TELEDYNE BATTERY PRODUCTS

7000 SERIES (LT)
VALVE-REGULATED LEAD-ACID
AIRCRAFT BATTERY SERVICE MANUAL

PROPOSITION 65 WARNING

BATTERY POSTS, TERMINALS AND RELATED ACCESSORIES CONTAIN LEAD AND LEAD COMPOUNDS, CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND REPRODUCTIVE HARM. **WASH HANDS AFTER HANDLING.**

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WARNING

THE SAFETY INSTRUCTIONS/PRECAUTIONS POSTED IN VARIOUS SECTIONS WITHIN THIS MANUAL MUST BE STRICTLY FOLLOWED.

ALWAYS WEAR SAFETY GLASSES AND ACID-RESISTANT GLOVES WHENEVER HANDLING BATTERIES ELECTROLYTE CONTAINS SULFURIC ACID, WHICH CAN PERMANENTLY DAMAGE EYES AND CAUSE SEVERE BURNS TO EXPOSED SKIN.

FOR LIMITATIONS, PROCEDURES AND PERFORMANCE INFORMATION NOT CONTAINED IN THIS SUPPLEMENT CONSULT THE BASIC PILOTS OPERATING HANDBOOK, AIRPLANE FLIGHT MANUAL, THE SPECIFIC STC OR THE BATTERY CONTINUOUS AIRWORTHINESS INSTRUCTIONS FOR THE APPLICATION.
THIS SERVICE MANUAL SHOULD NOT BE CONSTRUED AS THE FINAL AUTHORITY IN MAINTAINING YOUR SPECIFIC BATTERY. PLEASE CONSULT WITH TELEDYNE TECHNICAL SUPPORT FOR FURTHER INFORMATION.

CONTENTS

COMPONENT MAINTENANCE MANUAL

REVISIONS

Revision	Description of Change	Approved By	Date
NC	New document	JMR	10-27-07

Premium LT Valve Regulated Lead Acid Aircraft Batteries By TELEDYNE BATTERY PRODUCTS

SCOPE

This manual provides Maintenance Procedures for Gill 7000 Series Valve-Regulated Lead-Acid (LT VRLA) Aircraft Batteries manufactured under FAA Parts Manufacturer Approval number PQ1006NM for type certificated aircraft.

This manual has been written for the purpose of guidance only; consult Teledyne Battery Products Technical Support for further information.

The latest list of our PMA's can be obtained on our website at: www.gillbatteries.com or by calling our Customer Support at (800) 456 0070.

VALVE-REGULATED LEAD-ACID BATTERIES

3.1 DESCRIPTION

3.1.1 The 7000 series valve-regulated lead-acid (VRLA) batteries are designed with an optimum lead alloy with tin and copper to provide the best possible electrode characteristics necessary for performance. These VRLA batteries contain electrolyte absorbed in glass-mat separators, with no free electrolyte and are sometimes referred to as "sealed" or "recombinant-gas" batteries.

WARNING

ALL VRLA batteries contain sulfuric acid, which is highly corrosive and which can cause serious physical injury if it comes in contact with skin or if inhaled. It can also cause serious eye injury or blindness if it comes into contact with the eyes.

Caution must be exercised to avoid damage to the exterior case which could allow the contents to escape or come in physical contact with external materials or personnel.

If a battery case is found to be damaged, handle the battery with care and avoid contact with the skin. Inspect all areas adjacent to the battery for evidence of corrosion.

3.1.2 Gill valve-regulated lead-acid batteries have vent caps (with valves enclosed) that are sealed in place and cannot be accessed for maintenance. At no time must these vent caps be removed.

WARNING

During normal operation, the batteries will vent very small amounts of gases that must be vented away from the battery and aircraft. The venting mechanisms consist of nozzles (in the battery cover) and vent tubes that are designed to exhaust the battery compartment. Ensure that the vent tubes are not restricted or disabled in any way.

3.1.3 The electrolyte is contained in an absorptive glass-mat (AGM) separator that retains and immobilizes the electrolyte. These batteries can be operated in any orientation without spilling electrolyte.

3.1.4 The battery consists of twelve cells connected in series internally, making up a 24V battery, or six cells for 12V batteries. These cells are not replaceable.

3.1.5 Each cell is constructed of premium grade LT electrodes (plates) that are electrically isolated by AGM separators. These cells are inserted in the battery case under compression that helps to provide consistent availability of electrolyte with the tight pack providing good resistance to vibration.

3.2 SPECIFICATIONS

3.2.1 Gill battery ratings are defined by a series of specifications:

3.2.1.1 **The One-Hour Rate**

This is the rate of discharge a battery can endure for one hour with the battery voltage at or above 1.67 volts per cell, or 20 volts for a 24 volt lead-acid battery, or 10 volts for a 12 volt lead-acid battery.

The One-Hour Capacity, measured in Ampere Hours or Ah, is the product of the discharge rate and time (in hours) to the specified end voltage.

3.2.1.2 **The Emergency Rate**

This is the rate of discharge a battery can endure for thirty minutes with the battery voltage at or above 1.67 volts per cell, or 20 volts for a 24 volt lead-acid battery, or 10 volts for a 12 volt lead-acid battery.

The Emergency Rate is the total essential load, measured in amperes, required to support the essential bus for thirty minutes.

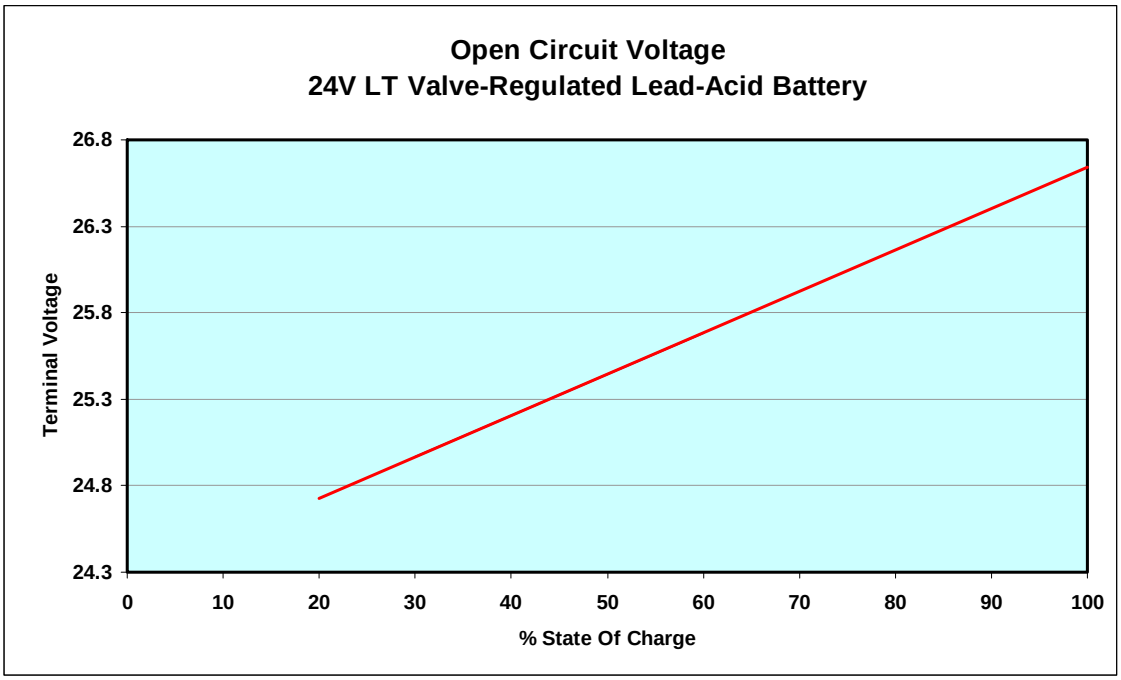
3.2.1.3 I_{pp}: This is the peak current delivered at 0.3 seconds into a 15 second controlled discharge at a constant terminal voltage of half the nominal battery voltage.

I_{pr}: This is the discharge current at the conclusion of a 15 second controlled discharge at a constant terminal voltage of half the nominal battery voltage.

3.2.2 State of charge using voltage measurements should be used as a guide only. Figure 1 indicates the relationship between Battery Open-Circuit Voltage (OCV)

and % State-of-Charge (SOC). Please note that state-of-charge is not the same as available capacity (see GLOSSARY).

FIGURE 1



3.2.3. All valve-regulated batteries operate best in controlled temperatures. Excessive excursions above 100^{0}F can shorten the life of lead-acid batteries. The optimum operating temperature is around 80^{0}F.

Available capacity declines as the temperature drops. This decline is primarily related to the state of the electrolyte and easily recoverable once the battery has warmed up sufficiently.

3.3 STC KIT PURCHASE

3.3.1 GILL STC KITS have been manufactured pursuant to FAA-Parts Manufacturer Approval (FAA-PMA) and are designed for use only with specified GILL batteries and parts. Teledyne Continental Motors Battery Products accepts no responsibility for any failure caused by any battery or part used with these kits which it does not manufacture, supply or specify.

SERVICE INSTRUCTIONS

4.1 SHIPMENT OF BATTERIES

4.1.1 The batteries are shipped conditioned and fully charged.

4.1.2 Each battery is identified with a unique serial number label and manufacturing date marked with indelible ink on the right side of the battery (side adjacent to the positive terminal, with the terminals facing forward). Please use this manufacturing date for future reference.

4.2 INSPECTION FOR SHIPPING DAMAGE

4.2.1 Upon receipt, the packages must be examined for any shipping damage before they are placed in storage or use. If any damage is noted, contact the shipping company immediately.

4.2.2 Type verification can be performed by checking the serial number label on the packaging against the accompanying FAA Form 8130-3 or Certificate of Compliance.

4.3 STORAGE REQUIREMENTS

4.3.1 Teledyne's 7000 series valve-regulated lead-acid batteries can be stored between -20^{0}F and +110^{0}F (store ideally at 80^{0}F). Storage at temperatures other than these, can lead to permanent damage.

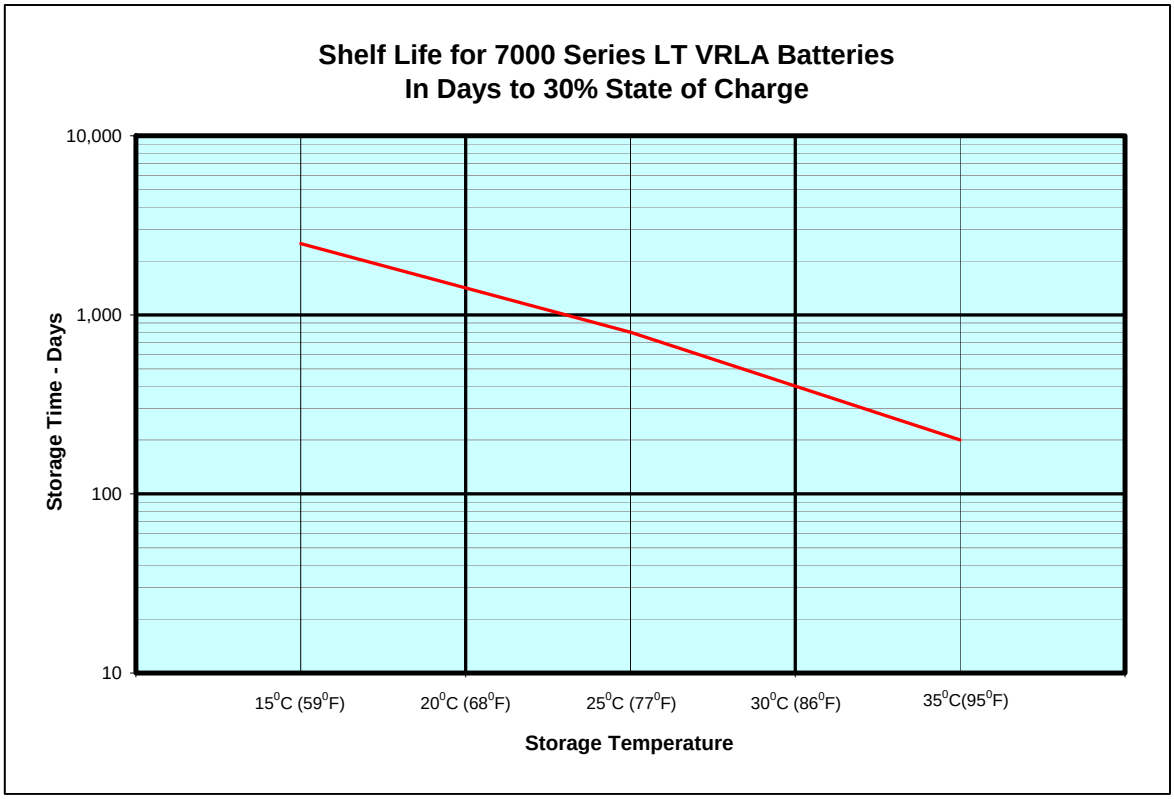
Storage temperatures will determine inspection requirements.

4.3.2 Teledyne's 7000 series valve-regulated lead-acid batteries have a maximum of 24 months of inspection-free storage life, IF stored at temperatures between 40^{0}F to 80^{0}F.

Batteries maintained at lower temperatures should be reviewed in this category as well.

4.3.3 Review figure 2 to determine the shelf life at various temperatures indicated. The 7000 series batteries can be stored for the number of days at the temperature indicated in Figure 2 without any damage.

FIGURE 2



4.3.4 If stored between 95°F (35°C) to 110°F (43°C), the battery must be inspected on a monthly basis. It is not recommended to store any VRLA batteries at these temperatures for excessive periods of time (maximum 3 months storage). Prolonged storage at high temperatures (over 110°F) will reduce battery life.

4.3.5 All batteries returned from service after initial use must be stored fully charged. The storage start date and battery voltage must be logged on the outer package or marked on the battery.

4.3.6 Long term storage at low temperatures (around 0°F) will not detrimentally affect the life of the battery, provided the battery is at a reasonably high state of charge (over 80%) before placing in storage.

4.3.7 Please call Gill technical support if there are any questions regarding shelf life and recharge periods.

4.4 INITIAL INSPECTION

4.4.1 Visually inspect the battery to ensure there is no damage. Remove the protective cap over the terminal pins and ensure that the pins are clean and there is no corrosion. The pins have been installed with the correct torque at the factory and do not require any re-seating. Call Gill Technical Support if you find any discrepancy.

4.4.2 DO NOT remove the lid. This is a "sealed" battery and does not need any other maintenance.

4.4.3 Inspect the open circuit voltage. Typical practice should be to recharge the battery at constant potential before placing into service. Review section 5 for all charging instructions.

For basic charging, constant-potential is the preferred charging method. Deep-discharge recovery will usually require application of Constant-Current and/or Constant-Potential charging (see 6.4). Please consult with technical support at Teledyne before attempting recovery from prolonged deep-discharge.

WARNING

ALL VRLA batteries contain sulfuric acid, which is highly corrosive and which can cause serious physical injury if it comes in contact with skin or if inhaled. It can also cause serious eye injury or blindness if it comes into contact with the eyes.

Caution must be exercised to avoid damage to the exterior case which could allow the contents to escape or come in physical contact with external materials or personnel.

If a battery case is found to be damaged, handle the battery with care and avoid contact with the skin. Inspect all areas adjacent to the battery for evidence of corrosion.

4.4.4 Charging should be terminated when the charge current drops to less than 0.5 ampere (typically takes up to 15 hours depending on the state-of-charge of the battery).

CHARGING

RECOMMENDATION

Charging should be conducted in a well-ventilated area at ambient conditions ranging from 65ºF to 80ºF.

5.1 OVERVIEW

5.1.1 Please review the charging method (constant-current or constant-voltage) before commencing. The preferred method is constant-voltage.

5.1.2 Correct charging is very important and will affect the overall life of the battery. The charging process is not 100% efficient due to losses resulting from internal resistance and will typically require 10% to 20% more recharge than the amount of capacity removed during discharge.

5.1.3 Undercharging a battery occurs when the required 110% to 120% of the removed capacity is not returned during recharge. If this occurs repeatedly, residual lead sulfate will eventually increase in the plates, making it difficult to fully recharge the battery. In this case the battery will suffer a permanent loss of capacity.

5.1.4 Overcharging generally occurs when either constant-current charging is used without adequate control of total time on-charge or the voltage limit in constant-voltage charge is higher than the recommended range (see 5.3.4). Overcharging a battery will corrode the positive grids and break-down the water component in the electrolyte to hydrogen and oxygen (electrolysis). This is quite detrimental to the life of VRLA batteries since the water cannot be replaced.

5.2 CONSTANT-CURRENT (CI)

5.2.1 These chargers must be capable of providing an output of ~ 35 volts and ~ 8 amperes (with selector switch) and provide a timer that can terminate charging when the required charge input is provided.

5.2.2 The ampere hours of energy restored is the product of rate of charge (in amperes) and the time (in hours).

5.2.3 Since these chargers are designed to provide a constant current throughout the charging period, this method can lead to overcharging if not controlled. In order to control the charge input, these chargers must have a shut-off timer.

5.2.4 In order to reduce heat and minimize corrosion, it is preferred to use low rates (0.5amps to 5 amps) when charging batteries using this technique. Note explanation in 6.4 "Deep Discharge Recovery" for general outline on using constant current recharge.

The battery will get slightly warm during charge. Measured at the surface of the case, the battery temperature should not exceed 100^{0}F.

5.2.5 For a complete list of all battery types and the charging rates, please use Table 1.

TABLE 1

CONSTANT-CURRENT CHARGING RATES

24 VOLT BATTERIES								
Battery No Load Voltage	One-Hour Capacity (Ah)							Charge Time (Hr)
	6.5	10	13	15	20	24	44	
	Charge Rates (Amps)							
>26.3	Charging Not Required							0
26.1 to 26.3	0.5	0.5	0.5	0.5	1	1	2	5
25.8 to 26.0	0.5	0.5	0.5	0.5	1	1	2	9
25.5 to 25.7	0.5	0.5	1	1.5	1	1	2	13

12 VOLT BATTERIES			
Battery No Load Voltage	One-Hour Capacity (Ah)		Charge Time (Hr)
	18	23	
	Charge Rate (Amps)		
>13.2	Charging Not Required		0
13 to 13.2	1	1	5
12.8 to 12.9	1	1	9
12.6 to 12.7	1	1	13

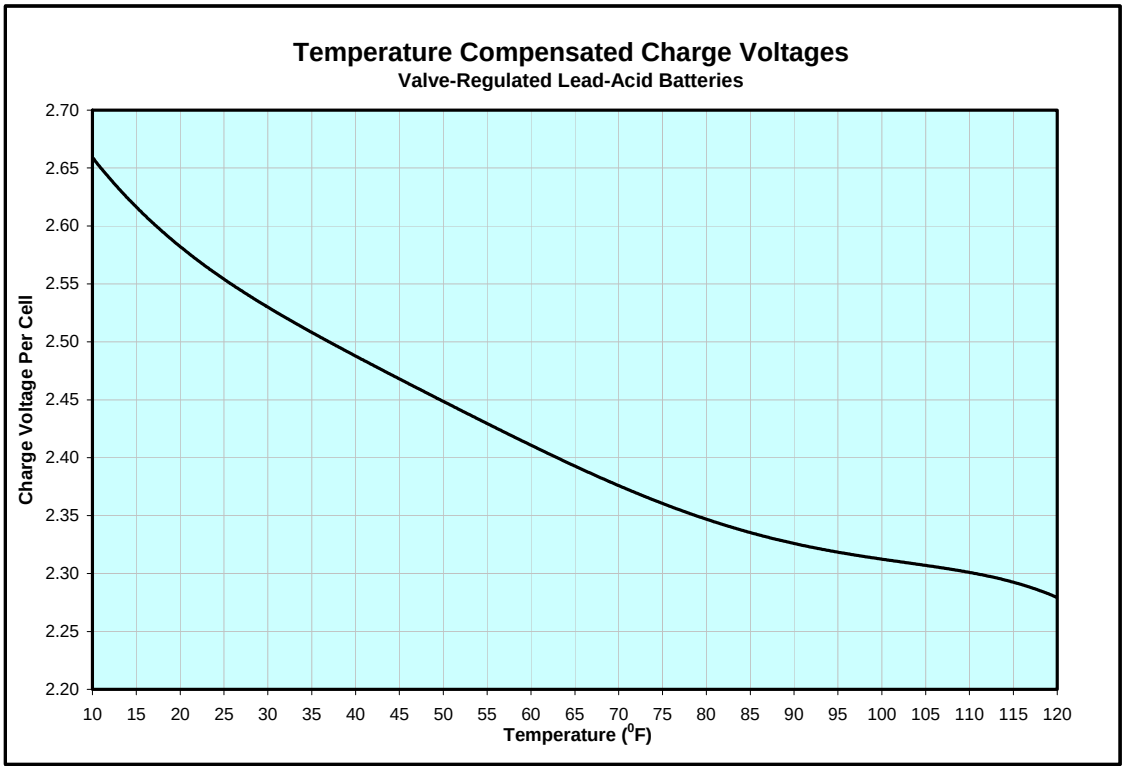
5.3 CONSTANT-VOLTAGE (CV)

5.3.1 These chargers are generally designed to provide a constant voltage source, with selectable initial current rates. Model variants provide selectable charge voltage and initial charge rates. Higher output current will reduce recharge time.

5.3.2 Because the current in any circuit is directly proportional to the voltage gradient across that circuit, CV charging will result in a high initial charging current which will start dropping off when the voltage gradient between the charger and battery begins to decrease.

5.3.3 Typically, the charger will regulate to 28.4 volts (24 volt batteries) or 14.2 volts (12 volt batteries). As the battery approaches the charger output voltage, charge current will drop below 0.5 ampere.

FIGURE 3



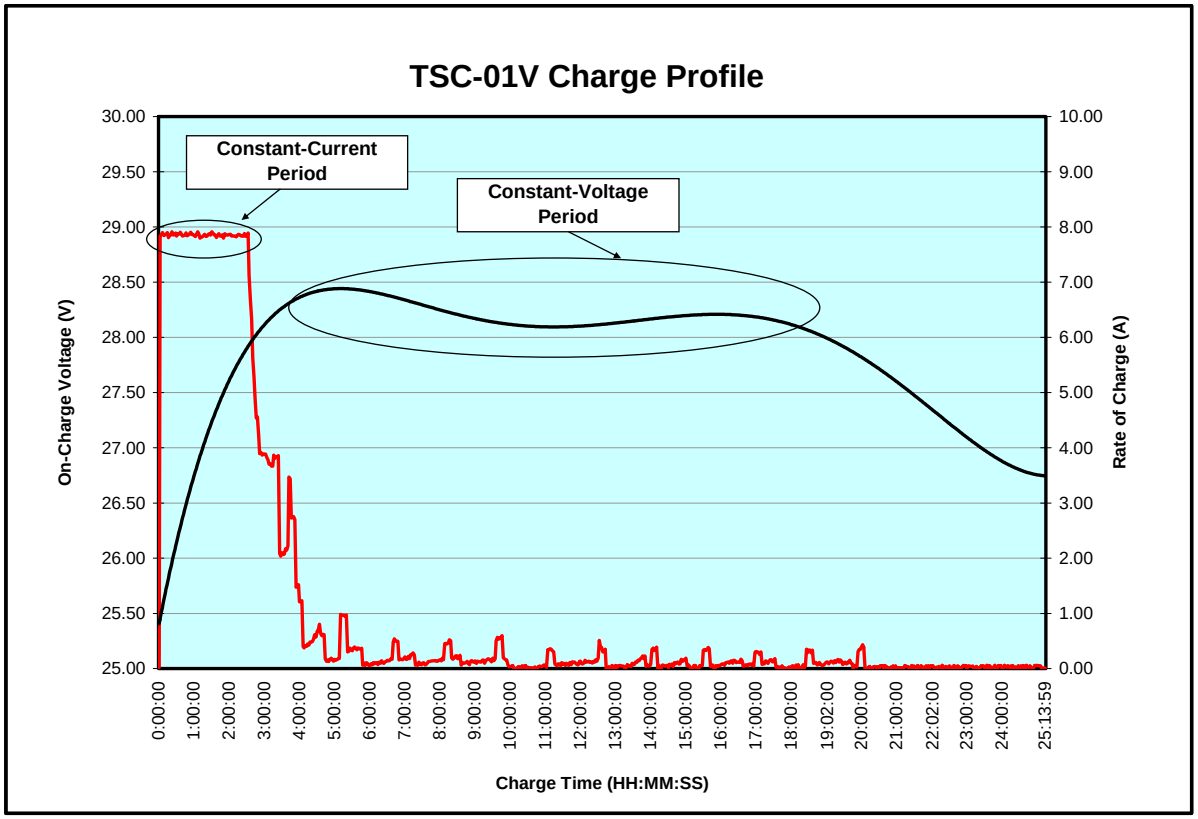
5.3.4 The battery must be connected to the charger with output voltage set between 28.2V up to 29.0V for 24V batteries (14.1V to 14.5V for 12V batteries) and left on until the charge rate drops below 1 ampere. At this point, disconnect the charger from its power source first before disconnecting the battery from the charger. Disconnecting the charger first will eliminate any sparks, since the battery could still be accepting a low rate of charge.

Note: Unless the charger is of a type that turns off automatically, you must disconnect the charger and battery once the charge rate drops below 0.5 ampere.

5.3.5 Alternatively, constant-voltage charging can be temperature-compensated for better control. Note Figure 3 for Temperature Compensated Charge Voltages.

5.3.6 Figure 4 represents Teledyne Battery Products' TSC-O1V Charger profile. This is a specialized charger that provides a constant-current charge initially; thereafter, it switches to constant-voltage charge to the battery.

FIGURE 4



5.4 OVERCHARGING

5.4.1 Overcharging will occur when using uncontrolled constant-current charging or if the voltage limit on a constant-voltage charger is higher than the manufacturer's recommended value (see 5.3.4).

5.4.2 Prolonged overcharging will lead to loss of water from the electrolyte – in the form of gassing and grid corrosion.

Please call Gill Technical Support for any additional concerns with charging.

ROUTINE MAINTENANCE

6.1 INSPECTION/SERVICE PERIOD

After initial installation, Gill requires a capacity check of the battery to be performed at 1,200 hours or 12 months, whichever comes first, with subsequent capacity checks performed every 600 hours or 6 months. Please refer to aircraft manufacturer's guidelines for further clarification.

WARNING

The battery must be removed from the installation and serviced in a well-ventilated designated area. During servicing, the battery will generate oxygen and hydrogen gases, which can be explosive under the right conditions.

6.1.1 Battery Integrity

Visually inspect the battery for any signs of cracks, corrosion, unusual terminal pin wear or discoloration on the pins.

WARNING

ALL VRLA batteries contain sulfuric acid, which is highly corrosive and which can cause serious physical injury if it comes in contact with skin or if inhaled. It can also cause serious eye injury or blindness if it comes into contact with the eyes.

Caution must be exercised to avoid damage to the exterior case which could allow the contents to escape or come in physical contact with external materials or personnel.

If a battery case is found to be damaged, handle the battery with care and avoid contact with the skin. Inspect all areas adjacent to the battery for evidence of corrosion.

6.2 CONTINUED AIRWORTHINESS REQUIREMENT – CAPACITY TESTING

During this inspection process the following components must be reviewed:

6.2.1 Measure and record the battery voltage.

6.2.2 Charge the battery using Constant-Current or Constant-Voltage methods described in Section 5.

6.2.3 Allow the battery to rest for 4 hours before commencing the discharge test.

6.2.4 The battery should be discharged at the 1 hour rate (see Table 2, Appendix A) to an end voltage of 1.67 volts per cell or 20 volts (per IEC 60952-1). Measure the time. The battery must achieve at least 80% of the rated time (or 48 minutes at the 1 hour rate). If the first discharge time is less than 48 minutes, repeat the cycle one more time.

6.2.5 If the second discharge fails to deliver at least 48 minutes, the battery should be rejected. Call Gill Technical Support for further details.

6.2.6 If the discharge cannot be conducted according to the rates required, Teledyne Gill can provide the appropriate discharge curve for that battery and suggest alternative rates. These performance curves are also in Appendix C. Call Gill Technical Support for additional instructions.

6.2.7 Once the battery has passed all required inspections and after it is fully recharged using constant-voltage charging methods, the battery is ready for installation.

6.3 INSPECTION OF CONNECTORS

6.3.1 Before reconnecting to the aircraft, ensure that the connector sockets have not worn or become loose. This inspection can be performed with a go-no-go gauge, part number 3600-51, obtained from Teledyne Gill.

6.4 DEEP-DISCHARGE RECOVERY

6.4.1 Deep discharge is usually indicated by a battery voltage of less than 21 volts. A battery which has been deeply discharged can be recharged using constant-current charging techniques. Constant-voltage method is not recommended.

6.4.2 The battery should be charged at a rate of 1.0A for a total input (in ampere-hours) of 200% of the one-hour capacity, which is determined as follows:

For example, for a one-hour capacity of 44 Ah, the charge time is determined as follows:

2 x 44Ah = 88 Ah (Ampere-hours) needed.
At the charge rate of 1.0 amperes, the total charge time would be:
88 Ah/1.0A = 88 hours

6.4.3 Stable voltage, measured 2 hours after charge termination, should be between 26.3V to 26.5V for 24V batteries and 13.1V to 13.3V for 12V batteries. If the voltage falls below the range specified, charging should be resumed using guidelines in 5.3.

Charging the battery to voltages higher than specified can shorten battery life.

6.4.4 Avoid subjecting a battery to frequent deep discharges as this can reduce the useful life of the battery.

UNSCHEDULED REMOVALS

7.1 Unscheduled removals may be required when the battery has been inadvertently discharged or has a premature failure. Recharging the battery using Constant Current method described in 5.2 should be attempted. . Perform a capacity check as outlined in 6.2.3 through 6.2.6. If the battery fails to provide specified capacity as noted in Table 2, Appendix A, it should be rejected.

7.2 In lieu of the capacity test set forth above, testing on an installed battery may be performed during the 400-hour maintenance check, or the periodic maintenance interval performed by the service center. This test entails a battery OCV check which is compared to the graph in Figure 1. If the voltage is below 75% state-of-charge, the battery should be pulled out for servicing as outlined in Section 6.

TRANSPORTATION

8.1 Gill LT VRLA batteries are classified as “Nonspillable” and are exempted from all other requirements of 49 CFR, Chapter 1, Subchapter C, Parts 106 – 180, as determined in:

a) US Department of Transportation’s 49CFR, Chapter 1, Part 173.159, paragraph “d”
b) IATA/ICAO Packing Instructions 806, Provision A67

RECYCLING

9.1 MATERIAL SAFETY DATA SHEETS

9.1.1 These have been included in Appendix C. They can be downloaded as needed from the Gill website: www.gillbatteries.com

9.2 RECYCLER LOCATIONS

9.2.1 All parts of spent lead-acid batteries are recyclable. Generally, batteries are collected by retailers and wholesalers who send large quantities to battery recyclers for reclamation. Battery recyclers are permitted hazardous waste treatment recycling facilities. If you have just a few batteries you should contact your local battery retailers or wholesalers.

9.2.2 The following is a listing of recyclers in California:

GNB, Inc. Resource Recycling Division
2700 South Indiana Street
Los Angeles, CA 90023
(213) 262-1101

RSR Quemetco, Inc.
720 South 7th Avenue
City of Industry, CA 91745
(800)527-9452

9.2.3 The California Department of Toxic Substances Control publishes an annual listing of commercial hazardous waste recyclers, which also includes facilities outside of California. A copy of this publication, the "Directory of Industrial Recyclers" may be obtained by calling (916) 324-2423, or writing to the:

California Waste Exchange Resource Recovery Unit
Hazardous Waste Management Program
Department of Toxic Substances Control
P.O. Box 806
Sacramento, CA 95812-0806

9.2.4 **Nation-wide Recycling:**

Most retailers, auto parts stores or service outlets that sell new lead-acid batteries will accept a small number (one or two) of spent lead-acid batteries for recycling. If you have a larger quantity to be recycled, call to verify that your chosen outlet can handle a larger quantity of old batteries.

Even if you live in a state where there is no lead-acid battery recycling law, it's common for battery retailers everywhere in the U.S. to accept used lead-acid batteries from customers. The spent batteries collected by retailers are shipped to EPA licensed and regulated facilities for recycling.

For additional information, please use the following web address to locate nation-wide recycling facilities: www.batterycouncil.org

9.3 INTERNATIONAL RECYCLING RESOURCES

9.3.1 British Battery Manufacturers Association
26 Grosvenor Gardens
London SW1W 0GT
Direct Tel: +44 (0) 207 838 4800
Direct Fax: +44 (0) 207 838 4801

9.3.2 SNAM (Societe Nouvelle d'Affinage des Metaux)
Rue de la Garenne
St Quentin Sallavier
38297 La Verpilliere Cedex
France
Telephone: 00 33 74 945 985
Battery re-processing.

9.3.3 For smaller batteries, you may also contact the Rechargeable Battery Recycling Corporation (RBRC) at www.rbrc.com for directions.

GLOSSARY

Active material	The formed (charged) material on the positive and negative electrodes (plates).
AGM	Absorptive Glass Mat, a non-woven fiberglass separator that holds the electrolyte.
Ah	Ampere-hour; the standard designation of capacity units for batteries.
CFR	Code of Federal Regulations.
Electrolyte	The liquid added to a battery that is capable of conducting ions between the two electrodes.
Electrolysis	Decomposition of an electrolyte by the action of an electric current flowing through the electrodes (positive and negative plates).
IATA	International Air Transport Association.
ICAO	International Civil Aviation Organization.
IEC	International Electrotechnical Commission.
I_{pp}	Peak current delivered at 0.3 seconds into a 15 second controlled discharge at a constant terminal voltage of half the nominal battery voltage.
I_{pr}	Discharge current at the conclusion of a 15 second controlled discharge at a constant terminal voltage of half the nominal battery voltage
Nonspillable	Refers to the ability of the battery to retain the electrolyte when subjected to tests identified under US DOT Reg 49 CFR, Part 173.159, paragraph "d".
OCV	Open Circuit Voltage; measured with no loads connected to the battery.
Passivation	Refers to the oxidation of the negative electrode.
Recombination	The process by which oxygen combines (reacts) with the negative active material.
Sponge lead	Fully charged negative plates convert to a very porous pure lead material, often referred as sponge lead since it resembles a sponge under high magnification.
State of Charge	The measure of charge level of a battery. This measure is not the same as available capacity. A "spent" battery could indicate a full state of charge (voltage) but has lower capacity than the battery started out with.
Sulfation	The product of discharge, lead sulfate, formed on both positive and negative plates.
Venting	Means for a battery to release the gases it generates during charging.

APPENDIX A

TABLE 2

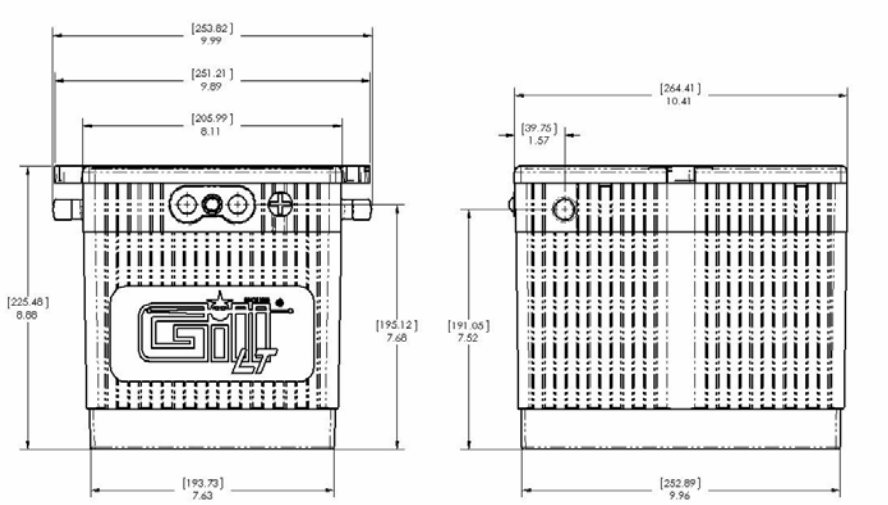
VRLA Battery Capacities

Type	Battery Voltage	1 Hour Rate (A)	30 Minute Rate (Amps)
7639-27	24	27	42
7638-44	24	44	70

APPENDIX B

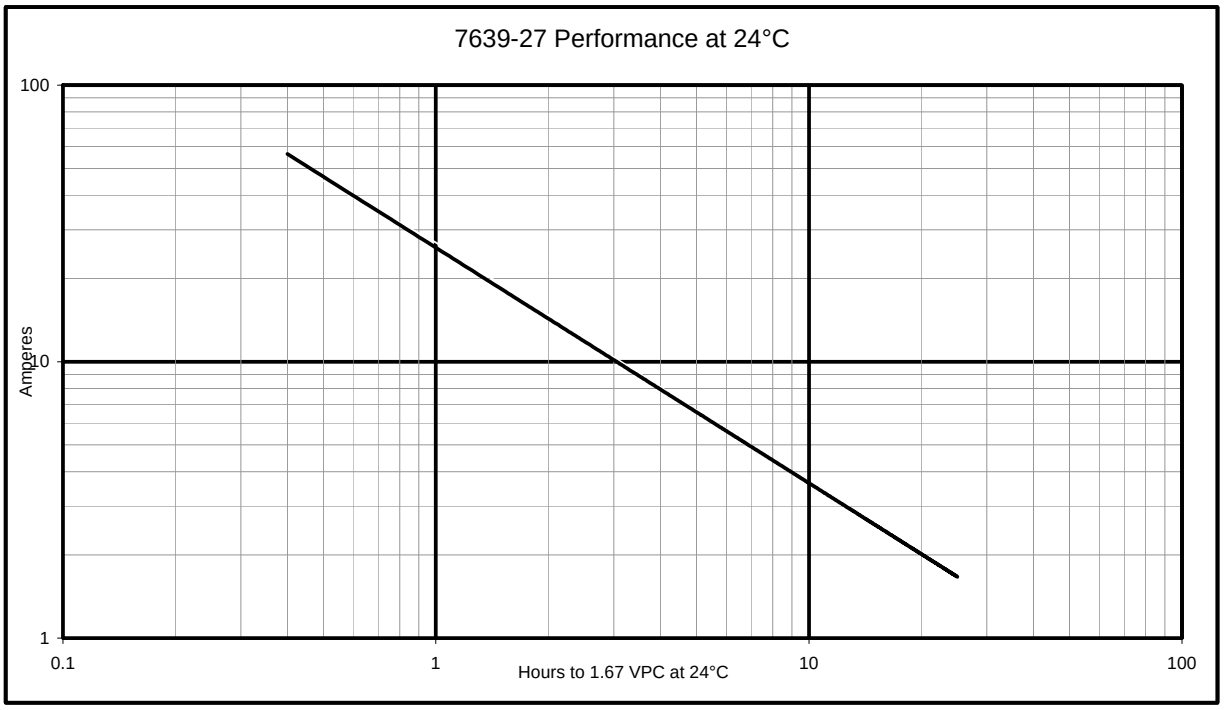
VRLA Battery Specifications and Performance Curves

1) 7639-27
2) 7638-44



7639-27 Performance Data

Power Rating, Current, at Various Temperatures											
Run time	60 sec. (@ -18°C 1.2 Volts per cell)	30 min. (@ 24°C 1.67 Volts per cell)	1 hr (@ 24°C 1.67 Volts per cell)	Ipp @ 24°C (A)	Ipr @ 24°C (A)	Ipp @ -18°C (A)	Ipr @ -18°C (A)	Ipp @ -30°C (A)	Ipr @ -30°C (A)	Battery Weight (lb)
Watts	5,727	970	581							62
Amps	415	45	27	1,574	1,142	1,104	734	866	596	
Capacity (Ah)	7	23	27							
Energy (Wh)	95	485	581							



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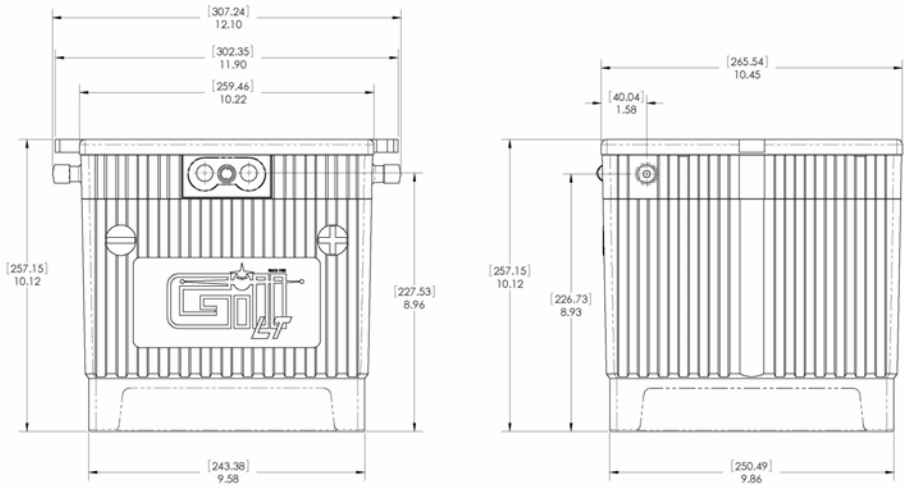
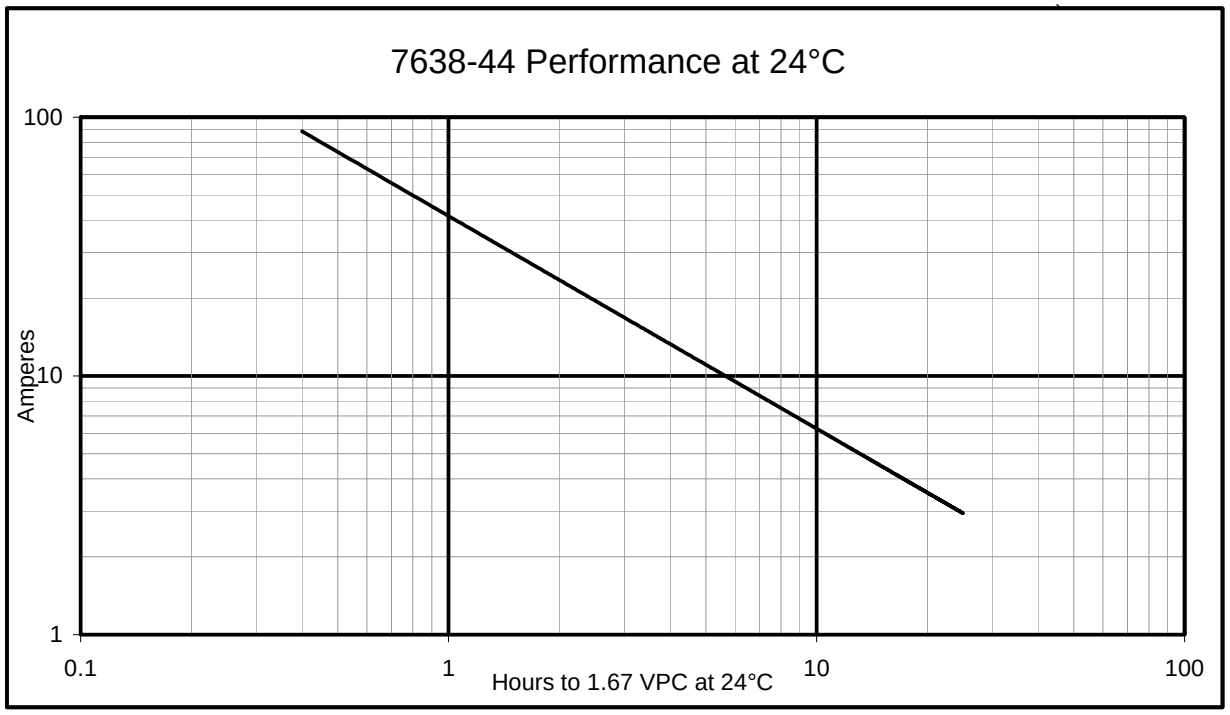


7638-44 Performance

Power Rating, Current, at Various Temperatures											
Discharge	60 sec. (@ -18°C to 1.2 Volts per cell)	30 min. (@ 24°C to 1.67 Volts per cell)	1 hr (@ 24°C to 1.67 Volts per cell)	Ipp @ 24°C (A)	Ipr @ 24°C (A)	Ipp @ -18°C (A)	Ipr @ -18°C (A)	Ipp @ -30°C (A)	Ipr @ -30°C (A)	Battery Weight (lb)
Watts	9,438	1,714	1,058							
Amps	600	70	44	1,857	1,247	1,677	1,051	1,411	948	86
Capacity (Ah)	10	35	44							
Energy (Wh)	157	857	1,058							



Premium LT Valve Regulated Lead Acid Aircraft Batteries By TELEDYNE BATTERY PRODUCTS

APPENDIX C

TELEDYNE BATTERY PRODUCTS MATERIAL SAFETY DATA SHEET
LEAD –ACID NONSPILLABLE BATTERY

HAZARD RATING

TELEDYNE BATTERY PRODUCTS
MATERIAL SAFETY DATA SHEET
LEAD-ACID NONSPILLABLE BATTERY

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

VENDOR ASSUMES NO RESPONSIBILITY FOR INJURY TO VENDEE OR THIRD PERSON PROXIMATELY CAUSED BY ABNORMAL USE OF THE MATERIAL EVEN IF REASONABLE SAFETY PROCEDURES ARE FOLLOWED. FURTHERMORE, VENDEE ASSUMES THE RISK IN THIS USE OF THE MATERIAL.

CONTRACT/ORDER NO.:----------
NATIONAL STOCK NO:----------
SPECIFICATION REFERENCE NO:----------
DATE PREPARED: April 2007

SECTION I: PRODUCT IDENTIFICATION

MANUFACTURER'S NAME:	**TELEDYNE BATTERY PRODUCTS**
ADDRESS:	840 WEST BROCKTON AVENUE REDLANDS, CA 92374
TELEPHONE:	909-793-3131
24-HOUR EMERGENCY CONTACT:	**INFOTRAC 1-800-535-5053**
PRODUCT NAME:	LEAD ACID, NONSPILLABLE BATTERY
TRADE NAME:	TELEDYNE BATTERY, GILL AIRCRAFT BATTERY, CENTURION AND SILTRON
SYNONYMS:	12B90R, 690R, 691R, G-25S, G-30S, G-35S, G-243S, G-6381ES, G-639ES, G641S AND G230S 7638-53, 7638-44, 7638-36, 7639-34, 7639-27
CHEMICAL FAMILY:	LEAD AND LEAD COMPONENTS
FORMULA:	NOT APPLICABLE
DOT DESCRIPTION:	NONSPILLABLE BATTERY
INTENDED USE:	VALVE REGULATED/LEAD-ACID BATTERIES FOR AIRCRAFT, EMERGENCY LIGHTING, GROUND SUPPORT, ENGINE STARTING EQUIPMENT AND CABLE TV/TELECOMMUNICATIONS.

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TELEDYNE BATTERY PRODUCTS MATERIAL SAFETY DATA SHEET
LEAD-ACID NONSPILLABLE BATTERY

SECTION II: HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	CAS #	WEIGHT %	OSHA PEL	ACGIH TLV	OSHA ACTION LEVEL
Lead and lead compounds	7439-92-1	<95	50 µg/m^3	0.15 mg/m^3	30 µg/m^3
Sulfuric acid (Electrolyte)	7664-93-9	<22	1 mg/m^3	1 mg/m^3	Not Applicable
Antimony	7440-36-0	<0.4	0.5 mg/m^3	0.5 mg/m^3	Not Applicable
Arsenic	7440-38-2	<0.1	10 µg/m^3	0.2 mg/m^3	5 µ/m^3
Barium sulfate	7727-43-7	<0.4	5 mg/m^3 **	10 mg/m^3	Not Applicable
Calcium compounds	7440-70-2	<0.1	5 mg/m^3*	2 mg/m^3*	Not Applicable
Carbon black extracts	1333-86-4	<0.1	3.5 mg/m^3	3.5 mg/m^3	Not Applicable
Magnesium sulfate	7487-88-9	<0.3	Not Applicable	Not Applicable	Not Applicable
Nickel sulfate	7786-81-4	<0.1	0.1 mg/m^3	0.1 mg/m^3	Not Applicable
Sodium sulfate	7757-82-6	<0.3	10 mg/m^3^	10 mg/m^3^	Not Applicable
Selenium	7782-49-2	<0.1	0.2 mg/m^3	0.2 mg/m^3	Not Applicable
Tin compounds	7440-31-5	<0.5	2 mg/m^3	2 mg/m^3	Not Applicable

* As CaO ** Respirable ^ Total nuisance dust

SECTION III: PHYSICAL DATA

BOILING POINT:	LEAD	3164 °F (1740 °C)	**MELTING POINT:**	LEAD	621 °F (327.43 °C)
@ 760 mm HG	ELECTROLYTE	203 °F (95 °C)		ELECTROLYTE	N/A
SPECIFIC GRAVITY:	LEAD	11.34	**VAPOR PRESSURE:**	LEAD	NEGLIGIBLE
	ELECTROLYTE	1.285		ELECTROLYTE	10 @ 18 °F
VAPOR DENSITY:	LEAD	N/A	**SOLUBILITY:**	LEAD	N/A
	ELECTROLYTE	>1		ELECTROLYTE	100%
% VOLATILES BY VOL.:		NEGLIGIBLE	**EVAPORATION RATE:**	LEAD	N/A
				ELECTROLYTE	<1

APPEARANCE AND ODOR: NO ODOR. BATTERY CASE IS PINK, WHITE, OFF-WHITE, OR BLACK. ELECTROLYTE IS A CLEAR AND ODORLESS LIQUID.

SECTION IV: HEALTH HAZARD INFORMATION

ROUTES OF EXPOSURE

INHALATION: INHALATION OF ELECTROLYTE CAN CAUSE BURNS IN THE UPPER RESPIRATORY TRACT. LUNG IRRITATION AND PULMONARY EDEMA MAY OCCUR. LEAD DUST, VAPOR OR FUME MAY BE ABSORBED BY THE RESPIRATORY SYSTEM AND CAN RESULT IN BOTH ACUTE AND CHRONIC OVEREXPOSURE AS WELL AS RESPIRATORY IRRITATION.

SKIN CONTACT: ELECTROLYTE MAY CAUSE BURNS OR LOCALIZED IRRITATION. LEAD IS NOT READILY ABSORBED THROUGH THE SKIN.

EYE CONTACT: ELECTROLYTE MAY CAUSE IRRITATION, CORNEAL BURNS AND CONJUNCTIVITIS. BLINDNESS OR SEVERE OR PERMANENT INJURY MAY RESULT. LEAD DUST, VAPOR OR FUME MAY CAUSE IRRITATION.

INGESTION: ELECTROLYTE MAY CAUSE BURNS TO THE MOUTH, ESOPHAGUS AND STOMACH. LEAD DUST, VAPOR OR FUME MAY BE ABSORBED BY THE RESPIRATORY SYSTEM AND CAN RESULT IN BOTH ACUTE AND CHRONIC OVEREXPOSURE.

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EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE: SULFURIC ACID MAY CAUSE IRRITATION TO THE EYES, NOSE AND THROAT. DIFFICULTY IN BREATHING MAY BE EXPERIENCED. ACID SPLASHED IN THE EYES OR ON THE SKIN MAY CAUSE BURNS OR IRRITATION. ACUTE UNTREATED OVEREXPOSURE TO LEAD MAY LEAD TO WEAKNESS, VOMITING, LOSS OF APPETITE, UN-COORDINATED BODY MOVEMENTS, CONVULSIONS, STUPOR AND POSSIBLY COMA.

CHRONIC OVEREXPOSURE: REPEATED PROLONGED EXPOSURE TO DILUTE SULFURIC ACID MAY CAUSE IRRITATION OF THE SKIN. REPEATED OR PROLONGED EXPOSURE TO MIST OR VAPORS OF SULFURIC ACID MAY CAUSE EROSION OF THE TEETH, CHRONIC IRRITATION OF THE EYES OR CHRONIC INFLAMMATION TO THE NOSE, THROAT AND BRONCHIAL TUBES. UNDER NORMAL CONDITIONS OF USE, EXPOSURE TO LEAD OR LEAD CONTAINING COMPOUNDS DOES NOT OCCUR. CHRONIC UNTREATED EXPOSURE TO LEAD MAY CAUSE WEAKNESS, INSOMNIA, HYPERTENSION, SLIGHT IRRITATION TO SKIN AND EYES, METALLIC TASTE IN MOUTH, ANEMIA, CONSTIPATION, HEADACHE, MUSCLE AND JOINT PAINS, NEUROMUSCULAR DYSFUNCTION, POSSIBLE PARALYSIS, ENCEPHALOPATHY AND PNEUMOCONIOSIS. LEAD EXPOSURE CAN POSE RISK TO DEVELOPING FETUSES AND MAY ALSO IMPAIR THE REPRODUCTIVE SYSTEMS IN BOTH MEN AND WOMEN. DAMAGE TO THE KIDNEYS, HEMATOPOIETIC AND/OR CENTRAL NERVOUS SYSTEM MAY OCCUR.

CARCINOGENICITY	IARC	NTP	OSHA
Lead	X		X
Arsenic	X	X	X
Sulfuric acid	X		

EMERGENCY AND FIRST AID PROCEDURES

EYES: (DRY OXIDE OR ACID) WASH IMMEDIATELY WITH LARGE AMOUNTS OF WATER, LIFTING THE LOWER AND UPPER LIDS CONTINUOUSLY. GET MEDICAL ATTENTION.

SKIN: NOT A DIRECT ROUTE OF ENTRY FOR LEAD AND LEAD COMPOUNDS. FOR ACID EXPOSURE, IMMEDIATELY FLUSH THE EXPOSED AREA OF THE SKIN WITH LARGE AMOUNTS OF WATER.
REMOVE ANY CONTAMINATED CLOTHING AND SHOES (THIS CAN BE DONE WHILE UNDER SHOWER). GET MEDICAL ATTENTION FOR ACID EXPOSURE.

INHALATION: FOR LEAD AND LEAD COMPOUNDS EXPOSURE, REMOVE EMPLOYEE FROM AREA OF EXPOSURE AND GET MEDICAL ATTENTION. FOR ACID EXPOSURE, REMOVE EMPLOYEE TO FRESH AIR. IF PERSON IS NOT BREATHING AND HAS NO PULSE, PERFORM CPR. KEEP VICTIM WARM AND AT REST. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: FOR LEAD EXPOSURE, GET MEDICAL ATTENTION. FOR SULFURIC ACID, GIVE EMPLOYEE LARGE AMOUNTS OF WATER IF CONSCIOUS. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION. FOR LEAD, GET IMMEDIATE MEDICAL ATTENTION.

SECTION V: FIRE AND EXPLOSION DATA

FLASH POINT: N/A FOR LEAD 675 °F FOR POLYPROPYLENE CASE
AUTO IGNITION TEMPERATURE: N/A
FLAMMABLE LIMITS IN AIR (% BY VOL): N/A
EXTINGUISHING MEDIA: USE HALON, DRY CHEMICAL EXTINGUISHER. BATTERY CASE WILL BURN.
SPECIAL FIRE FIGHTING PROCEDURES: USE OF WATER IN EXTINGUISHING BURNING BATTERIES MAY CAUSE SPATTERING DUE TO THE PRESENCE OF MOLTEN LEAD.
UNUSUAL FIRE AND EXPLOSION HAZARD: WHILE BATTERY IS BEING CHARGED, HYDROGEN GAS IS PRODUCED.

BATTERY MAY EXPLODE IF HYDROGEN GAS IS TRAPPED INSIDE THE BATTERY CASE. KEEP IGNITION SOURCES AWAY.

SECTION VI: REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:	NONE
INCOMPATIBILITY:	CONTACT OF ELECTROLYTE WITH ORGANIC MATERIAL. ALSO CONTACT OF LEAD WITH STRONG OXIDIZERS MAY LIBERATE HYDROGEN GAS.
HAZARDOUS DECOMPOSITION PRODUCTS:	SULFURIC ACID MIST, SULFUR DIOXIDE AND CARBON MONOXIDE MAY BE RELEASED WHEN ELECTROLYTE DECOMPOSES. NO DECOMPOSITION FOR LEAD AND LEAD COMPOUNDS.
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:	WILL NOT OCCUR.

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED:	SHOULD A BATTERY BREAK OPEN, ISOLATE THE AREA. PICK UP AND CONTAINERIZE ALL BATTERY PARTS AND MATERIALS. LIMIT PERSONAL EXPOSURE WITH GLOVES, EYE AND FACE PROTECTION. ELECTROLYTE SHOULD BE ABSORBED WITH A NON-ORGANIC TYPE ABSORBENT SUCH AS DRY SAND OR EARTH. AVOID DILUTION WITH WATER. LEAD SPILLED FROM THE BATTERY SHOULD BE HEPA VACUUMED OR WET MOPPED, DO NOT DRY SWEEP OR USE COMPRESSED AIR.
NEUTRALIZING CHEMICALS:	USE SODA ASH OR BAKING SODA TO NEUTRALIZE THE ELECTROLYTE.
WASTE DISPOSAL METHODS:	BATTERY PARTS MAY BE RECYCLED BY AN EPA-PERMITTED SECONDARY LEAD SMELTING FACILITY OR DISPOSED OF AS HAZARDOUS WASTE PURSUANT TO RCRA REQUIREMENTS.

SECTION VIII: SPECIAL PROTECTION INFORMATION

HANDLING AND STORAGE:	EXERCISE CAUTION IN HANDLING AND STORAGE DUE TO WEIGHT OF UNITS.
OTHER PRECAUTIONS:	DO NOT ALLOW METAL OR OTHER CONDUCTIVE MATERIAL TO SHORT CIRCUIT TERMINALS. HEAT, SPARK, DAMAGE TO ELECTRICAL CIRCUITS, AND FIRE MAY RESULT FROM SHORT CIRCUITING. PRACTICE GOOD HYGIENE TO MINIMIZE PERSONAL EXPOSURE. BATTERY MAY RELEASE HYDROGEN DURING CHARGING OR IF EXPOSED TO HIGH TEMPERATURES. DO NOT STORE IN AIR TIGHT CONTAINER.
VENTILATION REQUIREMENTS:	BATTERY CHARGING AREAS MUST BE ADEQUATELY VENTILATED TO PREVENT HAZARDOUS CONCENTRATIONS OF FLAMMABLE GAS OR ACID MIST. DESIGN CRITERIA FOR VENTILATION SYSTEMS ARE CONTAINED IN THE INDUSTRIAL VENTILATION MANUAL PUBLISHED BY THE ACGIH.
SPECIFIC PERSONAL PROTECTIVE EQUIPMENT	
RESPIRATORY:	UNDER NORMAL CONDITIONS OF USE RESPIRATORY PROTECTION IS NOT REQUIRED. HOWEVER, SHOULD CONDITIONS ARISE WHERE RESPIRATORS ARE NEEDED, USE ONLY NIOSH/MSHA RESPIRATORS APPROVED FOR DUST, FUME AND MIST.
EYE:	CHEMICAL GOGGLES, FULL FACE SHIELD.
SKIN:	GLOVES APPROVED FOR SULFURIC ACID.

OTHER: ACID RESISTANT APRON.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS:

SHOULD A BATTERY BREAK OPEN AND A LEAD SPILL OCCURS, PRECAUTIONS SHOULD BE TAKEN TO PREVENT LEAD DUST FROM BECOMING AIR BORNE. INDIVIDUALS SHOULD WEAR RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, RUBBER GLOVES AND EYE PROTECTION IF CONDUCTING A LEAD SPILL CLEAN-UP.

AVOID THE USE OF NON-INSULATED TOOLS. IF THEY ARE REQUIRED, TAKE CARE NOT TO MAKE A CONNECTION BETWEEN THE TWO BATTERY TERMINALS AS SEVERE SPARKING MAY OCCUR WHICH COULD RESULT IN AN EXPLOSION. RINGS, METAL WATCH BANDS, NECKLACES AND OTHER JEWELRY SHOULD BE REMOVED WHILE SERVICING BATTERIES.

SUFFICIENT VENTILATION SHOULD BE PROVIDED IN ALL WORK AREAS TO PREVENT A BUILD UP OF DANGEROUS GASES. IF THE
BATTERY ROOM IS AIR CONDITIONED AS PART OF AN OVERALL BUILDING SYSTEM, THE EXHAUST AIR FROM THE BATTERY ROOM SHOULD NOT BE RETURNED TO THE AIR DISTRIBUTION SYSTEM. THE ROOM SHOULD HAVE ITS OWN EXHAUST SYSTEM CONNECTED DIRECTLY TO OUTSIDE AIR. HYDROGEN AND OXYGEN GASES ARE PRODUCED DURING NORMAL BATTERY OPERATION, ESPECIALLY DURING CHARGING. HYDROGEN GAS IS LIGHTER THAN AIR, COLORLESS, ODORLESS AND TASTELESS, THEREFORE IT IS DIFFICULT TO DETECT WITHOUT SPECIAL EQUIPMENT. ALWAYS ASSUME THAT SMALL AMOUNTS OF GASES ARE PRESENT AND TAKE ALL NECESSARY PRECAUTIONS.

SECTION X: OTHER WARNINGS

PROPOSITION 65 WARNING

BATTERY POSTS, TERMINALS AND RELATED ACCESSORIES CONTAIN LEAD AND LEAD COMPOUNDS, CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND REPRODUCTIVE HARM. **WASH HANDS AFTER HANDLING.**

SARA TITLE III

THE CHEMICALS LISTED BELOW ARE TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

MATERIAL OR COMPONENT	CAS #	WEIGHT %
Lead and lead compounds	7439-92-1	<95
Sulfuric acid	7664-93-9	<22
Antimony	7440-36-0	<0.4
Arsenic	7440-38-2	<0.1
Selenium	7782-49-2	<0.1

THIS LEAD-ACID BATTERY IS CLASSIFIED AS A MANUFACTURED ARTICLE (40 CFR 372.3) AND THE HAZARDOUS MATERIALS (LEAD, ANTIMONY, ARSENIC AND NICKEL COMPOUNDS) CONTAINED WITHIN ARE NOT RELEASED UNDER NORMAL CONDITIONS OF USE. SINCE THESE CHEMICALS ARE NOT RELEASED DURING NORMAL USE THEY ARE EXEMPT FROM THE REPORTING REQUIREMENTS CONTAINED IN 40 CFR PART 372 SUBPART B. HOWEVER, SULFURIC ACID MAY BE RELEASED INTO THE ENVIRONMENT IF A BATTERY BREAKS AND THEREFORE MAY NOT BE EXEMPT FROM THE REPORTING REQUIREMENTS OF SARA TITLE III. SEE EXEMPTIONS, 40 CFR 372.38 (b).

THIS INFORMATION SHOULD BE INCLUDED IN ALL MSDS'S THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

UPDATED BY: JESUS BUENO LUNA, ENVIRONMENTAL / HEALTH AND SAFETY COORDINATOR
DATE: April 2007

TELEDYNE BATTERY PRODUCTS
MATERIAL SAFETY DATA SHEET
BATTERY FLUID (ELECTROLYTE)

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

VENDOR ASSUMES NO RESPONSIBILITY FOR INJURY TO VENDEE OR THIRD PERSON PROXIMATELY CAUSED BY ABNORMAL USE OF THE MATERIAL EVEN IF REASONABLE SAFETY PROCEDURES ARE FOLLOWED. FURTHERMORE, VENDEE ASSUMES THE RISK IN THIS USE OF THE MATERIAL.

CONTRACT/ORDER NO.:----------
NATIONAL STOCK NO.:----------
SPECIFICATION REFERENCE NO.:----------
DATE PREPARED: April 2007

HAZARD RATING:
HEALTH----------3
FLAMMABILITY----------0
REACTIVITY----------2
PERSONAL PROTECTION-----D

SECTION I: PRODUCT IDENTIFICATION

MANUFACTURER'S NAME: TELEDYNE BATTERY PRODUCTS

ADDRESS: 840 WEST BROCKTON AVENUE
REDLANDS, CA 92374

TELEPHONE: 909-793-3131

24-HOUR EMERGENCY CONTACT: INFOTRAC 1-800-535-5053

TRADE NAME: BATTERY ELECTROLYTE, VARIOUS GRADES

SYNONYMS: SULFURIC ACID

FORMULA: H_2SO_4

DOT DESCRIPTION: CONSUMER COMMODITY ORM-D

INTENDED USE: ELECTROLYTE FOR LEAD-ACID BATTERIES

SECTION II: HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	CAS #	WEIGHT %	OSHA PEL	ACGIH TLV	OSHA ACTION LEVEL
Sulfuric acid	7664-93-9	<50	1 mg/m^3	1 mg/m^3	Not Applicable

SECTION III: PHYSICAL DATA

BOILING POINT: @ 760 mmHg	203 °F (95 °C)	**MELTING POINT:**	N/A
SPECIFIC GRAVITY:	1.22 to 1.40	**VAPOR PRESSURE:**	< 1 mmHg @ 70 °F
VAPOR DENSITY:	>1	**SOLUBILITY:**	100%
% VOLATILES BY VOL.:	N/A	**EVAPORATION RATE:**	<1

APPEARANCE AND ODOR: CLEAR LIQUID, NO ODOR.

SECTION IV: HEALTH HAZARD INFORMATION

ROUTES OF EXPOSURE

INHALATION: INHALATION OF ELECTROLYTE CAN CAUSE BURNS IN THE UPPER RESPIRATORY TRACT. LUNG IRRITATION AND PULMONARY EDEMA MAY OCCUR.

SKIN CONTACT: ELECTROLYTE MAY CAUSE BURNS OR LOCALIZED IRRITATION.

EYE CONTACT: ELECTROLYTE MAY CAUSE IRRITATION, CORNEAL BURNS AND CONJUNCTIVITIS. BLINDNESS OR SEVERE OR PERMANENT INJURY MAY RESULT.

INGESTION: ELECTROLYTE MAY CAUSE BURNS TO THE MOUTH, ESOPHAGUS AND STOMACH.

EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE: SULFURIC ACID MAY CAUSE IRRITATION TO THE EYES, NOSE AND THROAT. DIFFICULTY IN BREATHING MAY BE EXPERIENCED. ACID SPLASHED IN THE EYES OR ON THE SKIN MAY CAUSE BURNS OR IRRITATION.

CHRONIC OVEREXPOSURE: REPEATED PROLONGED EXPOSURE TO DILUTE SULFURIC ACID MAY CAUSE IRRITATION OF THE SKIN. REPEATED OR PROLONGED EXPOSURE TO MIST OR VAPORS OF SULFURIC ACID MAY CAUSE EROSION OF THE TEETH, CHRONIC IRRITATION OF THE EYES OR CHRONIC INFLAMMATION TO THE NOSE, THROAT AND BRONCHIAL TUBES.

CARCINOGENICITY	IARC	NTP	OSHA
Sulfuric acid	X		

EMERGENCY AND FIRST AID PROCEDURES

EYES: WASH IMMEDIATELY WITH LARGE AMOUNTS OF WATER, LIFTING THE LOWER AND UPPER LIDS CONTINUOUSLY. GET MEDICAL ATTENTION.

SKIN: IMMEDIATELY FLUSH THE EXPOSED AREA OF THE SKIN WITH LARGE AMOUNTS OF WATER. REMOVE ANY CONTAMINATED CLOTHING AND SHOES (THIS CAN BE DONE WHILE UNDER SHOWER). GET MEDICAL ATTENTION.

INHALATION: REMOVE EMPLOYEE FROM AREA OF EXPOSURE TO FRESH AIR. IF PERSON IS NOT BREATHING AND HAS NO PULSE, PERFORM CPR. KEEP VICTIM WARM AND AT REST. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: GIVE EMPLOYEE LARGE AMOUNTS OF WATER IF CONSCIOUS. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION.

TELEDYNE BATTERY PRODUCTS MATERIAL SAFETY DATA SHEET
BATTERY ELECTROLYTE

SECTION V: FIRE AND EXPLOSION DATA

FLASH POINT:	N/A
AUTO IGNITION TEMPERATURE:	N/A
FLAMMABLE LIMITS IN AIR (% BY VOL):	N/A
EXTINGUISHING MEDIA:	USE DRY CHEMICAL OR CO2 EXTINGUISHER FOR SMALL FIRES. WATER FOG FOR LARGE FIRES.
SPECIAL FIRE FIGHTING PROCEDURES:	N/A

SECTION VI: REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:	NONE
INCOMPATIBILITY:	CONTACT OF ELECTROLYTE WITH ORGANIC MATERIAL..
HAZARDOUS DECOMPOSITION PRODUCTS:	SULFURIC ACID MIST, SULFUR DIOXIDE AND CARBON MONOXIDE MAY BE RELEASED WHEN ELECTROLYTE DECOMPOSES.
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:	WILL NOT OCCUR

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED:	ELECTROLYTE SHOULD BE ABSORBED WITH A NON-ORGANIC TYPE ABSORBENT SUCH AS DRY SAND OR EARTH. AVOID DILUTION WITH WATER.
NEUTRALIZING CHEMICALS:	USE SODA ASH OR BAKING SODA TO NEUTRALIZE ELECTROLYTE.
WASTE DISPOSAL METHODS:	ELECTROLYTE SHOULD BE HAULED TO A PERMITTED TREATMENT FACILITY.

SECTION VIII: SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS:	BATTERY CHARGING AREAS MUST BE ADEQUATELY VENTILATED TO KEEP VAPOR AND MIST CONCENTRATIONS BELOW EXPOSURE LIMITS. DESIGN CRITERIA FOR VENTILATION SYSTEMS ARE CONTAINED IN THE INDUSTRIAL VENTILATION MANUAL PUBLISHED BY THE ACGIH.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:	UNDER NORMAL CONDITIONS OF USE RESPIRATORY PROTECTION IS NOT REQUIRED. HOWEVER, SHOULD CONDITIONS ARISE WHERE RESPIRATORS ARE NEEDED, USE ONLY NIOSH/MSHA RESPIRATORS APPROVED FOR DUST, FUME AND MIST.
EYE:	CHEMICAL GOGGLES, FULL FACE SHIELD.
SKIN:	GLOVES APPROVED FOR SULFURIC ACID.
OTHER:	ACID RESISTANT APRON.

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SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS:

AVOID THE USE OF NON-INSULATED TOOLS. IF THEY ARE REQUIRED, TAKE CARE NOT TO MAKE A CONNECTION BETWEEN THE TWO BATTERY TERMINALS AS SEVERE SPARKING MAY OCCUR WHICH COULD RESULT IN AN EXPLOSION. RINGS, METAL WATCH BANDS, NECKLACES AND OTHER JEWELRY SHOULD BE REMOVED WHILE SERVICING BATTERIES.

SUFFICIENT VENTILATION SHOULD BE PROVIDED IN ALL WORK AREAS TO PREVENT A BUILD UP OF DANGEROUS GASES. IF THE
BATTERY ROOM IS AIR CONDITIONED AS PART OF AN OVERALL BUILDING SYSTEM, THE EXHAUST AIR FROM THE BATTERY ROOM SHOULD NOT BE RETURNED TO THE AIR DISTRIBUTION SYSTEM. THE ROOM SHOULD HAVE ITS OWN EXHAUST SYSTEM CONNECTED DIRECTLY TO OUTSIDE AIR. HYDROGEN AND OXYGEN GASES ARE PRODUCED DURING NORMAL BATTERY OPERATION, ESPECIALLY DURING CHARGING. HYDROGEN GAS IS LIGHTER THAN AIR, COLORLESS, ODORLESS AND TASTELESS, THEREFORE IT IS DIFFICULT TO DETECT WITHOUT SPECIAL EQUIPMENT. ALWAYS ASSUME THAT SMALL AMOUNTS OF GASES ARE PRESENT AND TAKE ALL NECESSARY PRECAUTIONS.

SECTION X: OTHER WARNINGS

PROPOSITION 65

N/A

SARA TITLE III

THE CHEMICALS LISTED BELOW ARE TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

MATERIAL OR COMPONENT	CAS #	WEIGHT %
Sulfuric acid	7664-93-9	<50

THIS INFORMATION SHOULD BE INCLUDED IN ALL MSDS THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

UPDATED BY: JESUS BUENO LUNA, ENVIRONMENTAL / HEALTH AND SAFETY COORDINATOR
DATE: April 2007

APPENDIX D

FAA-PMA ELIGIBLE INSTALLATION LIST AND SUPPLEMENT DATA

Drawing 1516 Revised: 10-1-07

NUMBER:	ELIGIBLE FOR INSTALLATION ON
G-240	**Cessna models:** 152, 172, 182
G-241	**Cessna models:** 152, 172, 182, 172R, 172S
G-242	**Cessna models:** 152, 172, 177, 182, 207, 210, 336, 337 **Piper models:** PA-23, PA-31, PA-36
G-242S	**Piper models:** PA-23, PA-31, PA-36 **Cessna models:** 152, 172, 177, 182, 207, 210, 336, 337
G-243	**Cessna models:** 152, 182, A152, 172, 172R, 172RG, 172S, T182, R182, TR182, T303, 210 (S/N 21059503 & ON), T210M, T210N, T210R, 188, 188A, 188B, A188, A188A, A188B AND T188C **Cirrus Design models:** SR20, SR22 **Slingsby Aviation, Ltd., models:** T67M260, T67M260-T3A
G-243S	**Cessna models:** 152, 182, A152, 172, 172R, 172RG, 172S, T182, R182, TR182, T303, 210 (S/N 21059503 & ON), T210M, T210N, T210R, 188, 188A, 188B, A188, A188A, A188B AND T188C **Cirrus Design models:** SR20, SR22 **Mooney models:** M20M, M20R **Slingsby Aviation, Ltd., models:** T67M260, T67M260-T3A
G-244	**Beech model:** A60 **Cessna models:** 310, 335, 340, 402, 404, 414, 421 **Piper model:** PA-31
G-246	**Airtractor models:** AT-300, AT-400 **Piper models:** PA-23, PA-31
G-246AT	**Air Tractor models:** AT-300, -302, -400, -400A, -402, -402A, -402B, -502, -502A, -502B, -503A, -602, -802, -802A
G-247	**Piper model:** PA-31P-350
G-25	**Aerostar models:** 600, 601, 601P **Beech models:** 19, 23, 24, 55, 58, 77 **Cessna models:** 120, 140, 150, 170, 172, 175, 177, 310, 320, 340 **Piper models:** PA-11, PA-36, PA-38
G-25M	**Piper Aerostar:** 600, 601, 601P, 602P
Starpower 25	**Aero-Star models:** 600, 601, 601P **Beech models:** 19, 23, 24, 55, 58, 77 **Cessna models:** 120, 140, 150, 170, 172, 175, 177, 310, 320, 340 **Piper models:** PA-11, PA-36, PA-38
G-25S	**Cessna models:** 120, 140, 150, 150A, 150B, 150C, 150D, 150E, 150F, 150G, 150H, 150J, 150K, 150L, 150M, 170, 170A, 170B, 172, 172A, 172B, 172C, 172D, 172E, 172G, 172F (USAF T-41A), 172H (USAF T-41A), 172I, 172K, 172L, 172M, 172N, 172P, 172Q, 172R, 172S, 175, 175A, 175B, 175C, 177, 177A, 177B, 310, 310A (USAF U-3A), 310B, 310C, 310D, 310E (USAF-U-3B), 320, 320-1, 320A, 320B, 320C, 320D, 320E, 320F, 340 **Piper models:** PA-11, PA-36-285, PA-36-300, PA-36-375, PA-38-112 **Aerostar models:** PA-60-600 (Aerostar 600), PA-60-601(Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P) **Raytheon models:** 19A, 23, A24, D55, E55, E55A, 58, 58A, 77 **Sky International models:** A-1, S-1S, S-1T, S-2, S-2A, S-2S, S-2B
G-35	**Beech models:** 17, 18, 19, 23, 24, 33, 35, 36, 50, 76 **Bell model:** 47G-5 **Cessna models:** 180, 182, 185, 188, 195, 206, 207, 210 **Mooney models:** M20, M20B, M20D, M20G, M20J, M20K **Piper models:** PA-11, PA-12, PA-14, PA-16, PA-18, PA-22, PA-23, PA-24, PA-25, PA-28, PA-30, PA-32, PA-34, PA-39, PA-44
G-35M	**Maule models:** M-4-210, -4-210C, -4-230C, -4-180C, -5-210C, -5-220C, -5-200, -5-235C, -5-180C, -6-235, -6-180, M-7-235, MX-7-180, MX-7-235
G-35S	**Beechcraft models:** 23, 35, 36, 50, 76 **Bell model:** 47G-5 **Cessna models:** 180, 182, 185, 188, 195, 206, 207, 210 **Maule models:** M-4-210, -220, -180, M-5-180, -210, -220, -235, -200, -210TC, M-6-180, -235, M-7-235, MX-7-180, MX-7-235, MXT-7-180, MT-7-235, MX-7-160, MXT-7-160, MX-7-180A, MXT-7-180A, MX-7-180B, M-8-235 **Mooney models:** M20, M20B, M20D, M20G, M20J, M20K **Piper models:** PA-12, PA-14, PA-16, PA-18, PA-22, PA-23, PA-24, PA-25, PA-28, PA-30, PA-32, PA-34, PA-39, PA-44
Starpower 35	**Beech models:** 17, 18, 19, 23, 24, 33, 35, 36, 50, 76 **Bell model:** 47G-5 **Cessna models:** 180, 182, 185, 188, 195, 206, 207, 210 **Mooney models:** M20, M20B, M20D, M20G, M20J, M20K **Piper models:** PA-11, PA-12, PA-14, PA-16, PA-18, PA-22, PA-23, PA-24, PA-25, PA-28, PA-30, PA-32, PA-34, PA-39, PA-44
G-6381C	**Avions Marcel Dassault models:** Fan Jet Falcon Series C, D, E, F **Beech models:** 65-90, 65-A90, B90, C90, E90, 99, 99A, 100, A99, A99A, A100, A100A **Embraer models:** EMB-110P1, EMB-110P2 **Gates Learjet models:** 23, 24 series, 25 series, 28 series, 29 series, 35 series, 36 series **Gulfstream Aerospace model:** G-159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124 **Lockheed-Georgia:** 1329-23 series **Mitsubishi models:** MU-2B, MU-2B-10, -15, -20, -25, -26, 26A, -30, -35, -36, -36A, -40, -60 **Rockwell International models:** NA-265 series; Aero Commander models 680T, 680V, 680W
G-6381E	**Avions Marcel Dassault models:** Fan Jet Falcon Series C, D, E, F **Raytheon (Beechcraft) models:** 65-90, 65-A90, 65-A90-1(JU-21A, U-21A, RU-21A, RU-21D, U-21G, RU-21H), 65-A90-4(RU-21E, RU-21H), B90, C90, E90, F90, 99, 99A, 100, A99, A99A, A100, A100A, B100, 200, 200(A100-1(U-21J), A100-1(U-21J), 200C, 200CT, 200T, A200(C-12A) OR (C-12C), A200CT(C-12D), OR (FWC-12D) OR (RC-12D), OR (C-12F) OR (RC-12G) OR (RG-12H) OR (RC-12K) OR (RC-12P), B200, B200C, (C-12F) OR (UC-12F) OR (UC-12M) OR (C-12R), B200CT, B200T, 300, B300, 300LW, B300C, MU-300-10, 400, 400T, Hawker 1000 **Bell models:** 204B, 205A, 205B, 205A-1, 212, 222U, 412 **Cessna models:** 208, 208B, 425, 441, 500, 501, 550, 551, S550, 560, 560XL **Embraer models:** EMB-110P1, EMB-110P2 **Gates Learjet models:** 23, 24 series, 25 series, 28 series, 29 series, 35 series, 36 series, 31, 31A, 55, 55B, 55C series **Gulfstream Aerospace model:** G-159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124

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FAA-PMA ELIGIBLE INSTALLATION LIST AND SUPPLEMENT DATA

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NUMBER:	ELIGIBLE FOR INSTALLATION ON
G-6381E	**Lockheed-Georgia:** 1329-23 series **Mitsubishi models:** MU-2B, MU-2B-10, -15, -20, -25, -26, 26A, -30, -35, -36, -36A, -40, -60 **Pilatus model:** Pilatus-PC-12 **Piper Aircraft Corporation models:** PA-31T, -31T1, -31T2, PA-42 and PA-42-720 **Rockwell International:** NA-265 series; Aero Commander models 680T, 680V, 680W, 690, 690A **Sikorsky models:** S-76A, S-76B, S-76C **Socata Group Aerospatiale model:** TBM-700
G-6381ES	**Raytheon (Beechcraft) models:** 65-90, 65-A90, 65-A90-1(JU-21A, U-21A, RU-21A, RU-21D, U-21G, RU-21H), 65-A90-4(RU-21E, RU-21H), B90, B99, C90, E90, F90, 99, 99A, 100, A99, A99A, A100, A100(U-21F), A100A, B100, 200(A100-1(U-21J), 300, 200, 200C, 200CT, 200T, A200(C-12A) OR (C-12C), A200CT(C-12D), OR (FWC-12D) OR(RC-12D), OR (C-12F) OR (RC-12G) OR (RG-12H) OR (RC-12K) OR (RC-12P), B200, B200C, (C-12F) OR (UC-12F) OR (UC-12M) OR (C-12R), B200CT, B200T, B300, 300LW, B300C, 400A serial number RK-98 and after, MU-300-10, 400, 400T, Hawker 1000 **Bell Helicopter models:** 204B, 205A, 205A-1, 205B, 212, 222U, 412, 412EP **Cessna models:** 208, 208A, 208B, 425, 441, 500, 501, 525/525A Series, 550, S550, 551, 560, 560XL, 650 Series **Dassault Aviation models:** Fan Jet Falcon Series C, D, E, F **Empresa Brasileira de Aeronautica S/A models**: EMB-110P1, EMB-110P2 **Gulfstream Aerospace models:** G-159, G-1159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124 **Learjet models:** 23, 24, 24A, 24B, 24B-A, 24C, 24D, 24D-A, 24E, 24F, 24F-A, 25, 25A, 25B, 25C, 25D, 25F, 28, 29, 35, 35A, 36A, 31, 31A, 55, 55B, 55C, 60 **Lockheed-Georgia models:** 1329-23A, -23D, -23E **Mitsubishi Heavy Industries models:** MU-2B, MU-2B-10, -15, -20, -25, -26, 26A, -30, 35, 36, -36A, -40, -60 **Piper models:** PA-31T, -31T1, -31T2, PA-42 and PA-42-720 Series **Sabreliner models:** NA-265, NA-265-20, -30, -40, -60, -65, -70, -80 **Twin Commander Aircraft models:** 680T, 680V, 680W, 690, 690A **Pilatus model:** Pilatus-PC-12 **Socata Group Aerospatiale model:** TBM-700 **Sikorsky models:** S-76A, S-76B, S-76C
7638-44	**Raytheon (Beechcraft) models:** 65-90, 65-A90, 65-A90-1(JU-21A, U-21A, RU-21A, RU-21D, U-21G, RU-21H), 65-A90-4(RU-21E, RU-21H), B90, B99, C90, E90, F90, 99, 99A, 100, A99, A99A, A100, A100(U-21F), A100A, B100, 200(A100-1(U-21J), 300, 200, 200C, 200CT, 200T, A200(C-12A) OR (C-12C), A200CT(C-12D), OR (FWC-12D) OR(RC-12D), OR (C-12F) OR (RC-12G) OR (RG-12H) OR (RC-12K) OR (RC-12P), B200, B200C, (C-12F) OR (UC-12F) OR (UC-12M) OR (C-12R), B200CT, B200T, B300, 300LW, B300C, 400A serial number RK-98 and after, MU-300-10, 400, 400T, Hawker 1000 **Bell Helicopter models:** 204B, 205A, 205A-1, 205B, 212, 222U, 412, 412EP **Cessna models:** 208, 208A, 208B, 425, 441, 500, 501, 525/525A Series, 550, S550, 551, 560, 560XL, 650 Series **Dassault Aviation models:** Fan Jet Falcon Series C, D, E, F **Empresa Brasileira de Aeronautica S/A models**: EMB-110P1, EMB-110P2 **Gulfstream Aerospace models:** G-159, G-1159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124 **Learjet models:** 23, 24, 24A, 24B, 24B-A, 24C, 24D, 24D-A, 24E, 24F, 24F-A, 25, 25A, 25B, 25C, 25D, 25F, 28, 29, 35, 35A, 36A, 31, 31A, 55, 55B, 55C, 60 **Lockheed-Georgia models:** 1329-23A, -23D, -23E **Mitsubishi Heavy Industries models:** MU-2B, MU-2B-10, -15, -20, -25, -26, 26A, -30, 35, 36, -36A, -40, -60 **Piper models:** PA-31T, -31T1, -31T2, PA-42 and PA-42-720 Series **Sabreliner models:** NA-265, NA-265-20, -30, -40, -60, -65, -70, -80 **Twin Commander Aircraft models:** 680T, 680V, 680W, 690, 690A **Pilatus model:** Pilatus-PC-12 **Socata Group Aerospatiale model:** TBM-700 **Sikorsky models:** S-76A, S-76B, S-76C
G-638C	**Avions Marcel Dassault models:** Fan Jet Falcon Series C, D, E, F **Beech models:** 65-90, 65-A90, B90, C90, E90, 99, 99A, 100, A99, A99A, A100, A100A **Embraer models:** EMB-110P1, EMB-110P2 **Gates Learjet models:** 23, 24 series, 25 series, 28 series, 29 series, 35 series, 36 series **Gulfstream Aerospace model:** G-159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124 **Lockheed-Georgia:** 1329-23 series **Mitsubishi models:** MU-2B, MU-2B-10, -15, -20, -25, -26, 26A, -30, -35, -36, -36A, -40, -60 **Rockwell International:** NA-265 series; Aero Commander models 680T, 680V, 680W
G-638E	**Avions Marcel Dassault models:** Fan Jet Falcon Series C, D, E, F **Beech models:** 65-90, 65-A90, B90, B100, C90, E90, 99, 99A, 100, A99, A99A, A100, A100A, F90 **Embraer models:** EMB-110P1, EMB-110P2 **Gates Learjet models:** 23, 24 series, 25 series, 28 series, 29 series, 31, 31A, 35 series, 36 series, 55, 55C **Gulfstream Aerospace model:** G-159 **Israel Aircraft Industries models:** 1121, 1121A, 1121B, 1123, 1124 **Lockheed-Georgia models:** 1329-23 series, 23A, 23D, 23E **Mitsubishi models:** MU-2B, MU-2B-10, -15, -20, -25, -26, -26A, -30, -35, -36, -36A, -40, -60 **Rockwell International:** NA-265 series; Aero Commander models 680T, 680V, 680W **Hawker Siddeley Beechcraft Hawker models:** DH-125, HS-125, BH-125 **Messerschmitt-Bolkow-Blohm GMBH model:** BO-105S **British Aerospace models:** DH.125-400A, HS.125-600A, HS.125-700A, BH.125-600A, BAE.125-800A, Jetstream series 3101 **Hawker Siddeley, Beechcraft Hawker models:** DH.125, HS.125, BH.125 **Messerschmitt-Bolkow-Blohm GMBH model:** BO-105S
G-639ES	**Beech (Raytheon) models:** DH.125 series 400, HS.125 series 600, HS.125 series 700, BH.125 series 600, Bae.125 Series 800 **British Aerospace Operations Ltd:** Jetstream series 3101 **Dassault-Breguet model:** Falcon 10 **Eurocopter Deutschland models:** BO-105A, BO-105C, BO-105S, MBB-BK 117 A-1, MBB-BK 117 A-3, MBB-BK 117 A-4, MBB-BK 117 B-1, MBB-BK 117 B-2, MBB-BK 117 C-1 **Mitsubishi Heavy Industries models:** YS-11A-200, YS-11A-300, YS-11A-500, YS-11A-600 **SIAI MARCHETTI Srl model:** F.260

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FAA-PMA ELIGIBLE INSTALLATION LIST AND SUPPLEMENT DATA

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NUMBER:	ELIGIBLE FOR INSTALLATION ON
7639-27	**Beech (Raytheon) models:** DH.125 series 400, HS.125 series 600, HS.125 series 700, BH.125 series 600, Bae.125 Series 800
	British Aerospace Operations Ltd: Jetstream series 3101
	Dassault-Breguet model: Falcon 10
	Eurocopter Deutschland models: BO-105A, BO-105C, BO-105S, MBB-BK 117 A-1, MBB-BK 117 A-3, MBB-BK 117 A-4, MBB-BK 117 B-1, MBB-BK 117 B-2, MBB-BK 117 C-1
	Mitsubishi Heavy Industries models: YS-11A-200, YS-11A-300, YS-11A-500, YS-11A-600
	SIAI MARCHETTI Srl model: F.260
G-640E	**Beech models:** 65, A65, 65-80, 65-A80, 65-B80, 65-88, 70
G-641S	**Bell models:** 206A, 206B, 206L, 206L-1, 206L-3 with STC SR01406LA
	McDonnell Douglas (Hughes) models: 369, 369A, 369H, 369HM, 369HS, 369HE, 369D, 369E, 369F, 369FF, 500N, 600N, with STC kit SR01427LA installed
	Schweizer Aircraft Corporation model: 269D (333)
G-641	**Bell models:** 206, 206A, 206B, 206B-1, 206L, 206L-1, 206L-3
	McDonnell Douglas (Hughes) models: 369, 369A, 369H, 369HM, 369HS, 369HE, 369D, 369E, 369F, 369FF, 500N, 600N with STC kit SR01427LA installed
	Schweizer Aircraft Corporation model: 269D (333)
G-88	**Ayres Corp. model:** S-2R
GE-50C	**Gulfstream Commander models:** 500, 520, 560, 560A, 560E, 680, 680E, 720
	North American models: AT6-C, AT6-D, AT6-F, T-6G, SNJ-5, SNJ-6, SNJ-7 or any BC-1A, AT6, AT6-A, AT6-B, SNJ-2, SNJ-3, SNJ-4 converted to 24 volts per North American Drg 121-954004, P51
GE-51C	**Airtractor models:** AT-301, AT-301A

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FAA-PMA ELIGIBLE INSTALLATION LIST AND SUPPLEMENT DATA

Drawing 1516 Revised: 10-1-07

NUMBER:	ELIGIBLE FOR INSTALLATION ON
SA5525NM	**Gulfstream model:** G-159
SA1017SO	**Beech models:** 65-90 Serial numbers LJ1 through LJ113, except LJ76, 65-A90 Serial numbers LJ114 through LJ317, and LJ76 and LJ 178A; 65-A90-1(JU-21A, U-21A, RU-21A, RU-21D, U-21G, RU-21H), 65-A90-4(RU-21E, RU-21H), B90 Serial numbers LJ318 through LJ501; C90 Serial numbers LJ502 through LJ589, E90 Serial numbers LW1 through LW57, 99 Serial number U1 through 136 and 147, A100 Serial numbers B1 and B90
SA1018SO	**Beech model:** B100
SA1213SO	**Israel Aircraft Industries models:** 1121, 1121A, 1121B
SA1214SO	**Israel Aircraft Industries, models:** 1123, 1124
SA1215SO	**Dassault models:** Fan Jet Falcon series: C, D, E, F
SH1186SO	**Bell models:** 212, 412, 412EP
SH2186SO	**Bell models:** 204B, 205A, 205A-1
SA2245SO	**Cessna model:** 425
ST1030SO	**British Aerospace models:** DH.125-400A, HS.125-600A, HS.125-700A, BH.125-600A, BAE.125-800A
SH1410SO	**Messerschmitt-Bolkow-Blohm GMBH model:** BO-105S
SA2948SO	**British Aerospace, model:** Jetstream 3101
SA1183SO	**Beech models:** 65, A65 Serial Numbers LC-240 through LC-335, 65-80, 65-A80, 65-B80 Serial Numbers LD-270 and up, 65-88, 70 Serial Numbers LB-1 through LB-35
SA887SO	**Aero Commander, models:** 680T, 680V, 680W
SA894SO	**Beech models:** 99, 99A, A99, 100, A100, A100A
SA1013SO	**Beech models:** C90 (S/N's LJ590 & after), E90 (S/N's LW58 & after) F90 (S/N's LA-2 & after), B99 (S/N's U146, U148 through U164)
ST1031SO	**Rockwell International:** NA-265 series
ST1032SO	**Lockheed-Georgia, model:** 1329-23 series
ST1033SO	**Learjet models:** 23, 24, 25, 28, 29, 35, 36 series
SA1042SO	**Mitsubishi models:** MU-2B, -10, -15, -20, -25, -26, -26A, -30, -35, -36, -36A, -40, -60
SA1050SO	**Gulfstream, model:** G-159
SA1051SO	**Cessna models:** 500, 501, 550, S-550, 551, 560
SA1058SO	**Beech model:** A100
SA1059SO	**Rockwell Commander models:** 690, 690A
SA1167SO	**Embraer models:** EMB-110P1, EMB-110P2
SA01203LA	**Cessna:** 525 and 525A series
SA1016SO	**Raytheon (Beechcraft) models:** 200(A100-1(U-21J), 200C, 200CT, 200T, A200(C-12A) OR (C-12C), A200CT(C-12D), OR (FWC-12D) OR (RC-12D), OR (C-12F) OR (RC-12G) OR (RG-12H) OR (RC-12K) OR (RC-12P), B200, B200C, (C-12F) OR (UC-12F) OR (UC-12M) OR (C-12R), B200CT, B200T, 300, B300, 300LW, B300C
SA1728SO	**Piper models:** PA-31T, -31T1, -31T2, PA-42 and PA-42-720 Series
SH297NM	**Bell Helicopter models:** 206, 206A, 206B, 206B-1, 206B-3, 206L, 206L-1, 206L-3
ST01117LA	**Cessna models:** 208, 208A, and 208B
ST01185LA	**Cessna models:** 650 series
SR01406LA	**Bell models:** 206A, 206B, 206L, 206L-1, 206L-3
SR01427LA	**MD Helicopters, Inc., (MDHI) models:** 369, 369A, 369H, 369HM, 369HS, 369HE, 369D, 369E, 369F, 369FF, 500N, 600N
SR01601NY-D	**Sikorsky models:** S-76A and S-76C

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