

Helmer Scientific, Inc

Governor's Pollution Prevention Award





Helmer & EMBRACO FMX COMPRESSOR FOR A BETTER WORLD



Overview

Helmer Scientific



**Privately
owned**

**+250
employees**

Medical Device Design and Manufacturing

Medical-grade cold storage for lab,
pharmacy, and Blood bank

Specialized Blood Bank storage and
processing equipment



- FDA Regulated GMP Facility located in Noblesville, IN.

- >100,000 installed devices across over 130 countries

- ISO-13485 Certified



CHALLENGES FOR OEMS

Medical Refrigerator & Freezers



CHALLENGES FOR OEMS

Medical Refrigerator & Freezers



Temperature Stability

Temperature control



Quality & Reliability

Clinical samples and products



Energy Efficiency

Meets sustainability and regulatory needs



Noise

Installation near staff and patient care areas





CHALLENGES FOR END USERS

Medical Refrigerators and Freezers



CHALLENGES FOR END USERS

Medical Refrigerator & Freezers



Temperature Stability

Maintain tight temperature control



Quality & Reliability

Safeguard clinical samples and products



Energy Efficiency/Sustainability

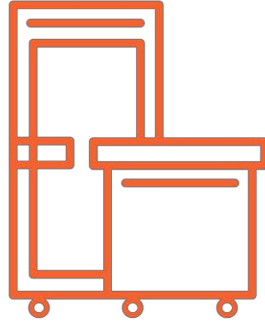
Lower total cost of ownerships



Serviceability

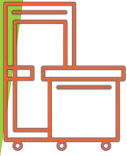
Reduce cost and downtime





HELMERS'S CHALLENGES

Case study



HELMER'S CHALLENGES

Case Study

01

Drive Continuous Improvement of performance & quality

Customer delight & competitive differentiation

02

Address regulatory drivers

Transition from high GWP refrigerants & reduce energy consumption

03

Enhance value while managing costs

Remain cost effective with new technology

04

Meet evolving customer requirements

Includes decreasing noise level / sound power for installations near staff & patient care areas



LEADING INNOVATION

HOW WE WORK TOGETHER?

- Evolving global environmental regulations
- Need a reliable solution with a short time to market
- Embraco FMX platform was able to address all the needs in a record
- Aggressive targets on "noise" reduction
- By delivering the whole condensing unit, Embraco enabled Helmer to speed up its time to market

EMBRACO - HELMER



WHAT CHANGES DID WE MAKE TO REDUCE ENERGY CONSUMPTION?

01

CHANGE COMPRESSOR

02

CHANGE FAN

03

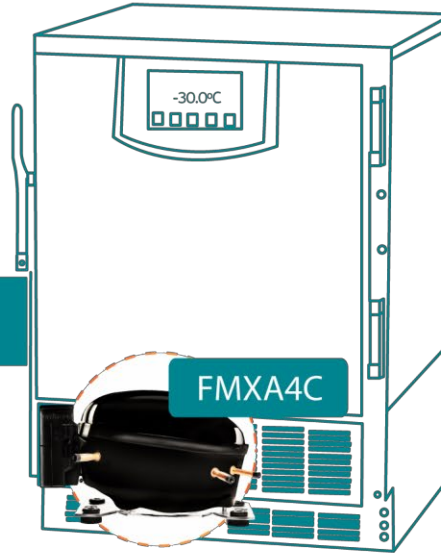
CABINET CHANGES



4cc Baseline

FMXA4C

Capacity down 15% <i>Btu/h</i>	306	↓	68 - 259
EER up 75% <i>Btu/Wh</i>	3.19	↑	5.60
Displacement up 6% <i>cc</i>	3.76	↑	3.97
Weight down 37% <i>lb</i>	16.7	↓	10.6



R134a

➤➤➤ R600a



Quiet and Efficient EC
Fan Motor

*At ASHRAE LBP



Helmer Case Study



Competitor **R134a**

FMXA4C **R600a**

 Charge (g)	128	60
 Energy consumption kWh/day	2.40	1.09
 % of Energy Star Allowance 4.42 kWh/day	54%	25%
 Sound Power dB(A)	59	45
 Pull down time (Mins)	48	36
 Temperature Uniformity (°C)	1.5	0.8
 Temperature Stability (°C) (Door openings)	2.5	0.6





Case Study Results

TEWI - It is defined as sum of the direct emissions and indirect emissions (energy use) of greenhouse gases.



Direct	BASELINE	CABINET WITH FMX
GWP - Global Warming Potential	1430	3
L - Annual leakage rate (kg/year)	0.003	0.003
N - Life of equipment	10	10
M -Charge (kg) (1-recycling factor)	0.128	0.060
Indirect	BASELINE	CABINET WITH FMX
a - Recycling Factor	0.95	0
E - Energy consumption (kWh/year)	876	298
β - Emission from energy generation (kg CO ₂ /kWh)	0.508	0.508
TEWI (T)	4.50	2.02

55%
OF REDUCTION ON
THE ENVIRONMENTAL
IMPACT DUE TO
CO₂ EMISSIONS

$$\text{TEWI} = \text{GWP} \cdot \text{L} \cdot \text{N} + \text{GWP} \cdot \text{M} \cdot (1 - \alpha) + \text{N} \cdot \text{E} \cdot \beta$$



Case Study Results

If the market were to convert 1,000 cabinets for this technology, the savings in carbon emissions generated by the new equipment are equivalent to:

CO₂ emissions from

Greenhouse gas emissions from



Annual energy
consumption
of 268 Homes
(Saves \$33,445
per year)



278,947
gallons of gasoline
consumed



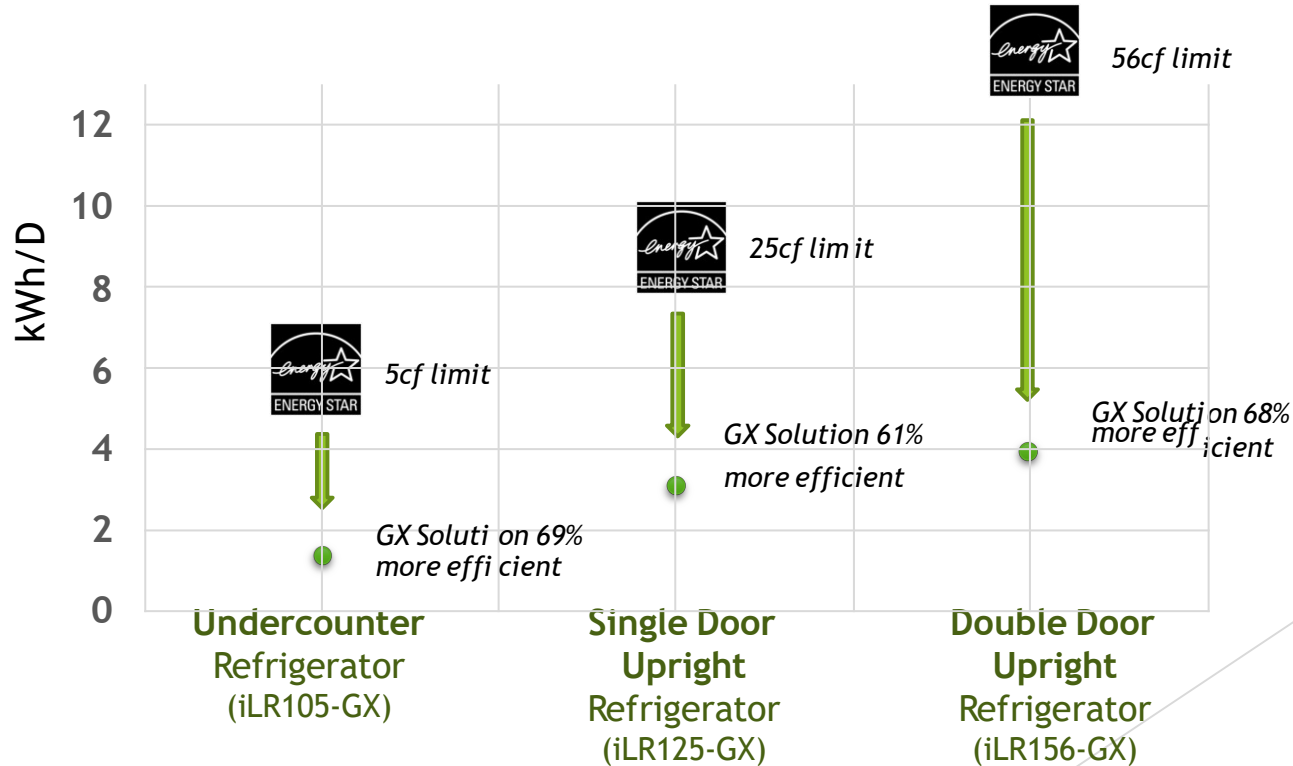
6,075,980
miles driven by an
average passenger
vehicle



SOURCE: EPA greenhouse equivalency calculator

Helmer GX Solutions are >60% more efficient than limits allowed by ENERGY STAR®

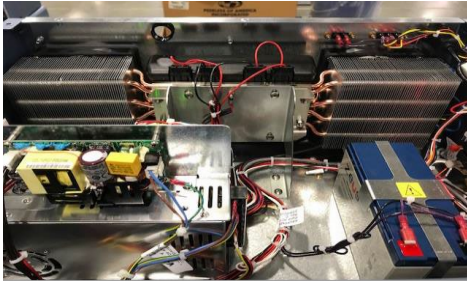
► ENERGY STAR compared to GX Solutions by Refrigerator Size:



Thermoelectric Technology



- **Current Product**
- **Condensing Unit** -Reciprocal Compressor
- **Evaporator** - Round Tube Plate Fin
- **Refrigerant** – 134A HFC
- **Redesigned Product**
- **Condensing/Evaporator Unit** - Thermoelectric & Round Tube Plate Fin
- **Evaporator** – combined with condenser
- **Refrigerant** – CO2 (Natural Refrigerant)



- **Energy Consumption:**
 - Current Product: 11.25 kWh/day
 - Redesigned Product: 1.91 kWh/day
 - **83% Reduction energy**

The Bottom Line

The attached shows the annual impact of the next generation GX product based on 2018 sales volume.

Refrigerant Charge (lbs)	3882	lbs/yr
CO2 Equivalent (lbs CO2/Unit)	5420	tons/yr
Energy (kWh/day)	31439	kWh/day
HFC Elimination	5300	lbs/yr
Raw Material Reduction	71	tons/yr

The estimated annual energy savings across the entire installed base of product is *\$1,377,028.

*Note: Power is rated at the National Average of \$.12 per kilowatt hour.

Thank you

Questions



ATMO
sphere

Business Case for
Natural Refrigerants



Helmer
SCIENTIFIC

embraco