S.A.F.E.R.

SAFETY ACTIVITIES FOR EFFECTIVE REFRIGERATION

MARCH 2002
HUMAN RESOURCES

John Milton
Executive Director
jmilton@orfa.com

Helen Morrison
Acting Administrative Assistant
admin@orfa.com

Rebecca Russell
Facilities Librarian
library@orfa.com

Terry Piche
Technical Director
tpiche@onlink.net

Hubie Basilio
Public Relations &
Communications Coordinator
hbasilio@orfa.com

Monica Gurpersaud
Office Assistant
office@orfa.com

COPYRIGHT © 2003 ONTARIO RECREATION FACILITIES ASSOCIATION INC.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopied, recorded or otherwise, without the prior written permission of the Ontario Recreation Facilities Association Inc.

The information contained in this reference material is distributed as a guide only; it is generally current to the best of our knowledge as to the revision date, having been compiled from sources believed to be reliable and to represent the best current opinion on the subject. No warranty, guarantee or representation is made by O.R.F.A. as to the absolute correctness or sufficiency of any representation contained in this reference material and O.R.F.A. assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety and health measures are contained in this reference material, or that other or additional measures may not be required in particular or exceptional conditions or circumstances.

While O.R.F.A. does not undertake to provide a revision service or guarantee accuracy, we shall be pleased to respond to your individual requests for information at any time.

Reference to companies and products are not intended by the publisher as an endorsement of any kind.
THE PROGRAM

The S.A.F.E.R. (Safety Activities For Effective Refrigeration) program is an initiative being promoted to operators of recreation facilities with refrigeration systems primarily in the Province of Ontario.

It is becoming of increasing importance that you and your organization promote and participate in continuous programs pertaining to the safe and efficient operation of your refrigeration systems. This document has been compiled as a partnership initiative among several organizations to address the issue of refrigeration safety and to promote an overview of risk management activities related to the safe operation of refrigeration systems.

The Ontario Recreation Facilities Association, Local 787 of the Refrigeration Workers of Ontario, CIMCO Lewis Refrigeration Ltd. and the Ontario Refrigeration Trade Labour-Management Health and Safety Committee have all partnered together to create this document which will serve to assist refrigeration operators, employers and service contractors in the “SAFER” operation of refrigeration systems in Ontario.

The Ontario Ministry of Consumer and Commercial Relations was an active participant and contributor to the process. The Construction Safety Association of Ontario through the Refrigeration/Air Conditioning Trade Labour Management Health and Safety Committee also supported the project.

BACKGROUND

Refrigeration systems in recreation facilities, dependent upon their capacity, are regulated in varying ways by codes, legislation and regulations pertaining to safety, operating practices and operating personnel. The variance of application of operating regulations was of major issue to the aforementioned groups. This document was originally designed to apply to all types of operators in the primary interest of safer operations for owners, operators, and service personnel and to assist the Ministry of Consumer and Commercial Relations (M.C.C.R.) in their endeavours to monitor regulations and safe operations.

The Operating Engineer’s Act was administered by the M.C.C.R. Pressure Vessels Safety Branch, which served as the Provincial Ministry, which monitored the regulations, inspections and safe operation of refrigeration plants in Ontario.

In June of 2001, the Government of Ontario passed the Technical Standards and Safety Act, and the former Operating Engineers Act, and Boilers and Pressure Vessels Act were revised and adopted as Regulations under the new Act. At the same time, jurisdiction was passed from the M.C.C.R. to the Ministry of Consumer and Business Services. The administrative authority for the Act and Regulations is the Technical Standards and Safety Authority (T.S.S.A.)

The regulations require that any plant, which exceeds 30 horsepower, be registered. Plants under 200 horsepower are required to meet the regulations for a fully guarded plant which will then not require the attendance of an Operating Engineer as defined in the regulations. Plants in excess of 200 horsepower require attendance by an Ontario Refrigeration Operator Class B Operator, or equivalent Operating Engineer at least 8 hours of every 24-hour period of operation.

In addition, the Ontario Recreation Facilities Association serves to educate operators through a voluntary-based refrigeration training program which assists in ensuring that operational and safety training in refrigeration is available for all people employed in Ontario recreation facilities that may not qualify them to acquire certification as an Ontario Refrigeration Operator Class B under the Operating Engineers Regulation. Therefore, whether your refrigeration system is registered as requiring attendance by a Class B Operator, or Operating Engineer, or if your plant is a fully guarded, unattended system, this document is designed to assist you in complying with safe and efficient operating practices.
HOW TO USE THIS DOCUMENT

1. This document has been designed as a “self-help” tool to provide owners/operators with an improved understanding of the safety requirements of refrigeration system operations.
2. The document has been developed in the most "user-friendly" format possible and is not intended to be highly technical in content.
3. The main goal of the S.A.F.E.R. program is to stimulate a process of self-inspection of refrigeration systems to provide an evaluation of the safety status of your respective system and to provide for improved understanding and awareness of the safety requirements for the operation of systems. A key objective of the program is to "operationalize" the many legislative and regulated requirements of owners and operators of refrigeration systems in recreation facilities.
4. It is highly recommended that competent members of your staff conduct the inspection. The Occupational Health and Safety Act of Ontario defines a competent person as a person who,
   i. is qualified because of his/her knowledge, training and experience to organize the work and its performance,
   ii. is familiar with the provisions of the Act and the regulations that apply to the work, and
   iii. has knowledge of any pertinent or actual changes to health or safety in the workplace
5. Make this document available to staff and the refrigeration service contractor.
6. Once the inspection is completed, circulate the results of the inspection to management (or owner representative) in order that routine or major improvements/replacements can be made to the system to ensure maximum safety and compliance.
7. Maintain an ongoing logbook of inspections and corrective action in chronological order.

Once compiled, this information and corrective actions are designed to assist in an improved understanding and safer operation of the refrigeration system. It is NOT intended for use as a basis for an inspector to shut your system down for non-compliance to safety requirements.

THE S.A.F.E.R. PROGRAM AND RISK MANAGEMENT

The S.A.F.E.R. Program has been designed to assist recreation facility operators in enhancing their Risk Management programs. Refrigeration systems represent large capital investments, continuous operational expenditures and regular maintenance costs along with potential hazards related to safety of operations.

The S.A.F.E.R. program has been developed to provide you with a simple, effective way of:

a) identifying safety (or risk) exposure
b) evaluating the safety deficiencies and level of risk
c) correcting the safety deficiencies
d) managing the risk through safety of operations

Operators of refrigeration systems need to be concerned with both employee and public safety. Safety regulations and requirements are changing constantly. When was the last time your refrigeration system was thoroughly inspected for safety? The S.A.F.E.R. program will show you how. It will also provide you with some valuable documentation to assist you in your risk management activities.

The S.A.F.E.R. Program has many other benefits:

1. Improved understanding of the legislation and regulations affecting refrigeration systems.
2. Improved understanding of operational responsibilities/service responsibilities by staff and refrigeration service contractors.
3. Diagnostic updates on the status of refrigeration system components.

ONTARIO RECREATION FACILITIES ASSOCIATION INC.
4. Data for development of maintenance programs and budgets (planned/preventive/programmed/replacement).
5. Insurance premiums maintained at the lowest possible level.
7. Improved plan for risk avoidance.
8. Less chance of negligence and impending liability.
9. Peace of mind!

**HOW TO GET STARTED**

The S.A.F.E.R. Program is yours to use in the manner that best meets the needs of your organization. Perhaps you already have a thorough inspection program. GREAT! Just use this one as an additional resource tool. If your organization doesn't inspect your refrigeration system on a regular basis, the S.A.F.E.R. Program is for YOU!

**FOLLOW THESE STEPS:**

- Read the document thoroughly
- If you need further clarification, call the Ontario Recreation Facilities Association Office 1-800-661-ORFA (6732) for assistance.
- Talk to your employer about the value of the program and how it could be applied in your organization.
- Talk to your refrigeration service contractor about it.
- Call a meeting with your staff about the program.
- Conduct the inspection (jointly or independently).
- Notify your owner representative of the inspection results and any required actions.
- Act on the information compiled as required.
- Communicate your actions with the appropriate authorities (i.e.: insurance carrier, local inspectors, etc.).
- Develop a program for re-inspection on a regular basis and incorporate into your risk management program.

You will then reap the benefits of a S.A.F.E.R. refrigeration system!!!

For further assistance regarding information pertinent to legislation, regulations, training programs or risk management programs, please contact the O.R.F.A. Office at 1-800-661-ORFA (6732). We will be pleased to assist you!
## SAFETY

<table>
<thead>
<tr>
<th>Training – <strong>DO</strong></th>
<th><strong>DO NOT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Send your key personnel to industry, government or other sponsored safety training courses and/or conduct “in house” safety training courses for your personnel.</td>
<td>• Assume people will conduct themselves in a safe manner. The safety of the system and of employees is first the responsibility of management and secondly that of the operators/maintenance personnel.</td>
</tr>
<tr>
<td>• Train personnel in the proper use of protective equipment.</td>
<td>• Allow inexperience, haste or fatigue to affect good judgement and considerations for safety.</td>
</tr>
<tr>
<td>• Conduct drills to train personnel in emergency procedures.</td>
<td></td>
</tr>
<tr>
<td>• Train your personnel in the safe use of all tools and equipment and in the safe response to emergencies.</td>
<td></td>
</tr>
<tr>
<td>• Acquaint your local Fire Department with your plant, personnel, safety plans and procedures - involve them in safety drills.</td>
<td></td>
</tr>
<tr>
<td>• Comply with federal, state/provincial and local laws and regulations concerning the release of gases or liquids from a refrigeration system.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment – <strong>DO</strong></th>
<th><strong>DO NOT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use safety glass or safety face shield to protect eyes. Install appropriate size and type of fire extinguishers in all machinery rooms.</td>
<td></td>
</tr>
<tr>
<td>• Keep recommended protective equipment readily available and in clean, sanitary and workable condition. Provide as appropriate, gas mask, air packs, water sprays, eye wash stations, emergency lighting, and protective clothing.</td>
<td></td>
</tr>
<tr>
<td>• Attach safety tags appropriately labelled, dated and signed to valves, switches, equipment, etc. when making repairs. Ex. “Danger”, “Hands Off”, “Do Not Operate”, “Do Not Throw Switch”, “Do Not Open”, etc.</td>
<td></td>
</tr>
<tr>
<td>• Insure that all wiring is in accordance with governing electrical codes.</td>
<td></td>
</tr>
</tbody>
</table>
## OPERATIONS

<table>
<thead>
<tr>
<th>DO</th>
<th>DO NOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cordon off equipment or areas under repair.</td>
<td>• Work on any system component without having help nearby and observing.</td>
</tr>
<tr>
<td>• Install machinery guards in accordance with applicable codes.</td>
<td>• Smoke in refrigeration machinery rooms.</td>
</tr>
<tr>
<td>• Protect personnel from falling by using approved safety ladders or platforms.</td>
<td>• Attempt repairs to equipment with power “ON”.</td>
</tr>
<tr>
<td>• Lock “OFF” and tag the source of power supply before working on electrical wiring or electrically operated devices or electrically driven equipment.</td>
<td>• Energize a solenoid valve with the coil cover or plunger assembly removed.</td>
</tr>
<tr>
<td>• Permit only electricians who are qualified/certified to work on power or control wiring and electrical devices and equipment.</td>
<td>• Attempt to repair safety relief valves.</td>
</tr>
<tr>
<td>• Return safety relief valves to the manufacturer or to certified inspection stations for repair and/or resetting.</td>
<td>• Use a solenoid valve as a shut off valve while making repairs.</td>
</tr>
<tr>
<td>• Use only positive closing shut-off valves to isolate equipment or system components when parts or a refrigeration system are to be opened up or removed for inspection and service or repair.</td>
<td>• Rely on a check valve to be tight holding when making repairs.</td>
</tr>
<tr>
<td>• Remove seal cap covers with caution. Liquid refrigerant can accumulate under these covers.</td>
<td>• Subject threaded parts to excessive torque.</td>
</tr>
<tr>
<td>• Avoid contact with liquid refrigerant.</td>
<td>• Attempt to tighten valve bonnets of screwed bonnet valves unless the valve is in a partially open position.</td>
</tr>
<tr>
<td>• Use a backup wrench on mating parts when loosening a screwed joint.</td>
<td>• Open a screwed bonnet valve without first determining the condition of the packing nut and packing to avoid unscrewing the packing nut or the valve bonnet.</td>
</tr>
<tr>
<td>• Approach a potentially hazardous area with caution. Escaping refrigerant can have a startling effect. Use approved protective masks, clothing, safety ladders and/or platforms and other equipment as appropriate.</td>
<td>• Purge or purposely release refrigerant into a room; especially an equipment room.</td>
</tr>
</tbody>
</table>
Before opening an operating refrigeration system:

a. Isolate the portion of the system to be opened by using only positive acting manual shutoff valves.

b. Reduce the pressure to zero psig by pumping out or by controlled bleed off of pressure in a manner acceptable to environmental regulations.

c. Remove all liquid refrigerant in the portion of the system involved before opening it up.

d. Follow only safe practices and procedures to avoid accidents using protective masks, clothing and equipment as appropriate.

e. Consult with acknowledged industry experts if at all uncertain of the procedure to follow.

Attempt repairs contrary to manufacturer's recommendations or warranties. (Ex. Compressors, control valves, pumps, switches, controls.)

Open up section of a refrigeration system before determining that the pressure has been reduced to 0 psi gauge and that liquid refrigerant has been removed.

Maintenance

- Periodically, at least once a year, have the system(s), including all components and controls, inspected by qualified/certified personnel according to a planned maintenance schedule.

- Regularly inspect and test safety relief valves. Re-certification or replacement of all safety relief valves after no more than five years service is required under the Regulations.

- Return control valves or regulators to the factory for thorough inspection and rebuilding when extensive repairs are required, especially those more than three years old. Spare parts kept in storage should be checked for corrosion and against manufacturer's latest assembly bulletin to be sure current parts are being used.

- Observe the manufacturer's torque requirements for tightening threaded parts of refrigeration system components when servicing, maintaining and/or repairing these items.

- Inspection and cleaning of strainers should be included in the planned maintenance schedule. Should a component downstream of a particular strainer require servicing or repair the companion strainer should also be inspected and cleaned.

- Stop all moving equipment when making adjustments whenever possible. Anything dropped into moving machinery can result in serious injury to the operator and damage to the machinery.
Whenever maintenance may involve major overhaul and/or repair of system component(s) it may be necessary or advisable to shut down the entire system or at least shut down and isolate the major component(s) to be overhauled/repaired. A review of section 3 - Operation and Repair is suggested plus a review of manufacturer's instructions, system drawings and/or other applicable information as may be required. Refrigerant vapour and/or liquid must be pumped out of the component(s) or otherwise removed and the component(s) must be properly isolated using the appropriate hand shut off valves in the system.

Before the component(s) are opened to the atmosphere or the environment, a positive determination should be made for the remaining presence of refrigerant vapour and/or liquid. Knowledge of the refrigerant's saturated pressure/temperature characteristics must be known along with the existing pressure and temperature in the component(s) and the ambient temperature in order to determine that all liquid has been removed and that the vapour pressure is 0 psig and safe to vent.

Local, provincial and/or federal regulations should be reviewed with regard to the release of refrigerants, brine(s) and solvent(s) to the atmosphere or environment.

Prior consideration should be given to the need for protective equipment and clothing, tools, ladders, platforms, etc.

### Handling Refrigerant Cylinders

<table>
<thead>
<tr>
<th>Storage - DO</th>
<th>DO NOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store cylinders in a cool, shaded area and/or under a roof, not over 125°F, to protect them against weather extremes.</td>
<td>Do not remove or change the numbers or marks stamped onto cylinders</td>
</tr>
<tr>
<td>Protect cylinders from any object producing a cut or abrasion on the surface of the cylinder material.</td>
<td>Store cylinders near flammable substances such as oil, gasoline, and waste or in buildings with a definite fire hazard.</td>
</tr>
<tr>
<td>Keep valves tightly closed and with valve caps and/or plugs in place when cylinders are not in use.</td>
<td>Heat a cylinder above 125°F or permit it to stay in the hot sun.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transportation - DO</th>
<th>DO NOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect against tampering by unauthorized individuals.</td>
<td>Lift cylinders by the cap.</td>
</tr>
<tr>
<td>Strap or chain cylinders to a wall or other fixed restraint.</td>
<td>Drop cylinders or permit them to strike violently against each other or against other surfaces or roll around in transit.</td>
</tr>
<tr>
<td>Use a crane with a safe cradle or platform to handle cylinders.</td>
<td>Drag or slide cylinders.</td>
</tr>
<tr>
<td>Allow handling only by experienced and properly instructed persons.</td>
<td>Use a lifting magnet or sling (rope or chain) when handling cylinders.</td>
</tr>
<tr>
<td>Comply with applicable regulations as they cover &quot;off premises&quot; transportation of refrigerants.</td>
<td>Use cylinders as rollers or support.</td>
</tr>
</tbody>
</table>
## Careful Use

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>DO NOT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Play it safe; to heat a cylinder, use hot water.</td>
<td>- Apply an open flame or live steam to a cylinder or cylinder valve.</td>
</tr>
<tr>
<td>- Be aware-some cylinders have fusible metal devices which start to melt at 157 °F.</td>
<td>- Tamper with safety devices in valves or cylinders or attempt to repair or alter cylinders or valves.</td>
</tr>
<tr>
<td>- Always use a pressure gauge when charging a system.</td>
<td>- Force connections that do not fit.</td>
</tr>
<tr>
<td>- Make sure the threads on regulators or other auxiliary equipment are the same as those on the cylinder valve.</td>
<td>- Use a cylinder unless it is properly supported to prevent it from being knocked over.</td>
</tr>
<tr>
<td>- Keep sparks and flames away.</td>
<td>- Use compressed gas where the cylinder is apt to be contaminated by the feedback of process materials unless protected by suitable check valves.</td>
</tr>
<tr>
<td>- Blow out charging lines before filling. Plug ends wherever possible when not in use.</td>
<td>- Use cylinders as rollers or support.</td>
</tr>
<tr>
<td>- Keep cylinder discharge valves clean. After removing the valve cap, slightly open the valve for just an instant with the valve pointed away from yourself and other persons to remove dirt particles from the openings, before using the refrigerant.</td>
<td>- Refill cylinders without the owner's permission.</td>
</tr>
<tr>
<td>- Use approved goggles and gloves when connecting and/or disconnecting cylinders. Keep an approved gas mask available at all times.</td>
<td>- Use connections, regulators, gauges, hoses and other appliances designed specifically and stamped accordingly for the refrigerant(s) with which they will be used.</td>
</tr>
<tr>
<td>- Should vapour leak between the stem and packing nut opening, close the valve and tighten the packing nut down (turn counter clockwise) on ammonia cylinders. Reopen the valve. Should leaking persist call the supplier immediately.</td>
<td>- Use approved goggles and gloves when connecting and/or disconnecting cylinders. Keep an approved gas mask available at all times.</td>
</tr>
</tbody>
</table>
To Obtain Refrigerant:

- **Ammonia (liquid):** place cylinder on its side with valve outlet up
- **Ammonia (vapour):** leave cylinder in upright position.
- **Halocarbons:** keep cylinder in upright position and open appropriate valve for liquid or vapour.

**In the Event of a Leak or Spill**

**Keep Calm**
1000 ppm (parts per million) of refrigerants R-12, R-22, and R-502, mixed with air, are relatively harmless. However, halocarbon refrigerants decompose in contact with a flame and form highly toxic products. These products can be fatal or cause serious injury in a short time, even when present in low concentrations.

If an electric heating element or open flame is located in a room where any refrigerant has leaked, ventilate the room before entering and turn off the heating element or open flame.

**Ventilate the Area**
Anhydrous ammonia is not a cumulative poison. It has a distinctive pungent odour that, even at low concentrations, is detectable by most people. No person will voluntarily remain in hazardous concentrations. Since ammonia gas is lighter than air, adequate ventilation is the best means of preventing an accumulation. Halocarbon refrigerants are heavier than air and will displace air at lower levels and in pits.

**Call a Doctor**
Any person overcome in a space lacking oxygen, due to high concentrations of halocarbon or ammonia refrigerant vapour, should be removed at once from the contaminated atmosphere. Administer artificial respiration, either manually or with a suitable inhalator operated by trained personnel.

Liquid from R-12, R-22, and R-502 refrigerants is -21°F or colder. Should liquid from any of these refrigerants contact the skin, the injury is similar to frost bite. Treat by splashing the affected area with water to raise the temperature above freezing.

**Wash the Affected Area**
Ammonia liquid splashes or concentrated vapour can cause skin burns. Liquid ammonia at atmospheric pressure is -28°F. Wash a person splashed with liquid or exposed to concentrated vapour immediately with large quantities of water. Continue this procedure for at least 15 minutes, removing all clothing while washing. After washing, apply wet compresses (solution of 2% of boric acid in distilled water) to affected parts until medical advice is available.

If ammonia liquid or vapour gets into a person's eyes, wash the eyes immediately, for at least 30 minutes, with the above solution of boric acid in distilled water.

**Wear a Mask & Goggles**
Avoid breathing any liquid refrigerant mist into the lungs, it can be fatal.

Always wear goggles when opening any part of a refrigerating system.

When checking for leaks with a halide leak detector avoid fumes produced by the flame in contact with refrigerant. These fumes are toxic. Preferably, use an electronic leak detector.
REFRIGERATION

SAFETY INSPECTION CHECKLIST

OWNER: ____________________________________________________________

ADDRESS: _________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

PLANT LOCATION: __________________________________________________

OWNER'S REPRESENTATIVE ON-SITE: ____________________________________
(e.g. Manager)

PERSON PERFORMING INSPECTION: ________________________________

DATE OF INSPECTION: _____________________________________________

NAME OF COMPANY DOING INSPECTION: ____________________________

ONTARIO RECREATION FACILITIES ASSOCIATION INC.
REFRIGERATION SAFETY INSPECTION CHECKLIST

OWNER:___________________________________________________________________________________________

ADDRESS:_______________________________________________________________________________________

COMPRESSORS

IDENTIFYING MARK/NO.:______________________________________________________________

EQUIPMENT LOCATION:______________________________________________________________

MANUFACTURER:_________ YEAR MANUFACTURED:_________

MODEL NO:_______________________________________________________________________________

SERIAL NO:_______________________________________________________________________________

REFRIGERANT TYPE:______________________________________________________________________

COMPRESSOR TYPE:_______________________________________________________________________

- RECIPROCATING □ ROTARY SCREW □
- ROTARY VANE □ VERT RECIPROCATING □

TYPE OF RELIEF VALVE:

- INTERNAL □ EXTERNAL □ NONE □

OPERATING RPM:___________________________ NAMEPLATE MAX. RPM:_________________________

OPERATING PRESSURES: SUCTION ____________ PSIG; DISCHARGE ____________ PSIG

RECOMMENDED MAXIMUM DISCHARGE ____________ PSIG

OPERATING COMPRESSION RATIO (DISCHARGE PSIA/SUCTION PSIA): _________________________

MAXIMUM COMPRESSION RATIO:___________________________________________________________

BORE AND STROKE OF MACHINE:__________________________________________________________

SAFETY CUTOUTS: SETTING FUNCTIONS PROPERLY?

- HIGH PRESSURE .................. _________ PSIG ......................... YES  NO
- LOW PRESSURE .................. _________ PSIG ......................... YES  NO
- OIL PRESSURE .................... _________ PSIG ......................... YES  NO
# REFRIGERATION SAFETY INSPECTION CHECKLIST

**OWNER:**

**ADDRESS:**

## COMPRESSORS

**IDENTIFYING MARK/NO.:**

**TYPE OF DRIVE:**
- BELT
- DIRECT

Circle Yes or No

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the drive mechanism/guard (belts, sheaves, coupling, etc.) appear to comply with safety regulations?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Has the compressor been altered, modified, or repaired in such a way that might affect the casing integrity?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Has the casing been re-certified and are re-certification papers available at the plant?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is the compressor free from excessive vibration?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is the compressor anchored securely in place?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Are there any other conditions that might negatively affect safe compressor operation?</td>
<td>YES or NO</td>
</tr>
</tbody>
</table>

If yes, please describe below:

___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________

ONTARIO RECREATION FACILITIES ASSOCIATION INC.
# REFRIGERATION SAFETY INSPECTION CHECKLIST

**OWNER:** ___________________________________________________________

**ADDRESS:** ____________________________________________________________

**VESSELS**

IDENTIFYING MARK/NO.: _______________________________________________

LOCATION: ______________________________________________________________

MANUFACTURER: ____________________ YEAR MANUFACTURED: __________

PRESSURE (PSIG): NORMAL OPERATING ________; MAX ALLOWANCE ______

DIAMETER (IN.): _________________ LENGTH (FT.): _____________________

<table>
<thead>
<tr>
<th>IS VESSEL ASME STAMPED?</th>
<th>YES or NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTRATION Nos.:</td>
<td></td>
</tr>
<tr>
<td>OIN ____________________</td>
<td></td>
</tr>
<tr>
<td>CRN ____________________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TO YOUR KNOWLEDGE HAS THIS VESSEL EVER BEEN ALTERED OR MODIFIED?</th>
<th>YES or NO</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>IF ALTERED, WAS VESSEL RE-CERTIFIED?</th>
<th>YES or NO</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ARE ASME CERTIFIED PRINTS AVAILABLE?</th>
<th>YES or NO</th>
</tr>
</thead>
</table>

**INSULATION CONDITION:**

- **GOOD**
  - □ NO SIGN IF VAPOUR BARRIER LEAKS
- **FAIR**
  - □ SLIGHT SIGN OF VAPOUR BARRIER LEAKS
- **POOR**
  - □ EXTENSIVE SIGNS OF VAPOUR BARRIER LEAKS
- **NOT INSULATED**
  - □

**VESSEL CONDITION:**

- **EXCELLENT**
  - □ NO VISIBLE CORROSION
- **GOOD**
  - □ SOME EXTERNAL CORROSION VISIBLE LESS THAN 25% OF SURFACE
- **POOR**
  - □ EXTENSIVE CORROSION SHOULD BE EXAMINED BY A QUALIFIED ENGINEER
- **UNKNOWN**
  - □ DUE TO INSULATION
REFRIGERATION SAFETY INSPECTION CHECKLIST

OWNER: _____________________________________________________________

ADDRESS: ___________________________________________________________

SHELL & TUBE HEAT EXCHANGERS

IDENTIFYING MARK/NO.: ________________________________________________

LOCATION: _____________________________________________________________

APPLICATION: ___________________________ YEAR MANUFACTURED: _________

MANUFACTURER: ___________________________ PRESSURE (PSIG): NORMAL OPERATING ________; MAX ALLOWANCE __________

DIAMETER (IN.): ___________________________ LENGTH (FT.): __________________

Circle Yes or No

IS VESSEL ASME STAMPED? ___________________________ YES or NO

REGISTRATION Nos. OIN ________ CRN ________________

TO YOUR KNOWLEDGE HAS THIS VESSEL EVER BEEN ALTERED OR MODIFIED? ___________________________ YES or NO

IF ALTERED, WAS VESSEL RE-CERTIFIED? ___________________________ YES or NO

ARE ASME CERTIFIED PRINTS AVAILABLE? ___________________________ YES or NO

INSULATION CONDITION:

GOOD □ NO SIGN OF VAPOUR BARRIER LEAKS
FAIR □ SLIGHT SIGN OF VAPOUR BARRIER LEAKS
POOR □ EXTENSIVE SIGNS OF VAPOUR BARRIER LEAKS
NOT INSULATED □

VESSEL CONDITION:

EXCELLENT □ NO VISIBLE CORROSION
GOOD □ SOME EXTERNAL CORROSION VISIBLE
GOOD □ SOME EXTERNAL CORROSION VISIBLE LESS THAN 25% OF SURFACE
POOR □ EXTENSIVE CORROSION, SHOULD BE EXAMINED BY A QUALIFIED ENGINEER
UNKNOWN □ DUE TO INSULATION

• OIL POT? ___________________________ YES or NO

• IS THERE AN OIL POT RELIEF VALVE? ___________________________ YES or NO

• IS OIL RELIEF VALVE PROPERLY PIPED TO ATMOSPHERE? ___________________________ YES or NO

ONTARIO RECREATION FACILITIES ASSOCIATION INC.
## REFRIGERATION SAFETY INSPECTION CHECKLIST

**OWNER:** __________________________________________________________________________________________

**ADDRESS:** _________________________________________________________________________________________

### SHELL & TUBE HEAT EXCHANGERS (BRINE CHILLER)

**IDENTIFYING MARK/NO.:** __________________________

**SAFETY RELIEF VALVE:**

- **TYPE:**
  - SINGLE □
  - DUAL □
  - NONE □
  - ARE SEALS INTACT □

**PRESSURE SETTING:** ___________ PSIG; **RATING** ____________ LBS. REFRIGERANT FOR EACH VALVE: __________________________________________

**YEAR OF MANUFACTURE OR RE-CERTIFICATION:** __________________________

**RELIEVE VALVE OUTLET SIZE:** ____________ IN. **OUTLET PIPE SIZE:** _________ IN. **INLET SIZE:** ______________ IN.

**IS VALVE PROPERLY PIPED TO ATMOSPHERE?**

<table>
<thead>
<tr>
<th>YES or NO</th>
</tr>
</thead>
</table>

**CONDITION:**

- **EXCELLENT** □
- **GOOD** □
- **POOR** □
- **UNKNOWN** □

- CLEAN, NO VISIBLE RUST, CORROSION
- SOME EXTERNAL RUST/CORROSION VISIBLE LESS THAN 25% OF SURFACE
- MUCH SURFACE RUST/ CORROSION VISIBLE
- SURFACE AND INTERNAL RUST/CORROSION

**SIGHT GLASS:**

- **TYPE:**
  - TUBULAR □
  - BULLS EYE □
  - NONE □

- PROTECTED FROM TRAFFIC HAZARDS? YES NO
- INTERNAL CHECK-TYPE SHUT-OFFS? YES NO
- 360° GAUGE GLASS GUARDS? YES NO
- IS HIGH LEVEL SWITCH OPERATIONAL? YES NO
- ARE THERE ANY OTHER CONDITIONS THAT MIGHT NEGATIVELY AFFECT SAFE HEAT EXCHANGER OPERATION? YES NO

**IF YES, PLEASE DESCRIBE:**

___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________

---

**S.A.F.E.R – SAFETY ACTIVITIES FOR EFFECTIVE REFRIGERATION**
REFRIGERATION SAFETY INSPECTION CHECKLIST

OWNER: __________________________________________________________________________________________

ADDRESS: _________________________________________________________________________________________

E V A P O R A T I V E  C O N D E N S E R S

IDENTIFYING MARK/NO.: __________________________________________________
LOCATION: _______________________________________________________________
MANUFACTURER: ______________ YEAR MANUFACTURED: ______________
MODEL NO: _______________________________________________________________
SERIAL NO: _______________________________________________________________
CRN NO: ______________________ (Required on new condensers after Oct. 1, 1989)

Circle Yes or No

| IS CONDENSER ADEQUATELY ANCHORED AND SUPPORTED? | YES or NO |
| IS THERE SAFE ACCESS FOR NORMAL SERVICE AND MAINTENANCE? | YES or NO |
| IS THE UNIT FREE FROM EXCESSIVE, VISIBLE VIBRATION? | YES or NO |
| IF ALTERED, WAS VESSEL RE-CERTIFIED? | YES or NO |
| IS THERE ADEQUATE PROTECTION AGAINST TRAFFIC HAZARDS? | YES or NO |
| ARE THERE ANY OTHER CONDITIONS THAT MIGHT NEGATIVELY AFFECT SAFE EVAPORATIVE CONDENSER OPERATION? | YES or NO |

IF YES, PLEASE DESCRIBE BELOW:
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________
___________________________________________________________________________________________________

ONTARIO RECREATION FACILITIES ASSOCIATION INC.
# Refrigeration Safety Inspection Checklist

**Owner:** 

**Address:** 

<table>
<thead>
<tr>
<th>System</th>
<th>Circle Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is all piping adequately supported and anchored?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is all piping adequately protected from traffic hazards?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is all piping free of abnormal ice formations?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is all piping properly marked (pressure, temperature, and flow direction)?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is the system free of abnormal sounds and vibrations?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is the system free of refrigerant leaks, except traces in the engine room?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is all personal protective equipment available and in good working condition, including breathing apparatus where required by the local jurisdiction?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is an up-to-date detailed operating procedures manual relating to procedures for training and the operation of all equipment and systems and all emergency procedures and accepted by the chief operator available on the premises?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Are there signs providing proper emergency instructions?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is there a written evacuation plan?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Is there a sign in the engine room with the name and address of installing/servicing contractor, the appropriate amount of refrigerant in the system and the field test pressure?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>System charge:</td>
<td>LBS.</td>
</tr>
<tr>
<td>Are shower head and eyewash available near engine room?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Does the engine room exhaust fan work?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>Exhaust quantity:</td>
<td>CFM</td>
</tr>
<tr>
<td>Does a refrigerant leak detector control the fan?</td>
<td>YES or NO</td>
</tr>
</tbody>
</table>
# REFRIGERATION SAFETY INSPECTION CHECKLIST

**OWNER:** __________________________________________________________________________________________

**ADDRESS:** _________________________________________________________________________________________

<table>
<thead>
<tr>
<th>S Y S T E M</th>
<th>YES or NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARE AISLES IN THE ENGINE ROOM CLEARLY MARKED AND CLEAR OF OBSTRUCTIONS; IN THE EVENT OF A LEAK, CAN PERSONNEL EXIT QUICKLY AND SAFELY?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IS THERE MORE THAN ONE EXIT FROM THE ENGINE ROOM?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>ARE EXIT/EXITS CLEAR OF PIPING/EQUIPMENT?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IS THERE AN UPDATED SYSTEMS SCHEMATIC DRAWING AVAILABLE?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>CAN THE MAIN LIQUID REFRIGERANT FEED BE SHUT-OFF FROM OUTSIDE THE ENGINE ROOM?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IS THERE A MSDS PROCEDURE AVAILABLE FOR ALL REFRIGERANTS?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IS THE PIPING ARRANGED SO THAT LIQUID REFRIGERANT CANNOT BE TRAPPED BETWEEN THE PUMP DISCHARGE CHECK VALVE AND SHUT-OFF VALVE?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IF NO, IS THERE A PROPERLY PIPEd RELIEF VALVE THERE?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>ARE ALL GAUGES IN WORKING ORDER?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>ARE ALL REFRIGERANT CYLINDERS DISCONNECTED FROM SYSTEM?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>ARE COVERS SECURELY ON ALL ELECTRICAL PANELS/JUNCTION BOXES?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>HAS A FORMAL INSPECTION OF THE ENTIRE SYSTEM BEEN COMPLETED BY A COMPETENT PERSON WITHIN THE LAST 12 MONTHS?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IF NO, NAME THE SERVICE COMPANY:</td>
<td></td>
</tr>
<tr>
<td>IS THERE A LOCKOUT PROCEDURE AVAILABLE?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>ARE THERE ANY OTHER CONDITIONS THAT MIGHT NEGATIVELY AFFECT SAFE SYSTEM OPERATIONS?</td>
<td>YES or NO</td>
</tr>
<tr>
<td>IF YES, PLEASE DESCRIBE BELOW:</td>
<td></td>
</tr>
</tbody>
</table>