

YORK YZ

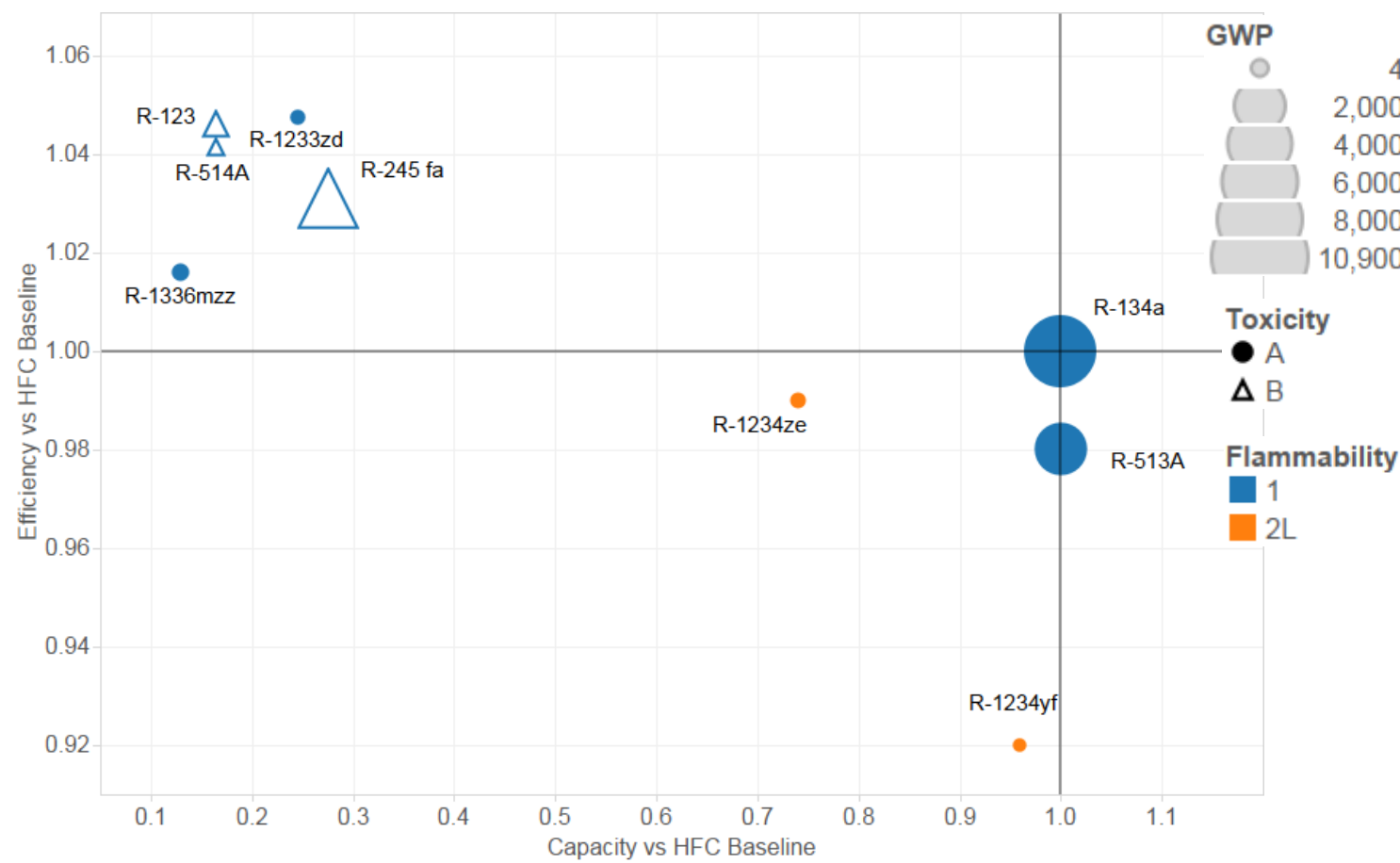
低GWP制冷剂R1233Zd(E)在离心式冷水机组应用研究 Magnetic Bearing Centrifugal Chiller



选择最佳制冷剂---R1233zd(E)

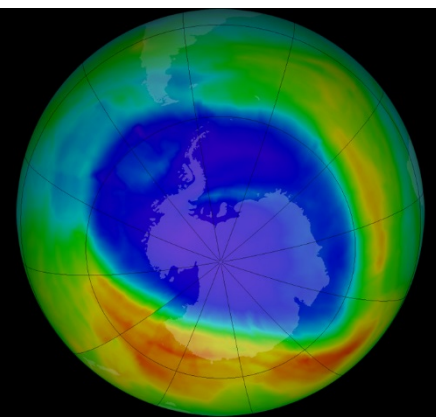
Best Choice for Centrifugal Chillers---R1233zd(E)

离心式冷水机组可选的冷媒选项 Refrigerant Options for Centrifugal Chiller



- 排除毒性; Exclude toxicity candidates;
- 排除高ODP特性; Exclude High ODP candidates;
- 排除高GWP特性; Exclude High GWP candidates;
- 排除易燃易爆特性; Exclude inflammability candidates;

结论: R1233zd(E)将是较优的选择
Conclusion: R1233zd(E) is our best choice



保护臭氧层
Ozone Protection

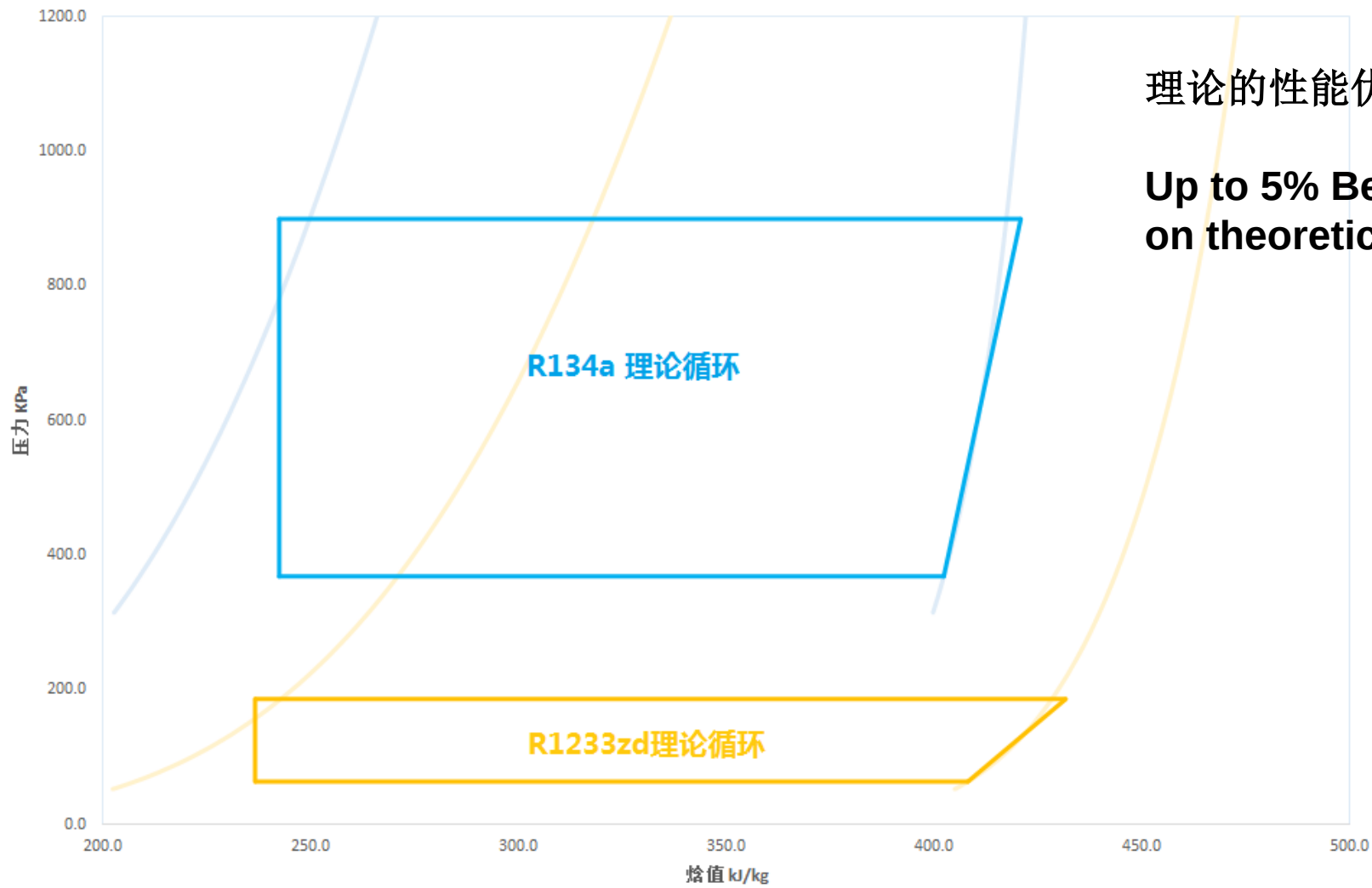


阻止全球气候变暖
Climate Concerns



R1233zd的理论性能优势

R1233zd Theoretical Benefit



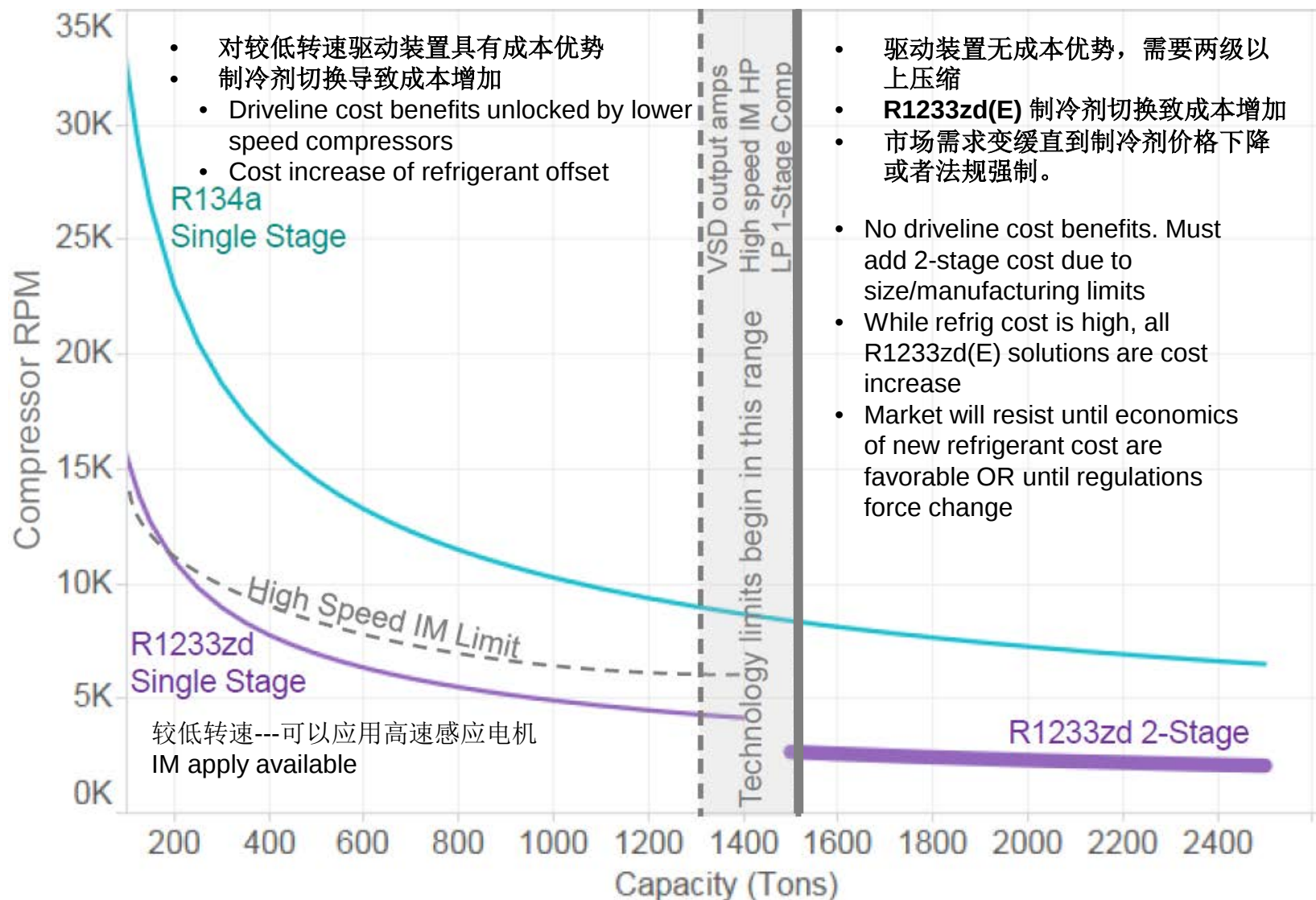
理论的性能优势较R134a增加约5%。

**Up to 5% Better Full Load
on theoretical cycle calculation.**



从中压到低压的转换引起不同冷量段采用的技术差异

Technology implications of transitioning from medium to low pressure vary across capacity range



结论:

由R1233zd(E)的转速较低的特征可以得到:

- 冷量 ≤ 1500 冷吨

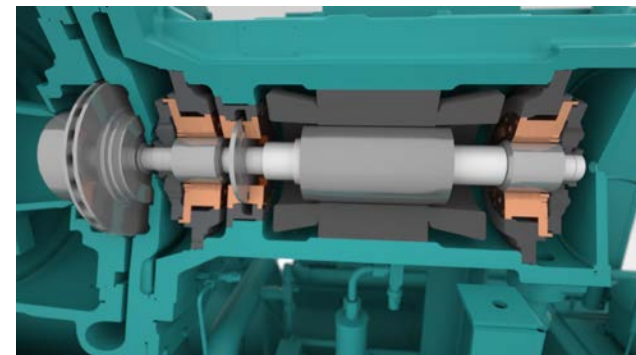
YZ-单级-直驱-高效感应电机-标配
低压VSD 为最优配置

Conclusion:

From the character of low speed of R1233zd(E) :

- Capacity < 1500 tons

YZ- Single stage- direct drive-
hermetic IM- std VSD (LV only)



轴承---转速仍然影响选择: 耐久性&可维护性驱动决策--- 零润滑

Bearings ---Speed still affects choices : durability & maintenance drive the decision---Lubrication free

R1233zd(E): 较低压缩机转速

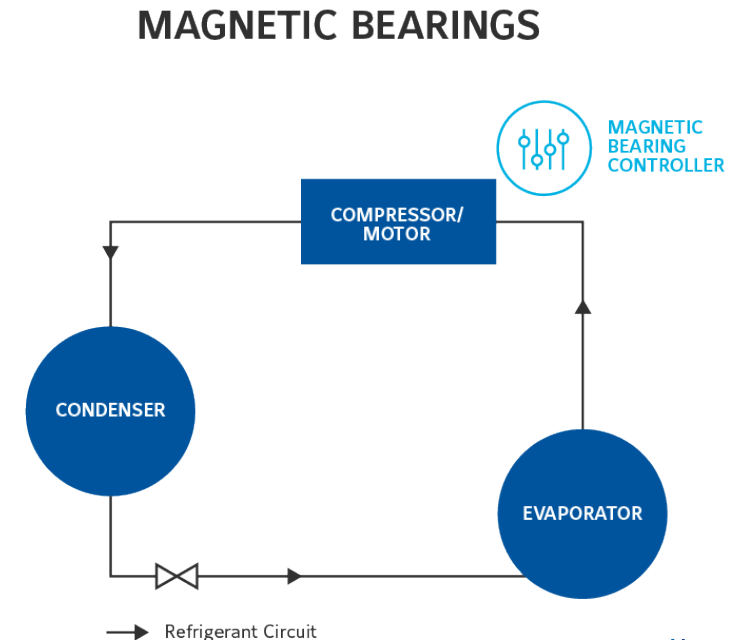
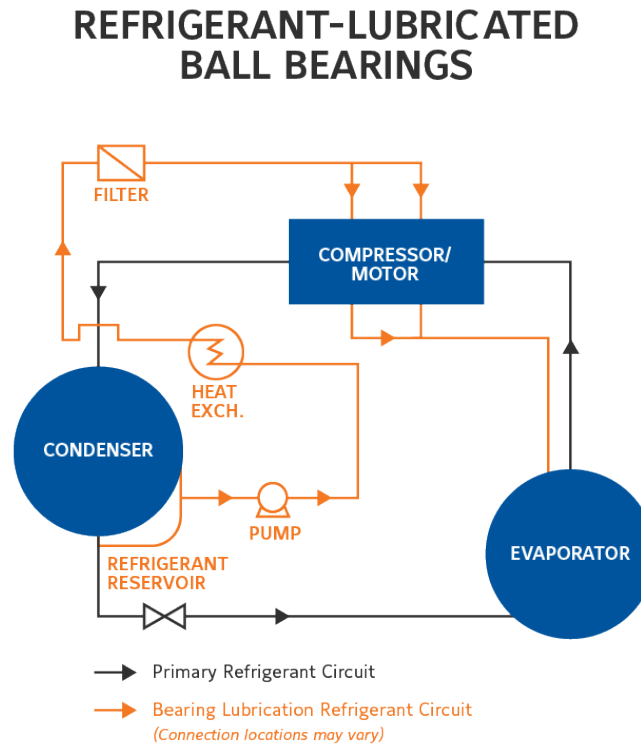
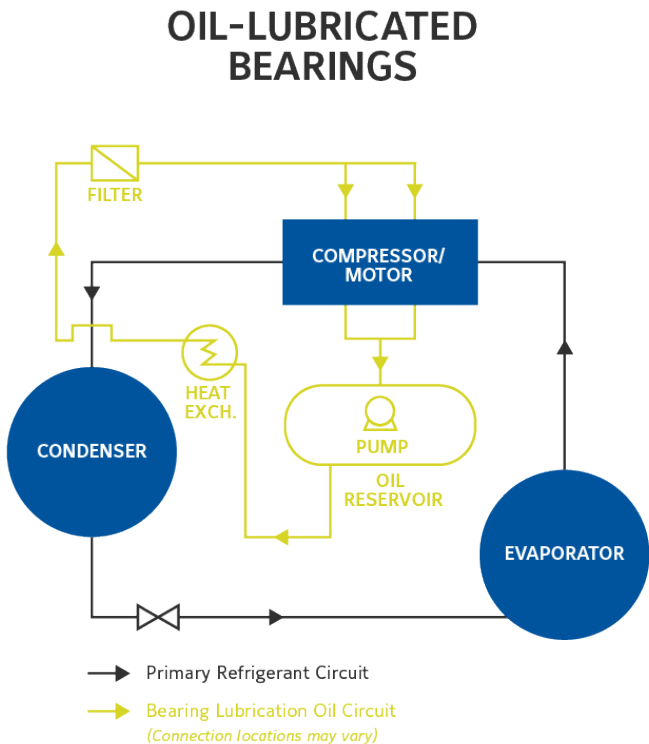
- 磁浮轴承 → 较宽的转速范围, 系统简单& 易维护
- 制冷剂润滑的滚动轴承 → 转速范围有限, 系统较复杂& 较难维护

R1233zd(E): Lower compressor speeds increases options

- Mag bearings → wide speed range, low complexity & maintenance
- Refrigerant lubricated ball bearings → limited speed range, high complexity, high maintenance/replacement

YZ轴承的选择: 磁浮轴承---零润滑!
Magnetic bearings. *Lubrication free* !

YZ优势: 系统简单、高效、低维护费用。
Simple, High efficiency, Low maintenance driveline



压缩机级数的选择--- 选择范围宽。 实际能效决定选择！

Options are wide. Real World Energy Efficiency makes the choice simple.

R1233zd(E): 低转速，同样的选择

- 单级→ 更好的部分负荷性能，低系统复杂程度
- 双级→ 配经济器后满负荷性能优势，系统较复杂，制冷剂轴承所需的低转速的匹配。

R1233zd(E): Lower speeds, same options

Single stage → better part load performance, lower complexity

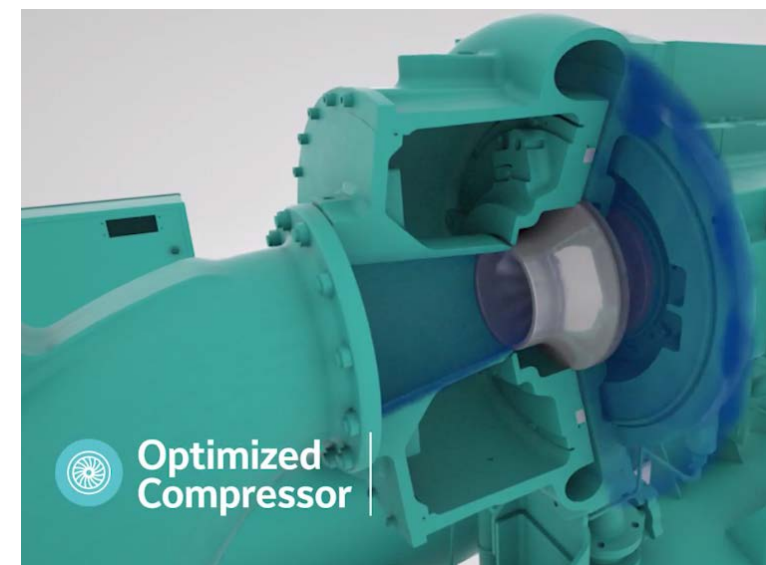
Two stage → full load efficiency benefit (of interstage economizer), higher complexity, required to stay under speed limits of refrigerant lubricated bearings

YZ的选择： 单级压缩。并运用VSD/VGD来最优调节负荷运行，以最优化部分负荷性能。

YZ优势： 最简化系统，最小化系统运行费用。

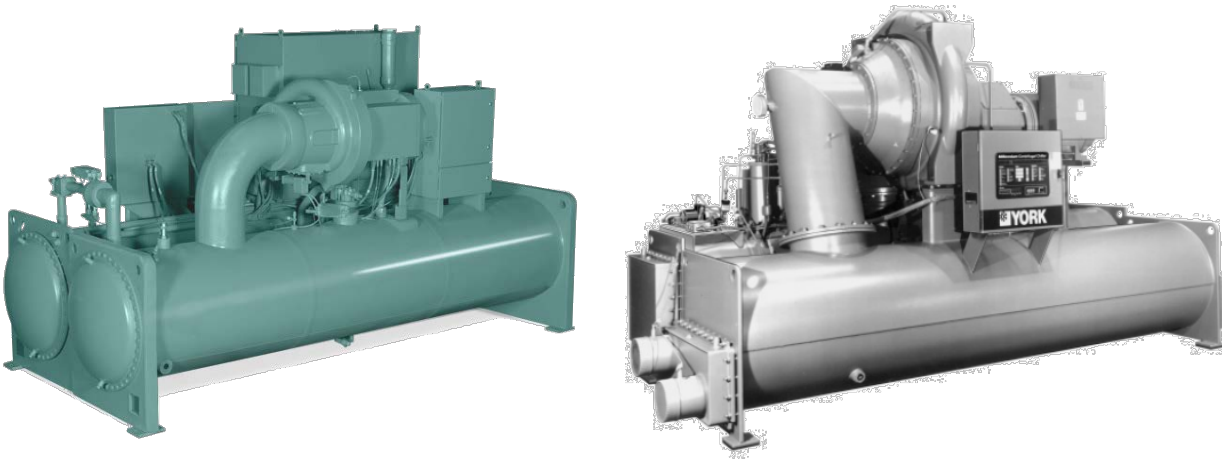
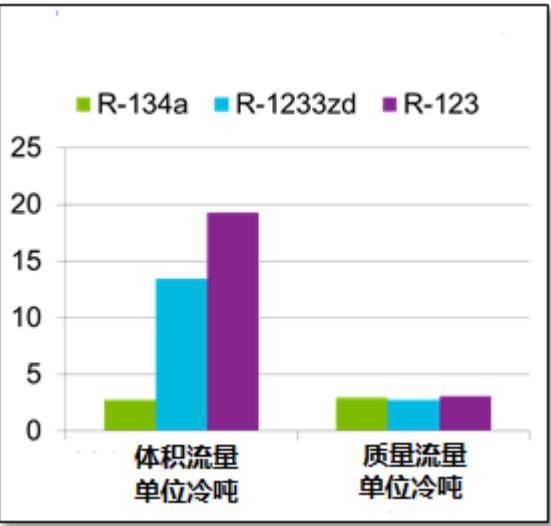
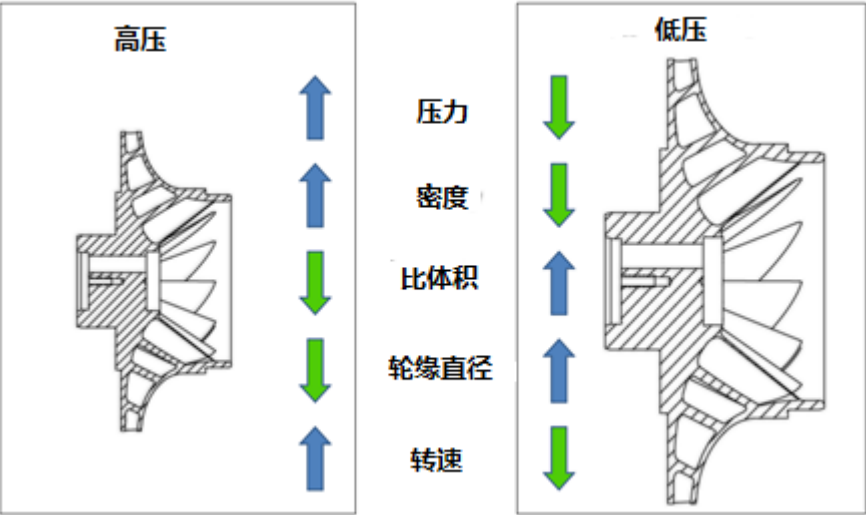
YZ Technology: Single stage compressor

YZ Customer Benefit: Maintains our commitment to delivering *real world customer* value (minimize operating expenses and environmental footprint)



压缩机---低压冷媒，尺寸变成一个重要的设计因素

Compressor---With low pressure refrigerant, size becomes an important design factor



R134a: 紧凑的压缩机不需要驱动设计的额外选择

R1233zd(E): 单位冷量下体积流量的增加使得压缩机需要紧凑设计

R134a: Compact compressors do not drive design choices

Low Pressure: Increased volumetric flow required leads to larger impellers and housings

压缩机---低压冷媒，尺寸变成一个重要的设计因素

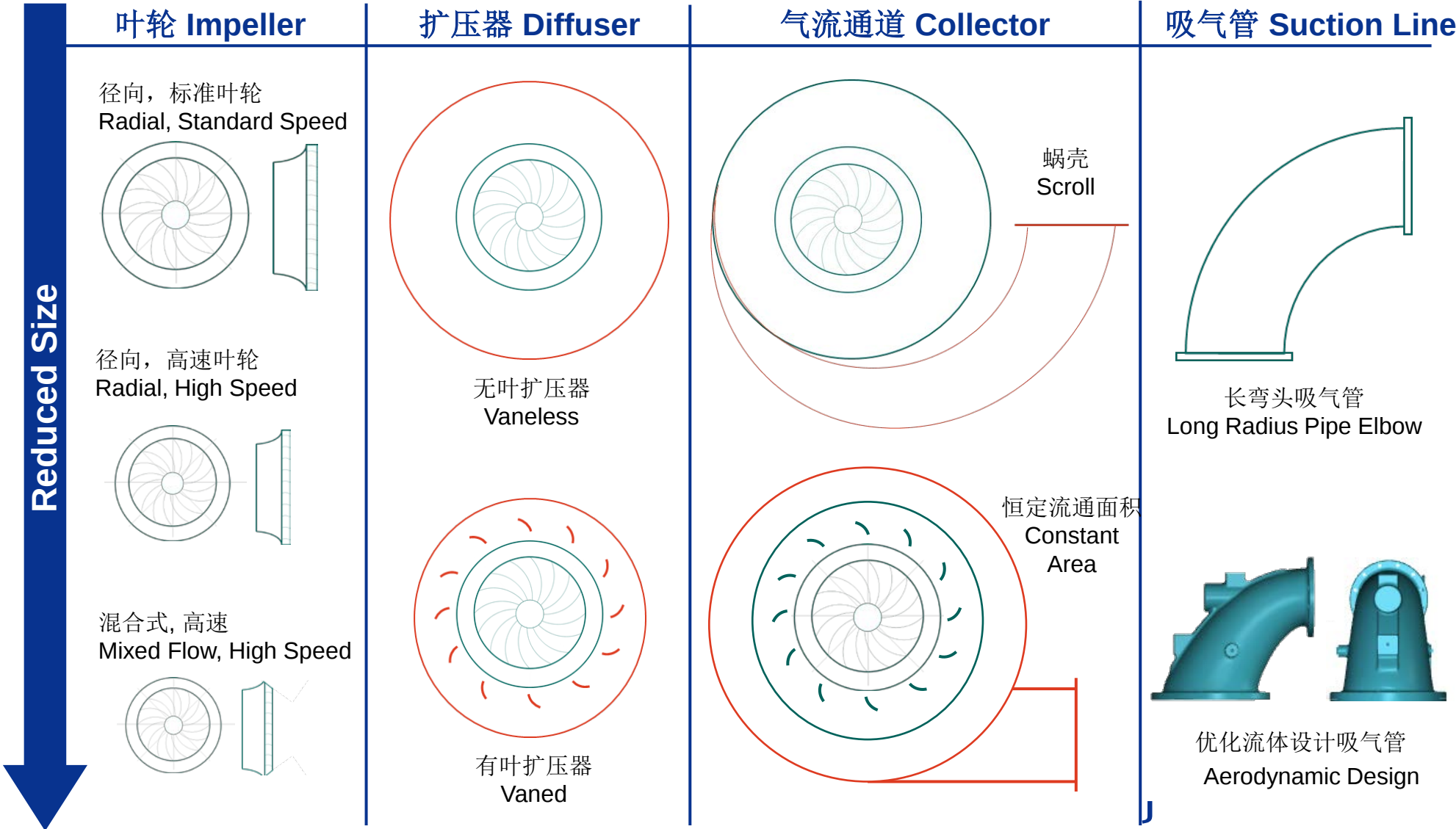
Compressor---With low pressure refrigerant, size becomes an important design factor

每个设计点都需要兼顾！

- 效率
- 尺寸
- 冷量
- 成本
- 可制造性
- 噪音

Each design choice has its pros / cons:

- Efficiency
- Size
- Capacity
- Cost
- Manufacturability
- Sound

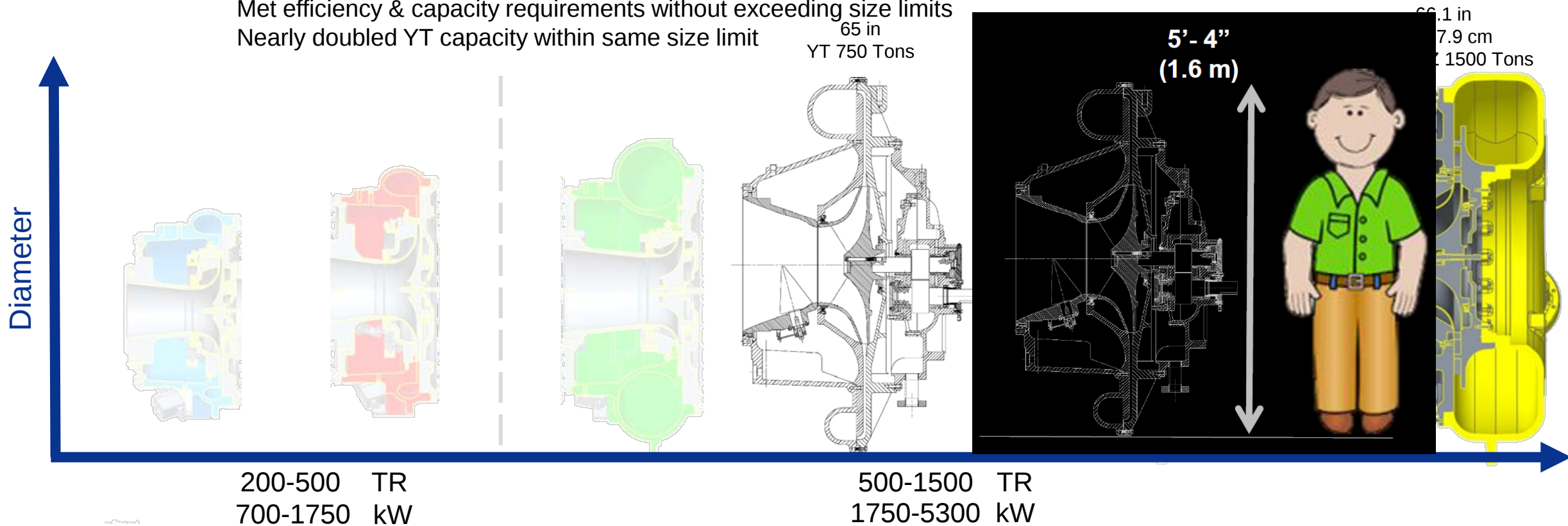


压缩机---低压冷媒，尺寸变成一个重要的设计因素

Compressor---With low pressure refrigerant, size becomes an important design factor

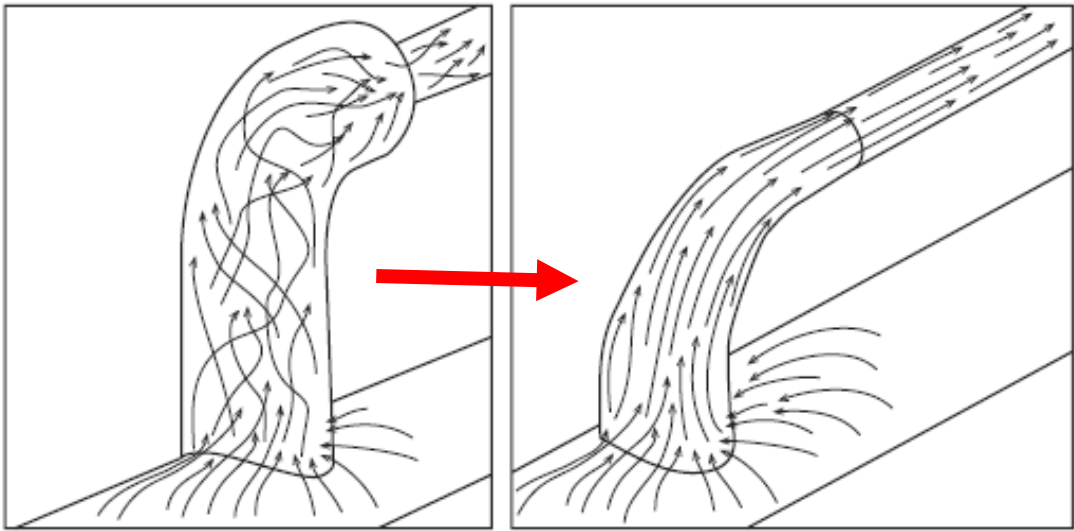
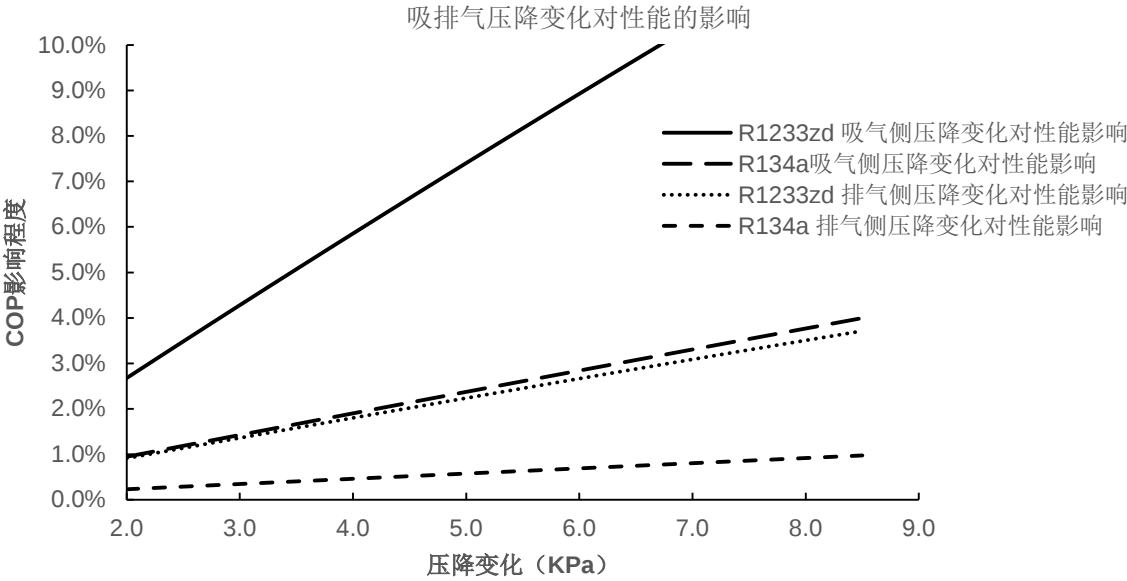
YZ: 在冷量范围内两种不同的流体设计
满足性能&冷量的要求，且没有超出尺寸限制
在同样的尺寸下几乎达到了老机组双倍的冷量

YZ Technology: Two different scalable aerodynamic designs across capacity range
Met efficiency & capacity requirements without exceeding size limits
Nearly doubled YT capacity within same size limit

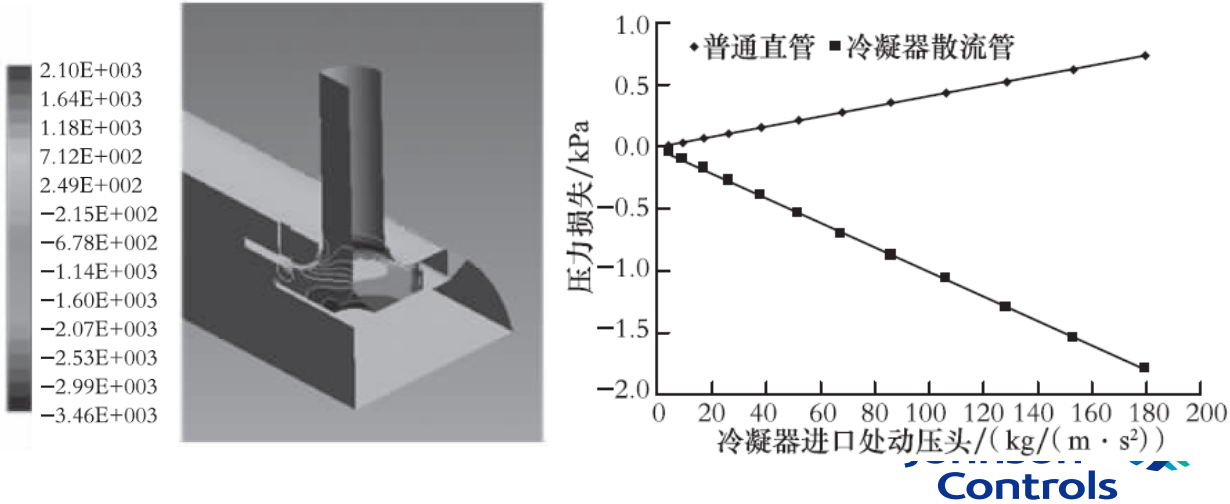


针对R1233zd (E) 管路压降的优化---压降“威胁”性能

Optimized Pressure Drop in pipe design --- Pressure Drop “Kills” Performance

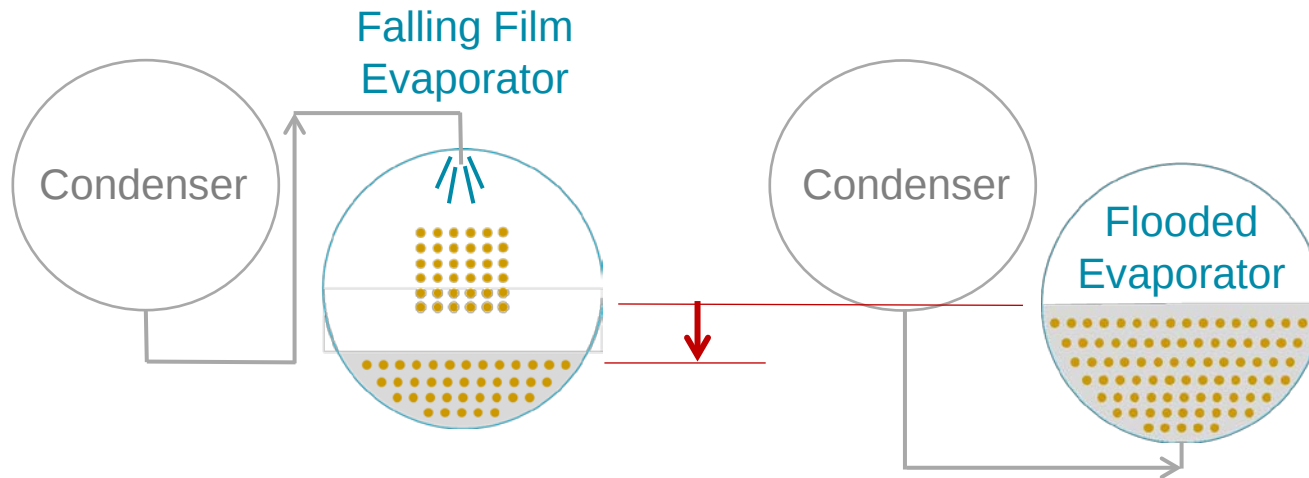


YZ : 优化流线型专利设计,最小化压降, 最优化性能
Patented Optimized design to minimize pressure drop and maximum performance



蒸发器--- 低压冷媒的挑战

Evaporator---Low pressure refrigerant challenges



R1233zd(E): 多重挑战 (与机遇并存)

- 蒸冷压差有限
- 分配器压差有限
- 小压头工况满足
- 淹没效应对性能的影响

R1233zd(E): Multiple evaporator challenges (and opportunities)

Far less differential pressure to 'move' refrigerant
Refrigerant pump complexity and cost could be needed
Must be able to operate at *real world* conditions (low ECWT)
Submergence effect in evaporator has increased performance impact

YZ: 降膜式蒸发器 Falling film Evap

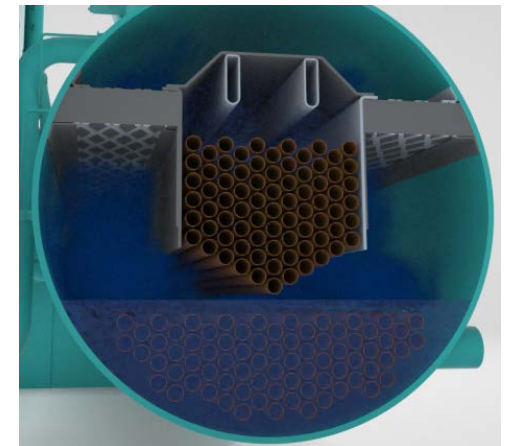
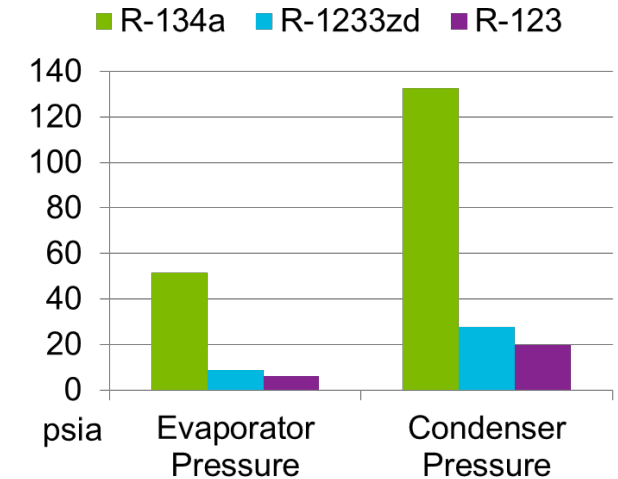
YZ的优势:

- 运行工况覆盖满液设计;
- 最小化筒径设计---最小化冷媒充注量---最小化浸入效应
- 创新的分配系统设计满足了最小压头的设计

YZ Customer Benefit:

YZ's design maintains *real world* operating capabilities and minimizes refrigerant charge / vessel diameter
YZ's refrigerant distribution system solved the low pressure 'moving' challenge without a refrigerant pump (reducing complexity)

Low Differential Pressure



抽气装置设计---低压冷媒特性使空气向机组内泄露

Purge System---With low pressure refrigerant leaks can let air into the chiller

R134a: 高压冷媒意味往外泄露

R1233zd(E): 需要设计抽气装置将不凝性气体排出机组外

R134a: Higher pressure means leaks always go out (not in)

R1233zd: Require a purge system to remove non-condensables in the event of a leak

YZ 的设计:

- 单独的制冷循环设计将分离储罐中的制冷剂和空气. 排气泵将空气排出.
- 自主设计和制造. 满足ASHRAE 147的排放标准要求.
- 机组控制中心联控控制。

YZ Technology:

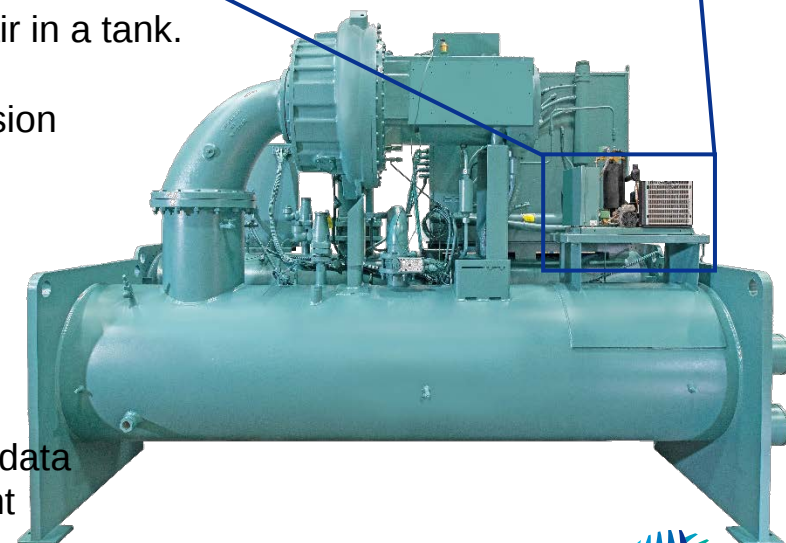
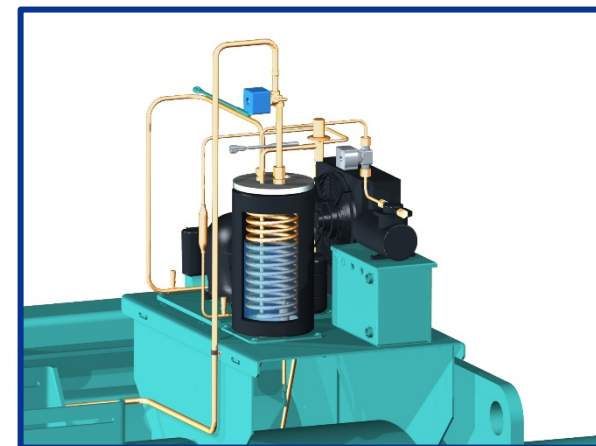
- Compressor driven purge using refrigeration effect to separate refrigerant and collect air in a tank. Vacuum pump empties tank.
- JCI designed and manufactured system. Meets ASHRAE 147 without secondary emission filter/canister; may offer as future option.
- Controlled directly by OptiView panel

YZ 优势:

- 机组控制中心使抽气装置的运行数据连接售后维修的数据库
- 专利设计的机组控制算法根据机组运行状态使抽气装置最小化运行。

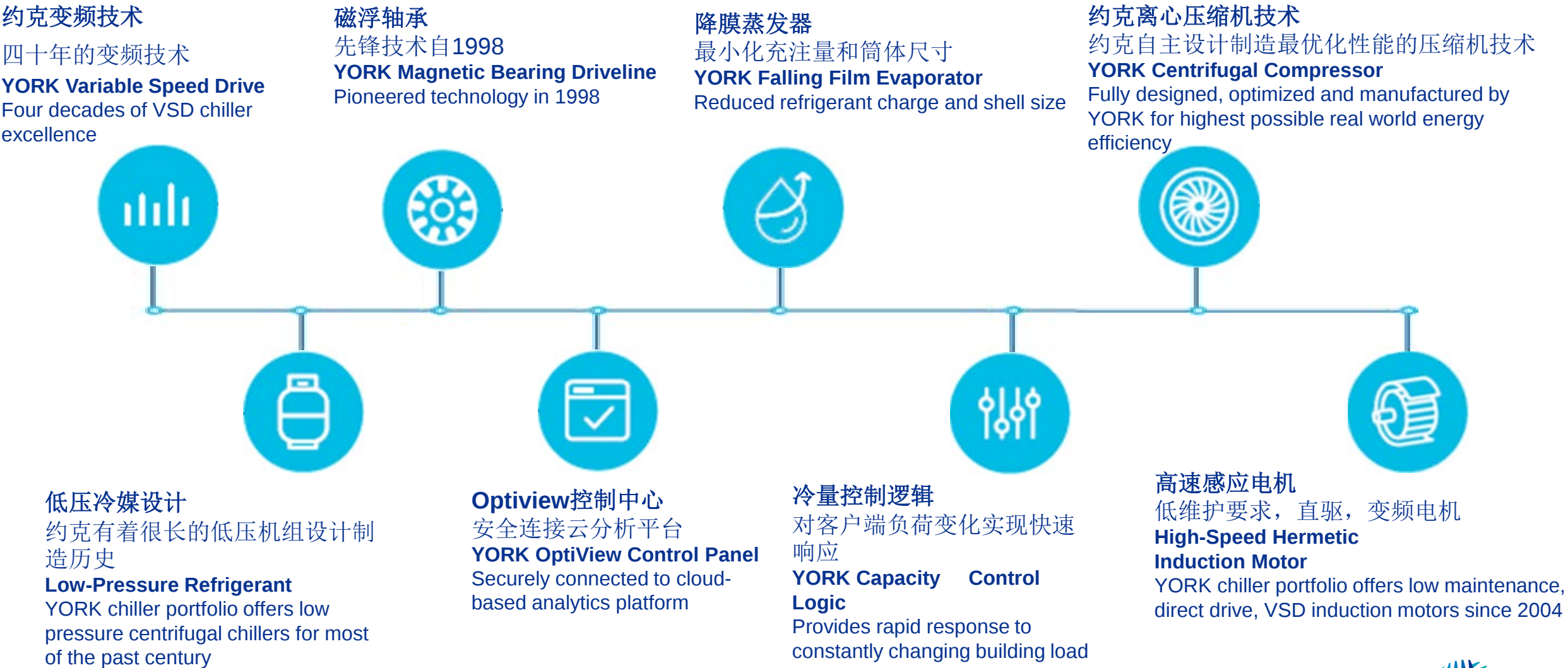
YZ Customer Benefit:

- OptiView based control design makes purge operation accessible to Connect Service data
- New control algorithm uses chiller operational data to minimize purge operation (patent pending)



YZ沿用了优质的技术平台，加上了创新点

YZ builds on a proud tradition of leading the HVAC industry through innovation that adds value





Up to 7% Better IPLV
Up to 5% Better Full Load

Q&A