OPERATION & SERVICE MANUAL

Model: 17A7505-7000
Mobile Air Conditioner (MACH-IV)
with Gasoline Motor-Gen Set
& Heater Option
230 VAC – 1 Phase – 60 Hz

11/2012 – Rev. 08

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REVISION	DATE	TEXT AFFECTED
05	04/2007	Modified 3.1, 7.2, 7.3, 8.1, and Parts Lists
06	12/2007	Removed Electrical Schematic
07	10/2009	Modified 1.0 Description, 2.1 Usage, 3.2 Air Conditioner Ratings, 3.3 Electrical Data, 6.4 Check For Refrigerant Leaks, 8.9 Refrigerant Charge and Appendix II Removed 9.4 Package Service Training
08	11/2012	Revised 3.4 Motor/Generating Set Features and 3.5 Motor/Gen-Set Ratings and Specifications

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1.0 DESCRIPTION

The Tronair Model 17A7505-7000 MACH-IV (Mobile Air Conditioner/Heater) is a complete portable aircraft ground cooling unit designed for corporate aviation departments, FBO's, and regional/commuter airlines.

The MACH-IV provides pre-cooling prior to passenger arrival, as well as during ramp maintenance work.

The four (4) ton air conditioner provides cool air using R-410A, environmentally "safe" refrigerant, when plugged into 1 phase, 60 Hz, 230 V power source or the on-board motor/generator set (motor/gen-set).

2.0 USAGE AND SAFETY INFORMATION

2.1 USAGE

The Tronair Model 17A7505-7000 MACH-IV provides 45,000 Btu/hr of cool air at 1,200-2,000 cfm for aircraft cabin comfort.

2.2 SAFETY PRECAUTIONS

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.

WARNING! – Warning is used to indicate the presence of a hazard that ***can cause severe personal injury, death, or substantial property damage*** if the warning notice is ignored.

CAUTION! – Caution is used to indicate the presence of a hazard that ***will or can cause minor personal injury or property damage*** if the caution notice is ignored.

Accidental Starts! Before servicing the equipment, always disconnect the power cord to prevent the air conditioner from starting accidentally. Ground leads to prevent sparks that could cause fires.

Rotating Parts! Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate the air conditioner with covers, shrouds, or guards removed.

Hot Parts! Components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the air conditioner is running or immediately after it is turned off. Never operate the air conditioner with heat shields or guards removed.

Electrical Shock! Never touch electrical wires or components while the air conditioner is running. They can be sources of electrical shock. Do not operate air conditioner with cabinet panels removed.

Lethal Exhaust Gases! Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, color-less, and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.

Explosive Gas! Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are Off. If On, a spark will occur at the ground cable terminal, which could cause an explosion if hydrogen gas or gasoline vapors are present.

Flammable Solvents! Carburetor cleaners and solvents are extremely flammable. Keep sparks, flames, and other sources of ignition away from the area. Follow the cleaner/solvent manufacturer's warnings and instructions on its proper and safe use. Never use gasoline as a cleaning agent.

2.0 USAGE AND SAFETY INFORMATION *(continued)*

2.3 SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for un-brazing operations. Have fire extinguisher available for all brazing operations.

WARNING!

1. **Air conditioner unit must be on a level surface or it may not operate correctly.**
2. **Before performing service or maintenance operations on unit, turn off main power switch to unit.**
3. **Electrical shock could cause personal injury.**
4. **Read your generator and engine operator manuals carefully; know your equipment before you use it. Consider the application, limitations and potential hazards before operation.**
5. **The generating set is equipped with a ground terminal for your protection. Always complete the grounding path from the set to an external grounding source to prevent electrical shock. (Follow special isolated neutral instructions when using with an MTS-100 or MTS-200 manual transfer switch.)**
6. **Electric load applied to generating set must be within its rating. Overloading will damage set or shorten its life.**
7. **Generating set must reach operating speed before load is applied. Disconnect electrical loads before shutting engine down.**
8. **Maintain electrical cords in good condition. Worn, bare, frayed or otherwise damaged cords can cause electrical shock.**
9. **Never operate the generating set or handle any electrical equipment while standing in water, while barefoot, while hands are wet or while in the rain or snow to prevent dangerous electric shock.**
10. **A ground fault circuit interrupter (GFCI) should be used in damp or high electrical conductive areas and construction job sites to prevent electric shock.**
11. **Before working on the engine or the generator, always remove the spark plug or the spark plug wire to prevent accidental starting.**
12. **Check generating fuel system on a regular basis. Look for signs of leaks, deterioration, chafed or spongy fuel hose, loose or missing fuel hose clamps, rusted or damaged fuel tanks, defective fuel shut-off valve. Correct any defect before operation.**
13. **Always provide adequate ventilation. Do not operate set in any enclosed or narrow space. Engines consume oxygen and give off deadly carbon monoxide poisonous gas. Improper ventilation will cause damage to set and possible injury to people.**
14. **Avoid severe burns by not touching hot muffler, hot exhaust manifold, or engine cooling cylinders.**
15. **Keep generator and engine clean. Remove all oil or gasoline deposits, and accumulated dirt from set and immediate area. Poor housekeeping creates a fire hazard.**
16. **Keep a fire extinguisher close by your set and be familiar on how to use it. Consult your local fire department for correct extinguisher type.**
17. **The unit should never be operated under the following conditions:**
    - **Change in engine speed, slow or fast**
    - **Overheating in load connecting devices**
    - **Sparking of arcs from set**
    - **Loss of electrical output**
    - **Damaged receptacles**
    - **Engine misfire**
    - **Excessive vibration**
    - **Enclosed compartments or confined areas**
    - **Flame or smoke**
    - **Rain, snow or water conditions**
    - **Operator non-attendance**
18. **The unit must be operated under the following conditions:**
    - **Good ventilation. Avoid areas where vapors can be trapped. Air flow and temperature are important. Never operate set when ambient temperature is over 105° F.**
19. **Engine exhaust gas is poisonous and dangerous. The gas contains carbon monoxide, an odorless, invisible gas which causes serious illness or death is breathed. Always direct exhaust fumes away from humans.**

2.3 SAFETY *CONSIDERATIONS (continued)*

WARNING!

20. **California proposition 65 warning: This is a warning to user that all exhaust fumes from this engine contain chemicals known to cause cancer, birth defects, or other reproductive harm. Do not breathe poisonous engine exhaust fumes.**
21. **Battery posts, terminals and related accessories contain lead and lead compounds; chemicals known to the State of California to cause cancer and reproductive harm.**
22. **Wash hands after handling.**
    - **If battery acid is ever required, battery must be brought to a full charge by commercial battery charger for 24 hours. Use extreme caution when handling the batteries. Battery acid is extremely dangerous and can cause severe burns to the eyes, skin and clothing. Flush contaminated areas immediately with water and call for medical assistance.**
    - **All electric start engines include a built-in battery charger which operates automatically when the engine runs. Provisions must be made to keep battery fully charged if the engine will not be operated frequently. This can be accomplished by a small commercial battery charger connected to battery and plugged into normal power.**
    - **Overcharging the battery will cause battery damage. Always use an automatically regulated charger so that as battery becomes charged, the rate of charge is automatically reduced. Check battery cells with a hydrometer. The specific gravity of each cell should be 1.280 at 75° F. If cells are low, add distilled water and recharge battery. Keep battery and battery terminals clean and dry. Terminals should have light grease or petroleum jelly applied to retard corrosion.**
23. **Disconnect or connection of battery terminals while engine is running will cause violent spark and may result in explosion. Never smoke or use open flame near battery. The area of battery use must be well ventilated because batteries give off a poisonous and explosive gas when being charged.**
24. **Engine should be refueled in a well-lighted area. Do not operate generator set where fuel spills have occurred until all excess fuel is cleaned up and removed. Avoid refueling near open flames, sparking electric devices, power tools, other high heat conditions or while the set is running.**
25. **Good ventilation is mandatory for safe generator operation. Avoid areas when fuel vapors and exhaust gases can be trapped. Proper air flow and temperatures are important for safe operation of air cooled sets. Never operate generator set when ambient temperature exceeds 105° F.**
26. **Muffler and air cleaner should always be installed and in good condition. They act as a flame arrestor if backfiring occurs.**
27. **Some generator models are equipped with automatic GFCI receptacles. If a ground fault exists (potential electric shock hazard), the receptacle will not produce power. When ground fault condition is removed, manually reset built-in circuit breaker. For maximum protection against electric shock hazard, manually operate test switch on GFCI protected receptacle while gen-set engine is running and before electric load is applied to receptacles.**
28. **Always read engine manual thoroughly before initial start of your new gen-set.**
29. **High altitude creates a negative effect on engines and can severely reduce engine horsepower, therefore reducing electric power output. All engine HP ratings meet SAE J1349 test codes. Reduce HP ratings 3.5% for each 1000 feet over 328 feet above sea level and 1% for every 10° F (5.65° C) rise above 77° F (25° C).**
30. **This manual and the manufacturer cannot possibly anticipate every possible happening that might involve a hazard. The listing, warnings and cautions in the manual and on tags and labels affixed to the gen-set are therefore, NOT ALL INCLUSIVE.**
    - **If a certain procedure, work method, test method, or operating procedure that is not recommended by this manual is used, user must assume all responsibility that the procedure and/or method will be safe to use by all others. If you modify or change this gen-set in any way from its original design, you must assume responsibility for its safe operation.**
31. **All generators have been factory load tested. All engines are "green" and have not had the (50) hour break-in time to develop peak horsepower.**
32. **Local Fire Departments must be consulted concerning proper and safe handling procedures for fuels such as gasoline, diesel, LPG, propane, or natural gas.**

3.0 FEATURES, BENEFITS AND RATINGS

Every compact one-piece unit arrives fully assembled, charged, tested and ready to run.

3.1 AIR CONDITIONER FEATURES/BENEFITS

- **Durable, Dependable Construction –** The air conditioner is designed for durability in any climate, the weather-resistant cabinets are constructed of galvanized steel, bonderized, and all exterior panels are coated with a pre-painted baked enamel finish. The paint finish is non-chalking, and is capable of withstanding ASTM B117 500-hour Salt Spray Test. All internal cabinet panels are primed, permitting longer life and a more attractive appearance for the entire unit. Totally enclosed condenser-fan motors and permanently lubricated bearings provide additional unit dependability.
- **Proven Compressor Reliability** – Design techniques feature computer-programmed balance between compressor, condenser and evaporator. Carrier-specified hermetic compressors are equipped with compressor over current and over temperature protection to ensure durability.
- **Extra Receptacles** – An external, covered 115 volt Ground Fault Interrupt (GFI) receptacle is provided as a convenient power source for drills, lights, refrigerant recovery units, or other electrical service tools. Simply connect the outlet to a field-supplied and properly fused branch circuit power supply.
- Single 8 kilowatt electric heater
- Pre-coated aluminum fin coil
- High pressure switch
- Loss of charge/low pressure switch
- Freeze protection switch
- Non-corrosive, sloped condensate drain pan, meets ASHRAE 62-89 (IAQ)
- Two inch (2") return-air filters
- Includes exclusive Acutrol™ metering device to precisely control refrigerant flow (preventing slugging and flood-back) while maintaining optimum unit performance.
- The wheels lock with the towbar in the upright and locking position.
- 12 inch diameter x 25 ft long blower hose (with storage compartment), connects quickly and easily to the air conditioning unit. The hose will not fully inflate during the cooling or heating process.
- Unit is designed to cool and/or heat an aircraft through a window or door opening.

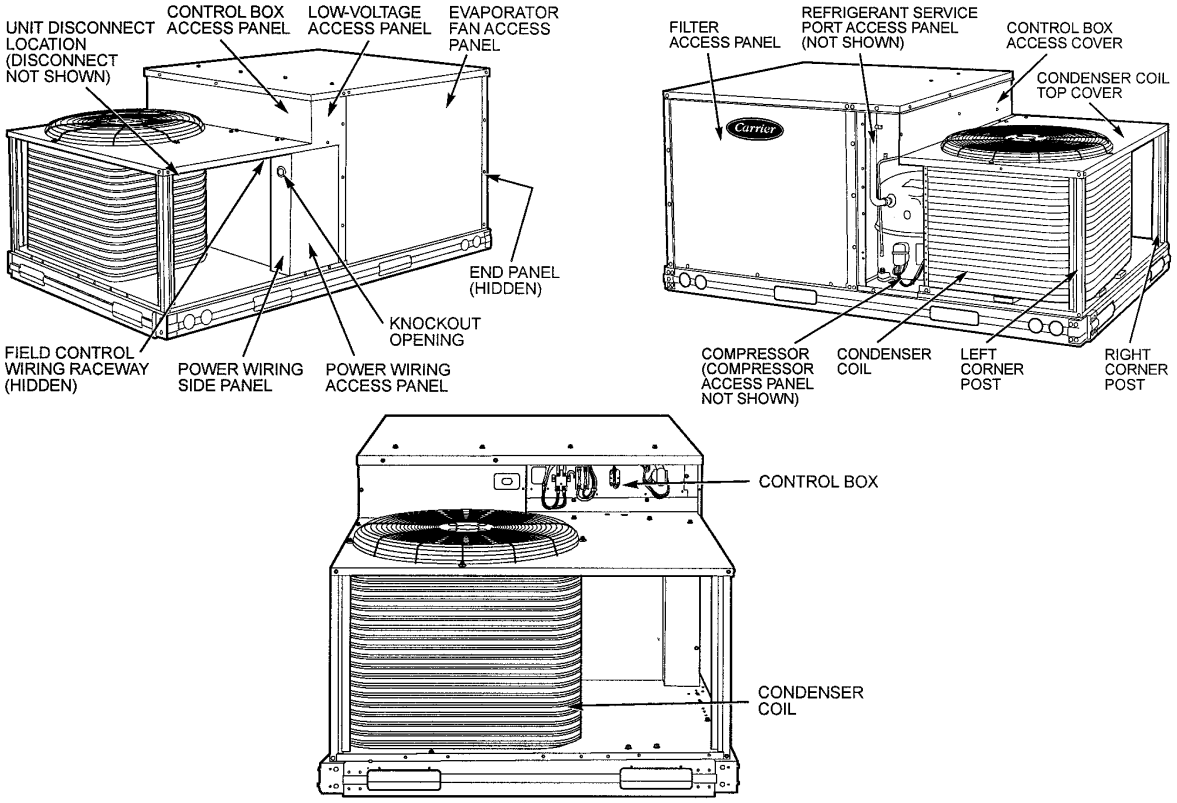


FIGURE 1 – Typical Component Location

3.0 FEATURES, BENEFITS AND RATINGS *(continued)*

3.2 AIR CONDITIONER RATINGS

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI) CAPACITY RATINGS

Nominal Tons	Standard CFM	Net Cooling Capacity (BTUH)	Total kW	SEER	Sound Rating (db)
4	1200-2000	45,000	4.0	13.0	85.0

LEGEND

BTUH – British Thermo Unit/Hour
SEER – Seasonal Energy Efficiency Ratio
kW – Kilowatt
db – **decibels -** Sound Levels

NOTES:

1. Rated in accordance with ARI Standards 210/240-06 or 360/360-04.
2. Ratings are net values, reflecting the effects of circulating fan heat.

3.3 ELECTRICAL DATA

ELECTRICAL DATA

Nominal V-Ph-Hz	Voltage Range		Compr (each)		OFM			IFM	Electric Heat		Power Supply		Disconnect Size	
	Min	Max	RLA	LRA	Qty	Hp	FLA	FLA	Nominal KW ♦	FLA	MCA	MOCP ††	FLA	LRA
230-1-60	187	253	21.8	117	1	1/4	1.5	4.9	8.7	36.3	51.5	60	47	133

LEGEND

IFM – Indoor (Evaporator) Fan Motor
OFM – Outdoor (Condenser) Fan Motor
RLA – Rated Load Amps
LRA – Locked Rotor Amps
FLA – Full Load Amps
MCA – Minimum Circuit Amps
MOCP – Maximum Overcurrent Protection
†† – Fuse or HACR Circuit Breaker
♦ – Heater Capacity (kW) is based on heater voltage of 208 volts. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

3.4 MOTOR/GENERATING SET FEATURES

- **GROUND FAULT CIRCUIT INTERRUPTERS (GFCI)** receptacles help protect operator from electric shock and provides OSHA/NEC compliance on the construction job-site.
- **VOLTMETER** allows easy review of generator voltage output.
- **RUN TIME METER** totals the hours of run time for service or rental use.
- **AUTOMATIC OIL SENSOR** protects your engine from low oil level and automatically stops engine before damage happens.
- **2-ELEMENT AIR CLEANER** adds major additional engine life.
- **ELECTRONIC STARTING** makes the large 9kw through 14kw a simple matter with just a turn of the key switch.

All generators are available with your choice of HONDA, VANGUARD, OR KOHLER heavy duty OHV engines.

GEN-PRO by GILLETTE, is a reliable and dependable electric power to go anywhere. These lightweight and compact generators are designed for extreme heavy duty and abusive conditions. These high portability generators will let you plug into, clean dependable electric power, virtually anywhere, anytime.

3.0 FEATURES, BENEFITS AND RATINGS *(continued)*

3.5 MOTOR/GEN-SET RATINGS and SPECIFICATIONS

Single (1) Phase, 60 Hz, 120/240 Volts

Standby Maximum kW	12.5
Rated amps at 240V	46
Code G Electric Motor Start Power in HP	5 HP
Engine Horsepower Maximum Rating	22 HP
Fuel Use	1.3 gal/hr
Voltage Regulation	+/-5% from nameplate rating
Frequency Regulation	+/-5% from nameplate rating
"Kleen-Power"	Waveform Harmonic Distortion averages 6 %
Engine Brand	Honda, Overhead Valve, Air Cooled
Engine Start	12 VDC Electric Starter
Engine Cylinders (cubic centimeters)	V-Twin
Low Oil Shut Down	Standard
dB(A) at 7 Meters	86
Battery	12 VDC
Voltmeter and Run Time Meter	Both meters are installed on all generator sets
120/240V Receptacle	N. 14-50R
Low Oil Shut Down Protection	If oil pressure falls below safe level, the engine will shut down and will not start until proper oil level is restored
120 V Receptacle	NEMA L5-30R

3.6 TRAILER

- Welded steel frame construction
- Tapered roller bearings; sealed (Can be lubricated when performing Maintenance.)
- Wheel: 4 hole, 4 inch bolt circle
- Tires: Size – 4.80 x 8 inch diameter Pressure – 50 psi (Rear)
  Size – 4 x 12.6 inch diameter Pressure – 85 psi (Front)

4.0 ELECTRICAL CONNECTIONS

CAUTION!

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate.

NOTE: In compliance with NEC requirements for multi-motor and combination load equipment (refer to NEC Articles 430 and 440), the over current protective device for the unit shall be fuse or HACR breaker. See section 3.3 Electrical Data for size.

4.1 ON/OFF (DISCONNECT) SWITCH LOCATION

The On/Off switch (Disconnect) is mounted on the unit under the top panel and behind the condenser coil. ***Reference Figures 1and 2.***

This factory-installed, internally-mounted, NEC (National Electrical Code) and UL (Underwriters' Laboratories) approved non-fused On/Off switch (Disconnect) provides unit power shutoff.

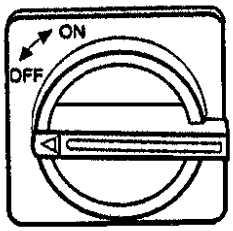


FIGURE 2
Unit Mounted Disconnect Switch

4.2 GROUND FAULT CIRCUIT INTERRUPTION (GFCI)

When certain adverse conditions exist, an electric shock potential is possible to the operator of electric generator sets. It is recommended by the National Electrical Code (NEC) and Occupational Health and Safety Administration (OSHA) to utilize a device that will automatically disconnect the electric load from the electric power source when these health and/or life threatening conditions exist.

The air conditioner on the MACH-IV is equipped with a manual disconnect. **If any other equipment is to be used with the motor/gen-set, it is the owner's responsibility to provide a manual and an automatic disconnect for that equipment.** The gen-pro is equipped with an automatic two pole magnetic reacting circuit breaker. (See Section 6.3, Receptacle Panel)

This device protects you against hazardous electrical shock that may be caused if your body becomes a path through which electricity travels to reach ground potential. This could happen when you touch an appliance or cord which is "live" through faulty mechanism, damp or worn insulation, etc. Also, be cautious about touching plumbing or other mechanical paths to ground.

4.3 NEMA 14-50P, 50 AMP, 240 VOLT PLUG

This MACH-IV is shipped with a NEMA 14-50P, 50 amp, 240 volt plug. This plug works with the NEMA 14-50R, 50 amp, 240 volt receptacle on the motor/gen-set (See Section 6.3, Receptacle Panel). In order to supply electricity to the air conditioner from another source, the receptacle must be equivalent to the plug on the air conditioner.

CAUTION!

When plugging the air conditioner into the motor/gen-set, it is NOT recommended to add an extension cord between the plug and the motor/gen-set. Only use the power cord attached to the air conditioner. If this caution is not heeded, the compressor will not operate.

WARNING!

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur.

This ground consists of an electrical wire connected to unit ground lug in control compartment when installed in accordance with NEC (National Electrical Code), ANSI (American National Standards Institute)/NFPA (National Fire Protection Association), latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22. 1) and local electrical codes.

Failure to follow this warning could result in the installer being liable for personal injury of others.

5.0 FUEL AND OIL FOR MOTOR/GEN-SET

Explosive Fuel! Gasoline is extremely flammable and its vapors can explode if ignited. Store only in approved containers, in well ventilated unoccupied buildings and away from sparks or flames. Do not fill the fuel tank while the engine is hot or running since spilled fuel could ignite when coming in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.

5.1 GENERAL RECOMMENDATIONS

- Purchase gasoline in small quantities and store in clean, approved containers. A container with a capacity of two to 10 gallons with a pouring spout is recommended. Such a container is easier to handle and helps eliminate spillage during refueling.
- Do not use gasoline left stored more than 2 months, to minimize gum deposits in your fuel system and to ensure easy starting.
- Do not add oil to gasoline.
- Do not overfill the fuel tank. Leave room for the fuel to expand.

5.2 FUEL TYPE

- For best results, use only clean, fresh, unleaded gasoline with a pump sticker octane rating of 87 or higher. In countries using the Research method, it should be 90 octane minimum.
- Unleaded gasoline is recommended, as it leaves fewer combustion chamber deposits.

5.3 GASOLINE/ALCOHOL BLENDS

- Gasohol (up to 10% ethyl alcohol, 90% unleaded gasoline by volume) is approved as a fuel for Kohler engines. Other gasoline/alcohol blends are not approved.

5.4 GASOLINE/ETHER BLENDS

- Methyl Tertiary Butle Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15% MTBE by volume) are approved as a fuel for Honda engines. Other gasoline/ether blends are not approved.

5.5 OIL RECOMMENDATIONS

Using the proper type and weight of oil in the crankcase is extremely important to the life of the unit.

To increase reliability and operational life of this motor/gen-set:

- Use proper oil type and weight.
- Check oil level daily.
- Change oil per Kohler Engine Manual. The engine requires 2.1 U.S. quarts total.

Oil Type: Use high quality detergent oil of **API (American Petroleum Institute) Service class SG or SH**. Select the viscosity based on the air temperature at the time of operation as shown in ***Figure 4***.

NOTE: Using other than service class SG or SH oil or extending oil change intervals longer than recommended can cause engine damage.

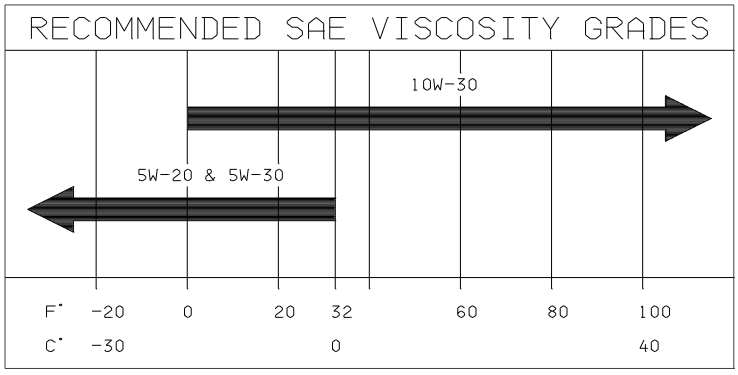
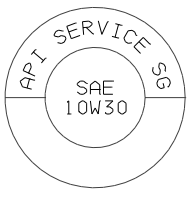


FIGURE 4

A logo (See ***Figure 5***) or symbol on oil containers identifies the API service class and SAE viscosity grade. Refer to Kohler Engine Owner's Manual, for detailed procedures on checking the oil, changing the oil, and changing the oil filter.



OIL CONTAINER LOGO

FIGURE 5

6.0 PRE START-UP

6.1 PRIOR TO OPERATION

Prior to operating the MACH-IV, the user should become familiar with the Owner's operating manuals.

CAUTION!

1. DO NOT jumper any safety devices when operating the unit.
2. DO NOT operate the compressor when the outdoor temperature is below 40°F (4°C) unless accessory low-temperature kit is installed.
3. DO NOT rapid-cycle the compressor. Allow five (5) minutes between "On" cycles to prevent compressor damage.

WARNING!

Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from both high- and low-pressure sides of the system before touching or disturbing anything inside terminal box if refrigerate leak is suspected around compressor terminals. Use accepted methods to recover refrigerant.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
- **Shut off electrical power to unit.**
- **Relieve all pressure from system using both high- and low-pressure ports. Use accepted methods to recover refrigerant.**
- **Cut component connecting tubing with tubing cutter and remove component from unit.**
- **Carefully un-sweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.**

6.2 GENERAL INSPECTION

1. Remove all access panels on the air conditioner.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to and/or shipped with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector or liquid-soap solution. If a refrigerant leak is detected, see 5.3 Check for Refrigerant Leaks section.
4. Remove all access panels on the air conditioner.
5. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to and/or shipped with unit.
6. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector or liquid-soap solution. If a refrigerant leak is detected, see 5.3 Check for Refrigerant Leaks.
   c. Inspect all field and factory wiring connections. Be sure that connections are completed and tight.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
7. Verify the following conditions:
   a. Make sure that condenser-fan blade is correctly positioned in fan orifice. Leading edge of blade should be two inches (2 in/51 mm) from condenser inlet grille and one-half inch (½ in/13mm) from fan deck.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

6.0 PRE START-UP *(continued)*

6.3 RECEPTACLE PANEL

The receptacle panel is to be used if you plan on supplying power to the air conditioner via the motor/gen-set. ***Figure 6*** is a description of all nine parts of the receptacle panel. The receptacle panel is located on the tongue end of the MACH-IV.

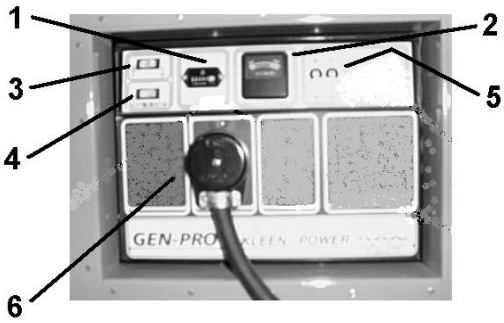


FIGURE 6 – Receptacle Panel

LEGEND
1. Run time meter (Hour Meter)
2. Voltmeter
3. Engine "Press-to-Start" rocker switch
4. Engine "Stop-Run" rocker switch
5. Two pole magnetic re-acting main circuit breaker
6. Standard 240 volt, 50 amp NEMA L14-50R twist-lock, 4 wire receptacle

CAUTION!

It is advised not to run other equipment off this receptacle panel while the compressor on the air conditioner is starting. Failure to heed this caution may damage the air conditioner and/or stop the compressor from starting.

Circuit Breaker (5): Circuit breakers protect against electrical overloads. If possible, it is advised to switch off or remove electric load before starting engine. Always use grounded male plugs. The neutral line of generating set is mechanically grounded to frame.

Hour Meter (1): Indicates the hours of use to help in determining service periods.

Volt Meter (2): Indicates the voltage output of generator set.

6.4 CHECK FOR REFRIGERANT LEAKS

Locate and repair refrigerant leaks and charge the unit as follows:
1. Using both high-pressure and low-pressure ports, locate leaks and recover remaining refrigerant to relieve system pressure.
2. Repair leak following accepted practices.
3. Check system for leaks using an approved method.
4. Evacuate refrigerant system and recover refrigerant if no additional leaks are found.
5. Charge unit with R-410A refrigerant (Reference Appendix II – MSDS) using a volumetric-charging cylinder or accurate scale. *Refer to unit rating plate for required charge.* Be sure to add extra refrigerant to compensate for internal volume of filter drier.

6.5 CHECK COOLING EFFECTS

Plug in unit. Turn On/Off switch to "On" position. Fan should be on and blowing correctly. After approximately 30 seconds, condenser should "kick on". Observe that compressor, condenser fan, and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied.

6.6 CHECK HEATING EFFECTS

Plug in unit. Flip Heat/Cool switch to cool. Turn On/Off switch to “On” position. Fan should be on and blowing correctly. After approximately 30 seconds, condenser should “kick on”. Observe that compressor, condenser fan and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied.

6.7 CHECK MOTOR/GEN-SET

1. Check the lubricating oil and maintain to proper level.

   Oil-Guard: Protection against damage to engine resulting from low oil level. As the oil level falls below safe level, the engine automatically shuts down and the engine will not restart until oil is added.

CAUTION!

Never start engine when oil level is below normal level or when oil fill cap is removed.

2. Check fuel source.
3. Make sure that exhaust is directed away from people and animals.
4. Check circuit breakers to ensure they are set.
5. Ensure battery is fully charged and the battery cables are connected to both the engine and the battery.

7.0 OPERATION

7.1 OPERATING INSTRUCTIONS

Operate the MACH-IV in accordance with the operating instructions provided on the instrument panel. Reference ***Figure 7***.

A description of each step of the STARTING and SHUTOFF sequence is given, along with a brief discussion of what is to be expected.

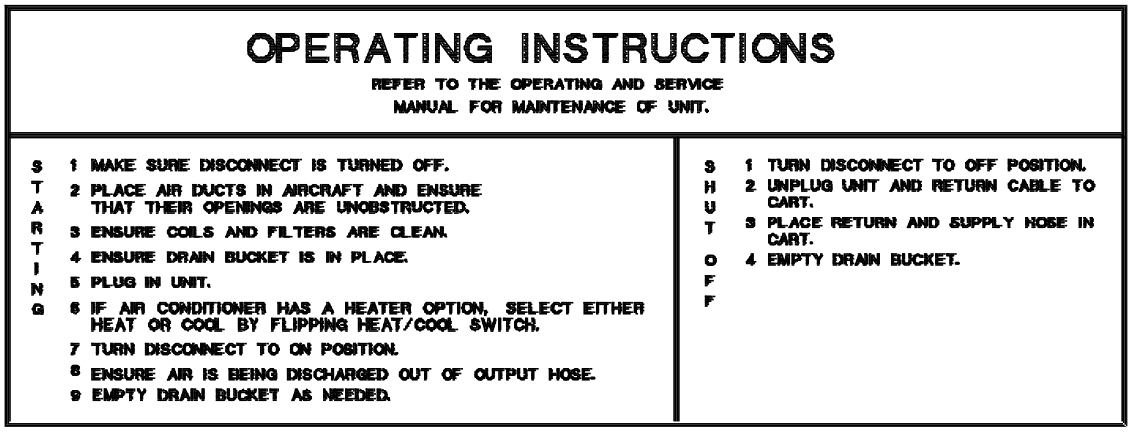


FIGURE 7 – Operating Instructions Label

7.2 STARTING MACH-IV

1. Ensure On/Off switch (Disconnect) is turned to "Off" position. The On/Off (Disconnect) switch is "Off" when turned counter-clockwise. ***Reference Figure 2.***

WARNING!

Until ready for use, always leave this switch in the Off position.

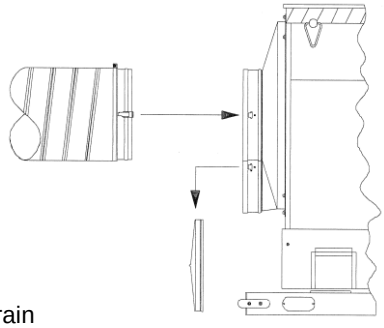


FIGURE 8

2. Place air duct in aircraft and ensure that the opening is unobstructed. Remove yellow output air duct from the storage compartment located under the unit. Remove yellow dust caps from the input and output duct openings located on the back of the air conditioner and place in the storage compartments. Attach yellow output air duct to the air conditioner via the duct opening located on the back of the air conditioner. ***See Figure 8.*** Place other end of yellow duct into the aircraft.
3. Ensure coils and filters are clean. Refer to section 8.5 Air Conditioner Cleaning.
4. Ensure drain bucket is in place. The MACH-IV unit does not have a factory supplied drain bucket. Depending on your usage, a drain bucket or any condensate collector device may not be needed. Below are two suggestions you may utilize if you do not want the condensation to collect on the floor/ramp:
   a. Purchase a bucket with a lid on it and the lid has at least a 13/16 inch diameter hole. The hole in the bucket will receive the 3/4 inch diameter yellow condensate hose coming out of the MACH-IV unit.
   b. Buy a 1/2 inch diameter male garden hose coupler and attach it to the end of the 3/4 inch diameter yellow condensate hose coming out of the MACH-IV unit. Also, purchase any length garden hose to attach to the 1/2 inch diameter garden hose coupler. By doing the above, you will be able to direct the condensate to any location.

WARNING!

The end of the garden hose can not be higher than the condensate trap located under the air conditioning unit. Damage to equipment and/or electrical shock may occur.

5. Plug unit into generator set or wall receptacle. See Section 4.0 Electrical Connections starting on Page **Error! Bookmark not defined.** for important instructions concerning electrical connections. The air conditioner on Tronair model 17A7505-7000 MACH-IV can receive power from either the motor/generator set or a wall receptacle. The following are instructions for both methods:
   a. Wall Receptacle – Ensure that receptacle meets requirements in Section 4.3, N. 14-50R Plug.
   b. Motor/Gen-Set – Insert plug into motor/gen-set as shown in ***Figure 6 – Receptacle Panel***.
6. a. If using generator set, locate the "Press-to-Start" rocker switch and the "Stop-Run" rocker switch as mounted on top left hand side of receptacle panel. See ***Figure 6*** – ***Receptacle Panel***.
   c. Move the "Stop-Run" switch to the run position (no action will take place). Move the "Press-to-Start" switch to "Start". This is a spring loaded momentary switch and it must be held in the "Start" position. The engine will begin to crank. When the engine starts, continue to hold this "Press-to-Start" switch for (5) seconds, then let go of the switch. It returns to its original neutral position and engine continues to run.

7.2 STARTING MACH-IV *(continued)*

7. Locate the Heat/Cool switch in front of the air conditioner unit near the power cord. See ***Figure 9***.

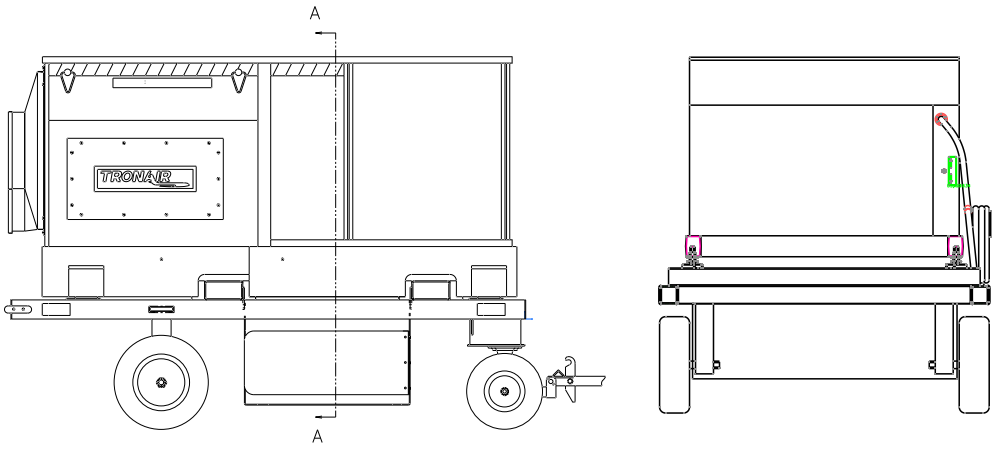


FIGURE 9

8. Turn On/Off switch (Disconnect) to "On" position. Turn On/Off switch (Disconnect) to "On" position by turning clockwise. Reference ***Figure 2.***
9. **Cooling:** Check supply air duct to ensure cool air is being discharged when condenser is on. When unit is turned "On", the evaporator blower fan located inside the fan access panel (Reference ***Figure 1***) begins rotating. After approximately 30 seconds, the compressor and condenser fan "kicks on".

NOTE: If the unit has been sitting for an extended amount of time without use and/or after considerable moving of unit (especially during shipping), the first 30 second delay may be as long as five (5) minutes due to removal of excessive pressure build-up against the head of the compressor.

These two items will continue to function until a temperature of 55° F is reached inside the air conditioner unit.

NOTE: If a temperature of less than 50o F is obtained, the freeze protection switch will open and the air conditioner unit will not function until the freeze protection switch is reset.

When a temperature of approximately 60° F is reached, the compressor and condenser fan will cycle back on. At no time will the evaporator blower fan ceases to operate as long as the On/Off (Disconnect) switch is in the "On" position.

Heating: Check supply air duct to ensure warm air is being discharged when the heater is on.

When heater is turned “On” and the Heat/Cool switch is in the “Heat” position, the evaporator blower fan located inside the fan access panel (Reference Figure 1) begins rotating and the electric heater starts.

When a temperature of 76° is achieved inside the air conditioner unit, the heater will shut. At no time will the evaporator blower fan cease to operate as long as the On/Off (Disconnect) switch is in the “On” position.

10. Empty drain bucket as needed to keep condensate from collecting on the floor/ramp.

7.3 SHUT OFF MACH-IV

1. Turn Disconnect to "Off" position. The On/Off (Disconnect) switch is "Off" when turned counter-clockwise. ***Reference Figure 2.***
2. Turn tank valve to closed position.
3. Flip power switch on generator set to "Off" position. To stop gen-set, move the "Stop-Run" switch from the "Run" position to the "Stop" position. Engine will stop running.
4. Unplug unit and return cable to cart. The cable hanger is located on the side of the unit. Ensure the cable does not touch the ground.
5. Place supply hose in cart.
6. Empty drain bucket.

8.0 MAINTENANCE AND SERVICE

WARNING!

CAUTION TO OPERATOR:
Many engine manuals try to explain engine operations to fit all possible applications. This method of explanation will sometimes lead to conflicting rules of operation. The following are the most important of the conflicts of operation for generator users:

- **Most engine manuals instruct user to start engine at half speed, let engine warm up, then move throttle to full speed and apply engine load. Consequent instructions are to remove load and run engine at half speed to cool engine down before stopping. DO NOT FOLLOW THESE INSTRUCTIONS. The engine governor is fixed at the proper speed and is not adjustable. Generators should be started at full speed and stopped at full speed. Changing the engine speed will ruin voltage and frequency output.**
- **All engines modified with dry fuel (LPG) and have the engine choke mechanism permanently fixed to that engine cannot be "choked" with this fuel. DO NOT CHOKE ANY ENGINE WITH DRY FUEL MODIFICATION.**
- **All engines are now EPA certified for compliance with minimal toxic exhaust emissions. Modification of muffler assembly, carburetor or air cleaner may alter and therefore cancel EPA certification.**

8.1 GENERAL

WARNING!

1. **Be sure that all control panel switches are in the "Off" position before making battery disconnections.**
2. **Battery posts, terminals and related accessories contain lead and lead compounds; chemicals known to the State of California to cause cancer and reproductive harm.**
3. **Wash hands after handling.**

Periodically inspect MACH-IV for loose connections, abrasions to cables and wires, and overall general condition of unit. Make repairs as necessary.

If the MACH-IV will be out of service for two months or more, use the following storage procedure:

- Clean the exterior surfaces of the unit, removing dirt and oil residue.
- Change the oil and oil filter in the Kohler engine while the engine is still warm from operation.
- The engine fuel system must be completely emptied.
- Remove the spark plugs and add one tablespoon of engine oil into each spark plug hole. Install plugs and ground spark plug leads - do not connect the leads to the spark plug. Crank the engine two or three revolutions.
- Disconnect positive 12V battery cable.
- Store the MACH-IV unit in a clean, dry place.

WARNING!

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

8.0 MAINTENANCE AND SERVICE *(continued)*

8.2 ENGINE

See Parts Lists and Illustrations Section of this manual and Honda Engine Owner's Manual for specific maintenance regarding the engine.

The single most important factor in long engine life is maintaining proper oil level and regularly scheduled changing of engine oil.

The following required maintenance procedures should be performed at the frequency stated in the table below. They should also be included as part of any seasonal tune-up.

MAINTENANCE SCHEDULE	
Frequency	**Maintenance Required**
Daily or Before Starting Engine	Fill fuel tank. Check oil level. Check air cleaner for dirty, loose, or damaged parts. Check air intake and cooling areas; clean as necessary[1].
Every 25 Hours	Service precleaner element[1].
Every 100 Hours	Replace air cleaner element[1]. Change engine oil. Remove cooling shrouds and clean cooling areas[1].
Every 200 Hours	Change oil filter. Check spark plug condition and gap.
Annually or Every 500 Hours	Have Bendix starter drive serviced[2]. Have solenoid shift starter disassembled and cleaned[2].

[1] Perform these maintenance procedures more frequently under extremely dusty, dirty conditions.

[2] Have a Honda Engine Service Dealer perform this service.

8.3 BATTERIES

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.

- Refer to the battery bulletin, Appendix I Johnson Controls Bulletin and MSDS, for specific maintenance regarding the batteries.
- It is suggested that once each year the battery be tested. Replace worn battery. Acceptable battery should be fully charged.

8.4 TRAILER SYSTEM

- Lubricate axle wheel bearings periodically (minimum once per year) with a multi-purpose lithium wheel bearing grease. Replace seals as required.
- Check and maintain tire pressure.

8.0 MAINTENANCE AND SERVICE *(continued)*

8.5 AIR CONDITIONER CLEANING

WARNING!

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

Inspect unit interior at the beginning of each heating and cooling season or as operating conditions require.

Evaporator Coil – Inspect and clean coil prior to each heating and cooling season, and as required by location.

1. Turn unit power off.
2. Slide filters (located in the hinged access panel) out of unit. Replace if dirty. ***See Figure 10.***

NOTE: This panel permits quick and simple filter access and prevents panels from being dropped.

3. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back flush toward return-air section to remove foreign material.
4. Flush condensate pan.
5. Re-install filters.
6. Reconnect wiring.
7. Close filter-hinged access panel.

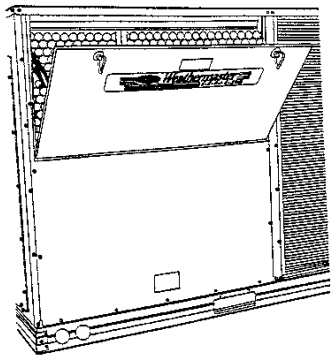


FIGURE 10
Filter Hinged Access Panel

Condenser Coil – Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor air conditions.

One-Row Coils – To access one-row coils, remove screws securing condenser-fan grille to condenser coil top cover. Place grille on top of condenser coil top cover as shown in ***Figure 11***. It is not necessary to remove the top cover.

Use a water hose or other suitable equipment to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.

Reverse the procedure outlined above to re-install the condenser-fan grille and condenser fan top cover.

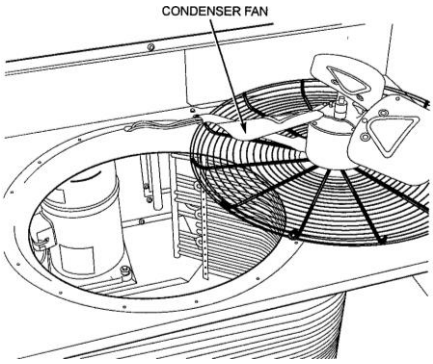


FIGURE 11
Condenser Coil Cleaning

Condensate Drain – Check and clean each year at start of cooling season. In winter, keep drain dry or protect against freeze-up. Condensate drain and tray are located on the bottom of the air conditioner.

Filters – Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

8.6 AIR CONDITIONER LUBRICATION

Compressors – Each compressor is charged with the correct amount of oil at the factory.

Fan-Motor Bearings – Fan-Motor bearings are of the permanently lubricated type. No further lubrication is required. No lubrication of condenser or evaporator-fan motors is required.

8.7 CONDENSER-FAN ADJUSTMENT

1. Shut off unit power supply and tag disconnect.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in ***Figure 12.***
5. Tighten setscrews.
6. Replace condenser-fan assembly.

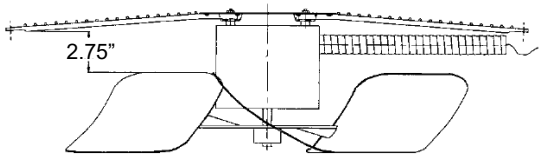


FIGURE 12
Condenser Fan Adjustment

8.8 CONDENSER COIL GRILLE

Condenser coil grille is shipped factory installed. No adjustments are required.

8.0 MAINTENANCE AND SERVICE *(continued)*

8.9 REFRIGERANT CHARGE

Amount of refrigerant charge is listed on unit nameplate. Refer to Carrier Charging, Recovery, Recycling, and Reclamation Training Manual and the following procedures.

Unit panels must be in place when unit is operating during charging procedure.

No Charge – Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant.

Low Charge Cooling – Vary refrigerant until the conditions of the cooling chart in manual. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air CFM must be within the normal operating range of the unit.

To Use Cooling Charging Chart – Take the outdoor ambient temperature and read the suction pressure gage. Refer to chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully reclaim some of the charge. Recheck the suction pressure as charge is adjusted.

9.0 TRAINING

9.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the MACH-IV.

9.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the MACH-IV in and around the intended aircraft at the intended aircraft servicing location.

9.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the MACH-IV.

NOTE: Maintenance and Troubleshooting are to be performed by skilled and trained technician(s).

10.0 TROUBLESHOOTING

Refer to Troubleshooting Tables and ***Figure 12*** for additional information.

TABLE - COOLING SERVICE ANALYSIS		
Problem	**Cause**	**Remedy**
Compressor and condenser fan will not start	Power failure	Call Power Company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective thermostat, contactor, transformer, or control relay	Replace component
	Insufficient line voltage	Determine cause and correct.
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too high	Lower thermostat setting below room temperature
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause. Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	One leg of three-phase power dead	Replace fuse or reset circuit breaker
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload, or start relay	Determine cause and replace
	Defective thermostat	Replace thermostat
	Faulty condenser-fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat set too low	Reset thermostat
	Low refrigerant charge	Locate leak; repair and recharge
	Leaking valves in compressor	Replace compressor
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter.	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct

10.0 TROUBLESHOOTING *(continued)*

Refer to Troubleshooting Tables and ***Figure 12*** for additional information.

TABLE - COOLING SERVICE ANALYSIS		
Problem	**Cause**	**Remedy**
Excessive head pressure	Dirty air filter	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks; repair and recharge
	Compressor valves leaking	Replace compressor
	Restriction in liquid tube	Remove restriction
Excessive suction pressure	High head load	Check for source and eliminate
	Compressor valves leaking	Replace compressor
	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks; repair and recharge
	Metering device or low-side restricted	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity. Check filter and replace if necessary
	Temperature too low in conditioned area	Reset thermostat
	Outdoor ambient below 25° F	Install low-ambient kit

11.0 PROVISION OF SPARES

11.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

TRONAIR, Inc.
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
Fax: (419) 867-0634
E-mail: sales@tronair.com
Website: www.tronair.com

11.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

12.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

a) Parts required for normal maintenance
b) Parts covered by a component manufacturers warranty
c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

a) Product Model Number
b) Product Serial Number
c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately *void any warranty, express or implied* and Tronair *disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse*.**

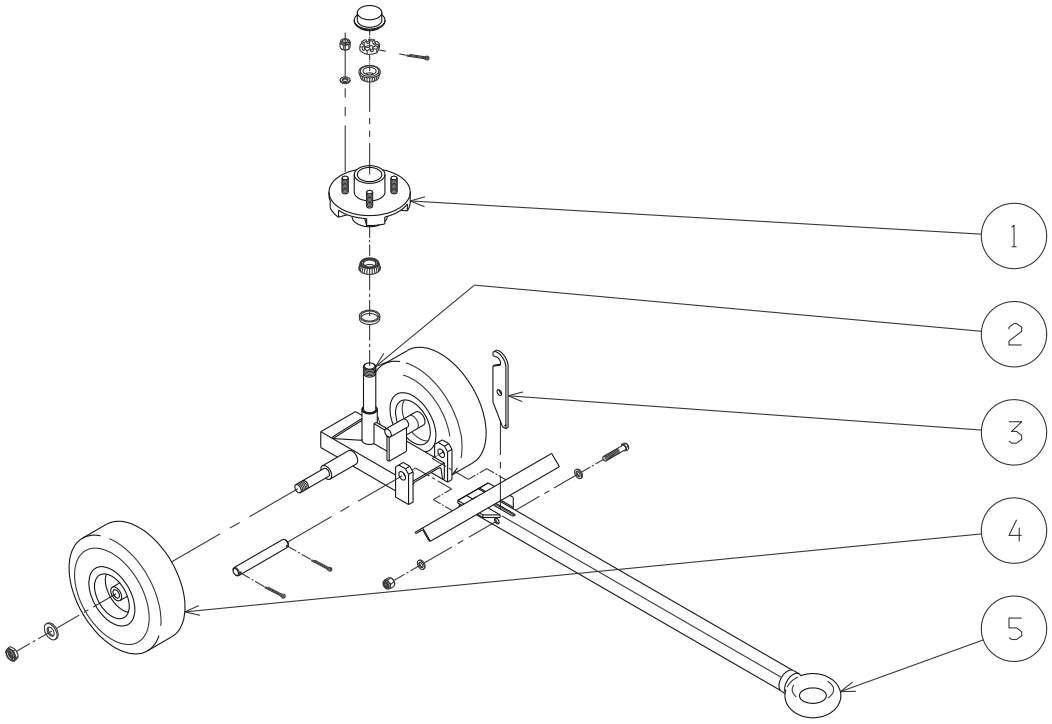
13.0 APPENDICES

APPENDIX I Safety Data Sheet Lead Acid Battery
APPENDIX II Safety Data Sheet 410A Refrigerant

Additional Documents:
Carrier Four Ton, 60 Hz Air Conditioner
Gillette Owner's Manual and Limited Warranty Policy

Parts List

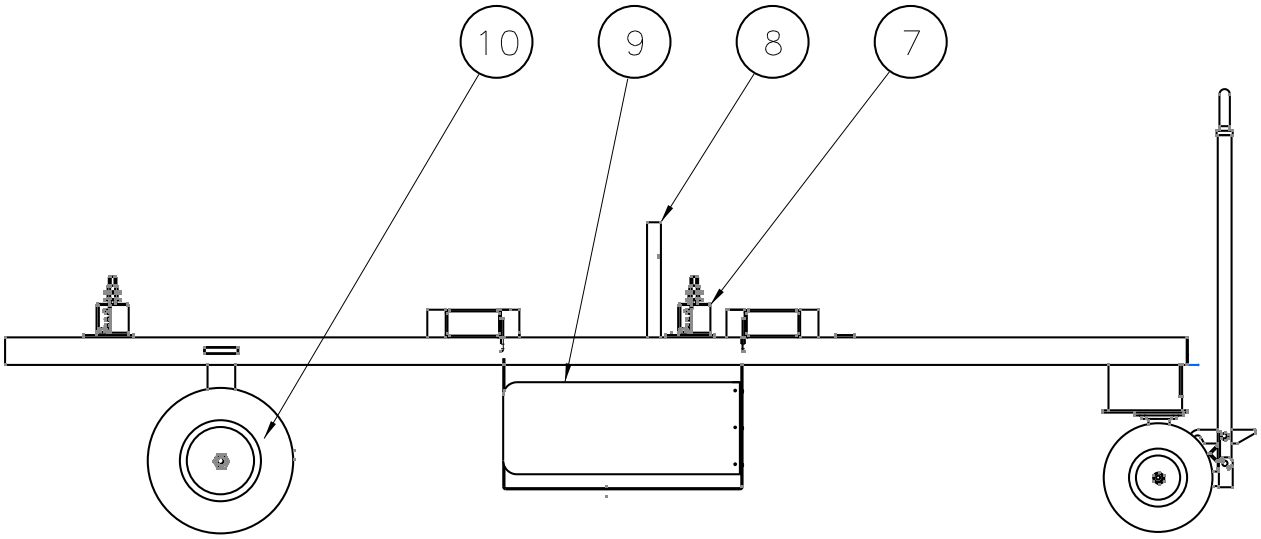
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your unit.

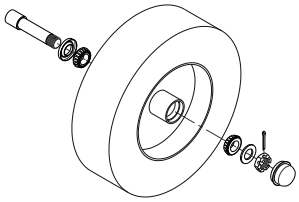


ITEM	PART NUMBER	DESCRIPTION	QTY
1	H-1335	Hub	1
2	Z-2449-01	Weldment, Steering Axle	1
3	**K-1320**	**Kit, Lever**; *consists of:*	
	G-1100-109522	Bolt, Hex Head, Grade 5, 1/2-20 x 2-1/4" long	1
	G-1202-1090N	Stopnut 1/2-20 Elastic	1
	G-1250-1090N	Flatwasher, 1/2 Narrow	2
	J-1626	Lever	1
4	**K-2084**	**Kit, Wheel (Single);** *consists of:*	
	G-1203-1115	Stopnut, 3/4-16 Elastic	1
	U-1041	Wheel, Pneumatic Tire	1
5	**K-3361**	**Kit, Tongue**; *consists of:*	
	G-1301-03	Pin, Cotter (1/8" diameter x 1-1/2" long)	2
	R-1122	Pin	1
	Z-4838-01	Weldment, Tongue	1

Parts List

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your unit.



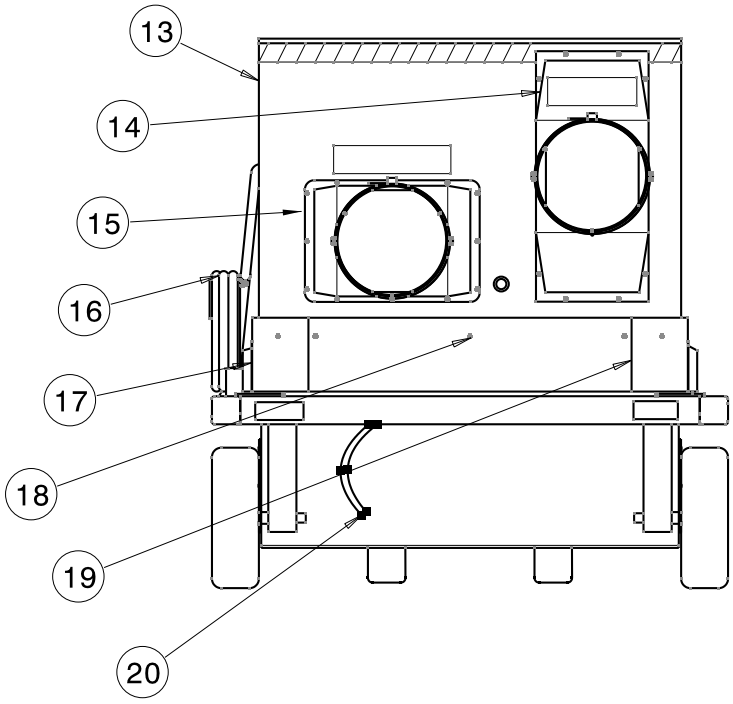


ITEM 10 DETAIL

ITEM	PART NUMBER	DESCRIPTION	QTY
8	Z-4767-01	Weldment, Frame	1
10	Z-1217	Assembly, Wheel, Tire & Bearing	1
7	**K-3344**	**Kit, Isolator**; *consists of:*	
	G-1100-109514	Bolt, Hex Head, Grade 5, 1/2-20 x 1-1/2" long	2
	G-1202-1090N	Stopnut 1/2-20 Elastic	4
	G-1250-1090N	Flatwasher, 1/2 Narrow	2
	H-2396	Isolator	1
9	**K-4120**	**Kit, Vent Hose Holder**	**1**

Parts List

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your unit.



ITEM	PART NUMBER	DESCRIPTION	QTY
13	H-2909	Air Conditioner	1
14	Z-6592	Assembly, Clamp	1
15	Z-6591	Assembly, Clamp	1
20	Z-4733	Assembly, Drain	1
Not Shown	EC-1971	Battery	1
Not Shown	H-3003	Hose, Insulated Vent	1
Not Shown	H-2459	Filter, Air Conditioner (16" x 25" x 2")	1
Not Shown	H-2917	Generator	1
Not Shown	EC-1508	Plug, NEMA 14-50P	1
16	**K-3348**	**Kit, Electrical Cable;** *consists of:*	
	EC-1176-04	Locknut, Conduit	1
	EC-1433-21	Connector, Strain Relief	1
	EC-1507-02*0600	Cable, Type 50 Electrical 600 V, 50 ft long	1
	G-1159-105010	Screw, Round Head Cross Recess Machine 1/4-20 x 1" long	1
	G-1202-1050	Stopnut, 1/4-20 Elastic	1
	G-1250-1050N	Flatwasher, 1/4 Narrow	2
	H-1721-10	Clamp, Electrical	1
17	**K-3362**	**Kit, Right Hand Shroud;** *consists of:*	
	G-1189	Screw, Hex Washer Head, #10 x 3/4" long	7
	S-1686-01	Shroud	1
	S-1688-01	Shroud	1
18	**K-3351**	**Kit, Front or Back Shroud;** *consists of:*	
	G-1189	Screw, Hex Washer Head, #10 x 3/4" long	3
	S-1663-01	Shroud	1
19	**K-3363**	**Kit, Left Hand Shroud;** *consists of:*	
	G-1189	Screw, Hex Washer Head, #10 x 3/4" long	7
	S-1685-01	Shroud	1
	S-1687-01	Shroud	1

APPENDIX I

Safety Data Sheet
Lead Acid Battery

Safety Data Sheet

1. IDENTIFICATION

Product Name: Lead Acid Battery **Synonyms:** SLI Battery	**Product Use**: Vehicle Electrical System **Manufacturer/Supplier:** Johnson Controls Battery Group **Address:** P.O. Box 590 Milwaukee, WI 53201 US
General Information Number: (800)-333-2222 ext. 3138 **Contact Person:** Industrial Hygiene & Safety Department	**Emergency number:** CHEMTREC: 800-424-9300

NOTE: The Johnson Controls sealed cell/battery is considered an article as defined by 29 CFR 1910.1200 (OSHA Hazard Communication Standard). The information contained in this SDS is supplied at the customer's request for information only.

2. HAZARD(S) IDENTIFICATION

Health		Environmental	Physical
Acute Toxicity (Oral, dermal, inhalation)	Category 4	Aquatic Chronic 1 Aquatic Acute 1	Explosive Chemical, Division 1.3
Skin corrosion/irritation	Category 1A		
Eye Damage	Category 1		
Reproductive	Category 1A		
Carcinogenicity (lead)	Category 1B		
Carcinogenicity (acid mist)	Category 1A		
Specific target organ toxicity (repeated exposure)	Category 2		

Label Elements:

Health	Environmental	Physical
		
Hazard Statements **DANGER!** Causes severe skin burns and eye damage. Causes serious eye damage. May damage fertility or the unborn child if ingested or inhaled. May cause cancer if ingested or inhaled. Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure.	***Precautionary Statements*** Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing, eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Causes skin irritation, serious eye damage. Contact with internal components may cause irritation or severe burns. Avoid contact with internal acid. Irritating to eyes, respiratory system, and skin.	

May form explosive air/gas mixture during charging. Extremely flammable gas (hydrogen). Explosive, fire, blast or projection hazard.	

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS (Chemical/Common Names):	CAS No.:	% by Wt:
Lead	7439-92-1	34
Lead Oxide	1309-60-0	31
Sulfuric Acid	7664-93-9	34
Lead Sulfate	7446-14-2	<1

Composition Comments All concentrations are in percent by weight.

4. FIRST AID MEASURES

Note: Under normal conditions of battery use, internal components will not present a health hazard. The following information is provided for battery electrolyte (acid) and lead for exposures that may occur during battery production or container breakage or under extreme heat conditions such as fire.

Inhalation Sulfuric Acid: Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.
Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

Skin contact Sulfuric Acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes.
Lead: Wash immediately with soap and water.

Eye contact Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes while lifting lids; Seek immediate medical attention if eyes have been exposed directly to acid.

Ingestion Sulfuric Acid: Give large quantities of water; Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death; consult physician.
Lead: Consult physician immediately.

5. FIRE FIGHTING MEASURES

Flash Point Not applicable unless individual components exposed.

Auto ignition Temperature No data available.

Flammable Limits LEL = 4.1% (Hydrogen Gas in air) ; UEL = 74.2%

Extinguishing Media CO2; foam; dry chemical. Do not use carbon dioxide directly on cells. Avoid breathing vapors. Use appropriate media for surrounding fire.

Special Fire Fighting Procedures Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.

Unusual Fire and Explosion Hazard Highly flammable hydrogen gas is generated during charging and operation of batteries. If ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery. Follow manufacturer's instructions for installation and service.

6: ACCIDENTAL RELEASE MEASURES

Protective Measures to be Taken if Material is Released or Spilled	Stop flow of material, contain/absorb small spills with dry sand, earth, and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of un-neutralized acid to sewer. Acid must be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.
Waste Disposal Method	Dispose of as a hazardous waste. Dispose of in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Handling	Unless involved in recycling operations, do not breach the casing or empty the contents of the battery. Handle carefully and avoid tipping, which may allow electrolyte leakage. There may be increasing risk of electric shock from strings of connected batteries. Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Keep vent caps on and cover terminals to prevent short circuits. Place cardboard between layers of stacked automotive batteries to avoid damage and short circuits. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water. Use banding or stretch wrap to secure items for shipping.
Storage	Store batteries under roof in cool, dry, well-ventilated areas separated from incompatible materials and from activities that may create flames, spark, or heat. Store on smooth, impervious surfaces provided with measures for liquid containment in the event of electrolyte spills. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.
Charging:	There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.
Other	Follow Manufacturers Recommendations regarding maximum recommended currents and operating temperature range. Do not overcharge beyond the recommended upper charging voltage limit. Applying pressure or deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits

US OSHA Specifically Regulated Substances (29 CFR 1910.1001 – 1050)

Ingredient	CAS Number	Type	Value
Lead	7439-92-1	TWA	0.05 mg/m³
Lead Oxide	1309-60-0	TWA	0.05 mg/m³
Lead Sulfate	7446-14-2	TWA	0.05 mg/m³

US OSHA Table Z-1 Limits for Air Contaminants (29CFR 1910.1000)

Ingredient	CAS Number	Type	Value
Sulfuric Acid	7664-93-9	PEL	1 mg/m³

US ACGIH Threshold Limit Values

Ingredient	CAS Number	Type	Value	Form
Lead	7439-92-1	TWA	0.05 mg/m³	
Lead Oxide	1309-60-0	TWA	0.05 mg/m³	
Lead Sulfate	7446-14-2	TWA	0.05 mg/m³	
Sulfuric Acid	7664-93-9	TWA	0.2 mg/m³	Thoracic Fractions

US NIOSH: Pocket Guide to Chemical Hazards

Ingredient	CAS Number	Type	Value
Lead	7439-92-1	TWA	0.05 mg/m³
Lead Oxide	1309-60-0	TWA	0.05 mg/m³
Sulfuric Acid	7664-93-9	TWA	1 mg/m³

International Exposure Limits (mg/m³)

*Chemical & Common Name	Quebec PEV	Ontario OEL	EU OEL
Lead and Lead Compounds (inorganic)	0.05	0.05	0.15 (a)
Electrolyte (H_2SO_4/H_2O)	1	0.2	0.05 (b)

(a) As inhalable aerosol **(b)** Thoracic fraction

Biological limit values

ACGIH Biological Exposure Indices

Ingredient	Value	Determinant	Specimen	Sampling Time
Lead	300 µg/l	Lead	Blood	*
Lead Oxide	300 µg/l	Lead	Blood	*
Lead Sulfate	300 µg/l	Lead	Blood	*

* - For Sampling details please see the source document.

Engineering Controls (Ventilation):

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Handle batteries cautiously, do not tip to avoid spills. Make certain vent caps are on securely. If battery case is damaged, avoid bodily contact with internal components. Wear protective clothing, eye and face protection, when filling, charging, or handling batteries. Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries. Charge batteries in areas with adequate ventilation. General dilution ventilation is acceptable.

Respiratory Protection (NIOSH/MSHA approved):

NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.

Skin Protection:

NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing and boots.

Eye Protection:

NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If necessary to handle damage product where exposure to the organic electrolyte is a possibility, chemical splash goggles and a face shield are recommended.

Other Protection:

In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply. Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries. Wash Hands after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.
Odor Threshold	Not applicable.
pH	Not applicable
Boiling Point	Not applicable unless individual components exposed.

	Battery Electrolyte (Acid) - 230 - 233.6 °F (110 - 112 °C) Lead - 3191 °F (1755 °C)
Melting Point	Lead - 621.32 °F (327.4 °C)
Specific Gravity (H_2O = 1)	1.215 to 1.350
Flash Point	498.2 °F (259.0 °C) Hydrogen
Evaporation Rate (Butyl Acetate = 1)	< 1
Vapor Pressure (mm Hg @ 20 ° C)	Battery Electrolyte (Acid) 11.7
Flammability	
Upper/lower flammability or explosive limits	Hydrogen Flammability Limit Lower- 4.1 % Flammability Limit Upper – 74.2 %
Vapor Pressure	Not applicable.
Vapor Density	3.4 (Air = 1) Battery Electrolyte (Acid)
Relative Density	1.21 - 1.3 Battery Electrolyte (Acid)
Solubility	Lead and Lead dioxide are not soluble. 100 % Battery Electrolyte (Acid).
% Volatile by Weight	Not applicable unless individual components exposed.
Partition coefficient (n-octanol/water)	Not applicable
Auto-ignition temperature	1076 °F (580 °C) Hydrogen.
Decomposition temperature	Not applicable
Viscosity	Not applicable

10. STABILITY AND REACTIVITY

Stability	The sealed battery is considered stable.
Conditions to Avoid	Sparks and other sources of ignition; high temperature; over charging.
Incompatibility (materials to avoid)	Electrolyte: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas. Lead compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents. Arsenic compounds: strong oxidizers; bromine azide. NOTE: hydrogen gas can react with inorganic arsenic to form the highly toxic gas – arsine
Hazardous Decomposition Products	Electrolyte: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide. Lead compounds: Temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.
Hazardous Polymerization	Will not occur.

11. TOXICOLOGICAL INFORMATION

NOTE: Under normal conditions of use, this product does not present a health hazard. The following information is provided for organic electrolyte and lead exposure that may occur due to container breakage or under extreme conditions such as fire. Organic electrolyte – reacts with moisture/water to produce hydrofluoric acid in trace quantities. Hydrofluoric acid is extremely corrosive and toxic. In severe exposures it acts as a systemic poison and causes severe burns. The reaction may be delayed. Any contact with this material, even minor, requires immediate medical attention.

ROUTES AND METHODS OF ENTRY	
Inhalation	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation. Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.
Skin Contact	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: Severe irritation, burns and ulceration. Lead Compounds: Not absorbed through the skin.
Skin Absorption	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** In the event of overcharging or damage to the unit, exposure to organic electrolyte solution/mist is possible. Extreme exposures to the organic electrolyte can be absorbed through the skin.
Eye Contact	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: Severe irritation, burns, cornea damage, and blindness. Lead Compounds: May cause eye irritation.
Ingestion	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach. Lead Compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.
SIGNS AND SYMPTONS OF OVEREXPOSURE	
Acute Effects	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation. Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability
Chronic Effects	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Sulfuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat & bronchial tubes. Lead Compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females. Repeated exposure to lead and lead compounds in the workplace may result in nervous system toxicity. Some toxicologists report abnormal conduction velocities in persons with blood lead levels of 50 µg/100 ml or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

ADDITIONAL HEALTH DATA

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as ventilation and respiratory protection covered in Section 8. Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the work site. Keep contaminated clothing out of non-contaminated areas, or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use only and should be isolated from children and their environment.

The 19th Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction. Risk phrase 61: May cause harm to the unborn child, applies to lead compounds, especially soluble forms.

Toxicological Data

Constituents	**Species**	**Test Results**

Sulfuric Acid (CAS 7664-93-9)		
Acute		
Oral		
LD50	Rat	2140 mg/kg

CARCINOGENICITY

Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

Lead Compounds: Lead is listed as a Group 2A- carcinogen, likely in animals at extreme doses. Per the guidance found in OSHA 29 CFR 1910.1200 Appendix F, this is approximately equivalent to GHS Category 1A. Proof of carcinogenicity in humans is lacking at present.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2A Probably carcinogenic to humans.
Lead oxide (CAS 1309-60-0)	2A Probably carcinogenic to humans.
Lead sulfate (CAS 7446-14-2)	2A Probably carcinogenic to humans.
NTP Report on Carcinogens	
Lead oxide (CAS 1309-60-0)	Reasonably Anticipated to be a Human Carcinogen.
Lead sulfate (CAS 7446-14-2)	Reasonably Anticipated to be a Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	May damage fertility or the unborn child.
Specific target organ toxicity - single exposure	No data available.
Specific target organ toxicity - repeated exposure	Lead: May cause damage to organs (blood, central nervous system) through prolonged or repeated exposure.
Aspiration hazard	Not classified.

12. ECOLOGICAL INFORMATION

Environmental Fate	Lead is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead
Environmental toxicity	Aquatic Toxicity:
Sulfuric Acid	24-hr LC50, freshwater fish (Brachydanio rerio): 82 mg/L 96 hr- LOEC, freshwater fish (Cyprinus carpio): 22 mg/L
Lead	48 hr LC50 (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion
Additional Information	No known effects on stratospheric ozone depletion Volatile organic compounds: 0% (by Volume) Water Endangering Class (WGK): NA

13. DISPOSAL CONSIDERATIONS

Waste disposal method	Material should be recycled if possible. Lead-acid batteries are completely recyclable. Dispose waste and residues in accordance with applicable federal, state, and local regulations.
Hazardous waste code	D008: Lead
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or packaging may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

Note: Transportation requirements do not apply once the battery pack has been installed in a vehicle as part of the vehicle's functional components.

United States DOT:

DOT rules specified in 49 CFR 173.159 regulate the transport of wet spillable batteries.

49 CFR 173.159 (e) specifies that when transported by highway or rail, electric storage batteries containing electrolyte or corrosive battery fluid are not subject to any other requirements of this subchapter, if all of the following are met:
(1) No other hazardous materials may be transported in the same vehicle;
(2) The batteries must be loaded or braced so as to prevent damage and short circuits in transit;
(3) Any other material loaded in the same vehicle must be blocked, braced, or otherwise secured to prevent contact with or damage to the batteries; and
(4) The transport vehicle may not carry material shipped by any person other than the shipper of the batteries.
If any of these requirements are not met, the batteries must be shipped as hazardous materials

GROUND – US-DOT/CAN-TDG/EU-ADR/APEC-ADR:

Proper Shipping name	Batteries, Wet, Filled with Acid
UN number	UN2794
Hazard classification	8
Packing group	N/A
Labels	Corrosive

AIRCRAFT – ICAO-IATA:

Proper Shipping name	Batteries, Wet, Filled with Acid
Packing group	None
Hazardous class	8
Label/Placard Required	Corrosive
UN Identification	UN2794
Environmental Hazards	No
ERG Code	8L
Reference	IATA packing instructions 870 (IATA DRG Edition 54)

VESSEL – IMO-IMDG:

Proper Shipping name	Batteries, Wet, Filled with Acid
Packing group	N/A
Hazardous class	8
Label/Placard Required	Corrosive
UN Identification	UN2794
Environmental Hazards	No
EmS	F-A, S-B
Reference	IMDG packing instructions P801

15. REGULATORY INFORMATION

This product is an article pursuant to 29 CFR 1910.1200 and as such is not subjected to the OSHA Hazard Communication Standard.

TSCA

TSCA Section 8b – Inventory Status:

Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b (40 CFR Part 707.60(b))

No notice of export will be required for articles, except PCB articles, unless the Agency so requires in the context of individual section 5, 6, or 7 actions.

TSCA Section 13 (40 CFR Part 707.20)

No import certification required (EPA 305-B-99-001, June 1999, Introduction to the Chemical Import Requirements of the Toxic Substances Control Act, Section IV.A)

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1)	Reproductive toxicity
	Central nervous system
	Kidney
	Blood
	Acute toxicity
Lead Oxide (CAS 1309-60-0)	Reproductive toxicity
	Central nervous system
	Kidney
	Blood
	Acute toxicity
Lead Sulfate (CAS 7446-14-2)	Reproductive toxicity
	Central nervous system
	Kidney
	Blood
	Acute toxicity

EPA SARA Title III

Section 302 EPCRA Extremely Hazardous Substances (EHS):

Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs. EPCRA Section 302 notification is required if 500 lbs. or more of sulfuric acid is present at one site (40 CFR 370.10). For more information consult 40 CFR Part 355.

Section 304 CERCLA Hazardous Substances:

Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning and Community Right to Know Act) is 1,000 lbs. State and local reportable quantities for spilled sulfuric acid may vary.

Section 311/312 Hazard Categorization:

EPCRA Section 312 Tier Two reporting is required for non-automotive batteries if sulfuric acid is present in quantities of 500 lbs. or more and/or if lead is present in quantities of 10,000 lbs. or more. For more information consult 40 CFR 370.10 and 40 CFR 370.40

Section 313 EPCRA Toxic Substances:

40 cfr section 372.38 (b) states: If a toxic chemical is present in an article at a covered facility, a person is not required to consider the quantity of the toxic chemical present in such article when determining whether an applicable threshold has been met under § 372.25, § 372.27, or § 372.28 or determining the amount of release to be reported under § 372.30. This exemption applies whether the person received the article from another person or the person produced the article. However, this exemption applies only to the quantity of the toxic chemical present in the article.

Supplier Notification:

This product contains toxic chemicals that may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. For a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

RCRA

Spent Lead Acid Batteries are subject to streamlined handling requirements when managed in compliance with 40 CFR section 266.80 or 40 CFR part 273. Waste sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Lead (CAS 7439-92-1)
Lead Oxide (CAS 1309-60-0)
Lead Sulfate (CAS 7446-14-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Lead Sulfate (CAS 7446-14-2)

Safe Drinking Water Act (SDWA)

Not regulated

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Sulfuric acid (CAS 7664-93-9) 6552

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Sulfuric acid (CAS 7664-93-9) 20 % WV

DEA Exempt Chemical Mixtures Code Number

Sulfuric acid (CAS 7664-93-9 6552

US State Regulations

US. Massachusetts RTK – Substance List

Lead (CAS 7439-92-1)
Lead Oxide (CAS 1309-60-0)
Lead Sulfate (CAS 7446-14-2)

US New Jersey Worker and Community Right-to-know Act

Lead (CAS 7439-92-1)
Lead Oxide (CAS 1309-60-0)
Lead Sulfate (CAS 7446-14-2)
Sulfuric acid (CAS 7664-93-9)

US Pennsylvania Worker and Community Right-to-know Law

Lead (CAS 7439-92-1)
Sulfuric acid (CAS 7664-93-9)

US Rhode Island RTK

Lead (CAS 7439-92-1)
Lead Oxide (CAS 1309-60-0)
Lead Sulfate (CAS 7446-14-2)
Sulfuric acid (CAS 7664-93-9)

US. California Proposition 65

WARNING: This product contains chemicals known to the State of California to cause cancer.
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.

*Battery companies not party to the 1999 consent judgment with Mateel Environmental Justice Foundation should include a Proposition 65 Warning that complies with the current version of Proposition 65.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Lead (CAS 7439-92-1)
Lead Oxide (CAS 1309-60-0)
Lead Sulfate (CAS 7446-14-2)
Sulfuric acid (CAS 7664-93-9)

International Inventories

Country(s) or Region	Inventory Name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

* A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

CANADIAN ENVIRONMENTAL PROTECTION ACT: These products are manufactured articles and are exempt from regulation.

CANADIAN WHMIS CLASSIFICATION: This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

Issue Date: 04/01/2015
Further information: NFPA Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3=Serious 4 = Severe

NFPA ratings

Disclaimer

Johnson Controls Battery Group, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

APPENDIX II

Safety Data Sheet
410A Refrigerant

Genetron® 410A

000000009881

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Genetron® 410A
MSDS Number	:	000000009881
Product Use Description	:	Refrigerant
Manufacturer or supplier's details	:	Honeywell International Inc. 101 Columbia Road Morristown, NJ 07962-1057
For more information call	:	800-522-8001 +1-973-455-6300 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-303-389-1414**
	:	**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
	:	
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	Liquefied gas
Color	:	colourless
Odor	:	weak

Classification of the substance or mixture

Classification of the substance or mixture	:	Gases under pressure, Liquefied gas Simple Asphyxiant

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements : **Prevention:**
Use personal protective equipment as required.

Storage:
Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise classified : May cause eye and skin irritation.
May cause frostbite.
May cause cardiac arrhythmia.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Chemical Name	CAS-No.	Concentration
Pentafluoroethane	354-33-6	50.00 %
Difluoromethane	75-10-5	50.00 %

SECTION 4. FIRST AID MEASURES

Inhalation	:	Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
Skin contact	:	After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.
Eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
Ingestion	:	Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

Treatment	:	Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frost-bitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	The product is not flammable. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Specific hazards during firefighting	:	Contents under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Container may rupture on heating. Cool closed containers exposed to fire with water spray.

Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen halides
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO2)
Carbonyl halides

Special protective equipment for firefighters : In the event of fire and/or explosion do not breathe fumes.
Wear self-contained breathing apparatus and protective suit.
No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Wear personal protective equipment. Unprotected persons must be kept away.
Remove all sources of ignition.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
After release, disperses into the air.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Avoid accumulation of vapours in low areas.
Unprotected personnel should not return until air has been tested and determined safe.
Ensure that the oxygen content is >= 19.5%.

Environmental precautions : Prevent further leakage or spillage if safe to do so.
The product evapourates readily.

Methods for cleaning up : Ventilate the area.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Handle with care. Avoid inhalation of vapour or mist. Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Use only in well-ventilated areas. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Follow all standard safety precautions for handling and use of compressed gas cylinders. Use authorized cylinders only. Protect cylinders from physical damage. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Do not remove screw cap until immediately ready for use. Always replace cap after use.
Advice on protection against fire and explosion	:	The product is not flammable. Can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Requirements for storage areas and containers	:	Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Keep containers tightly closed in a dry, cool and well-ventilated place. Storage rooms must be properly ventilated. Ensure adequate ventilation, especially in confined areas. Protect cylinders from physical damage. Store away from incompatible substances.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	:	Do not breathe vapour.

Avoid contact with skin, eyes and clothing.
Ensure that eyewash stations and safety showers are close to the workstation location.

Engineering measures	:	General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities.
Eye protection	:	Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes
Hand protection	:	Leather gloves In case of contact through splashing: Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- butyl-rubber gloves
Skin and body protection	:	Avoid skin contact with leaking liquid (danger of frostbite). Wear cold insulating gloves/ face shield/ eye protection.
Respiratory protection	:	In case of insufficient ventilation, wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. When using do not eat, drink or smoke. Remove and wash contaminated clothing before re-use. Keep working clothes separately. Do not breathe vapour. Avoid contact with skin, eyes and clothing.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Difluoromethane	75-10-5	TWA : time weighted average	2,200 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Difluoromethane	75-10-5	TWA : time weighted average	(1,000 ppm)	1994	Honeywell:Limit established by Honeywell International Inc.
Pentafluoroethane	354-33-6	TWA : time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Pentafluoroethane	354-33-6	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	Liquefied gas
Color	:	colourless
Odor	:	weak
pH	:	Note: neutral
Melting point/freezing point	:	Note: not determined

Boiling point/boiling range	:	-48.5 °C
Flash point	:	Note: not applicable
Evaporation rate	:	> 1 Method: Compared to CCl4.
lower flammability limit	:	Note: None
upper flammability limit	:	Note: None
Vapor pressure	:	14,844 hPa at 21.1 °C(70.0 °F) 33,798 hPa at 54.4 °C(129.9 °F)
Vapor density	:	3 Note: (Air = 1.0)
Density	:	1.08 g/cm3 at 21.1 °C
Water solubility	:	Note: no data available
Partition coefficient: n-octanol/water	:	log Pow: 1.48 Test substance: Ethane, pentafluoro- (HFC-125) log Pow: 0.21 Test substance: Difluoromethane (HFC-32)
Ignition temperature	:	> 750 °C
Decomposition temperature	:	> 250 °C

Global warming potential (GWP)	:	1,975
Ozone depletion potential (ODP)	:	0

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Hazardous polymerisation does not occur.
Conditions to avoid	:	Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	:	Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Hydrogen fluoride Carbonyl halides Carbon monoxide Carbon dioxide (CO_2)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity Pentafluoroethane	:	> 769000 ppm Exposure time: 4 h

Species: rat

Difluoromethane : LC50: > 520000 ppm
Exposure time: 4 h
Species: rat

Sensitisation
Pentafluoroethane : Cardiac sensitization
Species: dogs
Note: No-observed-effect level
75 000 ppm
Lowest observable effect level
100 000 ppm

Difluoromethane : Cardiac sensitization
Species: dogs
Note: No-observed-effect level
>350 000 ppm

Repeated dose toxicity
Pentafluoroethane : Species: rat
Application Route: Inhalation
Exposure time: (4 Weeks)
NOEL: 50000 ppm
Subchronic toxicity

Difluoromethane : Species: rat
Application Route: Inhalation
Exposure time: (90 d)
NOEL: 50000 ppm
Subchronic toxicity

Genotoxicity in vitro
Pentafluoroethane : Test Method: Ames test
Result: negative

Difluoromethane : Test Method: Ames test
Result: negative

: Cell type: Human lymphocytes
Result: negative

: Cell type: Chinese Hamster Ovary Cells
Result: negative

: Cell type: Human lymphocytes
Result: negative
Method: Mutagenicity (in vitro mammalian cytogenetic test)

: Test Method: Chromosome aberration test in vitro
Result: negative

Genotoxicity in vivo

Difluoromethane : Species: mouse
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

Teratogenicity

Pentafluoroethane : Species: rabbit
Application Route: Inhalation exposure
NOAEL,Teratog: 50,000 ppm
NOAEL,Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Species: rat
Application Route: Inhalation exposure
NOAEL,Teratog: 50,000 ppm
NOAEL,Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Difluoromethane : Species: rat
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Species: rabbit
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Further information : Acute toxicity Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evapouration of the liquid may cause frostbite. May cause

cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability

Pentafluoroethane : Result: Not readily biodegradable.
Value: 5 %
Method: OECD 301 D

Difluoromethane : Note: Minimal

Further information on ecology

Additional ecological information : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14. TRANSPORT INFORMATION

DOT

UN/ID No. : UN 3163

Proper shipping name : LIQUEFIED GAS, N.O.S.
(Pentafluoroethane, Difluoromethane)

	Class		2.2
	Packing group		
	Hazard Labels		2.2
IATA	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, Difluoromethane)
	Class	:	2.2
	Hazard Labels	:	2.2
	Packing instruction (cargo aircraft)	:	200
	Packing instruction (passenger aircraft)	:	200
IMDG	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S. (PENTAFLUOROETHANE, DIFLUOROMETHANE)
	Class	:	2.2
	Hazard Labels	:	2.2
	EmS Number	:	F-C, S-V
	Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	:	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
NZIOC - New Zealand	:	On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	:	SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
SARA 311/312 Hazards	:	Acute Health Hazard Sudden Release of Pressure Hazard
California Prop. 65	:	WARNING! This product contains a chemical known to the State of California to cause cancer. Dichloromethane 75-09-2

Massachusetts RTK	:	Dichloromethane	75-09-2
New Jersey RTK	:	Difluoromethane	75-10-5
Pennsylvania RTK	:	Difluoromethane	75-10-5
WHMIS Classification	:	A: Compressed Gas	

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Global warming potential : 1,975

Ozone depletion potential (ODP) : 0

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	1	2
Flammability	:	1	1
Physical Hazard	:	0	
Instability	:		0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.
Previous Issue Date: 09/11/2013
Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group

DURACELL

Article Information Sheet (AIS)

This Article Information Sheet (AIS) provides relevant battery information to retailers, consumers, OEMs and others users requesting a GHS-compliant SDS. Articles, such as batteries, are exempt from GHS SDS classification criteria. The GHS criteria is not designed or intended to be used to classify the physical, health and environmental hazards of an article. Branded consumer batteries are defined as electro-technical devices. The design, safety, manufacture, and qualification of branded consumer batteries follow ANSI and IEC battery standards. This document is based on principles set forth in the following hazard communication approaches: ANSI Z-400.1, GHS, JAMP AIS, and IEC 62474.

1. Document Information	
Document Name	**Duracell Alkaline Batteries (Major and Specialty Cells)**
Document ID	AIS-ALK
Issue Date	1-May-15
Version	1
Preparer	Global Product Stewardship
Last Revision	New
Information Contact	moquet.l@pg.com
2. Company Information	
Name & Address	P&G Duracell Global Business Unit, 14 Research Drive, Bethel, CT USA 06801
Telephone	(203) 796- 4430
Website	www.duracell. com
Consumer Relations	North America: 1-800-551-2355 (9:00 AM - 5:00 PM EST)
3. Article Information	
Description	Duracell branded consumer alkaline battery
Product Category	Electro-technical device
Use	Portable power source for electronic devices
Global sub-brands (Retail)	Coppertop, Plus, Quantum, Simply, Turbo, Ultra, Basic, TurboMax
Global sub-brands (B2B)	Procell, Industrial, OEM/OEA
Sizes	Major Cells: AA,AAA, C, D & 9V
Sizes	Specialty Cells: AAAA, MN11. MN21, MN27, MN175, PX76 (LR44), PX28, PX625, (LR09), LR43, LR54, N, J, 4.5V, 625A
Sizes	Lanterns: MN903, MN908, MN915, MN918; MN1203
Principles of Operation	A battery powers a device by converting stored chemical energy into electrical energy.
Representative Product Images	   
	Major Cells **Major Cells** **Lantern** **Specialty**
4. Article Construction	
Applicable Battery Industry Standards	ANSI C18.1M Part 1, ANSI C18.1M Part 2, ANSI C18.4, IEC 60086,1, IEC 60086-2, IEC 60086-5
Electro-technical System	Alkaline Manganese Dioxide
Electrode - Negative	Zinc (CAS # 7440-66-6)
Electrode - Positive	Manganese Dioxide (CAS # 1313-13-9)
Electrolyte	Alkali Metal Hydroxide (aqueous potassium hydroxide - CAS # 1310-58-3)
Materials of Construction - Can	Nickel Plated Steel
Declarable Substances (IEC 62474 Criteria 1)	None
Mercury Free Battery (ANSI C18.4M <5ppm)	Yes
Small Cell or Battery (ANSI C18.1M Part 2; IEC 60086-5)	Sizes: AAA and Specialty Cells fit inside a specially designed test cylinder 2.25 inches (57.1mm) long by 1.25 inches (31.70 mm) wide.
5. Health & Safety	

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Ingestion/Small Parts Warning	Required for Small Cell or Battery (Sizes: AAA and Specialty Cells): Keep away from children. If swallowed, consult a physician immediately.
Normal Conditions of Use	Exposure to contents inside the sealed battery will not occur unless the battery leaks, is exposed to high temperatures, or is mechanically abused.
Note to Physician	A damaged battery will release concentrated and caustic potassium hydroxide.
First Aid - If swallowed	Do not induce vomiting. Seek medical attention immediately. USA CALLS ONLY - CALL 24-HOUR NATIONAL BATTERY INGESTION HOTLINE: (202) 625-3333 - COLLECT.
First Aid - Eye Contact	Flush with water for at least 15 minutes. Seek medical care if irritation persists.
First Aid - Skin Contact	Remove contaminated clothing. Wash skin with soap and water. Seek medical care if irritation persists.
First Aid - Inhalation	Remove to fresh air.
Battery Safety Standards & Testing	Duracell batteries meet the requirements of ANSI C18. 1M Part 2 and IEC 60086-5. These standards specify tests and requirements for alkaline batteries to ensure safe operation under normal use and reasonably foreseeable misuse. The test regimes assess three conditions of safety. These are: **1-Intended use simulation:** Partial use, vibration, thermal shock, and mechanical shock **2-Reasonably foreseeable misuse:** Incorrect installation, external short-circuit, free fall (user-drop), over-discharge, and crush **3-Design consideration:** Thermal abuse, mold stress
Precautionary Statements	**CAUTION:** Batteries may explode or leak, and cause burn injury, if recharged, disposed of in fire, mixed with a different battery type, inserted backwards or disassembled. Replace all used batteries at the same time. Do not carry batteries loose in your pocket or purse. Do not remove the battery label. Keep small batteries (i.e., AAA) away from children. If swallowed, consult a physician at once.
6. Fire Hazard & Firefighting	
Fire Hazard	Batteries may rupture or leak if involved in a fire.
Extinguishing Media	Use any extinguishing media appropriate for the surrounding area.
Fires Involving Large Quantities of Batteries	Large quantities of batteries involved in a fire will rupture and release caustic potassium hydroxide. Firefighters should wear self-contained breathing apparatus and protective clothing.
7. Handling & Storage	
Handling Precautions	Avoid mechanical and electrical abuse. Do not short circuit or install incorrectly. Batteries may rupture or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions.
Storage Precautions	Store batteries in a dry place at normal room temperature. Refrigeration does not make them last longer.
Spills of Large Quantities of Loose Batteries (unpackaged)	Notify spill personnel of large spills. Irritating and flammable vapors may be released from leaking or ruptured batteries. Spread batteries apart to stop shorting. Eliminate all ignition sources. Evacuate area and allow vapors to dissipate. Clean-up personnel should wear appropriate PPE to avoid eye and skin contact and inhalation of vapors or fumes. Increase ventilation. Carefully collect batteries and place in appropriate container for disposal. Remove any spilled liquid with absorbent material and contain for disposal.
8. Disposal Considerations (GHS Section 13)	
Collection & Proper Disposal	Dispose of used (or excess) batteries in compliance with federal, state/provincial and local regulations. Do not accumulate large quantities of used batteries for disposal as accumulations could cause batteries to short-circuit. Do not incinerate. In countries, such as Canada and the EU, where there are regulations for the collection and recycling of batteries, consumers should dispose of their used batteries into the collection network at municipal depots and retailers. They should not dispose of batteries with household trash.

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USA EPA RCRA (40 CFR 261)	Classified as non-hazardous waste (not ignitable, corrosive, reactive or toxic). Federal Universal Waste Regulations (40 CFR 273) do not apply. State requirements may be more stringent than Federal.
California Universal Waste Rule (Cal. Code Regs. Title 22, Div. 4.5, Ch. 23)	California prohibits disposal of batteries as trash (including household trash).
9. Transport Information (GHS Section 14)	
Regulatory Status	Not regulated. Alkaline batteries (sometimes referred to as "Dry Cell" or "household" batteries) are not listed or regulated as dangerous goods under IATA Dangerous Goods Regulations, ICAO Technical Instructions, IMDG Code, UN Model Regulations, U.S. Hazardous Materials Regulations (49 CFR), and UNECE ADR.
UN Identification Number/ Shipping Name	None - Not Required
Special Provision (SP) Conformance	Special regulatory provisions require batteries to be packaged in a manner that prevents the generation of a dangerous quantity of heat and short circuits. Shippers can prepare batteries by taping the terminals, individually packaging batteries, or otherwise segregating the batteries to prevent risk of creating a short circuit. Batteries shipped in original unopened Duracell packaging is compliant.
US DOT SP	49 CFR 172.102 Special Provision 130
Air Transport (IATA/ICAO) SP	Special Provision A123 (56th Edition - 2015). NOTE: The words "NOT RESTRICTED" and "SPECIAL PROVISION A123" must be included on the description of the substance on the Air Waybill, when air way-bill is issued.
Passenger Air Travel	No restrictions
Emergency Transportation Hotline	**CHEMTREC 24-Hour Emergency Response Hotline** **Within the United States call +703-527-3887** **Outside the United States, call +1 703-527-3887 (Collect)**
10. Regulatory Information (GHS Section 15)	
10a. Battery Requirements	
USA EPA Mercury Containing & Rechargeable Battery Management Act of 1996	During the manufacturing process, no mercury is added.
EU Battery Directive 2006/66/EC & amendment 2013/56/EU	Compliant with marking and substance restrictions for mercury (<0.0005%); cadmium (<0.0020%)l and lead (<0.0040%). Global labels are marked with the special collection symbol and the EU qualifier in accordance with EU Battery Directive 2006/66/EC, Article 11, Paragraph 1 on batteries and accumulators and waste batteries and accumulators
10b. General Requirements	
USA CPSIA 2008 (PL. 11900314)	Exempt
USA CPSC FHSA (16 CFR 1500)	Consumer batteries are not listed as a hazardous product.
USA EPA TSCA Section 13 (40 CFR 707.20)	For customs clearance purpose, batteries are defined as an "Article".
USA EPA RCRA (40 CFR 261)	Classified as non-hazardous waste (not ignitable, corrosive, reactive or toxic). Federal Universal Waste Regulations (40 CFR 273) do not apply. State requirements may be more stringent than Federal.
California Prop 65	No warning required per 3rd party assessment.
CANADA Products Containing Mercury Regulations SOR/20140254	Mercury free
EU REACH SVHC's (161 Substances) Candidate List December 2014)	No listed substances are present (>0.01% w/w)
EU REACH Article 31	SDS is not required consumer alkaline batteries.

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Article Information Sheet (AIS)

10c. Regulatory Definitions - Articles	
USA OSHA	29 CFR 1910.1200(b)(6)(v)
USA TSCA	40 CFR 704.3; 710.2(3)(c); and [19 CFR 12.1209a)]
EU REACH	Title 1 - Chapter 2 - Article 3(3)
GHS	Section 1.3.2.1
11. Other Information	
11a. Certification & 3rd Party Approvals	
UL (UTGT2.S50939 Single Multiple Station Smoke Alarms - Component)	AA, 9V Certification Standard: ANSI/UL 217 Single & Multiple Station Smoke Alarms
11b. AIS Hazard Communication Approaches (consulted in developing this document):	
Globally Harmonized System (GHS)	GHS SDS requirements and classification criteria do not apply to articles or products (such as batteries) that have a fixed shape, which are not intended to release a chemical. The article exemption is found in Section 1.3.2.1.1 of the GHS and reads: ***The GHS applies to pure substances and their dilute solutions and to mixtures. "Articles" as defined by the Hazard Communication Standard (29 CFR 1900.1200) of the OSHA of the USA, or by similar definition, are outside the scope of the system."***
Joint Article Management Promotion Consortium JAMP	JAMP is a Japanese Industry Association who developed the concept of an Article Information Sheet as a supply chain tool to share and communicate chemical information in articles. The AIS authoring process is based on "declarable" substances to meet global regulatory requirements as well as substances to be reported by GADSL, JIG, etc.
IEC 62474 Ed. 1.0 B:2012 Material Declaration for Products of and for the Electro-technical Industry	An international standard that came into effect in March 2012 concerning declaration for electrical and electronic products. IEC 6274 replaces the defunct Joint Industry Guide – Material Declaration for Electro-technical Products (JIG-101-Ed 4.1 (May 21, 2012)
IEC 62474 Database - Publically available online (maintained by TC11: Environmental Standardization for electrical and electronic products and systems.	The general principle for a substance to be included in the database as a declarable substance is: 1) existing national laws or regulations in an IEC member country that are relevant to Electro-technical products and that prohibit or restrict substances, or that have a labeling, communication, reporting or notification requirement, and 2) applying IEC 62474 criteria results in identification of declarable substance.
ANSI Z 400.1/Z19.1 (2010)	2.1 Scope: Applies to preparation of SDSs for hazardous chemicals used under occupational conditions. Does not address how the standard may be applied to articles. It presents basic information on how to develop and write a SDS. Additional information is provided to help comply with state and federal environmental and safety laws and regulations. Elements of the standard may be acceptable for International use.