

# Cooling: New ways to deliver more from less

## High efficiency chillers: tomorrow's world today



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# Sustainability

- Sustainability is “Doing what we do today in a way which ensures that future generations are able to do what they do tomorrow.”



# Responsible Use Policy

- Necessity
- Tightness
- Efficiency
- Maintenance
- Efficiency
- Longevity

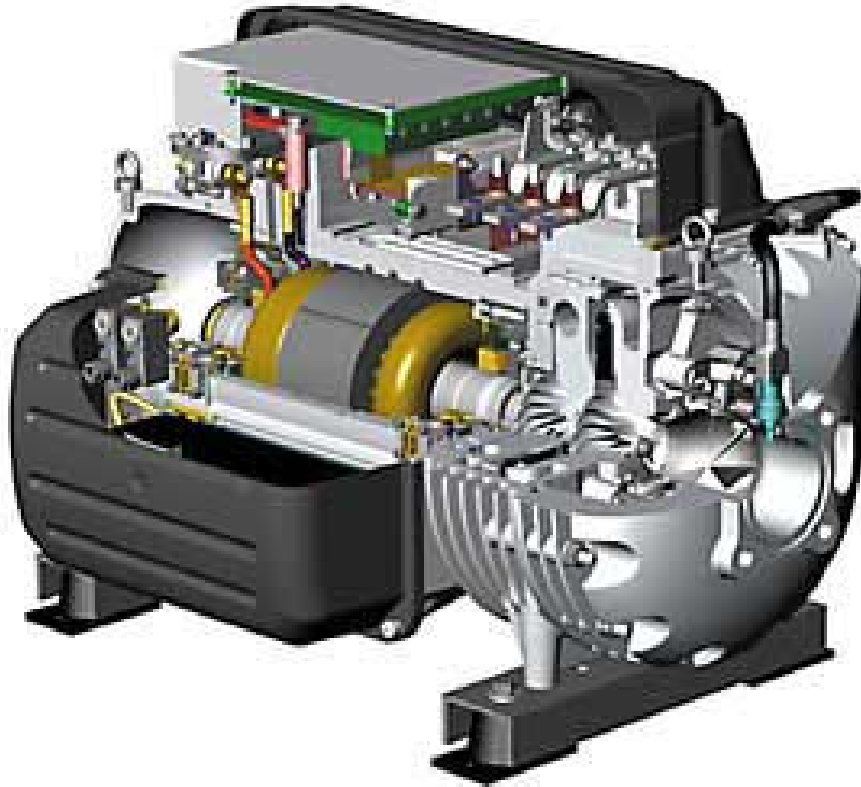
# Responsible Use Policy

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# Compressor



# Compressor



Centrifugal Compressor

Oil Free Bearings

No Complex Oil Circuit

Low Maintenance

Hermetic Compressor

Low Risk Of Leakage

Interfaced with PLC

No extra sensors required

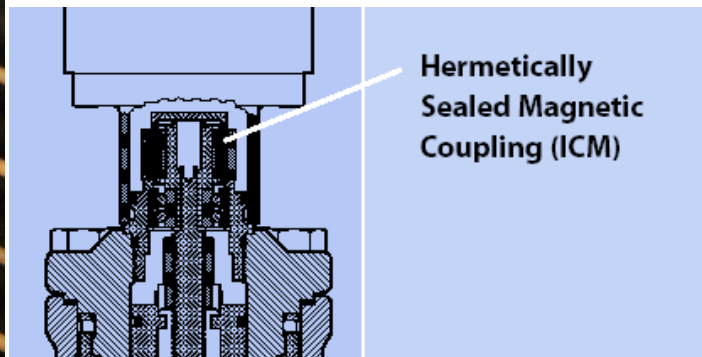


# Expansion Valve



Danfoss ICM Valve

Electronic Expansion



Hermetically  
Sealed Magnetic  
Coupling (ICM)

Hermetically Sealed

No Shaft Seal

No Leakage

# Pipework



Welded Steel Pipework

Industrial Solution

Industrial Quality

No Leakage

# Valves

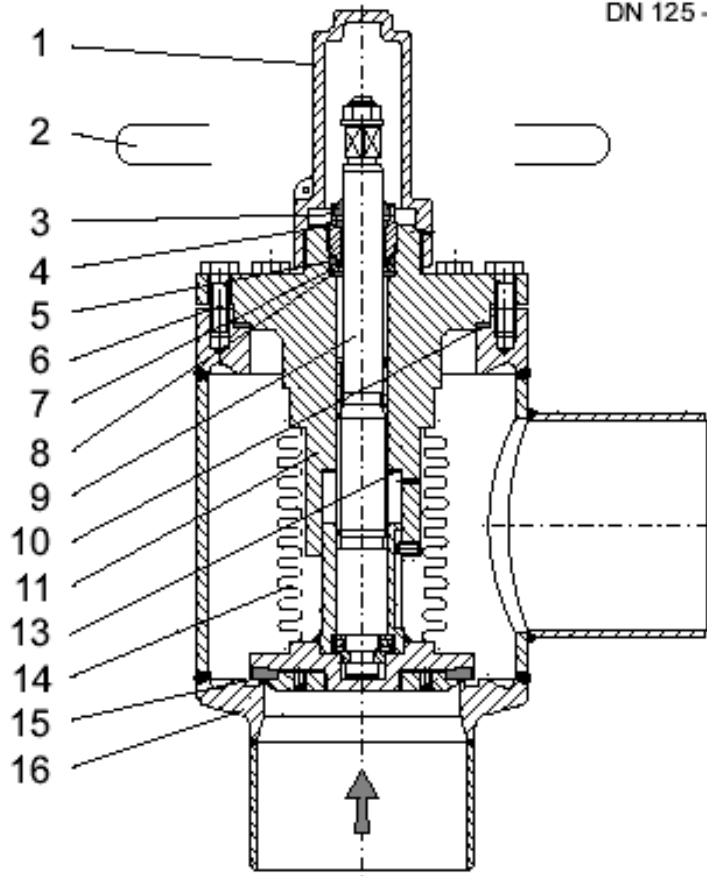
AWP AVB Valves

Bellow Seals



# Valves

DN 125 - 250

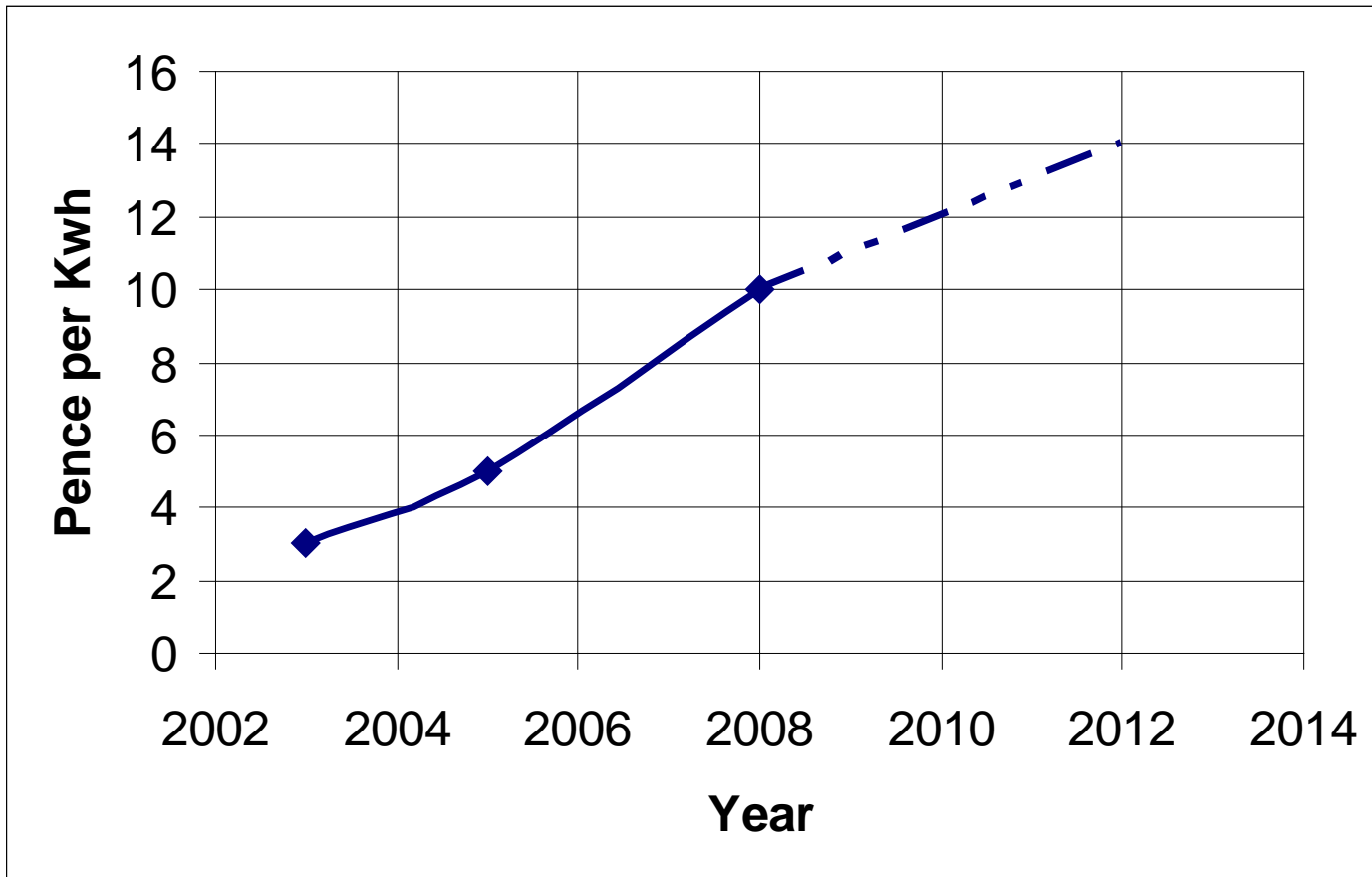


Pos.	Teil / part	Material
1	cap	3.2341
2	handwheel	Stahlblech
3	scraper	NBR-85
4	o-ring seal A	CR-70
5	o-ring seal B	CR-70
6	screws	8.8 / A2 - 70
7	elastic PTFE-ring	1.4571 / PTFE
8	flat sealing ring SB	AFM - asbestfrei
9	stem	1.4305
10	flat sealing ring K	Al 99,5 / Teflon / AFM
11	cover	1.0038 / 1.4301
13	flat sealing ring R	PTFE
14	metal bellows	1.4571
15	flat sealing ring S	PTFE
16	Body	1.0305 / 1.0488 1.4301 / 1.4541

# Responsible Use Policy

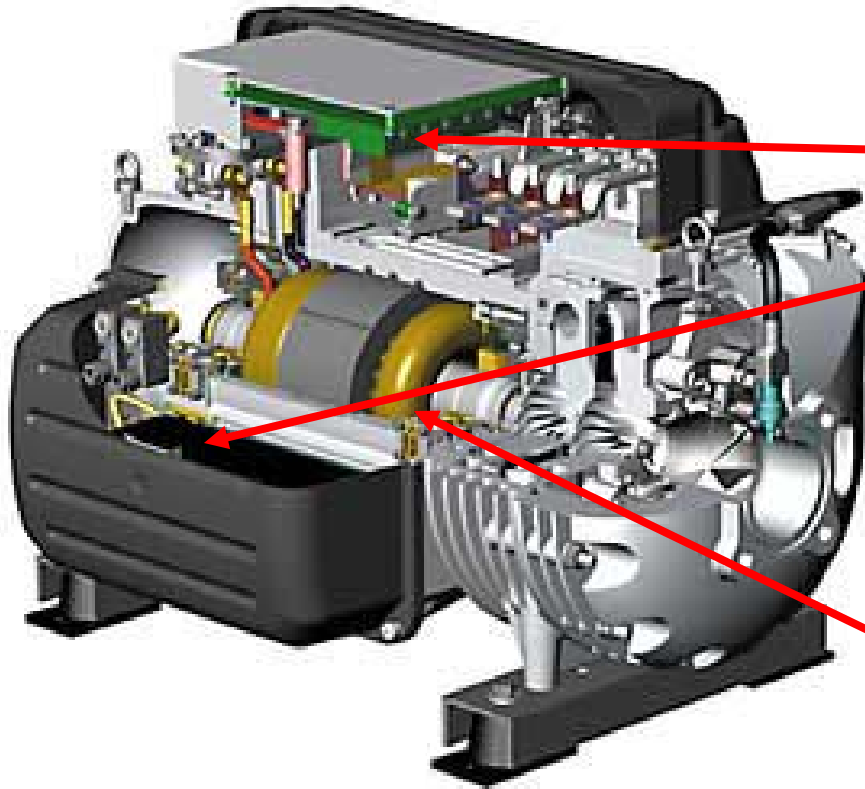
- Necessity
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# UK Electricity Costs: 2003 - 2012



**Data from DTI**

# High Efficiency Compressor



Centrifugal Compressor

Integral Inverter

On Board Computer

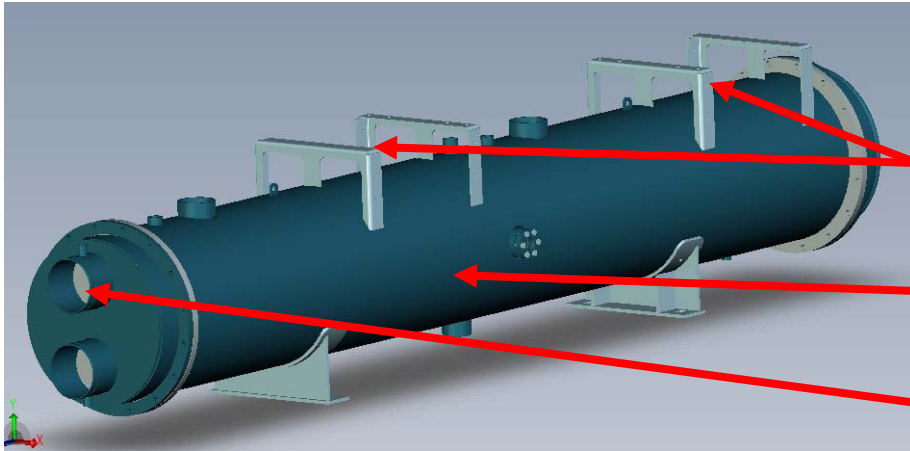
Variable Capacity Control

Increased Part Load COP

Electromagnetic Bearings

2 Amp Starting Current

# High Efficiency Evaporator

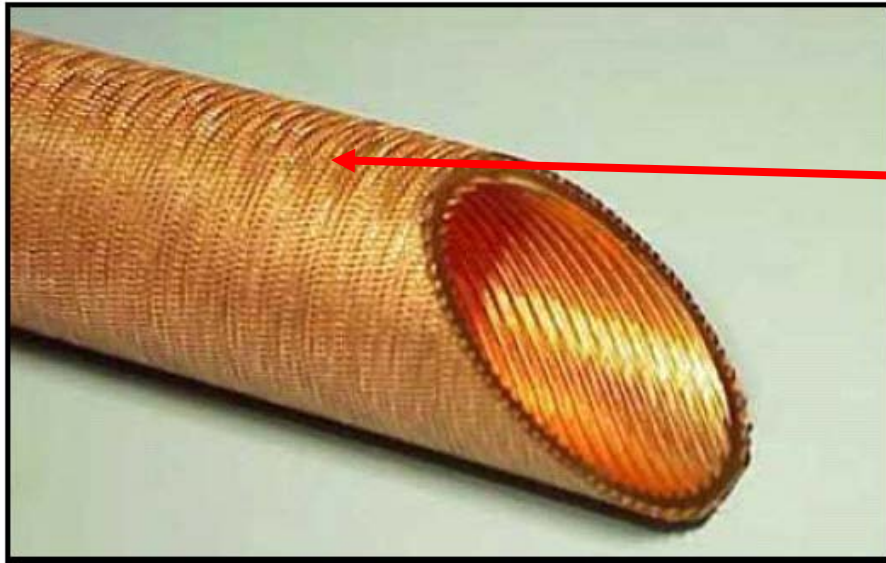


Shell & Tube Evaporators

Compressors On Top

Flooded Operation

Tubeside Water Flow



Enhanced Tube Evaporator

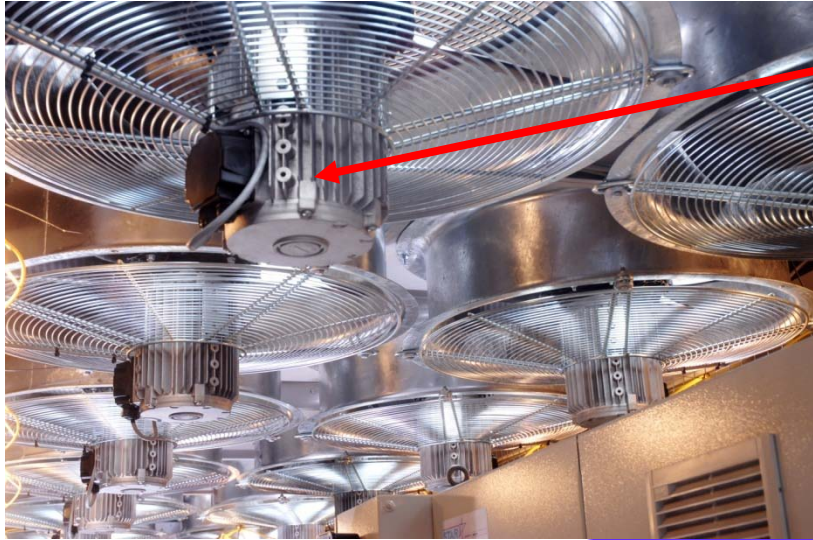
Integral Helical Fins

Enhanced Boiling Effect

Close Approach

Variable Evap Temperature

# Condenser Fan Control



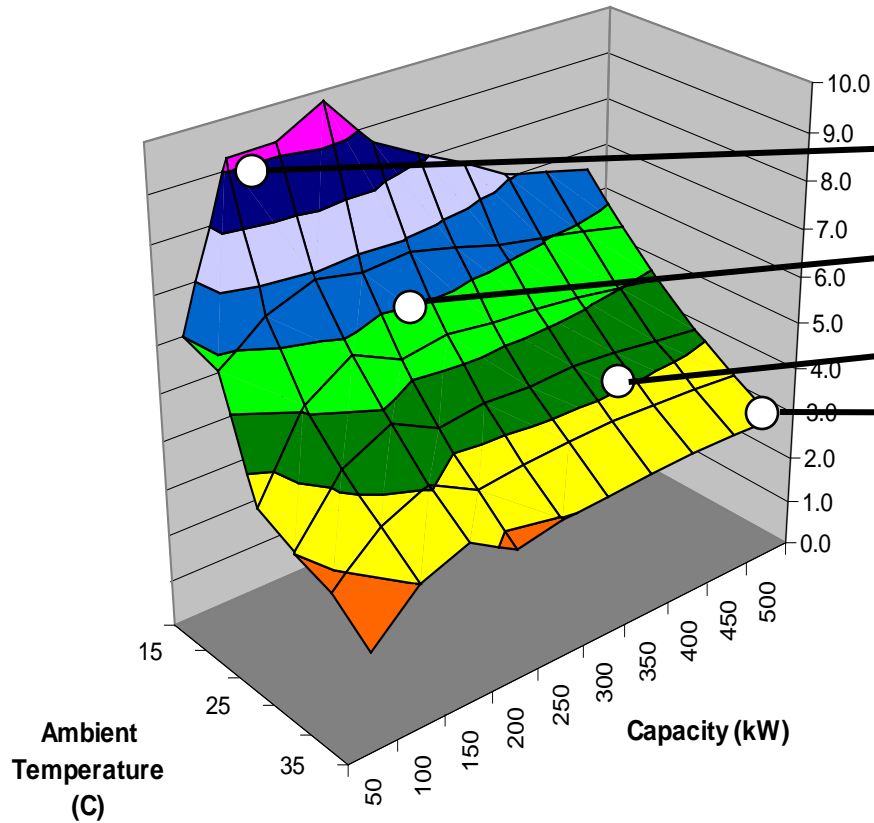
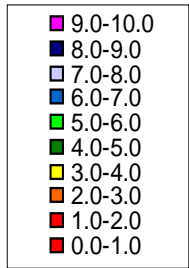
Inverter Drive Fans

Cubed Law

80% Speed = 50% Power

Floating Head Pressure

# Chiller Comparison



**9.2 for 12%**

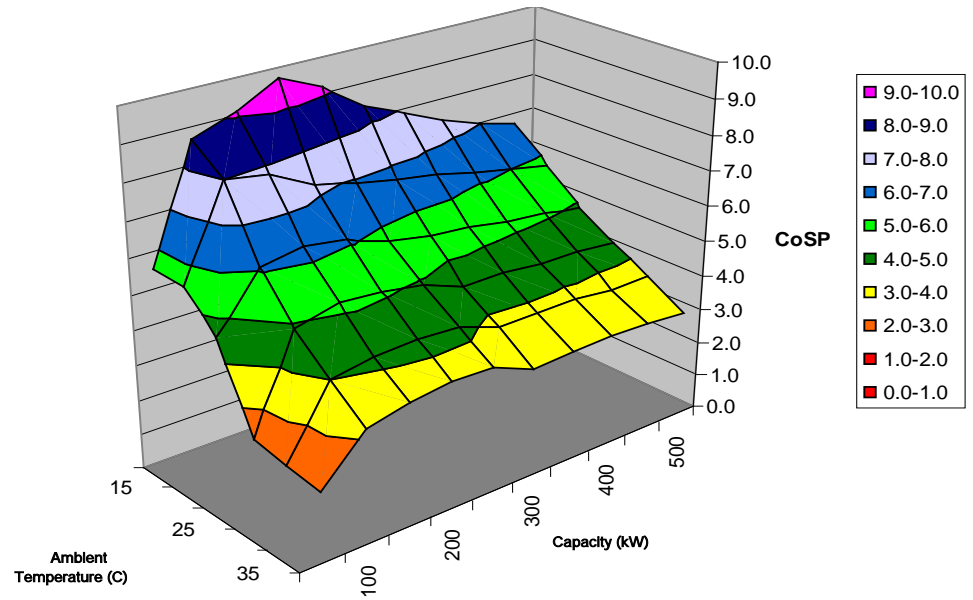
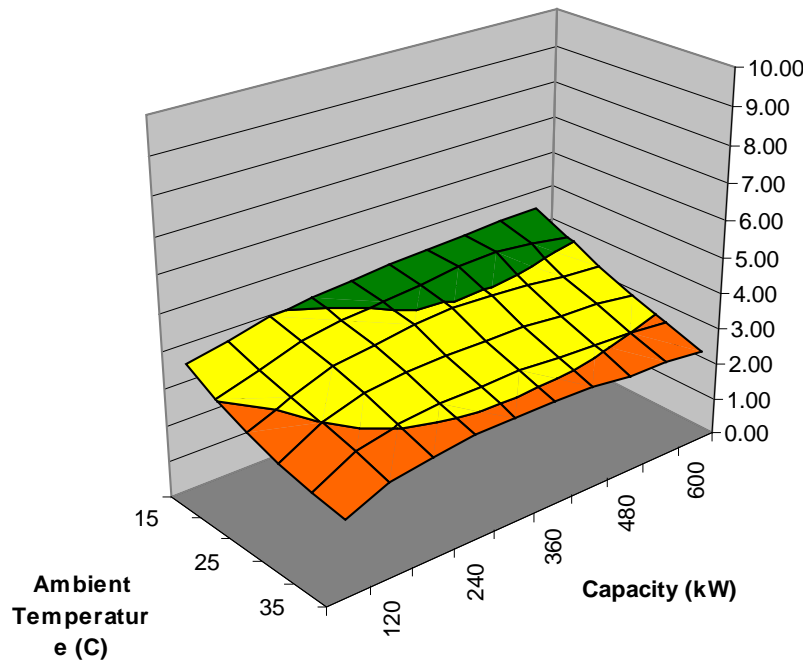
**5.9 for 45%**

**4.2 for 42%**

**3.2 for 1%**  
**IPLV = 5.55**

# Chiller Comparison

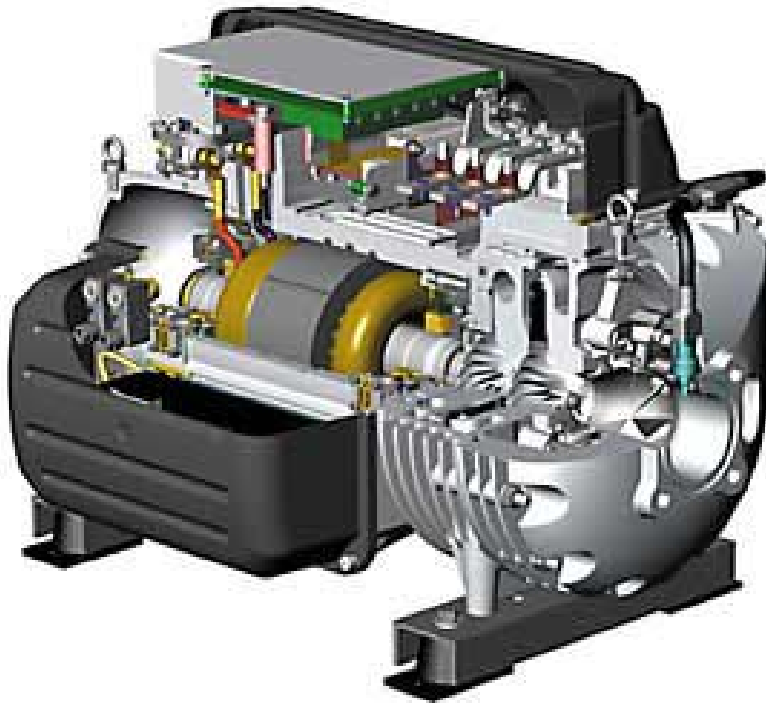
## Low Cost R134a Chiller CoSP



# Responsible Use Policy

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- Efficiency
- **Maintenance**
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- Longevity

# Maintenance Friendly Compressor



Oil Free

No Complex Oil Circuit

Zero Burnout Risk

One Moving Part

1/5<sup>th</sup> Weight

Plug and play electronics

# Maintenance Friendly Exp Valve



Top Cover



Function Module



Valve Body



# Maintenance Friendly Assembly



Welded Steel Pipework

Dual Relief Valves

Three Way Changeover

Bursting disc assembly

Indicator gauge for relief

Off Site Alarm/Monitoring

VFCs For Link To BMS

Full alarm history

Extended Warranty Option



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# Whole life efficiency



Walk-In Plantroom

Good Equipment Access

Chequer Plate Flooring

Internal Control Panel

Easy clean condenser

Internal Fan Protection

Internal/External Coil Guard

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# Longevity



Welded Steel Pipework

Epoxy Paint Finish

In/External Fin Protection

In/External Fan Protection



Industrial Package Build

Rugged construction

20+ Years Lifetime



# Conclusions



New technology leads to many new opportunities

The whole system design

must be consistent

Sustainability includes efficiency, refrigerant use

and useful life

