

HUSSMANN®

Modular Coil Refrigeration

The Standard in Superior Refrigeration Performance



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Key Factors

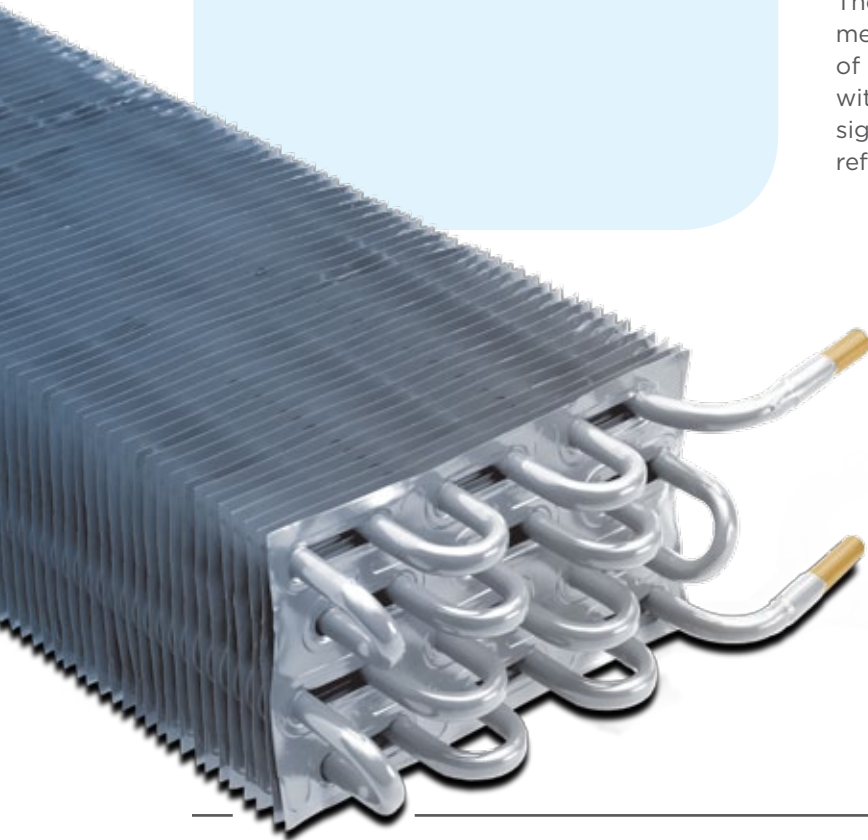
- Improved energy efficiency
- Smaller refrigerant charge
- Improved product temperatures
- Fewer refrigerant leaks
- Better sanitation and coil access
- Reduced installation time
- Greater merchandising flexibility
- Less risk of refrigerant contaminants
- Off-cycle defrost effective for all medium temperature models
- Easier all-aluminum recycling
- Optional pre-set expansion valves simplify installation

Modular evaporators have become a time-tested standard for performance excellence in refrigerated display fixtures. Each coil is only four feet long and refrigerates four feet of display case. With this unique technology, Hussmann modular coil merchandisers can provide important advantages to supermarkets.

A small number of differently sized four-foot coils satisfy the needs for all Hussmann's medium temperature self-service fixtures for meat, dairy, deli, and produce, as well as other Hussmann models using modular coils.

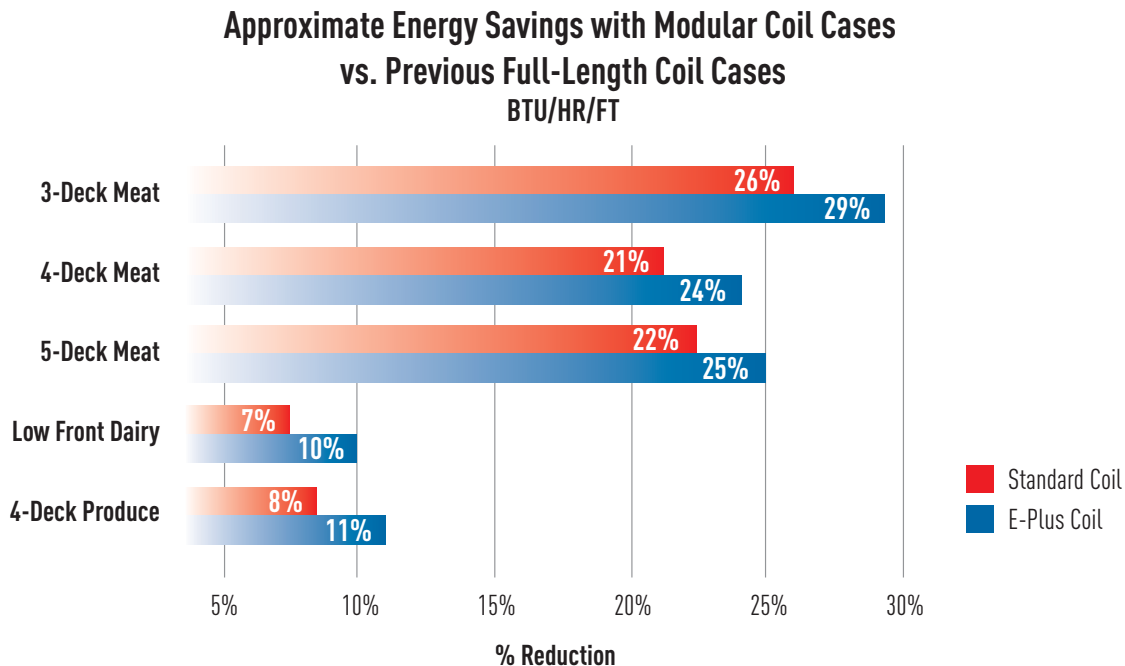
Reduced Refrigerant

The refrigerant charge in modular coil merchandisers has been reduced by an average of 50% to 60% compared to previous cases with full-length coils. This savings is particularly significant today with the increased cost of refrigerants.



Energy Efficiency Improvements

The modular coil design delivers substantial energy efficiency improvements by reducing the number of BTUs per hour needed to cool a case and by raising the evaporator temperature. At the same time we've achieved superior product temperatures.



BTU Improvements

Improvements in Hussmann modular coil cases to the air curtain, lighting and coil itself have generally yielded a 10% to 25% improvement in BTU/HR/FT compared to previous full-length coil cases, as illustrated above.

Evaporator Temperature Improvements

Hussmann merchandisers with modular coils operate at warmer evaporator temperatures than many other models. Importantly, this increase in evaporator temperature has been accomplished while lowering product temperatures.

Generally, every degree increase in evaporator temperature produces a 2% improvement in energy efficiency. So, by combining BTU improvements with increased evaporator temperatures, we see overall energy improvements as high as 30% on some models.

Modular coils are able to deliver efficiency improvements by packing substantially more primary coil surface in the same cubic space as traditional coils.

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Product Temperature is the Key

Warmer evaporator temperatures and colder product temperatures may seem to be conflicting goals. But with modular coils, we have accomplished both. Our modular coil and other design improvements have made it possible.

Traditionally, evaporator temperatures and discharge air temperatures were the standard measure of case performance. In fact, the real measure of refrigeration performance is product temperature, which is where we focused our efforts during development.

With modular coils, we've narrowed the range of product temperatures from the coldest to the warmest part of the case while lowering overall product temperatures. Merchandise is kept colder at more stable temperatures throughout the display fixture, even during defrost. While Hussmann modular coil cases may have higher evaporator and discharge air temperatures than competitive cases, the products inside modular coil cases are often being kept colder. Remember, product temperature is the real measure of case performance.

Standard and High Efficiency Models

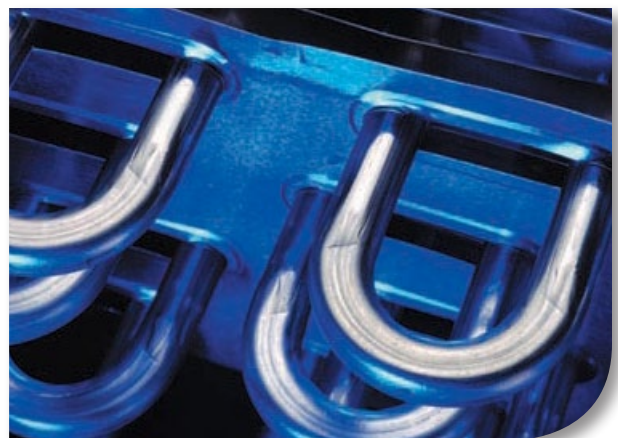
With many Hussmann modular coil cases we're offering both standard and high efficiency E-Plus models in most fixtures. While the standard models provide substantial efficiency improvements, the high efficiency models offer an additional energy reduction of about 5% to 10% through reduced BTUs and warmer evaporator temperatures.

For customers who are concerned about operating costs, the E-Plus option is an investment that will pay for itself quickly in reduced energy expense.

Reduction of Joints and Leaks

Traditional full-length commercial refrigeration coils have one braze or solder joint on every tube at one end of the coil. This means there are about 30 to 40 return-bend joints on every coil, which are all possible locations for refrigerant leaks.

With continuous tube modular coils, all return-bend joints have been completely eliminated, which dramatically reduces the chance of leaks.



Return-bend solder joints have been eliminated to reduce leaks.

Reduction of Contaminants

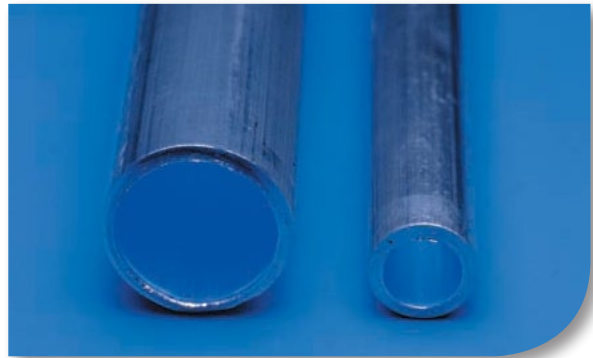
Contaminants in a refrigeration system can be the cause of several problems: formation of acids, clogged valves, breakdown of gaskets and seals, and even a possible compressor failure.

Traditional full-length coils require the introduction of either water or oil into the tube during manufacturing. Either of these materials can contaminate the system if not completely removed.

With Hussmann modular coils, only nitrogen is introduced into the tubes during manufacturing, insuring that newly manufactured coils will be free of contaminants.



Copper stubs simplify modular coil connection.



Smaller diameter tubing (right) in modular coils is more puncture resistant.

Aluminum versus Copper Evaporator Tubing

Hussmann has used aluminum coils for over 30 years. We have over 2 million installed in the field with excellent results in both durability and performance.

In regard to heat transfer efficiency...

Over the years, Hussmann has shown that aluminum is equal to copper as a heat transfer material. In both field and lab testing there is no measurable difference between the two.

In regard to leaks and leak repair...

Modular coils have been designed to be virtually leak free. Most coil leaks occur at the joints, and we have addressed this by eliminating all internal joints in modular coils.

Also, aluminum tubing is much thicker and stronger than copper tubing. Moreover, the smaller tubing diameter in modular coils is stronger yet (1800 psi burst strength) so the likelihood of a puncture leak is very remote. In addition, modular coils are located in the back wall of the case where they are less susceptible to puncture.

In the unlikely event that a modular coil should begin to leak, it can be repaired as in the past or you may simply prefer to replace the small, lightweight 4-foot coil. This is easily done. It can be shipped overnight and quickly replaced by making simple copper-to-copper connections at the special aluminum/copper stubs.

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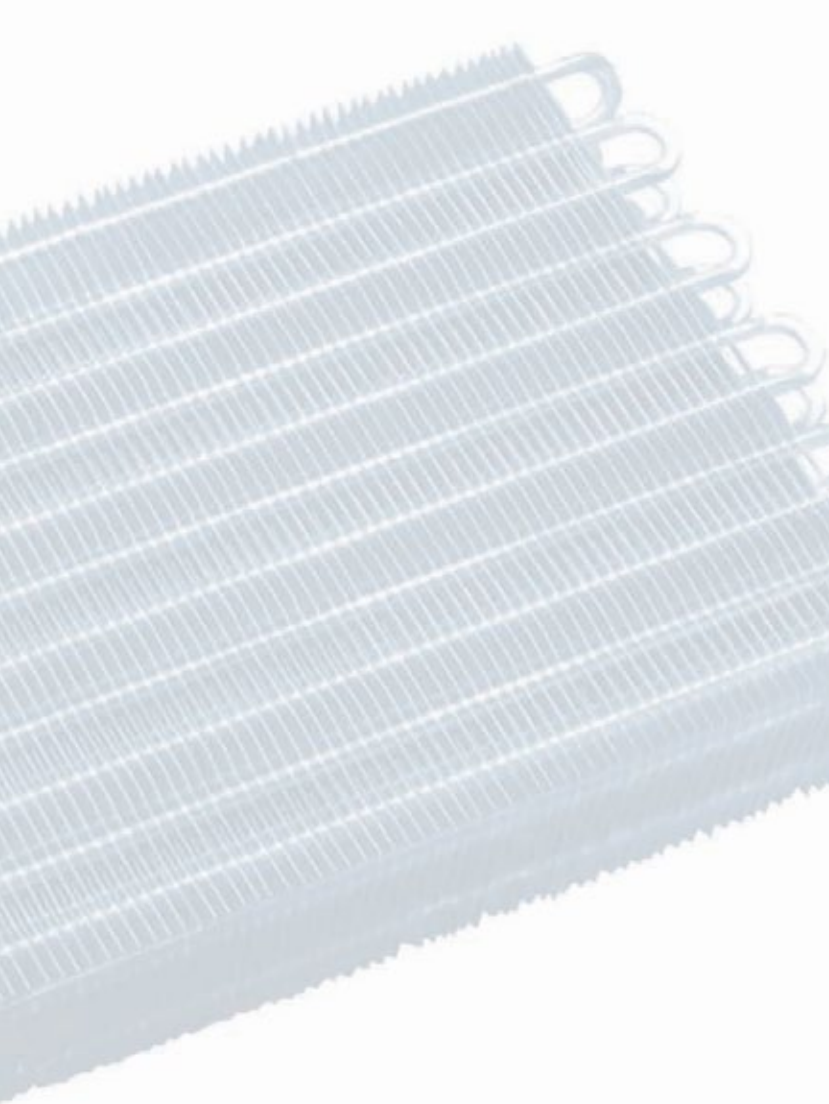
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Modular Coil Rear Wall Location

Rear wall modular coils allow clear access to the case bottom for cleaning. Modular hinge-up fan plenums swing completely out of the way to further facilitate clean up. The rear wall position also protects coils from damage.

Coils can be easily accessed by simply lifting out the back panel, which can be done without tools in seconds.

Finally, interior case supports can run between modular coils down to the case bottom. Full-length interior supports add strength and merchandising flexibility, since shelf brackets can be positioned all the way down to the bottom of the case.



Lift up modular fan plenum for easy access.

Optional Pre-Adjusted Expansion Valves

The modular coils are each fed by an expansion valve. The valves are interconnected through factory-assembled piping with only one liquid and one suction sub-out connection per case.

Expansion valves can be pre-set at the factory to achieve optimum super heat settings. They have been thoroughly tested and shown to work well under an extreme range of operating conditions, including indoor and outdoor ambients, mechanical sub-cooling and floating head pressures.

With pre-set expansion valves, installation is now quicker and less expensive since valves no longer need to be field adjusted. Various expansion valve options are available, including both adjustable and non-adjustable, depending on customer preference.

Finally, all valves have double protection against debris: a large capacity filter/dryer in each case, and an inlet screen in each valve. These have more than enough capacity to trap any piping debris that may be present.



Optional pre-set expansion valve.

Defrost Method

Medium temperature modular coil merchandisers no longer require the supplemental heat of gas or electric defrost. Simple off-cycle defrost is the preferred method. This is made possible throughout the medium temperature product family, since evaporator temperatures are much warmer, which tends to build less frost. Two- and three-deck produce cases with modular coils require “no” defrosts, leading to extremely stable product temperatures.

Off-cycle defrost is less expensive and, more importantly, product temperatures remain much more stable.

Easy Recycling

Hussmann all-aluminum modular coils can be easily recycled by simply removing the copper connectors and recycling the remaining all-aluminum coil. Most competitive coils, made with copper tubes and aluminum fins, are more difficult to recycle.

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