

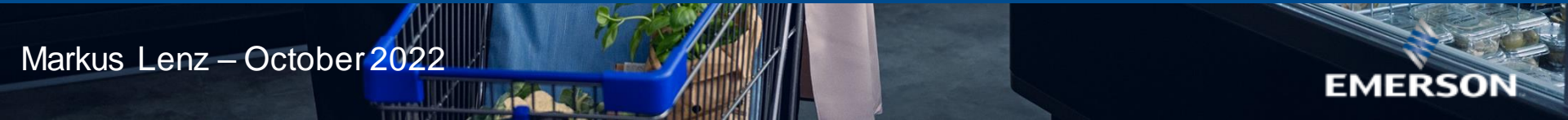
**Chillventa Specialist Forums 2022**  
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## **R-744 Refrigeration Units for Small and Medium Size Retail Formats**

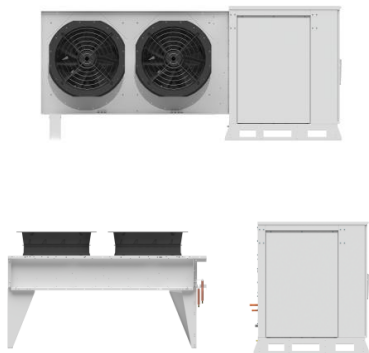


Markus Lenz – October 2022

**EMERSON**

# CO<sub>2</sub> Scroll Refrigeration Units Respond to the Trends and Needs of The Food Retail Sector: Small – Green - Smart

## Small (Urban)



### Installation Flexibility

- Modular Design
- Split Installation
- Indoor or Outdoor Installation
- Vertical or Horizontal Airflow
- Solving Noise and Space Constraints

## Green



### Reliability & Efficiency

- High Efficiency in all Climates
- Active Oil Management
- Tandem Compressors
- Heat Recovery
- Reducing Energy & Maintenance Costs

## Smart

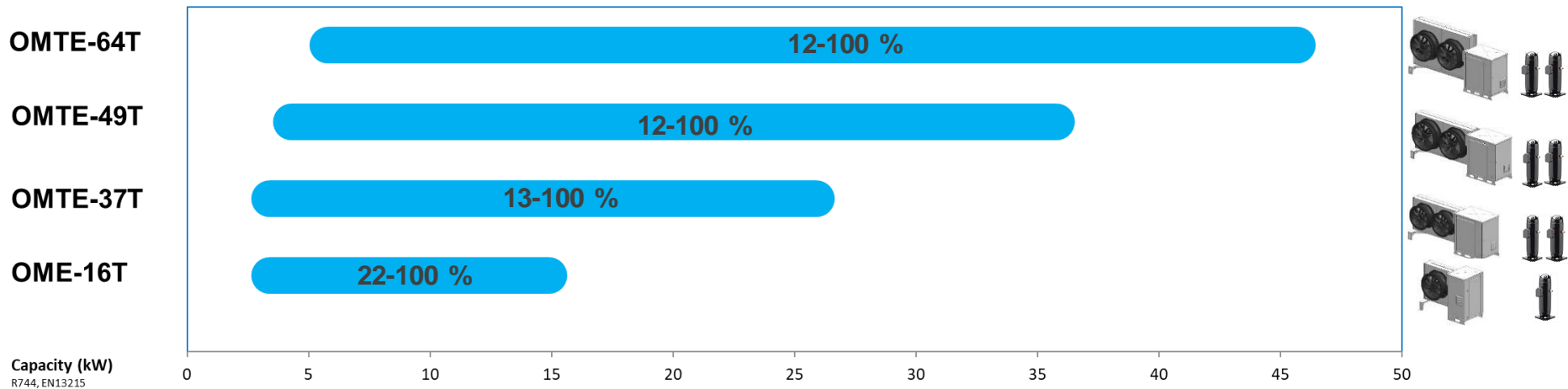


### Control Intelligence

- Remote Monitoring
- Electronic Envelope Control
- Predictive Maintenance
- Building Management Communication
- Prepared for Future Store Design



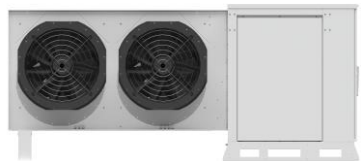
# CO<sub>2</sub> Scroll Refrigeration Units – Providing Refrigeration Solutions for Small and Medium Size Retail Formats



- High-Capacity Units For Decentralized Architecture
- Stepless Capacity Modulation Covering All Intermediate Cooling Demands
- Extra Wide Modulation Range Allows for Over-speeding & Avoids ON/OFF-Cycling in Winter
- Modular Design for Flexibility in Urban Stores

# Copeland CO<sub>2</sub> Refrigeration Unit Modularity

## Flexible Solution to Overcome Space & Noise Constraints



Outdoor Packaged



Outdoor Split



Outdoor / Indoor



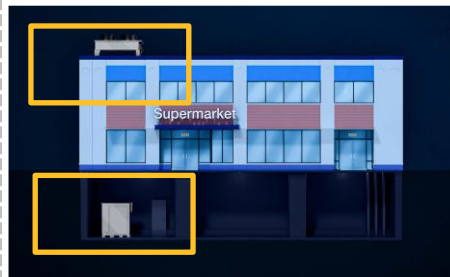
Indoor



- Out Of City
- Outdoor Space Available
- Back or Roof Location
- Low Noise
- Small Footprint



- Urban
- Roof Space Available
- Some Space Constraints
- Low Noise
- Small Footprint



- Urban
- Limited Outdoor Space Available
- Indoor Module Needed
- Small Footprint



- Urban
- Outdoor Space Unavailable
- Indoor Module Needed
- Ducted
- Small Footprint

# Adjusted High Quality Components Enable Reliable System Operation in all Climates



- Dynamic Vapor Injection
  - Control of flash gas in all conditions
- Frequency Drive Control
  - Enabling over-speeding for high demand
  - Wide modulation range for high and low ambient temperatures
- Active Oil Management
  - Reliable lubrication
- Smart Control
  - Electronic protection
  - Envelope control
  - Gas cooler performance analysis
- Flow Controls
  - Precise regulation of all system parameters

# 5 Key Benefits of Copeland's Transcritical CO<sub>2</sub> Scroll Unit



Copeland Scroll CO<sub>2</sub> Unit

1

Efficient Operation In All Climates With One Design

2

Indoor & Outdoor Modular Design To Address All Space, Sound & Installation Constraints

3

Innovative Scroll Technology & Control Intelligence Ensure Continuous Operations Even In The Hottest Weather conditions

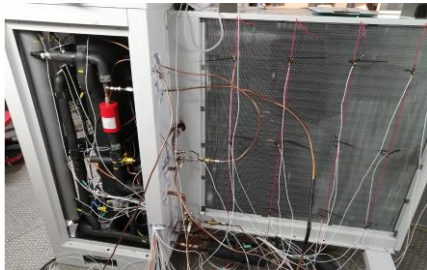
4

Designed To The Quality Requirements Of The Food Retail Industry

5

Low Sound Levels With Quiet Scroll Compressors, Compartment Insulation, EC Fans & Night Mode Control

# Extensive Solution Testing with CO<sub>2</sub> Scroll Refrigeration Units



Test	Status
System Performance	✓
DVI Control Algorithm	✓
High Ambient Operation	✓
Active Oil Management	✓
Gas Cooler Fault Detection	✓
Unit Sound	✓
Vibration Tubes & Components	✓
Split Design Testing	✓
EMC Compliance	✓
Outdoor Testing	✓



# Field Trial Campaign of CO<sub>2</sub> Scroll Refrigeration Units in Process

Application: Food Specialist in City Centre

Location: Belgium

Model: OME-16

Capacity: 15 kW MT

Commissioning: Q1 2022

- Supplying 4 Counters, 2 Cabinets, 1 Cold Room
- Split Installation
- Remote Monitoring

## Customer Feedback:

- Unit split design is an advantage for noise reasons, especially in city centers
- The wide capacity modulation range is a strong asset avoiding on/off cycling
- Reliable operation throughout long & hot summer 2022
- Active oil management is a reliability advantage and creates peace of mind



Outdoor



Basement



## Conclusions & Outlook

- The new CO<sub>2</sub> trans-critical scroll technology has proven reliability in lab & field trials
- The modular design allows for high installation flexibility
- A rich collection of monitoring data is supporting continuous optimization
- Smart control technology increases system reliability
- Ramp-up for the new range will start with smallest model starting from January 2023

**Thank You !**



Visit our booth:  
**Hall 6, Booth 324**

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