



Master Technical and Sales Training Guide

2019

Training Agenda

Session 1

- **Introductions**
- **What is IceCOLD® ?**
- **What is Oil Fouling ?**
- **IceCOLD® Composition**
- **Compatibility**
- **IceCOLD® Blends**
- **Installation Tools**
- **Installation Volumes**
- **HVAC and Refrigeration Systems**
- **Determining Correct IceCOLD® Volumes**

Session 2

- **Warranty and Insurance**
- **The Sales Presentation**
- **Proof of Performance Protocols**
- **Manufacturer Support**



Session 1

Technical Training

Corporate Office
5550 Granite Parkway Suite 270
Plano, Texas 75024
www.icecoldtech.com
800-593-7790

IceCOLD® Catalyst #1 – Removes Oil Fouling

When IceCOLD® is added to the cooling system's compressor oil, catalyst #1 removes the oil fouling by breaking and eliminating the surface tension on the walls of the copper tubing. The result is improved heat exchange and increased BTU's. Return air blown over the coils is cooled more efficiently and provides cooler supply air to the space being cooled. A space that is cooled faster will satisfy thermostat settings faster and reduce compressor run times. ASHRAE states that lost energy efficiencies caused by Oil Fouling begin immediately and can be as high as 7% in the first year and 5% in the second year; reaching 30% inefficiency and higher, during the life of equipment.

IceCOLD® Catalyst #2 – Makes the Refrigerant Extract Heat More Efficiently

The #2 catalyst attaches to the hydrocarbon molecule in the refrigerant as it passes through the Direct Expansion Valve. This reaction increases its surface area, and allows for greater heat transfer. The increased heat transfer causes the refrigerant to evaporate more efficiently, reducing work for the compressor.

IceCOLD® Component #3 – Lubricity Compound

The lubricity compound increases the lubricity of the compressor oil by 54% enabling the the equipment's moving parts to operate with less vibration, reduced noise levels, lower operating temperatures, and reduce friction. These findings have been conducted in an independent laboratory test by Intertek, using SAE protocols.

While we know that IceCOLD® improves mechanical efficiency, it isn't possible to determine an exact period of extended equipment life. However, improved lubricity can be shown to reduce electricity consumption by 1% to 3%.

IceCOLD® Compatibility & Applications

Compatibility with Refrigerants and Compressor Oils

Based on independent Intertek Laboratory reports, using SAE protocols, IceCOLD® is completely compatible with all modern compressor oils including; traditional mineral oils, and synthetics such as polyolester (POE) and polyalkylene glycol oils (PAG). Test results in Intertek Laboratory's have confirmed compatibility with all compressor components including gaskets, seals, and metals.

Independent Intertek Laboratory reports also confirm that IceCOLD® is compatible with all modern refrigerants, including:

R22 | R502 | R12 | R134a | R404a | R407c | R410a | R717 Ammonia

R11 and R123 systems have less oil fouling; therefore, IceCOLD® will not be as effective and is not used in these systems.

R11 has no new production and can only be sourced in recycled refrigerant.

R123 will have no new equipment developed from 2020 and no new production for service after 2030.

Refrigerants and IceCOLD® Blends

IceCOLD® Standard Blend is used in 90% of all applications. There are special blends that are used in certain types of refrigerants and compressors that are noted in the chart below.

Blend	Model #	Description
IceCOLD Standard Blend	ICSB-008	IceCOLD Standard Blend for DX systems
	ICSB-016	
	ICSB-128	
IceCOLD Centrifugal Blend	ICCB-008	IceCOLD Centrifugal Blend for refrigerant circuit of Centrifugal compressors only
	ICCB-016	
	ICCB-128	
IceCOLD Ammonia Blend	ICAB-008	IceCOLD Ammonia Blend for reciprocating ammonia compressors only
	ICAB-016	
	ICAB-128	
IceCOLD Lubricity Blend	ICLB-008	IceCOLD Lubricity Blend for separate oil sumps, gear boxes and bearings
	ICLB-016	
	ICLB-128	

IceCOLD® Installation Tools

Bright Solutions Yellow Pump

This pump is used for non chiller DX systems and automobile installations. Currently, the pump needs to be modified for long term use by replacing the rubber “O” rings with silicone “O” rings.

This pump is recommended for residential installations and light commercial installs of less than 16 units. 6-8 full strokes is equal to one unit.



The Yellow Jacket Bicycle Pump

This pump is recommended for large chiller installations. The pump will produce 3.5 units per stroke.



Pump Care and Maintenance

After each day's use, all pumps must be flushed to maintain purity and avoid Product contamination.

Pumps must be flushed with 91% alcohol.

Pumps will last longer if silicone “O” rings are installed and they are flushed after each day's use.

IceCOLD® Installation Volumes

Rule #1

It is recommended that rule #1 be used only on reciprocating chiller systems and commercial packaged units. Compressor manufacturer specifications can be found online. A search using the compressor make, model number, serial number and specifications will usually provide access to a user manual that will list the manufacturer's original compressor oil charge. The necessary information for an online search is found on the label of the compressor.

Multiply the oil fill (oil charge) quantity by 10%.

For example, if a chiller has eight gallons of oil:

8 gallons (multiplied by 128 oz. per gallon) = 1024 ounces

10% of 1,024 ounces = 102 units of IceCOLD®

Rule #2

Multiply the tonnage by one ounce. This is the acceptable rule for smaller residential DX systems. A 3.5 ton split system will require 3.5 ounces of IceCOLD®. Any system that is less than 2 tons (PTAC units or Aircons) will always require a minimum of 2 units of IceCOLD®.

IceCOLD® Installation Volumes

Rule #3

When installing IceCOLD® in centrifugal compressors, IceCOLD® Centrifugal Blend is installed separately into the refrigerant circuit at a ratio of .3 ounces per ton. We then install IceCOLD® Lubricity Blend separately into the oil sump at a ratio of 2% of the manufacturers stated oil charge.

Rule #4

When installing IceCOLD® in ammonia reciprocating compressors, IceCOLD® Ammonia Blend is used, and installed at a ratio of 5% of the manufacturers stated oil charge. IceCOLD® is NOT installed in ammonia screw compressors, due to the presence of a coalescing oil separator.

HVAC and Refrigeration Systems

Chillers

A chiller is a system where water (or glycol or salt water brine) is cooled, not the air. Unlike air cooling, water is used as the heat conductor. Water (brine) or Glycol (antifreeze) is circulated, instead of air, to cool a space or object. Water is cooled in a “barrel” with the evaporator refrigeration coils running through it.

The cooled or chilled water is pumped to a heat exchanger or “radiator” in the space to be cooled. A fan blows over the radiator, containing the chilled water, which cools the air. The chiller system is more efficient than an air system since water carries more heat per unit space, than air. The water is cooled to 42 - 48 degrees F and then returned from the radiator to the chiller barrel for re-cooling. It is returned to the radiator again and again to cool the designated space.

Chillers can have reciprocating, screw, or centrifugal compressors. For all chiller applications it is critical to confirm the compressor type, refrigerant type, and oil separator type to determine the blend and quantity of IceCOLD® that should be used.



Compressor Systems

Centrifugal Compressors can contain a separate oil circuit and no DX valve. In this case we add IceCOLD® Centrifugal Blend to the refrigerant circuit at .3 ounces per ton. We separately add IceCOLD® Lubricity Blend, to the oil circuit at 2% of the manufacturers stated oil charge. It is an industry known fact that oil fouling occurs from oil intruding into the refrigerant circuit over time through leaky seals. This makes Catalyst 1 effective in removing oil fouling. Catalyst 2 reacts as it passes through the DX valve which is non existent in these systems.

The IceCOLD® Standard Blend is compatible with Rotary (screw) compressors provided that there is not a Coalescing Oil Separator. Coalescing Oil Separators are generally a horizontally mounted cylinder. On Rotary (screw) compressors that do not have a coalescing oil separator, IceCOLD® Standard Blend is added to the refrigeration circuit at 10% of the manufacturers stated oil charge.



CENTRIFUGAL



A centrifugal compressor model number will normally be located on the front or side of the control panel. The refrigerant type and overall tonnage of the unit is also required for centrifugals and can usually be obtained by asking the on site technician or maintenance personnel if not listed on the control panel.

A screw compressor's information will normally be located on the control panel, or on the actual compressor itself. Tonnage is not a requirement for screw compressors, however, refrigerant type must be noted. We never install IceCOLD® in ammonia refrigerant with screw compressors.

SCREW



Compressor Systems

Reciprocating Compressors, that use traditional refrigerants, install IceCOLD® Standard Blend at a ratio of 10% of the manufacturers stated oil charge.

Semi-Hermetic compressors are housed with the motor in the same housing but the casing is a bolted type and can be repaired easily. The oil level is monitored by a sight gauge and an equal amount of oil should be removed for the amount of IceCOLD® being installed.



IceCOLD® SYNTHETIC CATALYST TECHNOLOGY FOR AMMONIA IS FOR AMMONIA DX SYSTEMS ONLY WITH PISTON TYPE COMPRESSORS. IceCOLD has not been approved for use in non DX, or screw, or centrifugal ammonia compressor systems. IceCOLD® Ammonia Blend is installed at 5% of the manufacturers stated oil charge. It is recommended to remove 5% of the existing oil charge before the IceCOLD® installation.

A reciprocating compressors model number can normally be found on the top of the motor housing. These are also sometimes referred to as piston compressors and can resemble an engine block. IceCOLD® is compatible in these compressors with all refrigerants including ammonia.

RECIPROCATING



Reciprocating compressors can often be used in refrigeration applications and rack systems with multiple compressors. It is important to record the model numbers of any additional oil reservoirs and to identify any refrigeration lines that run for more than 75' from the compressor to the condenser.

HVAC and Refrigeration Systems

Roof Top Units Scroll Compressors

Roof Top Units (Packaged Units) and most walk-in coolers and freezers will be driven by a reciprocating or scroll compressor.

It is critical to obtain equipment specifications from the compressor label, not the label of the outside of the Packaged Unit. Some packaged units have multiple compressors, which can vary in size.



Typically, the compressor oil charge will be stamped on the compressor label.

ROOF TOP PACKAGED UNIT (RTU)

RTU's can have single or multiple scroll type compressors inside of the packaged unit cabinet. It is critical to record the information from the compressors inside of the cabinet. This will require the recommended tools needed to open the cabinet. The needed model numbers will be found on the actual compressors and some manufacturers will label the oil charge as well



SCROLL COMPRESSOR



Compressor Systems

HERMETICALLY SEALED SCROLL COMPRESSOR

IceCOLD® Standard Blend is installed in the low pressure service port (Schrader valve). We install IceCOLD® in scroll type compressors at a ratio of 10% of the manufacturers stated oil charge.

Hermetic type compressors have a completely sealed housing with its motor also sealed in the same housing. It is leak proof but cannot be repaired. We do not remove any oil when installing IceCOLD®.



Liebert units are typically found in server rooms or data transfer stations. They will have dual compressors typically found in the side panel of the unit. Compressors can be reciprocating or scroll. The needed information can only be found on the actual compressors.

LIEBERT UNIT



DUCTLESS MINI SPLIT



A ductless mini split system will have the required information on the outside unit. Only the unit make, model, and serial number is needed as the compressor is not accessible.

The required information for a split system can be found on the unit nomenclature located on the outside of the unit. The compressor information is not needed for split systems. The units Make, Model #, and Serial # is required. Split systems always require one ounce per ton of IceCOLD®.

PTAC UNIT



PTAC units, packaged terminal air conditioners, are typically found in hotels. Normally the front cover will snap open where the unit Model # and serial # can be found. The compressor information is not required for these type of units. PTAC units always require 2 ounces of IceCOLD®.

SPLIT SYSTEM



HVAC and Refrigeration Systems

Refrigerated Trailer Units (RTU)

Refrigerated Trailer Units are attached to trailers or box trucks that are designed to transport refrigerated products.

Usually, the unit uses R134a refrigerant and the compressor is powered by a small diesel engine.

The installation volume of IceCOLD® for different sized RTUs:

2.5 ton RTU	=	8 units of IceCOLD®
5 ton RTU	=	12 units of IceCOLD®
Rail Car RTU	=	16 units of IceCOLD®





Session 2

Sales Training

Corporate Office
5550 Granite Parkway Suite 270
Plano, Texas 75024
www.icecoldtech.com
800-593-7790

IceCOLD® Warranty and Product Liability Insurance

IceCOLD Technology, LLC will warranty any compressor that is installed with IceCOLD® for a period of one year, provided that the product is installed by a licensed approved technician, and the equipment is registered for warranty at www.icecoldwarranty.com. The IceCOLD Technology, LLC Warranty Statement and Registration Protocols will be provided to all Distributors.

IceCOLD Technology, LLC carries a 12 million dollar, per occurrence, product liability insurance policy. In the event that IceCOLD® has caused damage to equipment, a claim can be filed. In 16 years of global IceCOLD® installations, there has never been any claims filed. A Liability Insurance Claims Protocol document will be provided to all Distributors.



Master Training Sales Presentation Deck



IceCOLD® is a scientifically engineered synthetic catalyst designed to restore lost efficiencies in all HVAC and refrigeration systems by eliminating what ASHRAE defines as oil fouling.

Significant Savings In Operating Cost
Increased Energy Efficiency
Exceptional ROI



A Costly Problem, You Might Not Know You Have!

The American Society of Heating, Refrigeration and Air Conditioning Engineers

Oil Fouling of the heat transfer surfaces of air conditioning and refrigeration systems, will cause a loss of efficiency that will continue to accumulate.

ASHRAE confirms that performance is degraded by 30% due to the build-up of lubricants on internal surfaces.

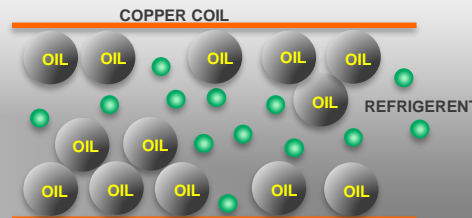
Higher percentages up to 40% have been observed in systems 20 years old, or older.

Before IceCOLD®

Compressor Oil build-up on inner surfaces of coils



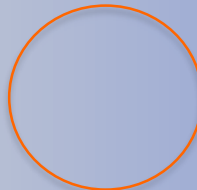
Compressor oil plaque is a barrier to efficient heat transfer



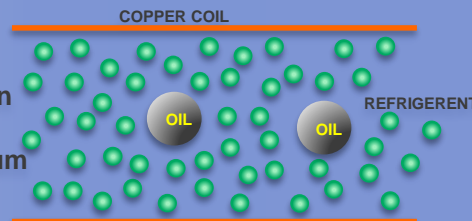
- Oil Fouling creates a “permanent” insulating barrier of compressor oil inside the inner walls of refrigeration tubing.
- Due to the insulating properties of the compressor oil, heat transfer in the refrigeration tubing is impeded.
- This insulating barrier can degrade system performance by more than 30%, causing the system to run longer, increasing energy costs.

After IceCOLD®

Oil fouling layer permanently removed by the IceCOLD® synthetic catalyst



Synthetic molecules break surface tension releasing oil plaque and restoring optimum heat exchange



IceCOLD® Ends Oil Fouling

The IceCOLD® Formula Uniquely Restores Lost Cooling Efficiency and Protects Equipment

Catalyst 1

- Improves efficiency of heat exchange by **removing Oil Fouling** and preventing it from reforming
- Efficiency improvements create **large fuel/kWh savings** or **faster processing times**

Catalyst 2

- Causes refrigerant **to extract more heat faster and more efficiently**
- System reaches set-point more quickly, decreasing equipment run time

Advanced Lubricity Compound

- Mixes with existing compressor oils and **improves lubricity by 54%** (Intertek test results)

In most systems, IceCOLD® is **installed once** and **lasts for the life of the system**

It is a non-toxic, non-hazardous, **GREEN** technology.



Compatible & Risk Free

- **IceCOLD®** has been third party tested by **Intertek** to show complete compatibility with all compressor oils, and refrigerants.
- **IceCOLD®** is **non-toxic** and it is **not harmful to metals** or rubber O-rings and gasket materials, according to Intertek Laboratory test results.
- **IceCOLD®** Technology will issue a **one year warranty** on any compressor installed with IceCOLD® by a certified IceCOLD installation technician.
- **IceCOLD®** has a successful **16 year history**, with tens of thousands of installations to its credit. The product is fully insured against damage to equipment, and there has never been a single claim.



Accreditations and Green Credentials



Prestigious 2012
Green Enterprise IT
Awards



McDonald's Australia optimized the energy efficiency of its HVAC systems by installing **IceCOLD**®



ENERGOTEST®

ROAD TEST LABORATORY



IceCOLD® Applications



- **Office Buildings**
- **Schools & Universities**
- **Hospitals**
- **Apartment Buildings**
- **Data and Server Centers**
- **Convention Centers**
- **Airports**
- **Residential Housing**
- **Super Markets**
- **Restaurants**
- **Shops & Retail**
- **Hotels**
- **Refrigerated Warehousing & Cold Storage**
- **Refrigerated Trucks and Trains**

IceCOLD® Benefits

- **Lower electricity costs**
- **Lower energy consumption**
- **Reduced equipment maintenance**
- **Reduced equipment noise**
- **Extended equipment life**
- **Increased cooling efficiency**
- **Enhanced cooling quality**
- **Extended shelf-life of perishables**
- **Improved customer experience**
- **Reduced carbon emissions**
- **Improved Associate experience**
- **Exceptional Return on Investment**
- **Cost effective 'Green' initiative**
- **Demonstrates environmental awareness**



IceCOLD® Sample Test Results

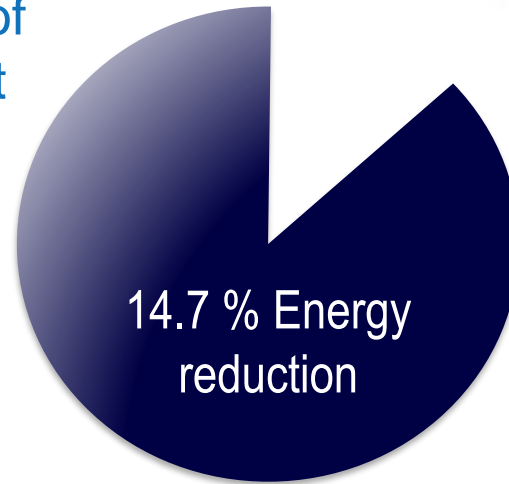
- Los Angeles Sheriff's Department 21%
- U. S. Postal Service 12 – 28%
- West Hills Community College District 19 – 22%
- Subway Restaurants 14 – 20%
- Valley Forge Casino & Resort 17%
- L A Fitness 15 – 28%
- Performance Innovate Transport 15 – 20%
- Wish Farms 15%
- American Strategic Insurance 13% - 24%
- Circle K 31%
- 7 Eleven Warehouses 23%



IceCOLD® Test: Air Conditioning



Proof of Performance Pilot on rooftop units at a Subway Restaurant showed a 14.7% reduction in compressor amp/hrs.



Key Findings



Faster Cooling Capabilities



Lower Amp draw



Reduction in GHG emissions



Lower Electricity Bills

IceCOLD® Test: Chiller



Customer: Ayala Corporation
Centrifugal Chiller: 650 Tons Capacity
Manufacturer: York
Model: YKEKEKP8-CUF
Compressor: YDHE 580DD

Key Findings



Higher Cooling Capacity



Energy Efficiency Gain 8.4%



Increased EER



Reduced GHG emissions



IceCOLD® Test: Roof Top Packages Unit



Customer: ASI Insurance
RTU Trane 90, 90, 75, 75 ton
Manufacturer: Trane
Compressor: CSHN240

Third Party Analysis



Higher Cooling Capacity



Energy Efficiency Gain 13 – 24%



Increased EER



Reduced GHG emissions



Corporate Office
5550 Granite Parkway Suite 270
Plano, Texas 75024
www.icecoldtech.com
800-593-7790

Proof of Performance

The following example is a of proof of performance protocol, used by engineers and independent test and balance engineering firms that specializes in third party data collection and analysis.

Testing Protocol for IceCOLD[®]


This testing protocol is provided for the purpose of establishing

1. A baseline test for cooling and refrigeration units to determine the performance of the unit prior to injection of the IceCOLD[®] product.
2. Performing the same test to determine the performance on the same unit after the addition of the IceCOLD[®] product. The protocol is as follows:

Baseline Testing (Pre IceCOLD[®] Installation)

HOBO UX120-006M is recommended data logger or Fluke kWh monitor

Attach data loggers to measure the following metrics and collect data at one minute intervals for a minimum period of 2 weeks. The objective is to establish a range of data that will be used to determine the baseline performance for the unit:

- Discharge Air Temperature
 - Supply Air Temperature
 - Outdoor Air Temperature
 - Compressor Motor Amperage (Amperes)
- 

IceCOLD® Reaction Period

Because IceCOLD® is a synthetic catalyst, following installation, a period of time must be allowed for the catalyst to react with the system. The time allowed for reaction is dependent on the size of the system being treated. A minimum of 2 weeks is recommended

Post IceCOLD® Installation Measurement

After the IceCOLD® product has been installed, and sufficient reaction period has occurred, the data logging of all points will continue, for a minimum period of 2-4 weeks.

On completion of the post installation measurement phase, all data will be downloaded from the loggers and submitted to an independent third party, qualified to analyze and prepare reports on the energy efficiency of HVACR systems. Reports will utilize the collected data to compare the results of the test unit's baseline performance, with the unit's performance following the installation of IceCOLD®.

Measurement Protocols For Chilled Water Systems

For chilled water applications, protocols and timing would be similar, with data collected as follows:

- Entering water temperature(°F)
- Leaving water temperature(°F)
- Compressor Motor Amperage (Amperes)
- Chilled water flow through the chiller(GPM)
- Outdoor Air Temperature(°F)

The same type of data analysis and results reporting would apply, to chilled water applications.



Prospect Development Process

Distributor & Dealer Support

IceCOLD® Technology can provide technical support in all key areas of Prospect Development, including, but not limited to:

Selecting equipment for proof of performance

Establishing objectives and metrics for a proof of performance test

Launching data loggers and downloading test data

Planning installation options

Project management oversight

Independent energy expert to analyze test data and prepare a report on performance results



Corporate Office
5550 Granite Parkway Suite 270
Plano, Texas 75024
www.icecoldtech.com
800-593-7790