TSX Series ultra-low temperature freezers

Green benefits

- Energy efficient—uses 25–42% less energy than conventional-refrigerant, ultra-low temperature freezers
- Save an additional 10–18% energy at a –70°C setpoint

The TSX Series freezer's V-drive technology is designed to detect conditions such as multiple door openings and adjust to a higher compressor speed when required.

Introduction

We are committed to designing our products with the environment in mind—it's part of how we enable our customers to make the world healthier, cleaner, and safer. This fact sheet provides the rationale behind the environmental claim that the Thermo Scientific™ TSX Series ultra-low temperature freezers are 25–42% more energy efficient compared to conventional-refrigerant freezer models.

Product description

The TSX Series ultra-low temperature freezers feature V-drive technology, designed to provide temperature uniformity that adapts to your environment—to help protect samples and offering energy savings. While conventional-refrigerant, ultra-low temperature freezers use single-speed compressors that continually cycle on and off, the V-drive runs at variable speeds, adjusting cooling performance to the conditions inside and outside the freezer. When conditions are stable, the V-drive runs at a low speed, which helps reduce energy consumption while maintaining a stable temperature for sample protection. When there are frequent door openings or samples being added to the freezer, the system detects the activity and increases the drive speed.

Available in two sizes, the TSX400 Series freezer shown here can hold up to 400 boxes in an 8.46 sq. ft. footprint while the TSX600 Series freezer can hold up to 600 boxes in an 11.38 sq. ft. footprint.

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In addition to these energy-saving features, the TSX Series freezers use coolants compliant with the US Environmental Protection Agency's Significant New Alternative Policy (SNAP) program [1], which helps to reduce environmental impact and further increase cooling efficiency. The foam insulation is also water-blown, which helps reduce chemical emissions and outgassing, common in other foam products. Finally, the quiet operation of the TSX Series freezers (45.5–47.5 dB) allows them to be located conveniently inside the lab.

Green features

Energy efficient

The TSX Series ultra-low temperature freezers use 25–42% less energy to operate at –80°C compared to the conventional-refrigerant Eppendorf® F570 and Panasonic® MDF-U76VC and MDF-U56VC freezers (Table 1). Power consumption for competitive models was based on published specifications from the respective manufacturers. For the TSX Series freezers, power consumption was measured with the temperature set to –80°C. Power consumption (kW) was measured for a 24-hour span to determine energy consumption (kWh). Measurements were conducted at ambient temperature, similar to typical laboratory conditions. Choosing the TSX600D freezer over the Panasonic MDF-U76VC freezer would help save more than 2,000 kWh of energy over the course of a year. This represents 1.6 tons of CO_2 equivalents, or the greenhouse gas emissions from driving 3,947 miles in an average passenger car [2]. Additional energy savings can be obtained by running the TSX Series freezers at a –70°C setpoint (6.5 kWh/day for the TSX400D and 7.8 kWh/day for the TSX600D—a 10–18% additional savings on energy usage when compared to the –80°C setpoint). In addition to these energy savings benefits, the TSX Series emits less heat into the room, which may help lower HVAC costs. A TSX400D emits 1,122 BTU compared to 2,374 BTU from a conventional-refrigerant freezer; TSX600D emits 1,233 BTU compared to 2,500 BTU for its comparable conventional-refrigerant freezer [3]. This represents a win for us, our customers, and the planet.

References

1. www.epa.gov/snap
2. US EPA Greenhouse Gas Equivalencies Calculator, http://www.epa.gov/cleanenergy/energy-resources/calculator.html, accessed June 16, 2016.
3. Based on internal testing comparing TSX400D and TSX600D to Thermo Scientific TSU400D and TSU600D models.

Table 1. Comparison of energy usage between TSX Series freezers and conventional freezers during operation at –80°C.*

Freezer model	Power usage (kW)	Run time (hr)	Energy usage (kWh)	Energy use reduction
TSX400D	0.33	24	7.9	31%
Eppendorf F570	0.48	24	11.5	
TSX400D	0.33	24	7.9	37%
Panasonic MDF-U56VC	0.58	24	12.48	
TSX600D	0.36	24	8.6	25%
Eppendorf F570	0.48	24	11.5	
TSX600D	0.36	24	8.7	42%
Panasonic MDF-U76VC	0.58	24	15.12	

* Data for competitive models is from published specifications as of September 2016.

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