RESULTS: The maximum inductance was L1 of Dwg-1 in the piezoelectric sounder driver circuit and its nominal value was 47-mH. The tolerance was 10-percent. After application of it's plus tolerance, the worst inductance was 51.7-mH.

The maximum capacitance was C1 of Dwg-1 in the DC blocking circuit and its nominal value was 0.1-µF. The tolerance was 10-percent. After application of it's plus tolerance, the worst capacitance was 0.11-µF.

Sample has a piezoelectric sounder measuring 0.03-µF with a computed 8-µJ of energy which is less than the 1500-µJ maximum. The piezoelectric sounder meets the requirements of this section.

SECTION 2.6 --CONTROL DRAWING-APPARATUS ENTITY, ASSOCIATED & INTRINSICALLY SAFE: The control drawing will list the intrinsically safe and/or associated apparatus that may be connected to each terminal of an intrinsically safe apparatus by a set or sets of maximum voltage and maximum current.

RESULTS: Sample has a control drawing. See SGS U.S. Testing Report 108694 dated October 19, 1998.

SECTION 3.1 TO 3.1.3 -- CREEPAGE & CLEARANCE SPACINGS AND INSULATION & CASTING COMPOUND THICKNESS: The supplied samples were measured for creepage, clearance, and thickness of all conductors, connecting wiring, and printed wiring board traces. Spacings and distances that meet values in Table 1 of the specification are nonfaultable. Creepage, clearances, and thickness less than specified, but more than one-third the requirement, are to be considered connected if that connection is a more severe condition. Each such connection between conductors will be counted as a one fault. If the spacing is less than one-third the requirement, and there are multiple adjacent conductors, the distance between each is to be added until the sum equals or exceeds one third. That number of conductors becomes a grouped set and is considered connected. One fault is counted for each set until all adjacent conductors have been evaluated. When these creepage, clearances or thickness is not within tolerance they may still be acceptable. There are other applicable evaluation sections that apply, but are often more severe. See Section 3.1.7(3), dielectric voltage withstand, or Section 3.2, Encapsulation, or Section 3.4.1, AC Voltage Withstand. Note 1: The voltage for assessing creepage distance is the nominal peak, and for assessing clearance is the nominal RMS voltage with tolerance not considered. For VDC, circuits use the same value for creepage or clearance distances. Note 2: For two separate circuits, the voltage is the sum of both or the largest when one is less than 20 percent of the other.

RESULTS: Considering the nominal voltage of 12.7-volts, the minimum required creepage distance for a non-coated or a single coat surface is 1.57-mm. Under a properly double coated board the creepage is 0.53-mm. Tracking index minimum is 90. Clearance distance between any conductive parts will be 1.57-mm. Distances through casting compound will be a minimum of 0.53-mm and at least 0.50-mm through solid insulation.

Sample did not have any non-coated surfaces. The least double coated creepage distance was Q1 solder pads and it measured 0.4-mm. The sample did not specify a tracking index. The least clearance was on the battery contacts support and it was 0.8-mm. The least casting thickness on the piezoelectric sounder leads and it was 0.6-mm and based on SGS U.S. Testing Job Number 108694, report dated of October

19,1998. For the least insulation thickness on the traces between Q1 & Q3 and it was 2.2-mm. The sample spacings were smaller that listed in Table 1, samples are at least 50.0% of UL913,Table 1 are deemed to meet requirements at the judgment of the evaluator.

SECTION 3.1.7 to 3.1.7(3) -- PRINTED WIRING BOARDS: Coating(s) applied to printed wiring boards are to be an adherent insulating coating that is: (a) at least two layers thick that has a minimum dielectric voltage rating of 200 volts per 0.025 mm (0.001 in.) Of thickness, or (b) a single layer not less than 0.50-mm thick, or, a single layer with a dielectric voltage withstand test of 0.50-kV.

RESULTS: Coating over the traces was considered as an insulated conductor and was tested at 500-vAC. As the withstand test voltage in Section 3.4 to 3.4.2 for two coatings is 400-vAC, the sample passes for this section.

SECTION 3.3 -- FIELD-WIRING CONNECTIONS: Terminals for intrinsically safe circuits shall be safely separated from non-intrinsically safe circuits by one or more of the following. A distance of 50-mm (2 inches), partitions designed to prevent contact and of sufficient thickness, separate enclosures within the main enclosure. Care shall be exercised in the layout of terminals, receptacles, and/or plugs to reduce the risk of unintended contact between different circuits when a field wire becomes dislodged or unintentionally dropped. If plugs and receptacles are used for external connections, the plugs and receptacles used to connect intrinsically safe circuits shall be non-interchangeable with other plugs and receptacles.

RESULTS: The interchange of the field wires did not degrade intrinsic safety.

SECTION 3.4 -- INTERNAL WIRING CONDUCTORS: Samples containing non-insulated internal wiring conductors are to be rigidly supported to maintain their spacing distances. For a nominal 12.7-volts applied the minimum creepage distance is 1.57-mm and the clearance spacing is 1.57-mm. Internal wiring conductors that are not rigidly supported will be insulated. The insulation will have a dielectric strength greater than 500-volts RMS or if larger, twice the normal working voltage of the circuit which is 25.4-volts.

RESULTS: Sample did not employ the usual wire conductors. Battery clip connectors were ridged, not insulated, and were properly spaced. Sample meets requirements of this section.

SECTION 3.5.3 -- CURRENT-LIMITING RESISTORS. Current-limiting resisters will not be faulted if they pass the following requirements. Resistor(s) will be film construction; wire-wound construction with restraints to hold its winding in place in case of breakage, or any other construction that controls the resistance element. The resistor(s) will have 1.5-times maximum voltage, as measured across it when the resistor is under maximum energy, applied to it. The voltage will be increased from zero to full value in approximately a minute and allowed to temperature stabilize. The resistor(s) under test will increase in resistance or open. When there is a decrease in resistance, as the resistor heats, that decrease will be within 1/3 of the starting value. After it cools, it will return to within 10% of its original value. If the resistor is protected by a fuse, the resistor will be tested by flowing 1.7-times the nominal fuse current value with the fuse defeated. It will meet the same requirement as in the voltage test. Note: A resistor operated at 2/3 of its power does not need testing.

RESULTS: The following resistor wattage values were used in this sample. When a resistor is operated at no more than two thirds their rated wattage, they are considered nonfaultable. They are all 0.125-watt resistors having more than 1935-ohms of resistance, all 0.25-watt resistors having more than 968-ohms of resistance, and these values meet the less than two thirds energy requirements. In addition, one resistor of each wattage was heat rise tested to at least 7 times its nominal wattage to determine heat rise characteristic for Section 4.1.

SECTION 3.7 -- PORTABLE APPARATUS ENCLOSURES: Exposed external surfaces of the enclosure and any external parts will consist of a non-sparking material such as plastic or brass, unless protected by a recess or a guard.

RESULTS: Sample enclosure meets the requirements of this section.

SECTION 3.8 to 3.8.4 -- CELLS and BATTERIES: These requirements apply to the entire apparatus, when it is intended for use in a Division 1 hazardous location. Primary, non-rechargeable, or secondary rechargeable battery cells will not spill electrolytes or emit explosive gases if it poses a hazard. Batteries will maintain spacing and clearance between conductive parts of the batteries and other conductive parts per Section 3.1 to 3.1.3. Apparatus with energy-limiting components will have them placed as close as practical to the battery terminals, they will be insulated where needed, and all spacings will be per Section 3.1 to 3.1.3. Batteries or battery packs will not short-circuit the battery when removed or replaced, nor will they apply the battery output to the load side of the energy-limiting components. Movement of battery cells and/or energy limiting components, because of the drop test, Section 7.9.1, will not impair intrinsic safety. For hand-held portable apparatus, such as radio receivers and transceivers, the construction will prevent the ejection or separation of the batteries from the apparatus when it poses a hazard under rough-use conditions as represented by the drop test described in Section 7.9.1.

RESULTS: The sample has a 3-cell battery with a nominal value of 12.7-volts. The components on which intrinsic safety depends are located near the energy source. When the battery is installed or removed, the battery does short but does not degrade the intrinsic safety of the sample. The cells were leak tight and gas tight unless subjected to direct flames or temperature above 75°C at which point the battery seals begin to degrade. Cell to cell insulation thickness was greater than required. Batteries meet the requirements of this section.

SECTION 3.8.9 -- EXTERNAL BATTERY RECHARGING CONTACTS: External contacts for battery charging will not deliver ignition-capable energy due to accidentally short-circuiting and is considered preventable by one or more of the following methods: (1) blocking diodes preventing current flow and are to be considered subject to fault unless protected, (2) recessing one or more contacts so they are untouchable by a circular disc probe 1.2-mm thick and 18-mm in diameter, (3) recessing all contacts of a circuit so the above circular disc probe cannot touch the either contact, (3) recessing all contacts of a circuit so the above circular disc probe cannot touch the either contact, (4) recessing each contact 0.5-mm below the surrounding area and separating them so two circular probes arranged in any manner will not touch. Depending on the construction method used, the number of faults as specified in the table below is to apply towards the compulsory double fault. If the test disk makes contact or the charging contacts are not set apart to spacing below, the current measured added to the "normal" current in Section 2.1.1.1 to 2.1.1.1(4)

RESULTS: Sample does not have external contacts.

SECTION 4.1 to 4.1.3 -- MAXIMUM TEMPERATURE: The maximum, stabilized temperature rise of any surface exposed to flammable or combustible materials, normal or fault conditions, will not exceed marked value or temperature code rating on the label. All temperature rises are normalized to an ambient temperature of 40°C. If any stabilized temperature rise exceeds 100°C, a temperature code is required on the label. When checking wires 0.5 mm or smaller, refer to ANSI/UL 913-88 Table 2. For larger wires use equation in Section 4.1.2 of ANSI/UL 913-88. Exception: Instead of measuring temperature directly for large or small component(s), the method in ANSI/UL 913-88 Section 7.6, Small Component Ignition Test, may be used. Passing this Section yields a temperature code of T4. Temperatures higher than marked will be permitted for small components, such as transistors, resistors, small gage wires, or surface mount components, if it is shown by test, ANSI/UL 913-88 Section 7.6, or Section 7.11.3, that the temperature is insufficient to cause ignition or charring.

RESULTS: Maximum rise was 79 when normalized to 40°C with a temperature code of T5. Data based on SGS U.S. Testing Job Number 108694, report dated of October 19,1998.

SECTION 4.2 to 4.2.4 -- MARKING REQUIREMENTS: ANSI/UL 913 requires the following information on an apparatus label: identification of the apparatus including manufacturer's name or trademark and type or model designation, hazardous location division, class and group(s), maximum surface temperature or temperature identification number based on operation at 40° C (104° F) ambient temperature, and control drawing number. If the sample is battery powered, the battery type, size, and voltage may be specified by manufacturer and model number, or by electrical equivalent. When battery energy varies greatly from manufacturer to manufacturer, it will be labeled by manufacturer and model type only, no equivalents. These markings can be on the main label or in the battery compartment. If battery is not intrinsically safe, label will carry a warning to change batteries in areas known to be nonhazardous.

RESULTS: Sample label continues to meet requirements.

SECTION 5.1 to 5.2.2.2 – DETERMINATION OF SAFE CURRENT OR VOLTAGE: Circuits that can be readily assessed may be considered intrinsically safe, without spark ignition testing, by comparison to the ignition curves found on Figures 1 though 8, in the referenced Standard(s). All figures assume Groups A, B, C, D, or methane, as marked, and that the gas or vapors are in air at normal atmospheric conditions. Values found above and to the right of the curves will cause ignition of the gas or vapor under evaluation. The circuit values are for all normal and fault conditions but do not include the 1.5-times energy factor. Values of current or voltage must be dc or peak ac. For linear resistive circuits with less than 5-H inductance: For normal or a single-fault, the circuit under evaluation must not exceed 80 percent of the current value determined from Figure 1 or 2, or for a two-fault condition, the current must not exceed 90 percent of the determined current value. Inductance-Resistance - Circuits: Figures 3 or 4 apply to inductance-resistance circuits: Figures 5 and 6 apply to inductance-resistance circuits at stepped voltages for values of inductance versus current that ignite gases or vapors for Groups B and methane, respectively. Interpolation is required for groups C and D that are not on these figures. For normal or a single-fault, the circuit under evaluation must not exceed 80 percent of the current value determined from Figures 3 through 6, or for a two-fault condition, the current must not exceed 90 percent of the determined current value. Capacitance-Resistance Circuits: Figures 7 and 8 apply to resistance-capacitance circuits and show ignitable combinations Groups A and B or methane for capacitance, voltage, and resistance that ignite gases or vapors in air. Interpolation is required for groups C and D that are not on these figures. These curves only address the discharge of the capacitor under evaluation. For normal or a single-fault, the circuit under evaluation must not exceed 80 percent of the voltage value determined from Figures 7 or 8, or for a two-fault condition, the voltage must not exceed 90 percent of the determined voltage value.

RESULTS: The values were calculated using data from Section 2.1.1.2. These were used to derive the safe current and voltage levels from the appropriate graphs from Figures 1 through 8.

Linear-Resistive Circuits With Less Than 5-µH Inductance: The maximum resistive sample current was 0.284-amps at an applied 12.7-volts. Considering Figure 1, Resistance Circuits with aluminum, cadmium, magnesium, and zinc, does not have voltage values below 12.1 volts. The graph value was 12.7-volts corresponds to an initial safe current of 5.000-amps. Applying the 0.8-factor-factor for zero fault yields a final safe current of 4.000-amps.

Inductance-Resistance Circuits: The maximum inductance was 51.7-mH at a current of 0.094-amps. Considering Figure 3 Inductance Circuits with aluminum, cadmium, magnesium, and zinc, a chart value of 51.7-mH corresponds to an initial safe current of 0.124-amps at less than 12-volts. Applying the 0.8-factor for a zero fault that yields a final safe current of 0.100-amps.

Capacitance-Resistance Circuits: The maximum capacitance was 0.110-µF at 12.7-volts. Considering Figure 8, Capacitance Circuits containing aluminum, cadmium, magnesium, and zinc, the 0.110-µF capacitance corresponds to an initial safe voltage of 59.0-volts with 1.82-ohms in series with the capacitor. Applying the 0.8-factor yields a final safe voltage of 47.2-volts.

SECTION 6.2 to 6.2.4 -- SPECIFIC REQUIREMENTS FOR INTRINSIC SAFETY: Intrinsically safe and associated apparatus intended for use in Division 1, Class II and Class III hazardous locations will comply with all applicable requirements found in ANSI/UL 913-88, sections 1 through 5. Sample cases or enclosures that are not dust-tight, per ANSI/UL 913-88 Section 6.3.1 through 6.3.1.2, will have internal spacings faulted to produce the most unfavorable condition without consideration to the number of induced faults. Parts encapsulated to a depth of 1-mm or more are considered dust-tight. Only the external surfaces of dust-tight cases or enclosures are considered exposed. Dust-tight cases must remain so after the drop test in Section 7.9.1. The maximum temperature rises of any exposed surface, when normalized to an ambient temperature of 40°C will comply with permissible temperatures below. For compliance to Class II, Groups E and G, and Class III, samples must also meet spark ignition requirements for Division 1, Class I, Groups D, or methane. The maximum temperature of an exposed surface for compliance to Class II, Group E, atmospheres containing combustible metal dusts, will not exceed 200°C (392°F). For Class II Group F, atmospheres containing combustible carbonaceous dusts, the maximum temperature will not exceed 200°C

(392°F). For Class II, Group G, atmospheres containing combustible dust not included in Groups E or F, the surface temperatures will not exceed (329°F). For Class III, atmospheres containing easily ignitable fibers or flyings, the surface temperatures will not exceed 165°C (329°F). Exception: Temperature excursions of small, exposed components, when under fault conditions, may exceed these limits if it is shown by test that these components will not char or ignite test wheat or corn dust (or a mixture of both) that will pass through a 100-mesh screen.

RESULTS: Sample was not rated for Class II locations.

SECTION 7.9.1 Drop Test: Portable equipment or apparatus is subjected to six (6) drop impacts onto a concrete floor from a height of 1 meter. The apparatus will not impact more than once on each side, corner, or edge. The drop test will not affect the intrinsic safety because of being dropped.

RESULTS: Sample passes. Data based on SGS U.S. Testing Job Number 108694, report dated of October 19,1998.

COMMENTS: Compliance with UL 1604 is according to "Section 500-3(a) of ANSI/NFPA 70-1987, National Electrical Code, which states that equipment which has been approved for a Division 1 location shall be permitted in a Division 2 location of the same class and group. The sample is permitted in Division 2, Class I, Groups C, and D.

****

End of Report

Meco AST Overfill Alarm

Product description

The Meco alarm is an inexpensive battery operated, intrinsically safe overfill alarm. Assists in overfill prevention.

Part Number 200400.

Specifications

- Certified intrinsically safe to ANSI/UL 913.
- Meets NFPA 30A, UL 2244 and UFC requirements.
- Assists in overfill prevention.
- Loud (100 db) pulsating alarm to alert the operator when the product level reaches the preset level.
- 9 V dc battery powered (battery not included). Lithium battery is recommended in all installations for extended life.
  9 V Alkaline for -4° F to +130° F operation.
  9 V Lithium for -40° F to 158° F operation.
- No power consumption in the “Non-alarm” condition provides years of life from a lithium battery.
- Ultra low power consumption after alarm reset.
- Ultralife® 9 V Lithium batteries available from Radio Shack.
- Use on protected or standard tanks.
- Easy field retrofit. No conduit wiring required.
- Optional connections for 12 V intrinsically safe line power supply.
- Single push-button switch for test before filling tank and to reset the audible alarm after the high level alarm point is reached.
- Adjustable float switch to accommodate a wide range of high level point settings.
- Float switch adjustment range is from 12 to 20 inches. Further adjustments can be accomplished using pipe nipples as illustrated.
- The MECOAlarm™ case has provisions inside the cover for wall mounting. The case can be separated the float switch and

mounted in a convenient location. The maximum separation between the case and the float is 500 feet.

- Float switch alarm point must be adjusted in accordance with Local Code, NFPA 30A or UFC requirements as applicable for the particular installation.

CONTACT

MECO, INC.
8425 El Paso Street
La Mesa, CA. 91942
(619) 466-1469 office
(619) 741-7754 fax
mecoincorporated.com

12 V DC EXTERNAL POWER OPTION

The MECOAlarm™ is available on a special order basis to operate the optional MECO intrinsically safe 12 V DC wall mount power supply. A conduit "T" must be installed between the case and the 2" bushing and a 2 conductor cable is to be routed from the power supply through the "T" and connected to the terminals provided in the alarm housing. Conduit must be supplied from the conduit "T" to the 12 V supply in accordance with local codes. The battery is not required when using the external power supply.

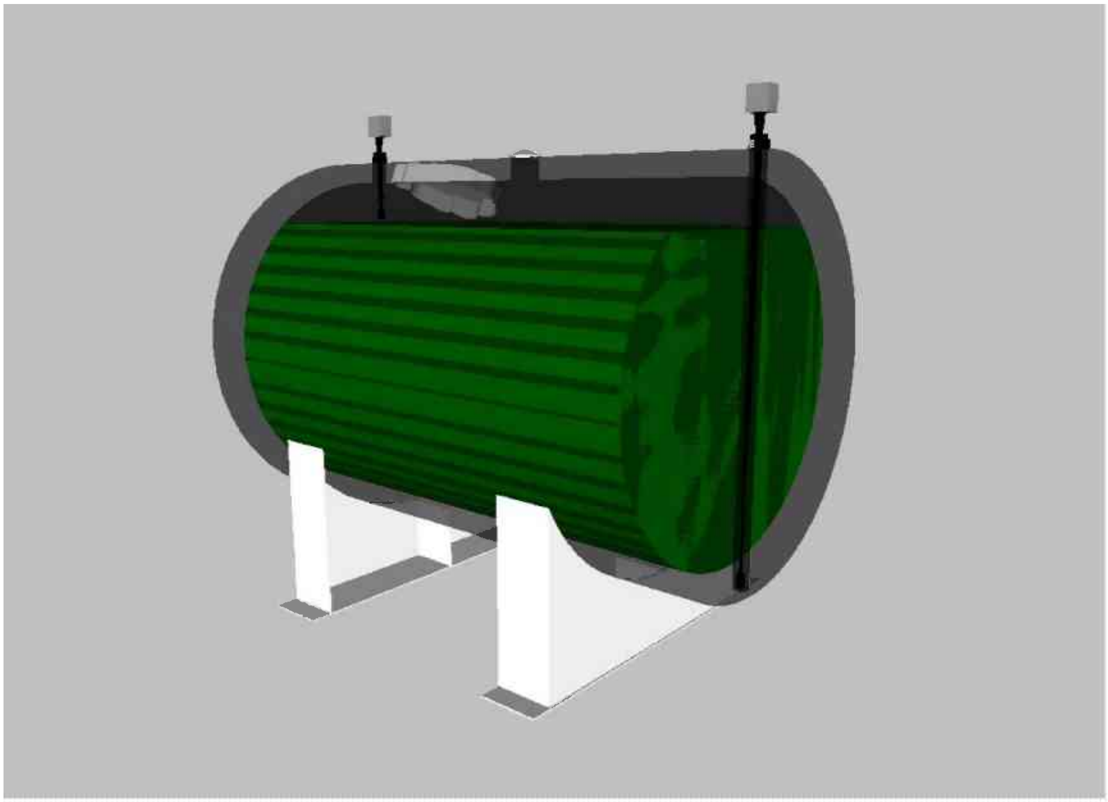
TYPICAL TALL TANK INSTALLATION

Remote Location of Alarm Case

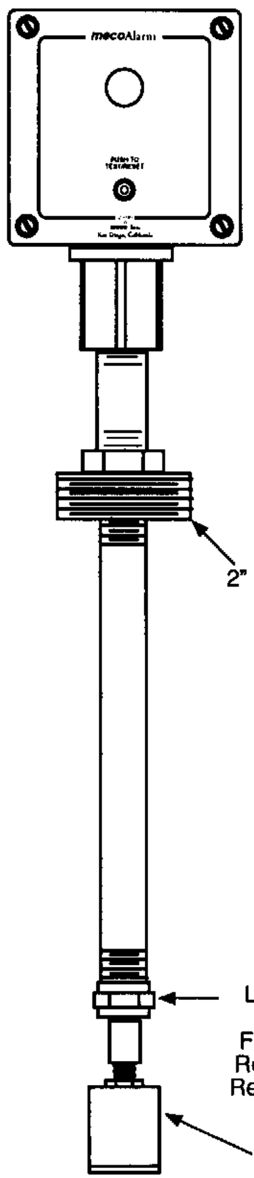
The MECOAlarm™ case has provisions inside the cover for wall mounting. Separate the case from the float switch assembly at the bushing and place the case at a convenient location for the operator. The maximum separation between the case and the float switch assembly is 500 feet. The case may be mounted to any surface using the two mounting holes provided under the cover. Use conduit as required by local codes from the float switch assembly to the case and extend the wire to the case using two conductors.

For all tank installations, the installer must adjust the bottom of the float switch to establish the alarm point in accordance with Local Code, NFPA 30A or UFC requirements as applicable for the particular installation. The alarm point may be determined from the tank capacity chart.

The Meco Alarm can be used as an overfill alarm or be configured to be used as an interstitial leak detector. When used as an interstitial monitor, Meco can custom build the probe length to meet any tank manufacturer's specifications.



FINAL INSPECTION AND/OR APPROVAL FOR USE SHALL BE MADE BY THE LOCAL ELECTRICAL AUTHORITIES



*meco*Alarm Installation Instructions

1. Remove four cover screws and remove cover.

2. Plug 9 V battery into terminals provided. For longest life and for use in climates with temperatures below -4°F, the Ultralife 9 V Lithium battery is recommended. Ultralife batteries are available from Radio Shack.

3. Close cover using care not to pinch wires between the cover and the case and replace four screws.

4. Test unit for proper operation.
   a. Press the Test/Reset Button and insure the alarm sounds while the button is depressed and the alarm stops when the button is released.
   b. Turn unit upside down and insure alarm sounds. While unit is upside down, press and release the Test/Reset Button and insure the alarm stops.

5. Adjust the Float Switch for the proper trip point prior to installing into tank. To adjust the Float Switch, loosen the chrome nut and extend the switch to the desired length and tighten the chrome nut. DO NOT OVER TIGHTEN THE CHROME NUT, a snug fit is all that is required. The nut is properly tightened when the Float Switch cannot be moved in or out of the 1/2" pipe.

6. Install the alarm in the tank.

BEFORE FILLING ANY TANK WITH THE ALARM INSTALLED, ALWAYS TEST THE ALARM BY PRESSING THE TEST/RESET BUTTON AND INSURE THE ALARM SOUNDS.

To insure maximum battery life, after the tank is full and the alarm has sounded, turn off the alarm by pressing the Test/Reset Button. Battery life is significantly reduced if the alarm is left on.

NOTE: THE *meco, Inc.* POWER SUPPLY PN 200051-2 IS NOT APPROVED FOR USE WITH THE ALARM IN CANADA

meco, Inc.
8425 El Paso Street, La Mesa, CA 91942

INSTALLATION INSTRUCTIONS, *meco*Alarm		
DATE: 1/15/02	DWG. NO. 200408	
REV. B	SCALE: NONE	SHEET 1 OF 1

Meco Alarm Installation Instructions

1. Remove four cover screws and remove cover.
2. Plug 9V battery into terminals provided. For longest life and for use in climates with temperatures below -4°F, the Ultralife 9 V lithium battery is recommended. Ultralife batteries are available from MecoAlarms.com.
3. Close cover using care not to pinch wires between the cover and the case, then replace four screws.
4. Test unit for proper operation.
    a. Press the test/reset button and ensure the alarm sounds when the button is depressed and the alarm stops when the button is released.
    b. Turn unit upside down and ensure alarm sounds. While unit is upside down, press and release the test/reset button and ensure the alarm stops.
5. Adjust the Float Switch for the proper trip point prior to installing into tank. To adjust the Float Switch loosen the Chrome Nut and extend the switch to the desired length and tighten the Chrome Nut. Do not over tighten the Chrome Nut; a snug fit is all that is required. The Nut is properly tightened when the float switch cannot be moved in or out of the ½ inch pipe.
6. Install the alarm in the tank.

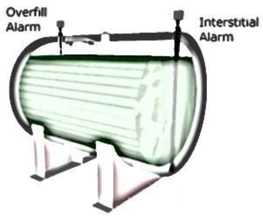
BEFORE FILLING ANY TANK WITH THE ALARM INSTALLED, ALWAYS TEST THE ALARM BY PRESSING THE TEST/RESET BUTTON AND ENSURE THE ALARM SOUNDS.

To ensure maximum battery life, after the tank is full and the alarm has sounded, turn off the alarm by pressing the test/reset button. Battery life is significantly reduced if the alarm is left on.

See reverse side for important notes when installing Alarm Head remotely from the high level sensor

Re-order at MecoAlarms.com

MECO



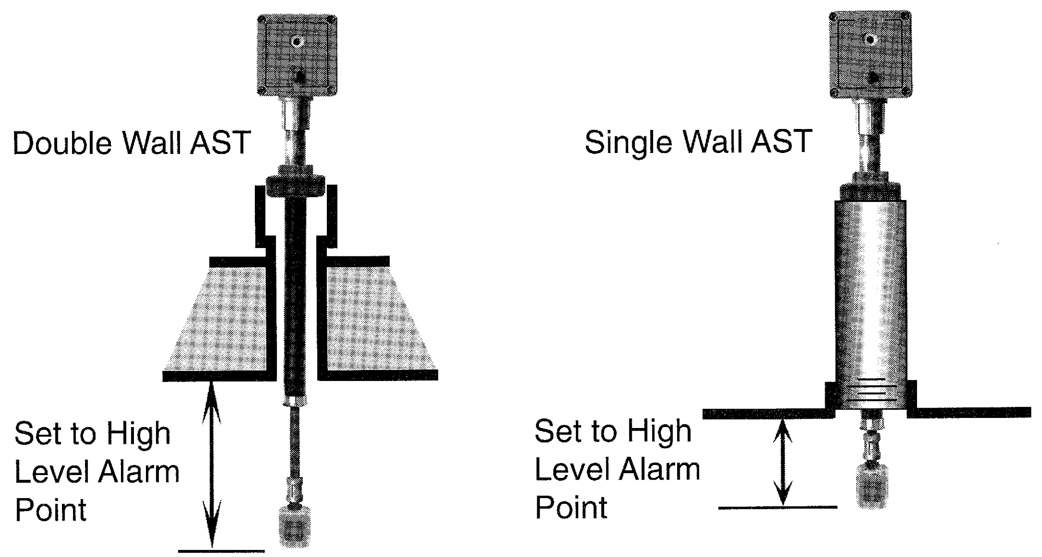
2" NPT Mounting Bushing

Loosen Chrome Nut and pull Float Switch down to required position, then retighten chrome nut.

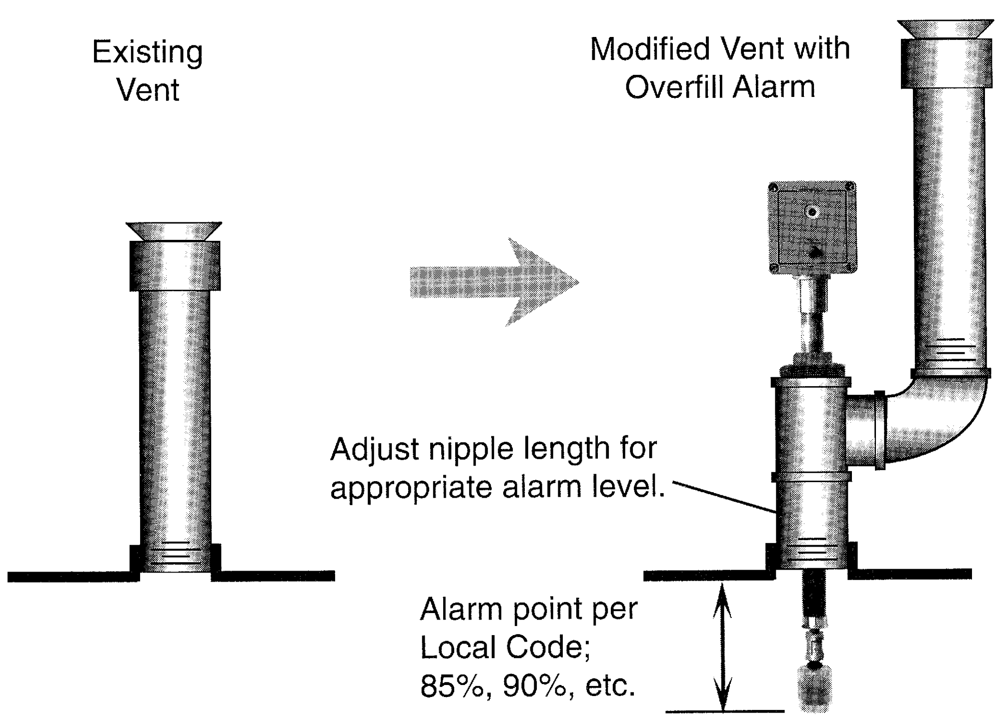
Float Switch: Adjust Float Switch to sound Alarm at the 90% fill point

Final inspection and/or approval for use shall be made by the local electrical authorities

TYPICAL NEW INSTALLATIONS



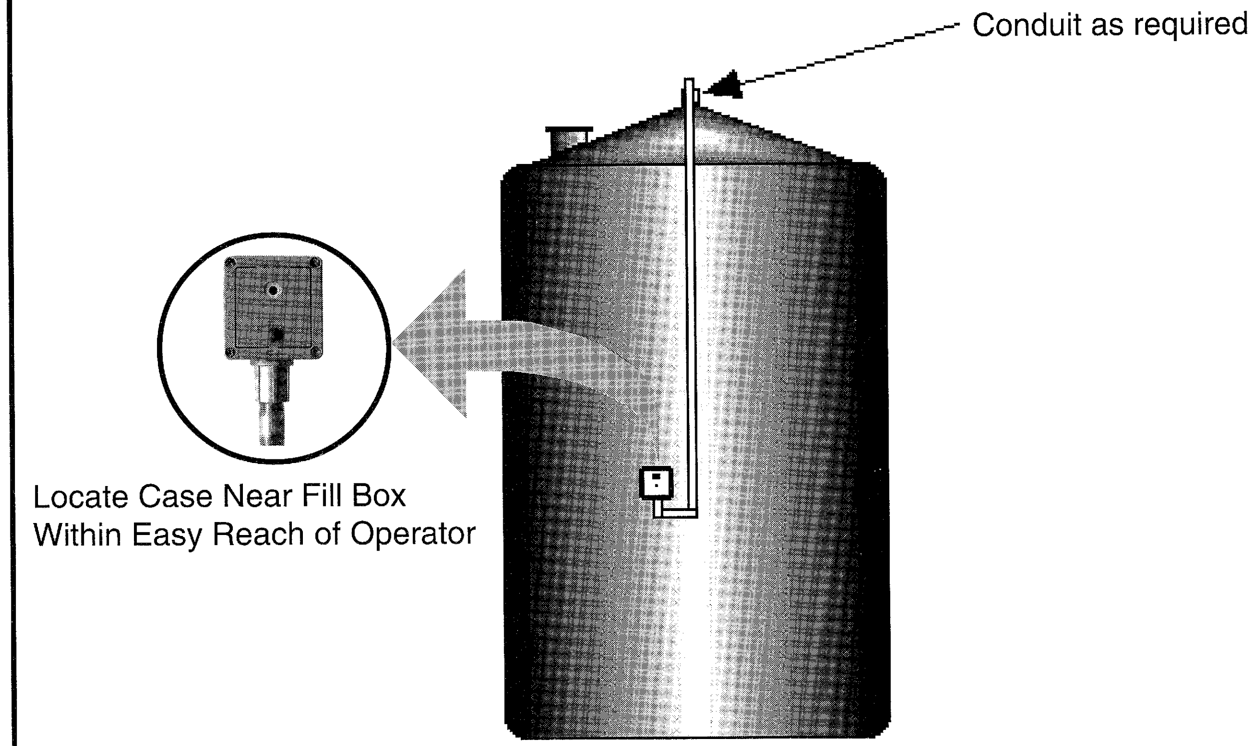
TYPICAL RETROFIT INSTALLATION



meco AST Overfill Alarm

TYPICAL TALL TANK INSTALLATION

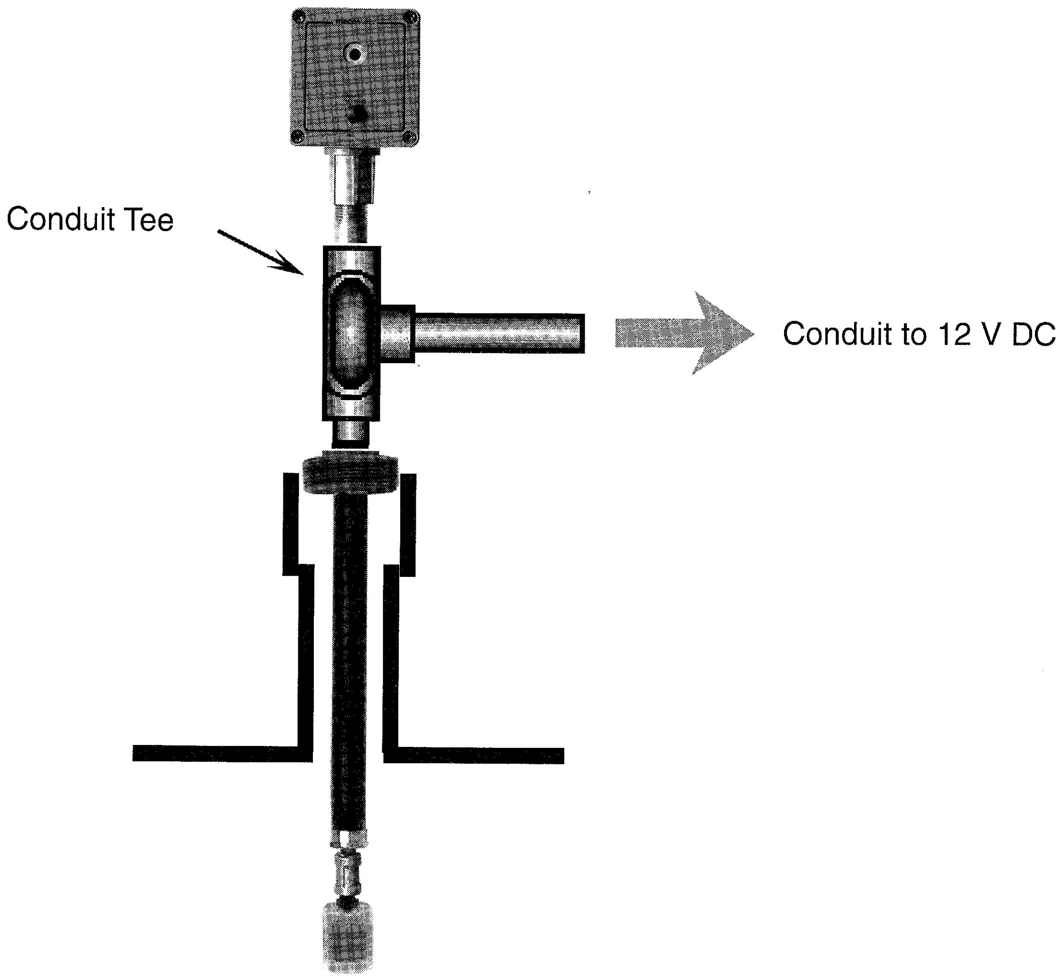
Remote Location of Alarm Case



The ***meco*Alarm™** case has provisions inside the cover for wall mounting. Separate the case from the float switch assembly at the bushing and place the case at a convenient location for the operator. The maximum separation between the case and the float switch assembly is 500 feet. The case may be mounted to any surface using the two mounting holes provided under the cover. Use conduit as required by local codes from the float switch assembly to the case and extend the wire to the case using two conductors.

For all tank installations, the installer must adjust the bottom of the float switch to establish the Alarm Point in accordance with Local Code, NFPA 30A or UFC requirements as applicable for the particular installation. The Alarm Point may be determined from the tank capacity chart.

12 V DC EXTERNAL POWER OPTION



The ***meco***Alarm™ is available on a special order basis to operate from the optional ***meco*** Intrinsically Safe 12 V DC Wall Mount Power Supply. A conduit "T" must be installed between the case and the 2" bushing and a 2 conductor cable is to be routed from the Power Supply through the "T" and connected to the terminals provided in the alarm housing. Conduit must be supplied from the conduit "T" to the 12 V supply in accordance with local codes. The battery is not required when using the external power supply.

meco Inc. Mroz Engineering Company, Inc.
6326 Lake Dora Avenue, San Diego, CA 92119
(619) 466-1469 • FAX (619) 465-1447

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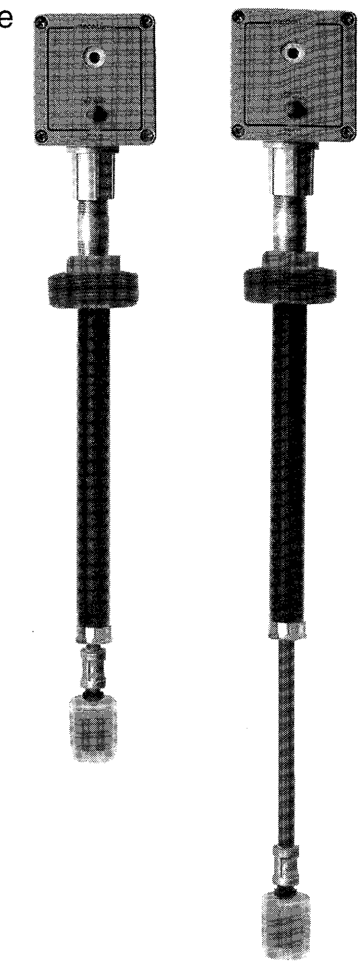
meco AST Overfill Alarm

Battery Operated

Part Number 200400



The ***meco***Alarm™ is an inexpensive battery operated, Intrinsically Safe Overfill Alarm offering the following features:

- **Certified Intrinsically Safe to ANSI/UL 913.**
- Meets NFPA 30A, UL 2244 and UFC Requirements.
- Assists in Overfill Prevention.
- Loud (100 db) Pulsating Alarm to alert the operator when the product level reaches the preset level.
- 9 V dc **Battery Powered** (Battery not included. Lithium battery is recommended in all installations for extended life).
  9 V Alkaline for -4° F to +130° F operation.
  9 V Lithium for -40° F to +158° F operation.
- No power consumption in the "Non-alarm" condition provides years of life from a Lithium battery.
- Ultra low power consumption after Alarm reset.
- Ultralife® 9 V Lithium batteries available from Radio Shack.
- Use on protected or standard tanks.
- Easy field retrofit. No conduit or wiring required.
- Optional connections for 12 V Intrinsically Safe line power supply.
- Single push-button switch for test before filling tank and to reset the Audible Alarm after the high level alarm point is reached.
- Adjustable float switch to accommodate a wide range of high level alarm point settings.
- Float switch adjustment range is from 12 to 20 inches. Further adjustments can be accomplished using pipe nipples as illustrated.

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