

ANSI/AHRI Standard 731 (SI)

**2013 Standard for
Flow Capacity Rating of
Suction Line Filters and
Suction Line Filter Driers**



Approved by ANSI on April 15, 2014



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Note:

For I-P ratings, see ANSI/AHRI Standard 730 (I-P)-2013.

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FLOW CAPACITY RATING OF SUCTION LINE FILTERS AND SUCTION LINE FILTER DRIERS

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish, for refrigerant Suction Line Filters and Suction Line Filter Driers (which may be referred to herein as "filters"): definitions; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This standard applies to Suction Line Filters and Suction Line Filter Driers, as defined in Section 3.

2.2 *Refrigerant.* This standard applies to Suction Line Filters and Suction Line Filter Driers for use in systems employing refrigerants, R-22, R-134a, R-290, R-404A, R-407A, R-407C, R-410A, R-507A, R-600a, and R-744 as defined in ANSI/ASHRAE 34 with Addenda.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the ASHRAEwiki website (<http://wiki.ashrae.org/index.php/ASHRAEwiki>) unless otherwise defined in this section.

3.1 *Permanent Installation.* An installation intended to remain in the system for an indefinite period.

3.2 *Published Rating.* A statement of the assigned values of those performance characteristics, under stated Rating Conditions, by which a unit may be chosen to fit its application. These values apply to all units of like nominal size and type (identification) produced by the same manufacturer. The term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated Rating Conditions.

3.2.1 *Application Rating.* A rating based on tests performed at application Rating Conditions (other than Standard Rating Conditions).

3.2.2 *Standard Rating.* A rating based on tests performed at Standard Rating Conditions.

3.3 *Rating Conditions.* Any set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

3.3.1 *Standard Rating Conditions.* Rating conditions used as the basis of comparison for performance characteristics.

3.4 *Refrigerant Flow Capacity.* The maximum capacity of a filter drier attained at specified conditions as mentioned in AHRI Standard 711, and 7 kPa change in pressure, expressed in kW.

3.4.1 *Pressure Drop.* The pressure difference between the inlet and outlet of a filter, including its connections expressed in kPa.

3.5 *"Shall" or "Should".* "Shall" or "should" shall be interpreted as follows:

3.5.1 Shall. Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.5.2 Should. "Should" is used to indicate provisions which are not mandatory, but which are desirable as good practice.

3.6 Suction Line Filter. A manufactured device used in the suction line of a refrigeration system, for the purpose of removing and retaining solid contaminants from the refrigerant.

3.7 Suction Line Filter Drier. A manufactured device used in the suction line of a refrigeration system, whose element is partly or wholly composed of a desiccant. It is intended to remove and retain moisture as well as solid contaminants from the refrigerant.

3.8 Temporary Installation. An installation intended to remain in the system for a short period of time with the purpose of cleaning a new or severely contaminated system.

Section 4. Test Requirements

4.1 Test Requirements. All filter and filter-drier capacity ratings shall be based on tests in accordance with, or subject to verification by, the test procedure of ANSI/ASHRAE Standard 78.

4.1.1 If the filter capacity depends upon the position of or direction of flow through the filter, the filter shall be tested for all variations for which ratings are published.

Section 5. Rating Requirements

5.1 Published Ratings. As used herein, the term Published Ratings includes the ratings shown on the filter or published in specifications, advertising or other literature controlled by the manufacturer at stated Rating Conditions. Published Ratings shall include Standard Ratings, and may also include Application Ratings (See Table 4).

5.2 Standard Ratings. Standard capacity ratings of filters for refrigerant suction line service shall be stated in kW and/or mass flow rate, kg/s. The following specified conditions shall be used to determine the refrigerant flow rate through the filter.

5.2.1 Standard Rating Conditions. Standard Rating Conditions shall be according to Table 1, Table 2, and Table 3 below:

| Table 1. Standard Rating Conditions For R-22, R-290, R-404A, R407C, R-410A, R407A and R-507A | |
|---|--------|
| Evaporator Saturation Temperature | 4°C |
| Vapor Temperature Leaving Evaporator | 10°C |
| Vapor Temperature Entering Filter | 18°C |
| Liquid Temperature Entering Expansion Device | 32°C |
| Pressure Drop | 21 kPa |

| Table 2. Standard Rating Conditions For R-134a and R-600a | |
|--|--------|
| Evaporator Saturation Temperature | 4°C |
| Vapor Temperature Leaving Evaporator | 10°C |
| Vapor Temperature Entering Filter | 18°C |
| Liquid Temperature Entering Expansion Device | 32°C |
| Pressure Drop | 14 kPa |

| | |
|--|--------|
| Evaporator Saturation Temperature | -29°C |
| Vapor Temperature Leaving Evaporator | -23°C |
| Vapor Temperature Entering Filter | -15°C |
| Liquid Temperature Entering Expansion Device | -7°C |
| Pressure Drop | 28 kPa |

5.2.2 Application Rating Conditions. In addition to AHRI standard capacity ratings at the conditions specified in Section 5.2.1, capacity ratings may also be published for other evaporator temperatures or pressure drop values, provided they are specified as such and are based on all the other provisions of this section (See Table 4).

5.3 Tolerances. To comply with this standard, published capacity ratings shall be based on the requirements of this section, and shall be such that any production Suction Line Filters and Suction Line Filter Drier selected at random and tested shall have a capacity not less than 95% of its Standard Rating.

| Evaporator Saturated Suction Temperature | Permanent Installations | | | Temporary Installations | | |
|--|---|-------------------|-------|---|-------------------|-------|
| | R-22, R-290, R-404A, R-407A, R-407C, R-410A, and R-507A | R-134a and R-600a | R-744 | R-22, R-290, R-404A, R-407A, R-407C, R-410A, and R-507A | R-134a and R-600a | R-744 |
| °C | kPa | kPa | kPa | kPa | kPa | kPa |
| 4.0 ² | 21 | 14 ² | N/A | 55 | 41 | N/A |
| -7.0 | 14 | 10 | 41 | 28 | 21 | 83 |
| -18 | 10 | 7.0 | 35 | 21 | 14 | 69 |
| -29 ³ | 7.0 ³ | 3.0 ³ | 28 | 14 | 7.0 | 51 |
| -40 | 3.0 | N/A | 21 | 7.0 | N/A | 41 |

Notes:

1. These pressure drop values also represent recommended maximum pressure drop values for selections of filters for Permanent and Temporary Installations
2. AHRI Standard Rating Conditions excluding R-744, Permanent Installations only.
3. AHRI Standard Rating Conditions for R-744, Permanent Installations only.

Section 6. Minimum Data Requirements for Published Ratings

6.1 Minimum Data Requirements for Published Ratings. As a minimum, Published Ratings shall include all Standard Ratings. All claims to ratings within the scope of this standard shall include the statement “Rated in accordance with ANSI/AHRI Standard 731 (SI)”. All claims to ratings outside the scope of this standard shall include the statement “Outside the scope of ANSI/AHRI Standard 731 (SI)”. Wherever Application Ratings are published or printed, they shall include a statement of the conditions at which the ratings apply.

Section 7. Marking and Nameplate Data

7.1 As a minimum, the nameplate shall display the manufacturer's name and model designation.

Section 8. Conformance Conditions

8.1 *Conformance.* While conformance with this standard is voluntary, conformance shall not be claimed or implied for products or equipment within the standard's *Purpose* (Section 1) and *Scope* (Section 2) unless such product claims meet all of the requirements of the standard and all of the testing and rating requirements are measured and reported in complete compliance with the standard. Any product that has not met all the requirements of the standard shall not reference, state, or acknowledge the standard in any written, oral, or electronic communication.

APPENDIX A. REFERENCES - NORMATIVE

A1 Listed here are all standards, handbooks and other publications essential to the formation and implementation of the standard. All references in this appendix are considered as part of the standard.

A1.1 ANSI/AHRI Standard 711-2009, *Performance Rating of Liquid-Line Driers*, 2009, American National Standards Institute/Air-Conditioning Heating & Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.2 ANSI/ASHRAE Standard 34-2010 with Addenda, *Designation and Safety Classification of Refrigerants*, 2010, American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., West 43rd Street, 4th Floor, New York, NY 10036, U.S.A./1791 Tullie Circle N.E., Atlanta, GA 30329, U.S.A.

A1.3 ANSI/ASHRAE Standard 78-1985 (RA 2007), *Method of Testing Flow Capacity of Suction Line Filters and Filter Driers*, 2007, American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., West 43rd Street, 4th Floor, New York, NY 10036, U.S.A./1791 Tullie Circle N.E., Atlanta, GA 30329, U.S.A.

A1.4 *ASHRAEwiki, Terminology*. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc, Web. 21 Sept. 2012 <<http://wiki.ashrae.org/>>

APPENDIX B. REFERENCES – INFORMATIVE

None.