

# TSG Series small-capacity undercounter refrigerators

## 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 Thermo Scientific™ TSG Series undercounter refrigerators are energy efficient.



## Green benefits

- **Energy efficient**—With ENERGY STAR™ certification, uses 5–30% less energy than comparable models

## Product description

The TSG Series small-capacity undercounter refrigerators are powered by Phononic™ solid-state refrigeration technology and are designed to meet the rigorous and demanding cold-storage requirements of health care, research, and industrial applications where reliable performance is required. The TSG Series refrigerators bring cutting-edge innovation and energy efficiency to refrigeration by incorporating solid-state technology instead of traditional refrigeration methods—enabling you to reliably maintain highly demanding storage conditions for breast milk, medication, analyzer kits, reagents, and even cell culture media, while enjoying increased storage capacity to get more done in less space. You can achieve this all while using less energy and releasing very minimal heat into the work environment.

Powered by the innovative solid-state cooling technology by Phononic refrigeration, the TSG Series refrigerators provide excellent performance without the need for a toxic, bulky compressor. This makes the TSG series refrigerators a more environmentally friendly solution to protect samples, save energy, and free up valuable cooling space. While conventional refrigerant units use single-speed compressors that continually cycle on and off, the



combination of cold-wall and forced-air mechanisms helps ensure that conditions are optimal for the most demanding applications such as vaccine or pharmaceutical storage.

In addition to these energy-saving features, the TSG Series refrigerators use non-hydrofluorocarbon (HFC) coolants, helping to further reduce environmental impact and increase cooling efficiency. HFCs have been identified by the United States Environmental Protection Agency [1] and European Commission [2] as having significant global warming potential (GWP). So we are phasing out use of these coolants in our freezers and refrigerators in favor of more environmentally friendly alternatives that also offer better cooling efficiency. Additionally, the foam insulation of these products is water-blown rather than chemical-blown, which helps reduce the chemical emissions and outgassing that are common with other foam products.

Our commitment to environmental responsibility doesn't end there. Our refrigerators and freezers are manufactured in a zero waste–certified facility, meaning more than 90% of all the waste generated at our manufacturing site is diverted from landfill [3]. Finally, the TSG Series refrigerators operate at just 42 dB, a noise level similar to that of a library [4], allowing them to be located conveniently inside a lab rather than relegated to the hallway.

## Green feature Energy efficient

The TSG Series refrigerators are ENERGY STAR marked, meeting established ENERGY STAR certification criteria for lab-grade refrigerators and freezers. The TSG Series refrigerators use 5% less energy to operate than the

Helmer Scientific HB105 model refrigerator and 30% less energy than our previous model, the Thermo Scientific™ General-Purpose Undercounter Refrigerator (Cat. No. MR05PA-SEEE-TS, Table 1). Power consumption (inkW) for the TSG Series and Helmer Scientific models is based on ENERGY STAR specifications with the temperature set to +4°C. Power consumption was measured for a 24-hour span to determine the energy usage (inkWh/day). The Thermo Scientific general-purpose model was also set at +4°C over a 24-hour period. Measurements were conducted at ambient temperature, similar to typical laboratory conditions. The “energy use reduction” percentage shows the energy efficiency gain when switching to the specified TSG model from other models shown.

Choosing the TSG Series refrigerator over the general-purpose model would reduce energy use by 30%, saving more than 330 kWh of energy over the course of a year. This saving represents 0.25 tons of CO<sub>2</sub> equivalents, or the greenhouse gas emissions from driving 618 miles in an average passenger car [5]. It also translates into annual energy cost savings of just over \$35 [6], based on commercial-sector electricity rates. In addition to these energy savings benefits, the TSG Series refrigerator emits far less heat into the room, which could also help lower heating, ventilation, and air conditioning (HVAC) costs. The TSG Series refrigerator emits 213 BTU [7], compared to 395 BTU from the general-purpose model.

**Table 1. Comparison of energy usage between TSG Series undercounter refrigerator and comparable models.**

Refrigerator model	Energy usage (kWh/day)	Energy use reduction by switching to TSG model	Cat. No.
Thermo Fisher Scientific	2.17	NA	TSG505SA*
Helmer Scientific	2.29	5%	HB105**
Thermo Fisher Scientific	3.1	30%	MR05PA-SEEE-TS†

\* [energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2318693](http://energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2318693)

\*\* [energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2307153](http://energystar.gov/productfinder/product/certified-lab-grade-refrigeration/details/2307153)

† Data on file.

## References

1. [epa.gov/snap](http://epa.gov/snap)
2. [ec.europa.eu/clima/policies/f-gas\\_en](http://ec.europa.eu/clima/policies/f-gas_en)
3. 90% diversion is based on internal audits. Certification is pending.
4. [industrialnoisecontrol.com/comparative-noise-examples.htm](http://industrialnoisecontrol.com/comparative-noise-examples.htm)
5. US EPA Greenhouse Gas Equivalencies Calculator, [epa.gov/energy/greenhouse-gas-equivalencies-calculator](http://epa.gov/energy/greenhouse-gas-equivalencies-calculator), accessed 15 August 2018
6. Calculated from United States energy rates in the commercial sector, available at [eia.gov/electricity/monthly/epm\\_table\\_grapher.cfm?t=epmt\\_5\\_6\\_a](http://eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a), accessed 6 June 2018.
7. [assets.thermofisher.com/TFS-Assets/LED/Datasheets/TSG505SA-technical-data-sheet.pdf](http://assets.thermofisher.com/TFS-Assets/LED/Datasheets/TSG505SA-technical-data-sheet.pdf)

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