

FRIGI-TECH INTERNATIONAL



Education at your fingertips

***There is the misconception
that an air conditioner
blows cold air...when
actually it removes the heat
from the conditioned space.***



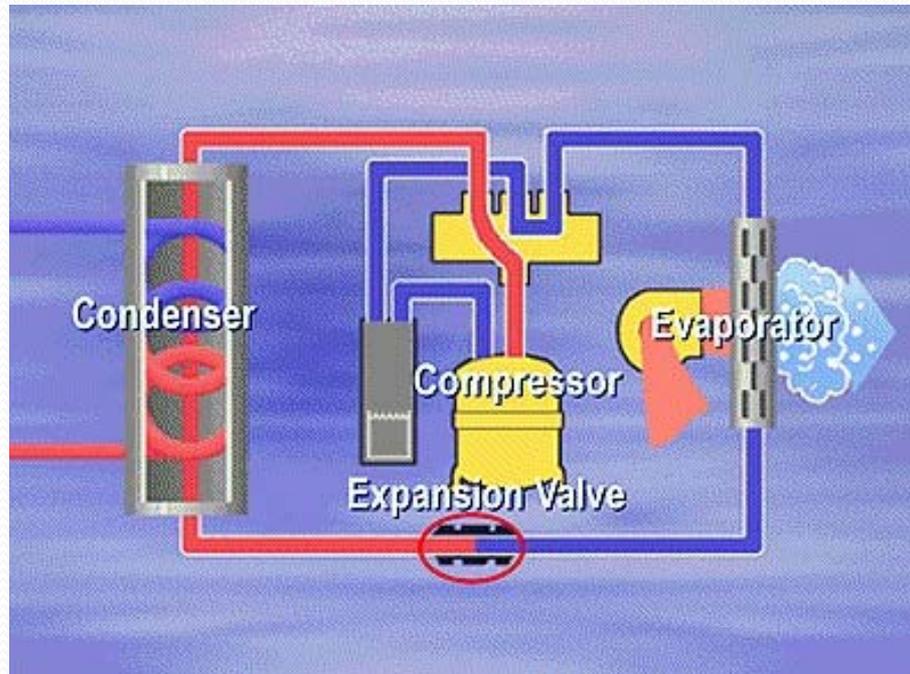


Let's start with what we're all about

HVAC&R

**(Heating, Ventilation, Air Conditioning
And Refrigeration)**

Refrigeration Cycle



This is a diagram of a refrigeration cycle. It operates the same for something as small as a refrigerator to something as large as a chiller that cools an entire hospital. The refrigeration cycle has four major components. These components include the compressor, the condenser, the expansion valve and the evaporator.

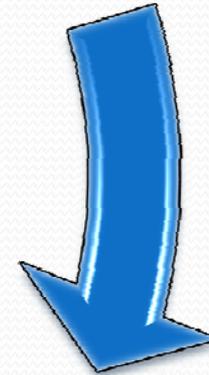
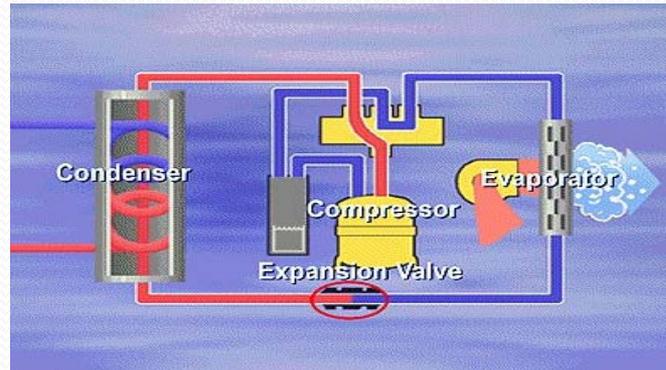
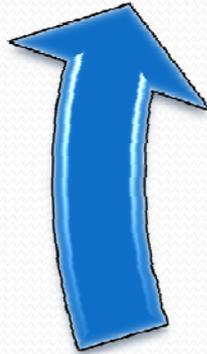


This Is How It Works...

This low temperature refrigerant is going to travel to the evaporator coil. The **evaporator coil** is another radiator. This is where the heat is removed from your house. A fan will move the warm air from the conditioned space across the evaporator coil. By this time the refrigerant is so much colder than the air it is conditioning, it will absorb the heat from the air and is going to supply a colder air to you. At this point the refrigerant is returned back to the compressor and starts the cycle again.



LET'S START HERE: The **compressor** does just what its name is. It compresses refrigerant. Science tells us that pressure and temperature are related; when pressure rises temperature rises, when pressure drops temperature drops. The compressor has pistons that pump up and down (just like in your automobile) creating high pressure therefore creating the refrigerant temperature to rise.



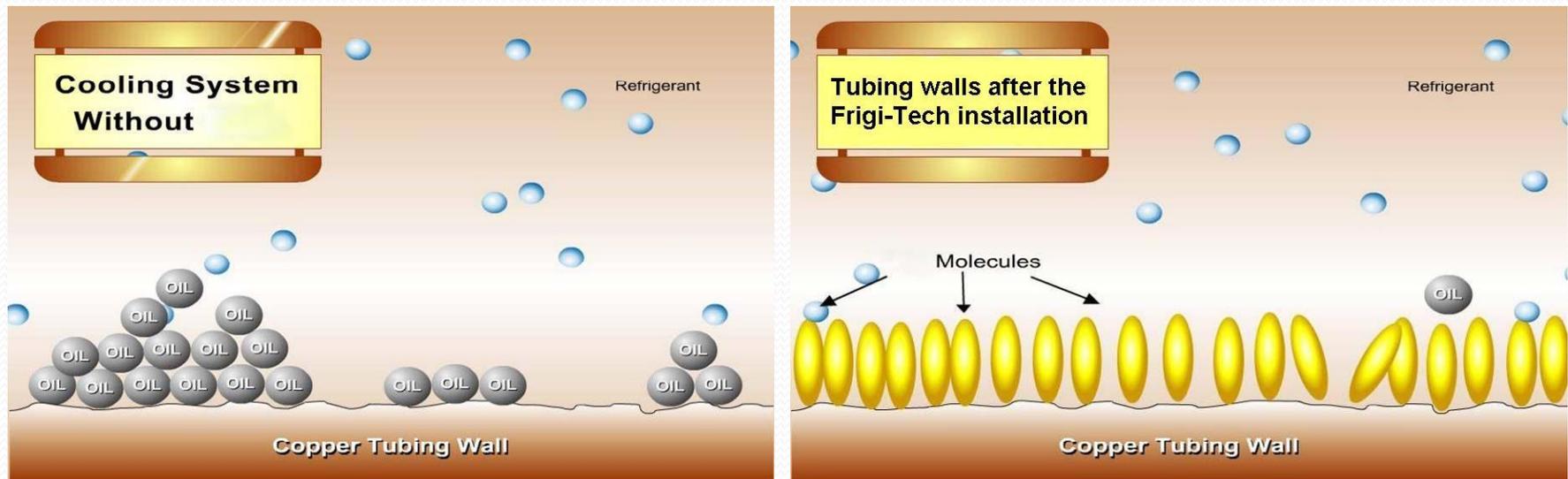
The cooled high temperature refrigerant is then going to travel to the **metering device**; in this case it is an expansion valve. The metering device is a lot like when you hold your thumb over a water hose. There is going to be high pressure behind your thumb and low pressure on the other side. Again, science tells us that pressure and temperature are related. The metering device is going to reduce the pressure therefore reducing the temperature of the refrigerant.



The high temperature refrigerant then travels to the **condensing unit**. This is the box that sits outside of your home. The condensing unit is a radiator. Outside air is blown across the condenser usually by a fan. Since the air is cooler than the super-heated refrigerant, the heat is absorbed by the outside air. Therefore causing the refrigerant temperature to drop.

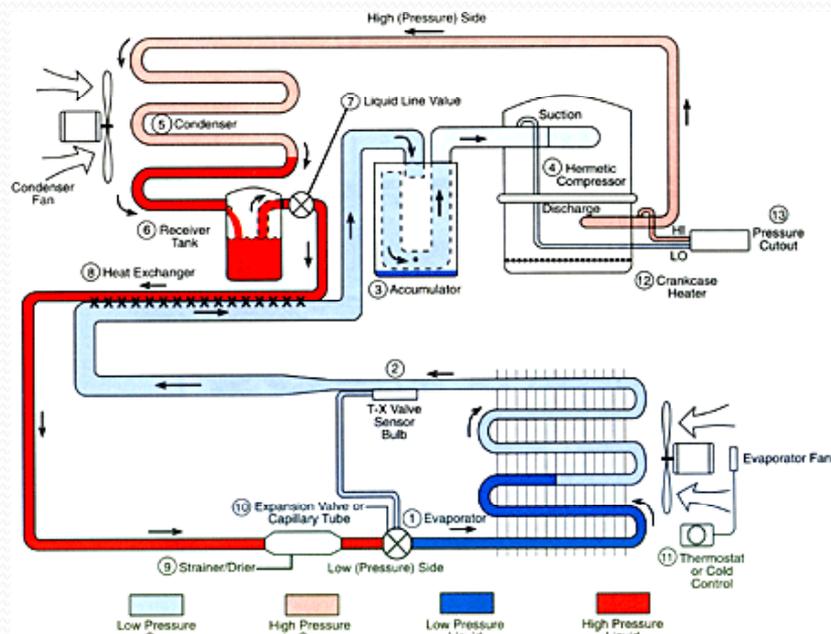
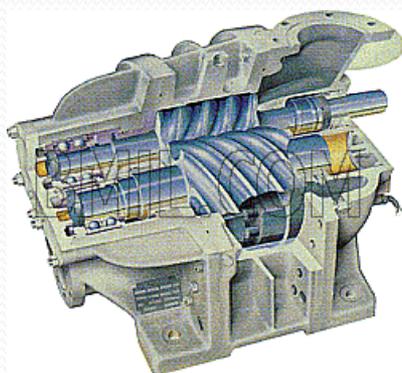
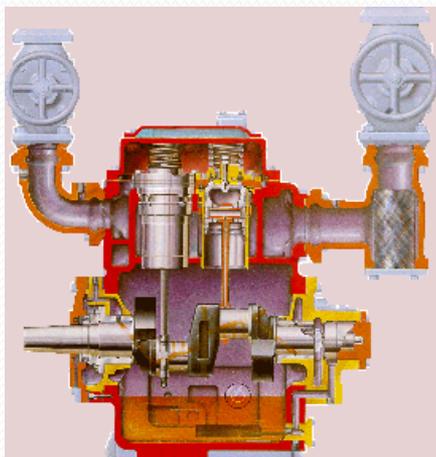
Where Frigi-Tech Comes Into Play

As Frigi-Tech is introduced into the compressor it is going to bond to the metal surfaces as it has an incredible affinity to metal. The metal surfaces will be your refrigerant lines, compressors and coils. Frigi-Tech is a boundary lubricant and is going to tremendously reduce the friction. This reduction in friction means less amperage to do the same amount of work.



But the majority of the savings doesn't come from friction reduction.

As the piston goes up it will push the refrigerant and a small amount of oil through the refrigerant lines. The oil is there to lubricate the pistons. Over time this oil will begin to build layer upon layer. This is referred to as “oil fouling”. Oil is a fantastic insulator and this causes it to impede the heat transfer on the heat exchangers (condenser and evaporator coils). Thus, degrading the efficiency of the system. Because of Frigi-Tech’s high affinity to metal it will displace the buildup of the refrigerant oil and send it back to the lubrication cycle where it belongs. That is going to restore the heat exchange back to where it was when the system was new.





"Oil fouling of heat transfer surfaces of air conditioning and refrigeration systems, will cause a loss of about 7% efficiency the first year, 5% the second year, and 2% per year the following years."

(per 1998 ASHRAE Handbook, Refrigeration, Chap.2.9)



Frigi-Tech has two main benefits, the ability to reduce friction by 1500% and restore the heat exchange back to what the system was when it was new.



The secondary benefits are centered on preventative maintenance. These benefits have shown to typically reduce maintenance cost by around 50% and double the remaining life of the compressor at the point that Frigi-Tech is installed.



Also, spectro-analysis of the oil will show a reduction of acidity levels and metal content. The acidity levels will reduce due to our anti-oxidants which provide 3 times the oxidation and corrosion protection above what the typical refrigerant oil can offer.



Will Frigi-Tech Void My Manufacturers Warranty?

**No. Frigi-Tech not only meets but it exceeds
manufacturer's specifications, as shown on
our "Spec Sheet".**

Who Should Install Frigi-Tech?

**A “Class A” licensed HVAC&R
Technician**





**Since Frigi-Tech reduces
service maintenance and
extends the life of the
equipment, you may find
opposition from
manufacturers and
technicians.**



**They make money two
ways, servicing old
equipment and replacing
with new equipment... We
greatly impact both.**



There are many types of HVAC&R systems. They range from having different compressors, different sizes (tonnage), different refrigerants, and the age of the unit. These differences will reflect what type of Frigi-Tech to install as well as how much to install.

How Much Frigi-Tech Do I Install And How Do I Know Which Blend To Use?

Frigi-Tech has guidelines that we go by to determine the answer to these questions. Although we are here for support with any questions you may have, the following references will clarify how we figure out the correct blend and amount. Through time, you may feel comfortable with deciding this information on your own.

Treatment Amounts

TONNAGE

AMOUNT OF FRIGI-TECH

1-10 Tons

1 Ounce Per Ton

20 Tons And More

5-10% Of Oil Capacity*

*** Oil capacity can be determined by reviewing the Manufacturer's Specifications. If you are unable to locate the oil capacity, Frigi-Tech is able to research it with the Make, Model and Serial Number of the unit. We recommend a 5% application for units 9 years and younger and 10% application for units 10 years and older.**

Horsepower (HP) and quantity of refrigerant does not have any relevance to the amount of Frigi-Tech to install.

Initial Audit Form

This Is A Great Tool For All Of Your Projects, Just Let Us Know And We Will Send You A Copy

Date of initial audit: _____

Audit conducted by: _____

Customer: _____

Address: _____

MAKE OF COMPRESSOR	
MODEL NUMBER	
REFRIGERANT	
SUPPLY AIR TEMPERATURE	
NUMBER OF COMPRESSORS	
COMPRESSOR TYPE <small>(RECIPROCATING, SCREW, CENTRIFUGAL)</small>	
TONNAGE OF COMPRESSORS	
USE OF CONDITIONED SPACE <small>(FREEZER, OFFICE, WAREHOUSE, ETC...)</small>	
DATE OF LAST SERVICE	
OIL CAPACITY PER COMPRESSOR	
OIL BEING USED <small>(P.O.E, AB, MINERAL)</small>	
AGE OF COMPRESSOR	

Approved Frigi-Tech For Refrigerants

FRIGI-TECH Blend Type	Traditional Refrigerants		Interims	HFC'S
		R-12, R-12 Low Temp*	R-22, R-502 R-22 Low Temp*, R-502 Low Temp*	R-401A, R-401B, R-402A, R-408A, R-409A, (MP-39, MP-66, HP-80, FX-10, FX-56)
P.O.E.	NOT ACCEPTABLE	NOT ACCEPTABLE	ACCEPTABLE	PREFERED
MINERAL OIL	PREFERED	PREFERED	NOT ACCEPTABLE	NOT ACCEPTABLE
A.B.	ACCEPTABLE	ACCEPTABLE	PREFERED	NOT ACCEPTABLE
LOW TEMP MINERAL OIL*	PREFERED	PREFERED	NOT ACCEPTABLE	NOT ACCEPTABLE

* LOW TEMPERATURE MINERAL OIL SYSTEMS **MUST** USE THE LOW TEMPERATURE FRIGI-TECH.

Not all Refrigerants are listed. If you do not find the correct refrigerant on the list or if you are not certain the blend, please contact Frigi-Tech International.

What Systems Can I Install Frigi-Tech Into?

Frigi-Tech can be installed into something as small as a window unit to something as large as chiller that cools a university.



Frigi-Tech can be custom blended to meet any lubrication need.

Installation Guidelines

- Only a qualified, licensed air conditioning and refrigeration technician should do installation.
- Determine the proper amount of FRIGI-TECH to be installed into the units. This is usually equal to 5-10% of the compressor's oil charge.
- Use a standard hand held refrigeration oil pump for the installation. These pumps usually deliver between 1.0 to 4.0 ounces of product per stroke depending on the type of pump you are using. Pre-determine your capacity so you know how many strokes will be necessary.
- Attach a standard refrigerant gauge hose to the pump with the Schrader valve needle depressor end being the loose end.
- All air should be purged from the hose. Stroke the pump until the hose is completely filled with FRIGI-TECH.
- Attach the pump hose lightly to the Schrader valve of the suction line of the compressor. Stroke the pump until a small amount of FRIGI-TECH runs out and covers the Schrader valve. This insures all the air is fully purged from the line.
- Tighten the hose on to the Schrader valve, and pump in the correct amount of FRIGI-TECH.
- Disconnect the hose from the suction line Schrader valve. The installation is complete.
- NOTE: The compressor must be running during the installation process.



Air conditioning and refrigeration systems have filters/driers in place to remove moisture and to trap contaminants. It is uncommon to need filter changes when Frigi-Tech is installed, but in highly contaminated systems it is possible.



Prior to installation, you can check the filter to see if contaminants exist. To do this, simply, take a temperature reading before the filter and a temperature reading after the filter. If there is less than a 5° temperature difference, the filter will not need to be changed.





As the system is hermetically sealed, there should be no contaminants. We rarely see cases where filters need to be replaced. Although in case of contaminants being introduced into the system, **you should monitor the filters daily for one week.**

Do I Need To Remove Oil When I Install Frigi-Tech?

No, not normally. You may need to if are installing into a chiller that is over 50 Tons. You will need to monitor the sight glass for one week. The sight glass is there to check oil levels.

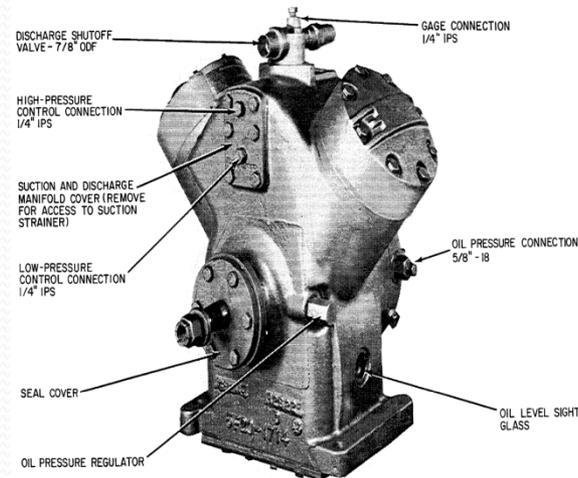


Fig. 1 - 5F20; 2-Cylinder Compressor

Storage And Care

We recommend storing in a cool/dry place.

The standard shelf life of regular and special blends of Frigi-Tech are indefinite as long as it has been stored properly and the seal has not been broken.

Once the seal has been broken, you should purge the opened container with dry nitrogen (this will remove moisture from the oil).

You will not want to use any oil that is discolored (dark gold or brown). This may occur when the oil has been stored in improper conditions Also if the oil has been contaminated with debris.



**As A General Rule Of Thumb, Frigi-Tech
Conservatively Estimates, We Will Save The End
User Approximately 10% On The HVAC&R Portion
Of The Electric Bill.**

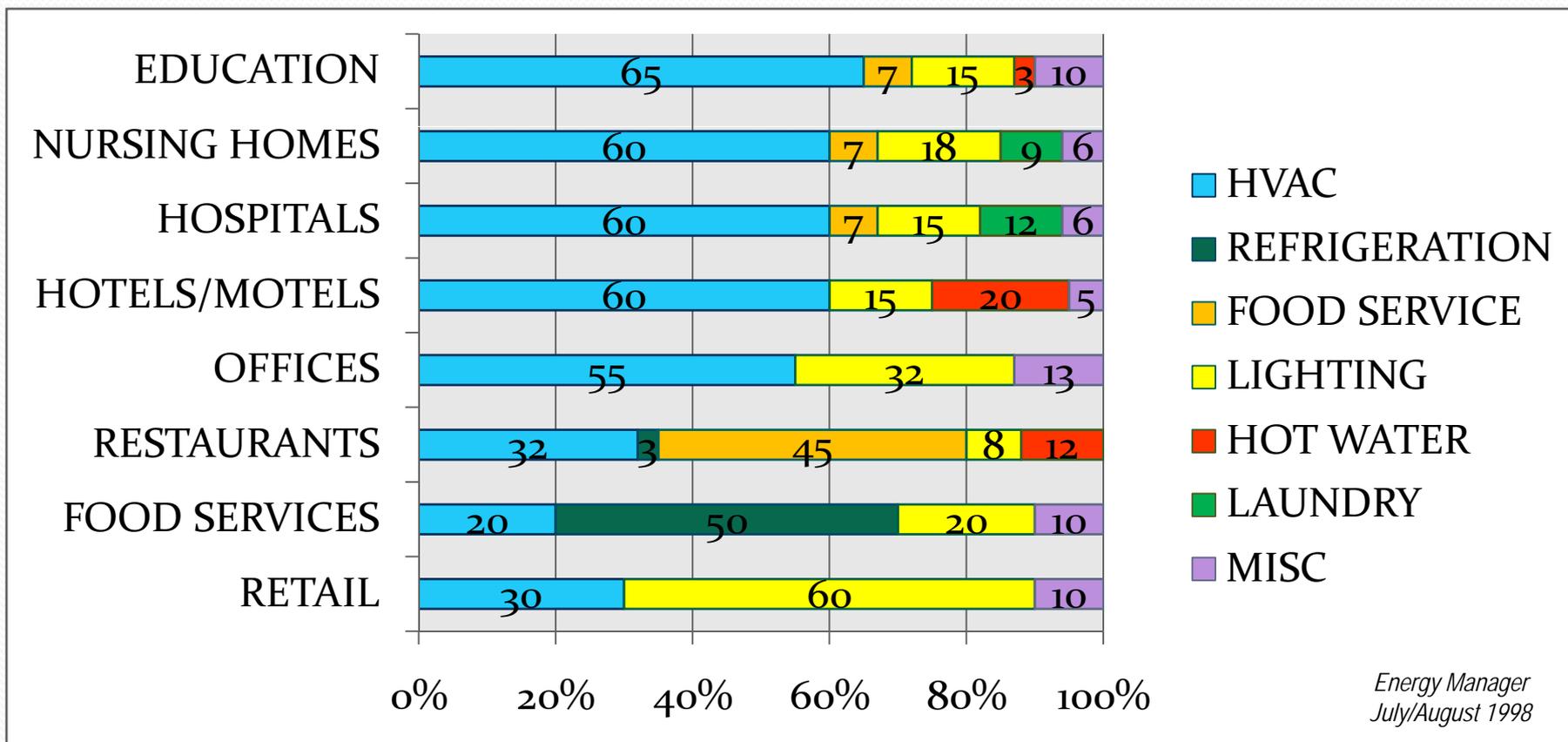
*We generally see more savings than that, but we would rather
under promise and over deliver. You will be a hero in your
customer's eyes.*

We Usually Get Posed With The Question . . . How Much Do I Sell Frigi-Tech For?

As Frigi-Tech does not sell to the end user, we do not have a set price to recommend. We leave the decision up to you. Although, we do have some great tools to assist you.

Energy Usage Chart

(A Great Tool in Figuring Savings)



Testing Procedures

The best scenario for a Frigi-Tech test is to locate two side by side units that are of the same age, that they are of the same tonnage, they both will be under the same load, and that do not share the same common oil.

Once you find the right systems to treat you can easily set up your data logger (such as a remote monitoring system from Winn Energy or a Hobo Data Logger) on each unit and begin to record your initial readings. The things that you can note for comparison are as follows:

- Amps
- Kw or kwh
- Run hours
- Internal pressures
- Head temperature
- Sound or decibel level
- Vibration analysis
- Delta T*

* this is the difference in the supply air, air coming out of the vents after the evaporator; and the return air, air before the evaporator.

We recommend that a base line for any of these test run for at least a week and readings taken every 15 minutes. Although you may see an initial savings immediately, it takes almost 2-3 weeks for Frigi-Tech to properly travel throughout the hermetic circuit.



**Frigi-Tech International, Inc.
has the longest track record in
the industry with this being
our 26th year.**

**Our 2 million dollar International
Product Liability Insurance is in
effect with the use of a Class A
Mechanical Contractor and
submission of Audit Forms.**



**We have a dedicated staff
available 24 hours a day,
7 days a week.**



**If you should have any
questions or concerns, please do
not hesitate to contact us . . .**



**Think of us as a tool . . . use
us as much and often as
you need us.**



**We're just a phone call or
email away...**

713.896.6889

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