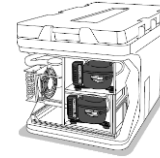


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Compressor Driven Ultra-Low Temperature Vaccine transport box UT31



medical
systems



Vittorio Iormetti

SECOP



Hendrik Bünz

Market Needs



SECO²P

B medical systems



Growth in the mRNA based developments, Cell & Gene Therapy etc..



Several vaccines (e.g: some of the COVID-19 vaccines, Ebola vaccines) that exists today requires Ultra-low temperature storage and transport



Lack of portable and reliable cold chain infrastructure able to meet these very low temperature requirements in developing countries



During COVID-19 pandemic, the gap in the mobile Ultra-low cold chain solutions became more obvious. Need for building resilient cold chain across the world

Limits of Passive Solutions



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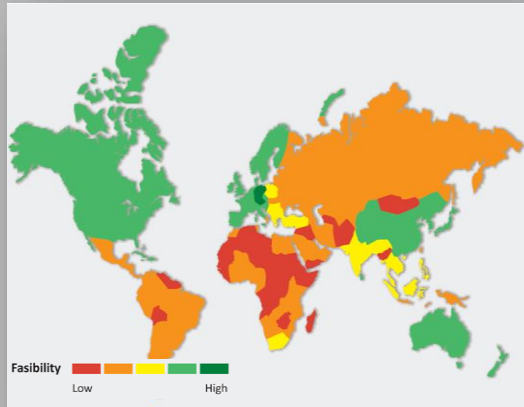
B medical systems

INSULATED PANEL
COLD PACK
PRODUCT
OUTER BOX



DRY ICE PASSIVE BOXES

Passive solutions used today for ULT vaccine transportation



Source: DHL Covid 19 Report

ACCESS TO TEMPERATURE SENSITIVE VACCINES

Good availability only for 25 countries (30% of world population)

Limitations and risks:

- ✓ Non eco-friendly (high GWP/1-way waste)
- ✓ High risk of vaccine waste
- ✓ Limited temperature stability
- ✓ Dry ice availability mainly in industrialized countries
- ✓ High Total Cost of Ownership (TCO) in the long run

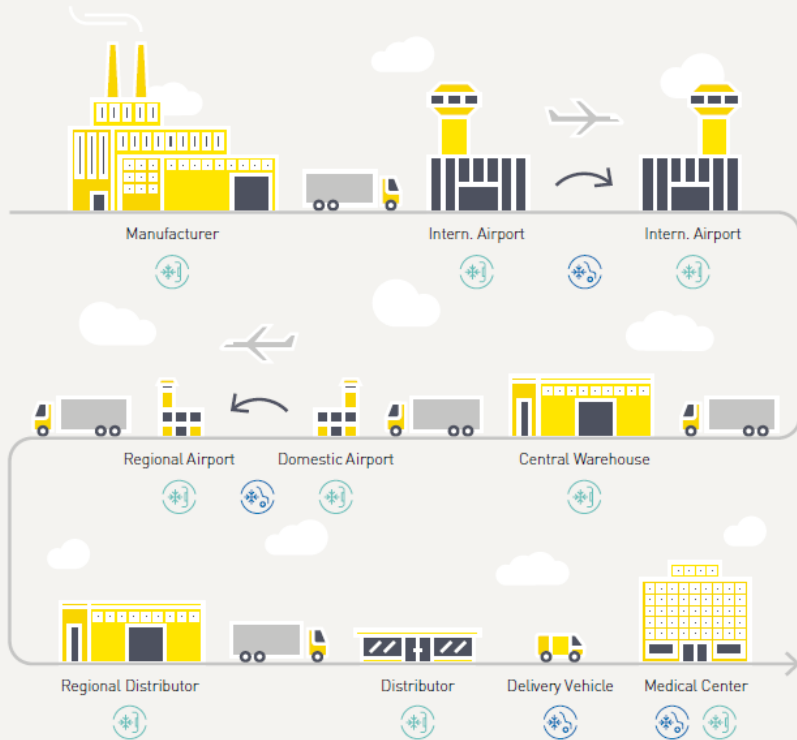
The Challenge



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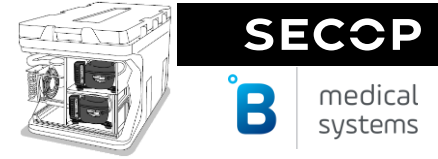
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Maintain an ultra-cold chain:

- ✓ with an active ultra-low temperature mobile solution
- ✓ able to guarantee reliable storage and transportation till the last mile
- ✓ even in harsh environmental conditions and in places with common power shortage and fluctuations and very poor road infrastructure

The Joint Development



Goals of joint development

- ✓ 2-stage compressors battery driven
- ✓ Active cooling for temperature stability
- ✓ Electronic control and monitoring
- ✓ Environmental friendly (low GWP)
- ✓ Multiple voltage for global reach
- ✓ Safety and robustness
- ✓ Long life-time at T_A of $+43^{\circ}\text{C}$
- ✓ Reduced TCO



Jointly developed
a new innovative active solution
for ultra-low temperature
transport & storage

The Solution

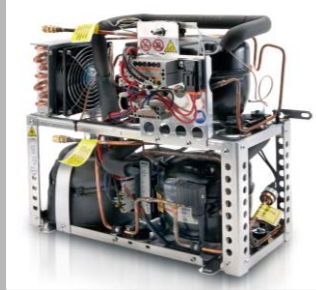
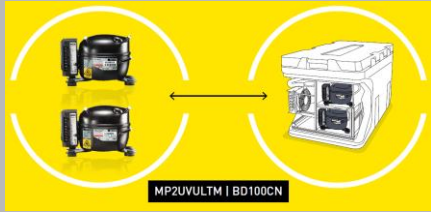


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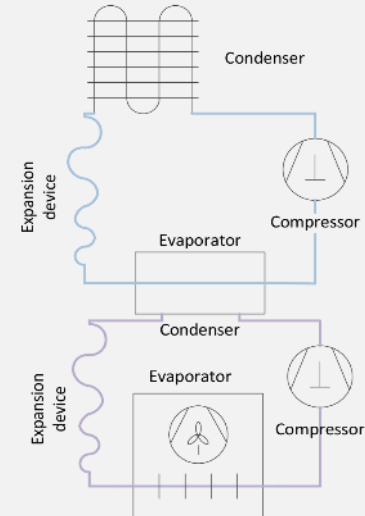


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ULT two-stage cascade system

- R290 boiling point: -42.1°C
- R170 boiling point: -88.5°C



SECOP Compressor



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MP2UVULTM



- ✓ Optimized for low GWP hydrocarbon refrigerants
- ✓ Electronic cooling capacity control for exact temperature tuning and energy efficiency variable speed control
- ✓ Designed for AC/DC global voltage range and optimized for low grid areas
- ✓ Robust solution up to tropical ambient (43°C)
- ✓ Proven for long life-time under ULT conditions



Energy efficient
compressor



Superior product
quality and reliability



Premium controllers
for compressors



Hydrocarbon
"green solutions"



Precise temperature
control



Variable speed
compressors

SECOP ULT Cascade Unit



Cascade unit with 2 electronic controlled compressors for DC mobile applications



- ✓ **Flexible cascade temp. setting:** -86°C to -20°C in ambient conditions up to 43°C
- ✓ **Low energy consumption:** high efficiency components for energy saving (2.48 kwh/day at -80°C)
- ✓ **Fast pull down** (-80°C in 4.5hrs at 25°C)
- ✓ **automated** 2-stage speed control for premium temperature stability (-80°C $\pm$ 2K at 25°C ambient)
- ✓ **Long life-time** due to low starting current peaks and multiple electronic protection

1° stage	R290	BD100CN
2° stage	R170	MP2UVULTM

B Medical Systems - UT31



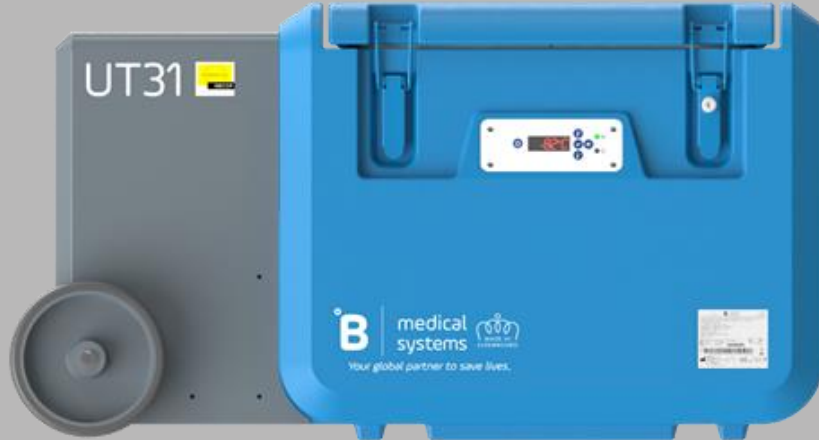
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-86°C to -20°C



- ✓ 27 liters capacity or plasma storage capacity of 84 bags of 350ml
- ✓ **Rotomolded body construction:** rust free and extremely robust with reinforced insulation of 70mm PU + 30mm VIP panels
- ✓ Covers a broad range of temperature **from -86°C to -20°C**
- ✓ Mobile, designed for **easy transportation**. Can be used in cars, truck, vans, etc.
- ✓ **Green technology:** energy-efficient using natural gases
- ✓ **Flexible DC/AC:** can be powered with battery 12/24V DC and 110-240V 50/60Hz AC
- ✓ Designed for **tropical climate** (+10°C to +43°C)
- ✓ 24/7 remote **temperature monitoring**



- **Storage:** Long term and short term storage of temperature sensitive specimens and vaccines
- **Transport:** Transportation of temperature sensitive specimens and vaccines till the last mile

Ultra-low temperature safe storage and transport between -86°C to -20°C:



- Temperature sensitive specimens in Research labs / Laboratories / Universities / Pharma / Life Science sector



- Vaccines between the healthcare facilities and at the last mile



- C> specimens and associated therapeutics



- Other clinical applications

Conclusion



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- ✓ A proven and validated solution to support safe distribution of vaccines in remote areas
- ✓ Reliable storage and transportation of specimens with **exact temperature setting and monitoring**
- ✓ From -86°C to -20°C ULT temperature
- ✓ In severe ambient **tropical conditions**
- ✓ **Global grid connectivity**
- ✓ Offering **long life time** and **reduced TCO**
- ✓ Reducing the risk to waste precious specimens

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