

TSX Series ultra-low temperature freezers



Greener by design™



Less hazardous: use of refrigerants with low Global Warming Potential, contain water-blown insulation with 0 Global Warming Potential and Ozone Depleting Potential



Less waste: made with recycled stainless steel and aluminum, and produced in a certified zero-waste manufacturing facility



More energy efficient: ENERGY STAR® certified (12 TSX models), save an additional 34–37% energy at a -70°C set point and products are created in plants that use 100% renewable energy



Responsibly packaged: uses foam plank with 60% recycled content and corrugated cardboard with 43% recycled content



Extended life: Have a 12-year warranty*, longer than other comparable products on the market

*Applies to TSX Universal Series ULT freezers only.

Learn more at thermofisher.com/greenerbydesign

Introduction

We are committed to designing our products with the environment in mind. This fact sheet provides the rationale behind the environmental claims that Thermo Scientific™ TSX™ Universal Series ultra-low temperature (ULT) freezers and Thermo Scientific™ TSX™ Core Series ULT freezers are **certified under the latest ENERGY STAR® 2.0 standard**, which sets more stringent energy efficiency and performance benchmarks than earlier versions. Manufactured in U.S. facilities powered by 100% renewable energy—including **a certified zero-waste manufacturing site** – these freezers are more energy efficient than conventional-refrigerant models, use less hazardous refrigerants and insulation, incorporate recycled metals and packaging, and carry a longer warranty than comparable products on the market.

Product description

The TSX Series ULT freezers (Figure 1) feature our next-generation Universal **V-drive adaptive control technology, designed to minimize energy consumption without sacrificing sample security.** While conventional ULT freezers use single-speed compressors that continually cycle on and off, the V-drive runs the compressors at variable speeds, adjusting cooling performance to the cooling demands inside and outside the freezer. When conditions are stable, the V-drive controls the system at 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. Additionally, the TSX Series ULT freezers operate at under 44 dB, a noise level similar to that of a library [1]; this allows them to be located conveniently inside the lab.



Figure 1. TSX Universal Series ULT freezer Available in four sizes, the smallest unit, the TSX40086, shown here, can hold up to 400 standard 2" cryo boxes in a 8.21 sq. ft. footprint, while the largest unit, the TSX70086 freezer, can hold up to 700 boxes in an 14.26 sq. ft. footprint.

Green features

Less hazardous

In 2015, we committed to a more sustainable future by aligning with international regulatory efforts to reduce the use and emissions of greenhouse gases, known as hydrofluorocarbons (HFCs). TSX Series freezers use non-hydrofluorocarbon (non-HFC) refrigerants, which help reduce environmental impact and further increase cooling efficiency. HFC refrigerants have been identified by the U.S. Environmental Protection Agency [2] and European Commission [3] as powerful greenhouse gases with significant global warming potential. Thermo Fisher has phased out use of these refrigerants in our freezers and refrigerators opting instead for more sustainable hydrocarbon alternatives that have a significantly lower Global Warming Potential (GWP) than other comparable products on market (Figure 2). Also, the foam insulation has a 0 GWP and Ozone Depleting Potential (ODP) and is water-blown, which helps reduce the chemical emissions and outgassing that are common with other foam products.

Less waste

TSX Series ULT freezers are built using steel and aluminum with recycled content – up to 70% of each unit is comprised of recycled metals.* Our commitment to waste reduction extends throughout our operations, with manufacturing conducted in [certified zero-waste-to-landfill status](#). At least 90% of non-hazardous waste is diverted from landfill, waste-to-energy, and incineration, including the recycling of steel and copper manufacturing scrap.

More energy efficient

TSX Series ULT freezers are among 12 models certified under the latest ENERGY STAR® 2.0 standard, which sets more stringent energy and performance benchmarks than earlier versions. Independent certification confirms both efficiency and sample protection.

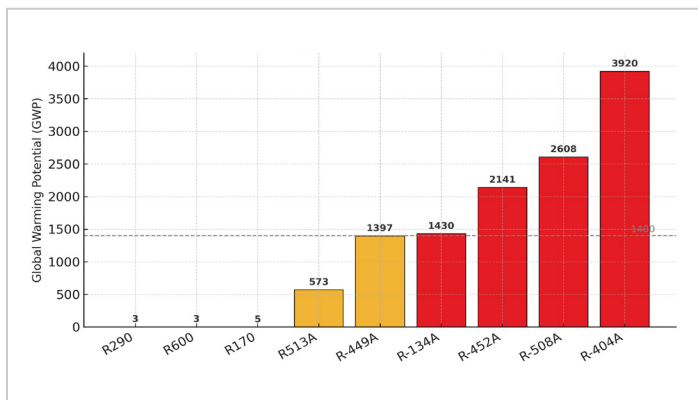


Figure 2. Common refrigerant global warming potentials.

TSX ULT freezers comparable to other and prior products.

Proven efficiency vs. conventional freezers:

- Competitors in the same class use **significantly more energy than TSX models**.
- **Eppendorf F570h** consumes **15% more energy** than the TSX40086FA.
- **Haier DW-86L578J** consumes **36% more energy** than the TSX40086FA.
- **Eppendorf F740hi** consumes **58% more energy** than the TSX60086FA.
- **Haier DW-86L828JA** consumes **35% more energy** than the TSX60086FA.
- At a -70°C set point, TSX freezers **save an additional 34–37% energy**, with daily usage as low as 4.9–5.1 kWh/day.
- Choosing TSX60086FA over the Eppendorf F740hi alone **saves ~1,640 kWh/year**, equal to 0.68 metric tons of CO_2 (\approx driving 1,700 miles) and about \$207/year in energy costs.

Designed for long-term savings:

- Lower heat emission into the lab reduces strain on HVAC systems, further cutting operational costs.

Balanced performance:

Unlike some ULT designs that cut energy at the expense of temperature stability or door-opening recovery, TSX freezers are engineered to deliver both sustainability and uncompromised sample protection.

**https://www.energystar.gov/products/lab_grade_refrigerators_freezers

*Post-consumer/post-industrial content percentages vary by material lot and subcomponent part.

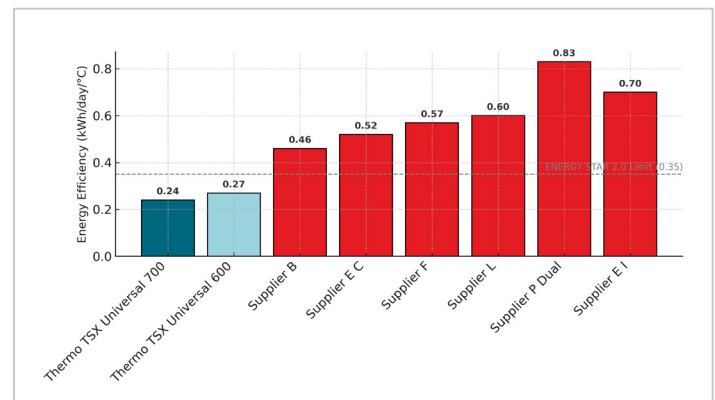


Figure 3. Energy Efficiency of ULT Freezers vs ENERGY STAR 2.0

Responsibly packaged

Beyond the product itself, we have also implemented more responsible packaging for the TSX ULT freezers. The packaging for these units includes corrugated cardboard with 43% recycled content (33% post-consumer and 10% post-industrial) and polyethylene foam planks with 60% post-industrial recycled content. Additionally, these material types are recyclable [6].

Extended life

We confidently stand behind our products and offer a longer warranty as compared to other comparable products on the market. Our TSX Universal ULT freezers have a 12-year warranty, two years longer than the typical ULT freezer lifespan. When moving from a 10-year unit life to a 12-year unit life by

providing this warranty means 17% fewer units produced, shipped and disposed each year.

In order to capture all the sustainability benefits of these new products, we also completed review and labeling through My Green Lab's ACT™ Label 2.0 program, which provides a third-party verified Environmental Impact Factor for each product. Learn more about the ACT label at act.mygreenlab.org.

Product carbon footprint (PCF) data for TSX freezers is provided through My Green Lab's ACT™ ecolabels and is also available upon request for customers and tenders, supporting transparent sustainability reporting.

Table 1. Comparison of energy usage between TSX ULT freezers and conventional freezers operating at -80°C.*

Freezer model	Capacity (cu. ft.)	Power usage (kWh/cu. ft./day)	Daily energy usage (kWh/day)	Energy use reduction	Annual CO ₂ equivalents (metric tons)	**Average annual operational cost
TSX40086FA	19.31	0.36	6.95		1.1	\$320
TSX40086CA	19.31	0.36	6.95		1.1	\$320
Eppendorf F570h	19.48	0.41	7.99	15%	1.2	\$367
Haier DW-86L578J	20.52	0.46	9.44	36%	1.5	\$434
TSX60086FA	28.79	0.27	7.77		1.2	\$357
TSX60086CA	28.79	0.27	7.77		1.2	\$357
Eppendorf F740hi	26.1	0.47	12.27	58%	1.9	\$564
Haier DW-86L828JA	29.09	0.36	10.47	35%	1.7	\$481

*energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/3417896, energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2376235, energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/3417884, energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2319106.

**Based on \$0.1260 current commercial energy cost from EPA.

References

1. IAC Acoustics. Comparative examples of noise levels. industrialnoisecontrol.com/comparative-noise-examples.htm
2. U.S. Environmental Protection Agency. SNAP program. epa.gov/snap
3. European Commission. Fluorinated greenhouse gases. ec.europa.eu/clima/policies/f-gas_en
4. U.S. Environmental Protection Agency. Greenhouse Gas Equivalencies Calculator. epa.gov/energy/greenhouse-gas-equivalencies-calculator
5. Based on an energy rate of \$0.1260 as reported by the United States Energy Information Administration as the national average commercial rate. eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a
6. US Environmental Protection Agency, Advancing Sustainable Materials Management: 2015 Tables and Figures. epa.gov/sites/production/files/2018-07/documents/smm_2015_tables_and_figures_07252018_fnl_508_0.pdf; polyethylene foam is recyclable in only a limited number of communities having appropriate recycling facilities.

Reference sites

thermofisher.com/greenerbydesign | thermofisher.com/actlabel | thermofisher.com/csr

 Find out more at thermofisher.com/ult

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