



SR2015

EQUIPMENT SELECTION SOFTWARE

USER GUIDE

BOHN

FLEXCOLD

A HEATCRAFT WORLDWIDE REFRIGERATION BRAND

1 - INTRODUCTION

This program was developed to facilitate the equipment selection for cold storage application. The products listed on the program are from Flexcold and Bohn trademarks, developed by Heatcraft do Brasil Ltda, worldwide refrigeration leader.

The main change from the SR2011 version to the SR2015 was the introduction of the new Integrated System frame (Plug In and Euromon), which includes the selection of PI and BPN models.

2 – ATENTION FOR THE USE OF SR2015

The calculated thermal load includes a 10% safety factor to cover an unexpected increase on the chamber load, excessive temperatures or changes on the product's package.

The thermal load calculation is based on the provided data defined by the user. The results obtained on the SR2015 do not presuppose any exception or particular cases, being the sole responsibility of the user the correct data insertion and the program operation.

It is the user's responsibility to ensure the appropriate product package and the air flow conditions on the chamber.

Heatcraft ensures the refrigeration of the air inside the chamber, not the products.

3 – GENERAL DATA

At this frame the client contact and the project title are registered. This information will be available at the printed project after it is complete.

- **Language selection:** select the preference language (Portuguese, Spanish or English).

4 – THERMAL LOAD

4.1 - DIMENSIONS

- **Units:** select the measure unit for the dimensions fields (meters or feet).
- **Length and width:** the evaporator must be installed on the larger dimension and at the opposed side of the chamber's door. When the dimension exceeds 20 feet, we recommend the addition of one more evaporator. The distances between the evaporator and the chamber walls must be in accordance with the recommended distances for each product.
- **Height:** the free height application for each product is defined according to the list below:
- **RI family:** 9 feet.
- **FL, FBA and EDS families:** 13 feet.
- **FM and MP families:** 20 feet.
- **HP and BH families:** 40 feet.

The chamber height must not be higher than 40 feet.

- **Observation:** the evaporator list that is presented on the evaporator guide is directly

related to the height informed at the Thermal Load frame. This is an important factor for the product selection and must obey the recommended limits for each evaporator family.

- **Door area:** informs the total chamber door area (m² or ft²).

4.2 – INSULATION

This field considers that the ceiling insulation is the same applied on the chamber walls, with the same thickness.

- **Units:** select the measure unit for the insulation thickness (millimeters or inches).
- **Walls and ceiling:** two materials are provided for the insulation selection, polystyrene and the polyurethane, with thermal conductivity equal to 0,028 kcal/mh°C and 0,018 kcal/mh°C respectively. If necessary, a different type of insulation can be used by selecting the option “Others”. In this case, the thermal conductivity must be filled manually in kcal/mh°C.
- **Thickness:** defines the insulation thickness. It is related with the internal temperature and the insulation material (polystyrene or polyurethane).
- **Thermal conductivity (k):** the thermal conductivity values will be automatically filled according to the insulation material selection, or manually filled in case the “Other” option is selected at the “Walls and ceiling” field.

4.3 – INSTALLATION LOCATION

- **Ambient temperature:** medium ambient temperature outside the chamber in °C. This field considers only four temperature ranges: 32°C (89,6°F), 35°C (95,0°F), 38°C (100,4°F) and 43°C (109,4°F).
- **Observation:** The greater the ambient temperature, the bigger will be the calculated thermal load.

4.4 – TEMPERATURE INSIDE THE CHAMBER

- **Indoor temperature:** indoor chamber temperature necessary to preserve the stored products.
- **Unit:** select the measure unit for the temperature field (°C or °F).

4.5 – PRODUCT TYPE

- **Variety:** select the product family that will be stored at the chamber. Five options are presented (All, Fruit/Vegetables, Meat, Milky and Miscellaneous), each containing the main products used on the market.
- **Product:** select the product type that will be stored on the chamber. The listed products are defined by the “Variety” field. The system considers the registered products features to calculate the thermal load.
- **Observation:** By selecting the “All” option at the “Variety” field, all product will be

presented on a single list.

- **Inlet product temperature:** product temperature before being stored.
- **Unit:** select the measure unit for the “Inlet Product Temperature” field (°C or °F).
- **Product quantity / day:** Product quantity that will be daily stored (kg or lb).
- **Unit:** select the measure unit for the “Product Quantity / Day” field (kg or lb).
- **Processing period:** necessary period (in hours) to cool down the stored products. Usually the cool down process is 24h. This value can be changed by the user according to each chamber process.
- **Attention:** for freezing tunnels and fast cooling (process period usually lower than 24h) use high air flow evaporators.

4.6 – ADDITIONAL INFORMATION

- **Number of people inside the chamber:** Considers the number of people that enters the chamber in a day.
- **Dwell time inside the chamber:** Dwell time (in hours) of people inside the chamber in a daytime.
- **Condensing unit operating time:** the operating time for the condensing unit is considered from 18 to 20 daily hours. For high or medium chamber temperatures (evaporating temperature between 46°F to 23°F) is recommended 18 daily hours. For low chamber temperatures (evaporating temperatures between 23°F to -31°F) is recommended 20 daily hours. This period can reach the maximum value of 24 daily hours.
- **Observation:** For freezing tunnels, the condensing unit operating time must be between 18 and 20 daily hours, despite the processing period.
- **Attention:** do not confuse the condensing unit operating time with the processing period. The smaller the condensing unit operating time, the greater will be the calculated thermal load, which will result in an oversized equipment selection.

4.7 – HEAT GENERATED WITHIN THE CHAMBER

- **Lamp Power:** sum of power for all lamps within the chamber (measured in Watts)
- **Active light time:** daily hours that the lamps remain activated.
- **Total engine power:** power, measured in HP, of all engines installed inside the chamber.
- **Engine work time:** working hours spent by the engines within a day.

4.8 – RESULTS

- **Unit:** select the measure unit for the “Thermal Load” field (BTU/h or kcal/h).
- **Thermal Load:** indicates the calculated thermal load for the chamber, according to the data provided by the user.
- **Calculate:** Button used to calculate the thermal load, based on the data provided by the user. It will only be activated when all the data is filled.

5 – EQUIPMENT SELECTION

Select sets composed by Condensing Units and Evaporators, from Flexcold and Bohn brands.

- **Observation:** for integrated systems selection (BPN and PI models), select the “Integrated System” frame.

5.1 – MEASURE UNITS

- **Thermal units:** define the measure units for the thermal load, and for the Condensing Unit and Evaporator capacities (BTU/h or kcal/h).
- **Temperature:** define the measure unit for temperature (°C or °F).
- **Dimensions:** define the measure unit for the selected equipment dimensions (millimeters or inches)
- **Mass:** define the measure unit for the selected equipment mass (kg or lb).

5.2 - DATA

- **Thermal load:** calculated thermal load defined on the “Thermal Load” frame.

5.2.1 – TEMPERATURE

- **Internal:** temperature inside the chamber, defined on the “Thermal Load” frame.
- **Evaporation:** evaporation temperature of the refrigerant on the evaporator. The ideal evaporation temperature for the Flexcold and Bohn products considers a difference of 6°C (10,8°F) lower than the internal chamber temperature within the chamber. This value can be changed by the user.
- **Attention:** the greater the difference between the evaporation temperature and the internal chamber temperature, the lower will be the humidity inside the chamber, which can compromise the stored products quality.
- **Ambient temperature:** ambient temperature defined on the “Thermal Load” frame.

5.2.2 – CONDENSING UNIT

- **Type:** compressor type for the condensing unit (Hermetic, Semi-Hermetic or Scroll).
- **Refrigerant:** refrigerant fluid applied on the cooling system (R22, R134a, R404a or HP81).
- **Models:** condensing unit models available for the condition defined by the user.
- **Number of units:** number of condensing units defined by the user. If the informed number is insufficient for the described chamber, the system will request an increase on this value.

5.2.3 – EVAPORATOR

- **Number of evaporators for each condensing unit:** number of evaporators defined by the user.
- **Observation:** usually it is considered only one evaporator for each condensing unit,

however, it is possible to apply more than one evaporator per condensing unit. If the informed number is insufficient for the described chamber, the system will request an increase on this value.

- **Fins per inches:** define the evaporator selection according to the coil configuration (7, 6, 5, 4 or 2,5 fins per inches).
- **Defrost:** defrost type for the evaporator (natural, electric or hot gas defrost).
- **Observation:** for chamber temperatures below 32°F (0°C), it is recommended the application of electric or hot gas defrost type. For chamber temperatures above 32°F (0°C), it is recommended natural defrost type.
- **Evaporators:** evaporator models available for the conditions described by the user.
- **Search:** button to start the equipment selection (condensing unit and evaporator) for the chamber described by the user. It will only be activated when all the data is filled.

5.3 – CONDENSING UNIT SPECIFICATIONS

In this field are presented the model, the capacity, the power and the physical data for the condensing unit selected by the system.

- **Observation:** if the condensing unit capacity is much greater than the chamber's thermal load, the system will send an alert message, asking the user to define a new equipment set.

5.4 – EVAPORATOR SPECIFICATIONS

In this field are presented the model, the capacity, the defrost type, the physical and electrical data for the evaporator selected by the system.

- **Observation:** if the evaporator capacity is much greater than the condensing unit capacity, the system will send an alert message, asking the user to define a new equipment set.

6 – INTEGRATED SYSTEM

6.1 – MEASURE UNITS

- **Thermal units:** define the measure units for the thermal load, and for the Condensing Unit and Evaporator capacities (BTU/h or kcal/h).
- **Temperature:** define the measure unit for temperature (°C or °F).
- **Dimensions:** define the measure unit for the hollow on the chamber wall for the equipment installation (millimeters or inches)
- **Mass:** define the measure unit for the selected equipment mass (kg or lb).

6.2 - DATA

6.2.1 – TEMPERATURE

- **Internal:** temperature inside the chamber, defined on the “Thermal Load” frame.
- **Evaporation:** evaporation temperature of the refrigerant on the evaporator. The ideal evaporation temperature for the Flexcold and Bohn products considers a difference of 6°C (10,8°F) lower than the internal chamber temperature within the chamber. This value can be changed by the user.
- **Attention:** the greater the difference between the evaporation temperature and the internal chamber temperature, the lower will be the humidity inside the chamber, which can compromise the stored products quality.
- **Ambient temperature:** ambient temperature defined on the “Thermal Load” frame.
- **Thermal load:** calculated thermal load defined on the “Thermal Load” frame.
- **Type:** compressor type for the condensing unit (Hermetic).
- **Refrigerant:** refrigerant fluid applied on the cooling system (R22 and R404a).
- **Models:** integrated system models available for the condition defined by the user (PI and BPN models).
- **Number of units:** number of integrated system units defined by the user. If the informed number is insufficient for the described chamber, the system will request an increase on this value.

Search: button to start the integrated system selection for the chamber described by the user. It will only be activated when all the data is filled.



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