American National Standard for

ANSI/IIAR 1-2012

Definitions and Terminology Used in IIAR Standards

Approved by
the American National
Standards Institute
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International Institute of
Ammonia Refrigeration

Notes on the Standard Text

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This standard was approved by ANSI for publication on May 16, 2012.

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Foreword (Informative)

This Standard is issued as a companion to the ANSI/IIAR Standards. As the various Standards are published or revised, this Standard will be continuously maintained and updated.

This Standard was prepared using the ANSI consensus method whereby organizations and individuals recognized as having interest in the subject of the Standard were contacted to be part of a consensus body, whose vote to approve the Standard is required in addition to the public review process. This Standard was prepared and approved for submittal to ANSI by the IIAR Standards Committee and the IIAR Board of Directors.

At the time of publication of this standard, the IIAR Standards Committee had the following members:

Robert J. Czarnecki, Chair - Campbell Soup Company
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Section 1
Purpose

This Standard provides a unified set of definitions for use in the IIAR Standards. A set of common definitions is provided to prevent confusion among engineers, contractors and jurisdictional authorities. This Standard is a companion to ANSI/IIAR Standards.

Section 2
Scope

The definitions provided in this Standard apply to the defined terms whenever they are used in any one of the Standards in the ANSI/IIAR Standards.

These definitions do not apply to all occurrences or usages in the industrial refrigeration industry. They only apply to their usages in the above referenced Standards.

Section 3
Definitions

actuator: A mechanism which transmits movement to a component of a device such as the stem of a valve.

ammonia: *Refrigerant*-grade anhydrous *ammonia*.

approved: Acceptable to the authorities having jurisdiction.

approved nationally recognized testing laboratory: A laboratory acceptable to the jurisdictional authorities that provides uniform testing and examination procedures under established standards; is properly organized, equipped, and qualified for testing; and has a follow-up inspection service of the current production of the *listed* products.

authorized inspection agency: An established and recognized organization or individual regularly engaged in conducting tests or furnishing inspection services, when such organization or individual has been approved by the jurisdiction involved.

Cv : *Valve* flow coefficient (US units) - the flow (gal/min) of 60ºF water that passes through the *valve* at 1 psig *pressure* drop. See also Kv.

code authority: Any group or body recognized by the jurisdiction involved, and which has authority over the rules and regulations governing design, fabrication, testing and assembly of refrigeration and related equipment.

commissioning: The completion of the start-up process, which demonstrates the ability of the closed-circuit mechanical refrigerating system to automatically operate in a safe manner and achieve its intended task(s).

compressor: A specific machine for raising the *pressure* of *refrigerant* vapor. A **high stage compressor** is a compressor for compressing refrigerant vapor and discharging to the condenser. A **low stage compressor** (also known as a booster compressor) is a *compressor* for compressing

refrigerant vapor and discharging to the suction system of a higher stage *compressor*.

- **positive displacement compressor:** A *compressor* in which an increase in pressure is attained by changing the volume of the compression chamber.

condenser: That part of a *closed circuit mechanical refrigerating system* where refrigerant vapor is liquefied by the removal of heat. See also *desuperheater.*

- **air-cooled condenser:** A type of *condenser* in which heat removal is accomplished entirely by sensible heat gain of the air flowing over condensing surfaces.

- **double-pipe (tube-in-tube) condenser:** A type of *condenser* constructed of one or more assemblies of two tubes, one within the other, in which *refrigerant* is condensed either in the annular space or the inner tube.

- **evaporative condenser:** A type of *condenser* that obtains cooling effect by the evaporation of water in an air stream on the external surface of the tubes for the heat removal.

- **plate type condenser:** A *condenser* that uses heat transfer surfaces (plates) in lieu of *condenser coils*. The *refrigerant* is contained between paired plates that are welded or brazed together or elastomerically sealed. The plates may be placed into heat exchanger shells (plate-and-shell) or stacked between pressure end-plates (plate-and-frame).

- **shell and tube condenser:** A type of *condenser* with tubes secured into a tube sheet at one or both ends of an enclosing shell, in which refrigerant is condensed either in the shell side or the tube side.

condenser coil: That part of a *condenser* constructed of pipe or tubing not enclosed in a *pressure vessel*.

contractor: The entity that assumes various contractual responsibilities for services such as installing, integrating, maintaining or operating the various components of the refrigerating system.

cylinder: A container used for the transportation of *refrigerant*.

desuperheater: A heat exchanger which provides sensible cooling to the *refrigerant* vapor.

direct expansion: A *refrigerant* feed arrangement whereby liquid *refrigerant* is fed to an evaporator through an expansion *valve* or device and evaporates completely before leaving as vapor. See *valve: automatic expansion valve.*

emergency operating procedures: Procedures for operating the system under abnormal, unintended or time-sensitive conditions. These abnormal or time-sensitive conditions may involve risk to health and welfare of operators, employees, and the public; and/or components of the refrigerating system; and/or product.

emergency pressure control system (EPCS): A system consisting of pressure sensors, independent *compressor* shut-off controls and automatically controlled crossover *valves* that, when opened, will permit a high-pressure portion of a system to connect to a lower pressure portion of a system when opened.

evaporator: That part of a *closed circuit mechanical refrigerating system* designed to absorb heat by vaporizing liquid *refrigerant.*

- **plate type evaporator:** An *evaporator* that uses heat transfer surfaces (plates) in lieu of *evaporator coils*. The *refrigerant* is contained between paired plates that are welded or brazed together or elastomerically sealed. The plates may be used individually or placed into heat exchanger shells (plate-and-shell) or stacked between two pressure end-plates (plate and frame).

evaporator coil: That part of an *evaporator* constructed of pipe or tubing not enclosed in a *pressure vessel*.

exit: A means of egress.

float switch: A device incorporating a buoyancy component which responds to changing liquid level to mechanically actuate an electrical switch.

forced feed oil lubrication: A lubrication system in which oil is provided by an internal or external mechanical oil pump. This does not include splash type or drip type *compressor* lubrication systems.
header: A primary pipe or tube component of a refrigerating system to which are connected several other secondary pipes or tubes. Also known as manifold.

heat transfer component: The pressure containing portion of equipment used for heat transfer including pipes, tubes, coils or other components and their *headers*, not constructed as *pressure vessels*.

highside: Those parts of a *closed circuit mechanical refrigerating system* subjected to approximate *condenser pressure*.

informative appendix: An appendix that is not part of the standard but is included for information purposes only.

internal gross volume: The volume as determined from internal dimensions of the container, with no allowance for the volume of the internal parts.

Kv : *Valve* flow coefficient (SI units) - the flow (m3/h) of 15ºC water that passes through the *valve* at 1 bar *pressure* drop. See also Cv.

liquid level transmitter: A device which senses liquid level and relays the level position by means of electrical, electronic or pneumatic signal.

listed: Equipment that has been tested and is identified as acceptable by an *approved, nationally recognized testing laboratory*.

lowside: The parts of a *closed-circuit mechanical refrigerating system* subjected to approximate *evaporator pressure*.

machinery room: An enclosed space that is designed specifically to safely house refrigerating equipment which includes: *compressors*, *refrigerant* pumps or other *refrigerant* liquid transfer equipment that raises the pressure of the *refrigerant*.

manually operated valve: See *valve* : *shut off valve*.

MAWP: Maximum allowable working *pressure* for which the device has been designed.

mechanical actuating float: Buoyancy component which responds to changing liquid level to mechanically modulate a *valve* element controlling fluid flow.

monitored: A means of continual oversight such as notification to on-site staff, a third party alarm service or a responsible party.

MOPD: Maximum operating *pressure* differential.

MSSPD: Maximum seat sealing *pressure* differential.

normative appendix: An integral part of the mandatory requirements of the standard, which, for reasons of convenience, is placed after all other normative elements.

owner or owner's designated representative: The legal entity that is responsible for the refrigeration system.

piping: The interconnecting parts of a *closed circuit mechanical refrigerating system* which contain and convey the *refrigerant*. Piping includes pipe, flanges, bolting, gaskets, *valves*, fittings, the pressure-containing parts of other components such as *heat transfer components,* expansion joints, *strainers*, filters, and devices which serve such purposes as mixing, separating, snubbing, distributing, metering or controlling flow, pipe hangers, supporting fixtures and structural attachments.

plate heat exchanger: See *condenser: plate type condenser* and *evaporator: plate type evaporator*.

pressure: Force per unit area.

- **design pressure:** The maximum *pressure* for which a specific portion of a *closed circuit mechanical refrigerating system* is designed.
- **field (pressure) test:** A *pressure* test performed in the field.
- **leak test pressure:** The pressure which is applied to test a system or any part of it for tightness. See also *pressure*: *field (pressure)test*.

- **operating pressure:** Any *pressure*, within a range of *pressures*, determined by operational and safety limits (equal to, or below the *design pressure*) where a system or portion of a system, is intended to operate. Also known as working *pressure*

- **test pressure:** The *pressure* to which a piece of equipment or a system is subjected, according to *pressure* test or leak test procedures.

pressure-containing envelope: Enclosure which isolates the contained *refrigerant* from the atmosphere or other fluid(s).

pressure limiting device: A *pressure* responsive electronic or mechanical control designed to automatically stop the operation of the *pressure* imposing element at a predetermined *pressure*.

pressure relief valve: A *pressure* actuated *valve* held closed by a spring or other means and designed to automatically open to relieve *pressure* in excess of its setting, also called a safety *valve*. See also *pressure-relief device, dual pressure-relief device* and *hydrostatic relief valve.*

- **hydrostatic relief valve:** A *pressure relief valve* designed to automatically open to relieve liquid *pressure* in excess of its setting. Primarily used for the protection of *piping* or equipment where liquid *refrigerant* may be automatically trapped between two *valves* and subject to thermal expansion.

- **Pressure-relief device:** A *pressure* actuated *valve* or *rupture member* designed to automatically open to relieve excessive *pressure*. See also *dual pressure-relief device, pressure-relief valve*.

- **dual pressure-relief device:** Two *pressure-relief devices* (*valves* or *rupture members*) mounted on a *three way valve* that allows one device to remain active while the other is isolated. See also *pressure-relief device, pressure-relief valve*.

pressure vessel: Any *refrigerant* containing receptacle in a *closed circuit mechanical refrigerating system* designed and manufactured under the rules of ASME Section VIII, Division 1, Boiler and Pressure Vessel Code. See also *receiver: receiver* and *controlled-pressure receiver.*

EXCEPTIONS per ASME Section VIII, Division 1, Boiler and Pressure Vessel Code:

a. *Compressors*
b. Pumps
c. Controls

EXCEPTIONS per ASME B31.5, Refrigeration Piping and Heat Transfer Components:

a. *Condenser Coils*
b. *Evaporator Coils*
c. *Headers*
d. *Piping*
e. Other components and their headers not constructed as pressure vessels

proof test: Design confirmation by testing a production sample to verify that it will not fail when exposed to a predetermined *pressure* that exceeds its rated *design pressure*.

property insurance underwriter: An insurance company licensed to write insurance for the property in question in the jurisdiction concerned.

readily accessible: Capable of being reached safely and quickly for operation, repair, and inspection without requiring those to whom ready access is required to climb over or remove obstacles or to resort to the use of portable access equipment.

receiver: A *pressure vessel* in a *closed-circuit mechanical refrigerating system* designed to hold the varying volume of liquid *refrigerant* resulting from changes in system operating conditions. See also *pressure vessel*.

- **controlled-pressure receiver:** An intermediate *pressure receiver* used to flash-cool *refrigerant* and to control the feed *pressure*. See also *pressure vessel*.

refrigerant: A compound used in a closed circuit mechanical refrigeration cycle that undergoes phase change from a liquid to a gas and back, e.g. a*mmonia.*

refrigerant pump: A mechanical device for moving liquid *refrigerant* within a *closed circuit mechanical refrigerating system*.

refrigerating system (closed circuit mechanical refrigerating system): A combination of interconnected refrigerant-containing parts constituting at least one closed *refrigerant* circuit in which a *refrigerant* is circulated using mechanical compression for the purpose of extracting heat.

rupture member (disc): A non-reclosing *pressure-relief device* actuated by inlet *pressure* and designed to function by the bursting of a membrane.

saturation temperature: The temperature at which vapor and liquid can exist in equilibrium at a given *pressure*. See also *pressure*.

seal cap: A generic term for *pressure*-containing or non-*pressure*-containing enclosure which attaches to the *valve* and fully encloses a *stem* (spindle) and associated *stem* seal packing nut. The seal cap, when designated as *pressure*-containing, is designed as an extension of the *pressure-containing envelope.*

secondary coolant: Any liquid used for the transmission of heat without a change in its state. Also known as secondary refrigerant or brine.

shall (shall not): A term used where the provision is mandatory.

should (should not): A term used where the provisions are not mandatory but are (are not) recommended good practice under most but not all conditions.

start-up: A procedure, following the installation of a *refrigerating system*, which confirms the proper operation of all the equipment and interconnecting *piping* and electrical switchgear and controls.

stem: A rotating or linear sliding component that extends through the *pressure containing envelope* for the purpose of actuating an internal element (example: disc) of the *valve*, also referred to in practice as, but not limited to 'spindle'.

strainer: A *pressure*-containing component through which *refrigerant* flows for the purpose of separating particulate matter from the flow stream.

subcooled: Reduced to a temperature below the saturation temperature.

superheat: The sensible heat content in a vapor which raises the temperature of the vapor above the saturation temperature.

supplier: The individual or organization from whom title for equipment or material passes to the purchaser.

temporary operating procedure: An operating procedure that involves a deliberate and planned operation of a piece of equipment at conditions outside of its normal operating range including any specific steps that must be taken so that there are no safety ramifications.

trained start-up technician: An individual having adequate training and experience which qualifies that individual to start-up and operate a *closed-circuit mechanical refrigerating system* with which he or she has become familiar before actual start-up.

trained technician: An individual having adequate training and experience which qualify that individual to service, maintain and operate a *closed-circuit mechanical refrigerating system* with which he or she has become familiar.

ultimate strength: The highest *pressure* or stress level which the component can tolerate without rupture or failure.

valve: A *pressure*-containing device that stops, permits or controls flow. See also *piping, pressure-relief valve, pressure-relief device, dual pressure-relief device.*

- **automatic expansion valve:** A controlling device that self-regulates the flow of liquid *refrigerant* into an *evaporator* of a *closed circuit mechanical refrigerating system.*
- **automatic liquid refrigerant drain valve:** See *valve: highside float valve*.

- **check valve:** A *valve* allowing fluid flow in one direction only.

- **control valve:** All *valves* except *shut-off valves*. Example: solenoid *valve*, check *valve*, regulating *valve*, etc.

- **downstream pressure regulator:** A control *valve* that regulates the downstream pressure by controlling the flow of oil or *refrigerant* through the device and is actuated toward open by a *pressure* falling below regulator set point downstream of the *valve*.

- **evaporator pressure regulator:** A control *valve* that regulates evaporator pressure by controlling the flow of *refrigerant* from an *evaporator* section and is actuated toward open by a pressure above set point upstream of the *valve*.

- **flow regulating valve:** A *valve* designed to control flow.

- **highside float valve:** A control *valve* that regulates upstream liquid level by controlling the flow of *refrigerant* or oil. This type of *valve* is actuated open by a rising liquid level upstream of the *valve*.

- **lowside float valve:** A control *valve* that regulates downstream liquid level by controlling the flow of liquid *refrigerant* into an *evaporator*. This type of *valve* is actuated towards the closed position by a rising liquid level downstream of the *valve*.

- **motorized valve:** A *valve* operated by a motor.

- **multi-function valve:** A *valve* designed to fulfill the function of both control and shut-off.

- **oil drain float valve:** See *valve: highside float valve*.

- **self-closing valve:** A manually-operated *stop valve* that will automatically return to the closed position by means of a spring or other device when the operating handle is released.

- **shut-off valve:** An externally actuated *valve* solely designed to stop flow for the purpose of isolating a sub-section of the system, also referred to in practice as, but not limited to — "block," "hand," "service," "manually operated valve" or "stop" *valve*.

- **solenoid valve:** A *valve* that is opened or closed by the magnetic action of an electrically energized coil. The opposite action is accomplished by gravity, *pressure* or spring action.

- **thermostatic expansion valve:** A *control valve* that regulates *superheat* of *refrigerant* vapor leaving an *evaporator* by controlling the flow of *refrigerant* into an *evaporator* of a *closed-circuit mechanical refrigerating system* and is actuated by changes in *evaporator* pressure and *superheat* of the *refrigerant* vapor leaving the *evaporator*.

- **three way valve:** A service *valve* for dual mounted *pressure-relief valves*. A manually operated *valve* with one inlet which alternately can stop flow to either of two outlets.

- **uni-body valve:** A *valve* limited to maximum 1/2" [15 mm] nominal bore incorporating a one-piece body with integral bonnet and without any *pressure*-containing assembly joint.

Notes

Notes

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