Thermo Scientific BIOS Bioprocessing Centrifuges

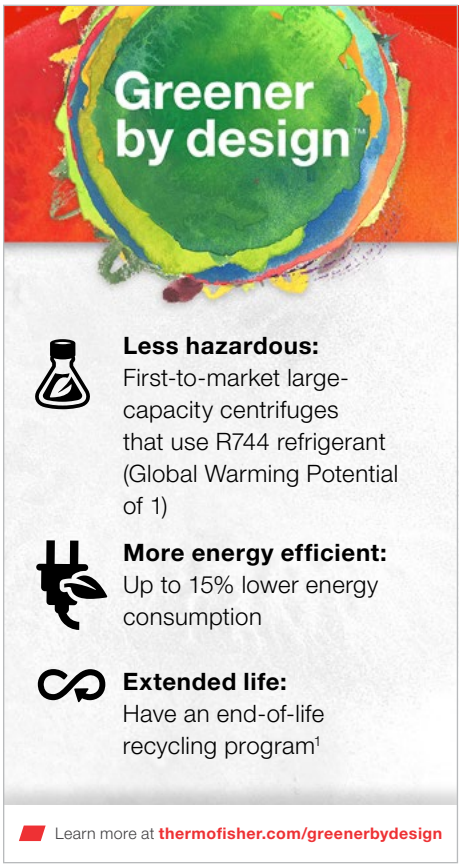

Figure 1. Thermo Scientific BIOS A and BIOS 16 Centrifuges

Introduction

We are committed to designing our products with the environment in mind. This fact sheet helps provide the rationale behind the environmental claims that the Thermo Scientific™ BIOS A and 16 Bioprocessing Centrifuges with GreenCool™ Technology are more energy efficient, contain less hazardous refrigerants and have an end-of-life recycling program as compared to prior models and other centrifuges currently on the market.

Product description

BIOS A and 16 bioprocessing centrifuges with GreenCool Technology bring outstanding power and enhanced sustainability to blood processing centers. Featuring a natural refrigerant (CO_2) cooling system, these centrifuges significantly reduce the environmental impact with a Global Warming Potential (GWP) of 1 and comply with upcoming EU and US EPA F-gas regulations.

The BIOS series also possess class-leading features such as the Thermo Scientific™ Eco-Spin™ Windshielded Rotors with reduced energy consumption.

Green features

Less hazardous

Thermo Fisher Scientific is committed to a more sustainable future by supporting U.S. Environmental Protection Agency and European Commission's efforts to transition to greener refrigerants by replacing hydrofluorocarbon (HFC) refrigerants. HFC refrigerants have been identified by the U.S. EPA and EU Commission as powerful greenhouse gases with significant global warming potential.

Thermo Fisher Scientific is in the process of phasing out the use of these refrigerants in centrifuge products and are replacing them with more sustainable, natural refrigerant alternatives that have a significantly lower Global Warming Potential (GWP).

The BIOS centrifuge series utilizes R744, a natural, stable non-flammable refrigerant that has a lower GWP as compared to other refrigerant options commonly used in refrigerated floor-standing centrifuges (Table 1).

More energy efficient

The centrifuges are more energy efficient with the use of R744 when compared to other refrigerants such as R452A and even R600A. BIOS A centrifuge has a 15% lower energy consumption when compared to the legacy Thermo Scientific™ Sorvall™ BIOS A model measured for a 1-hour run at maximum spin speed. The energy consumption of BIOS 16 centrifuge is 14% lower compared to the legacy Sorvall BIOS 16 centrifuge that utilized R-449A HFC/HFO refrigerant (Table 2).

Windshielded rotors (BIOS 16 model)

BIOS models can be operated with the Thermo Scientific™ Eco-Spin™ Windshielded Rotors, which use up to 64% less energy than non-windshielded designs of the same rotor body (Figure 2/Table 3).

Choosing BIOS 16 centrifuge with the windshielded rotors reduces energy use by an average of 57%. For the 16 x 500 mL rotor size, this would be equivalent to saving 3,919 kWh of energy over the course of one year when in use for 4 hours per working day. The savings represent 2.6 metric tons of CO_2 equivalents, the greenhouse gas emissions from driving 6,705 miles in an average passenger car[2]. It also translates into energy cost savings of $534 annually[3], based on commercial sector electricity rates.

Figure 3. Thermo Scientific 8 x 2,000 mL Windshielded Rotor

Fiberlite rotor (BIOS A model)

Fiberlite rotors offer additional benefits that extend their useful lifespan beyond that of rotors made from aluminum and other metals. Carbon fiber composite rotors are corrosion-resistant, unlike metal rotor surfaces that can be damaged by moisture, chemicals, or alkaline solutions. Fiberlite rotors are also fatigue-resistant, which mitigates the effects of substantial load or stress that—due to high rotational speeds and repeat cycles—can threaten metal rotor structure by causing it to stretch and change in size. Such changes can limit rotor life or lead to failure (Table 4). Fiberlite rotors, by contrast, can be repaired if damaged. They are backed by a 15-year warranty.[4]

Figure 4. Thermo Scientific Fiberlite F6-10x1000 LEX Rotor

Table 1. Comparison of Global Warming Potential (GWP) of natural, synthetic, and hydrofluorocarbon (HFC) refrigerants commonly used in floor-standing centrifuges.

Name	GWP	Refrigerant class
R744	1	Natural (CO_2)
R600A	3	Hydrocarbon (HC)
R449A	1,396	Hydrofluorocarbon (HFC)/ Hydrofluoroolefin (HFO)
R452A	2,140	Hydrofluoroolefin (HFO)

Table 2. Comparison of energy consumption of current and previous Thermo Scientific blood banking centrifuges*

Name	Power consumption
Thermo Scientific BIOS A Centrifuge with GreenCool Technology	5400 W
Legacy Thermo Scientific™ Sorvall™ BIOS A Centrifuge	6400 W
Thermo Scientific BIOS 16 Centrifuge with GreenCool Technology	4600 W
Legacy Thermo Scientific Sorvall BIOS 16 Centrifuge	5400 W

*Energy use measured for a 1-hour run at maximum spin speed and compared to previous model

Figure 2. Power consumption of Thermo Scientific windshielded rotors as compared with non-windshielded designs of the same rotor body.

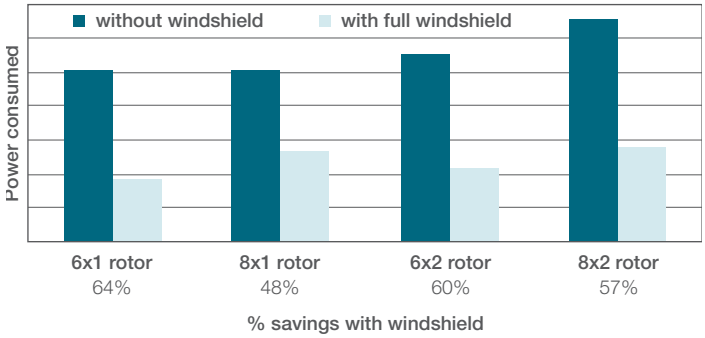

Table 3. Comparison of energy use of centrifuges with and without Eco-Spin windshielded rotors.*

Rotor size	Energy usage with windshield (Wh)	Energy usage without windshield (Wh)	Energy use reduction with windshield
6 x 550 mL	1,834	5,079	64%
8 x 550 mL	2,648	5,061	48%
12 x 500 mL	2,211	5,522	60%
16 x 500 mL	2,782	6,536	57%

* Based on an engineering evaluation of windshielded and non-windshielded designs of the same rotor body. Comparison of Cryofuge 8 and 16, and BIOS 16 centrifuge models with defined rotor size and equivalent centrifuge model on the market.

Extended life

BIOS Centrifuges with GreenCool technology are fully RoHS and WEEE compliant. These units are designed for longevity and when the unit is ready for retirement, we are partnering with reputable and certified recyclers in the United States to offer customers a way to recycle their used instruments. The materials can then reenter the manufacturing stream, which helps reduce additional mining of natural resources. Instructions on how to responsibly dispose of your centrifuge are provided at thermofisher.com/centrifuge-recycling.

Our commitment to environmental responsibility doesn't end there. These centrifuges are manufactured in a certified zero-waste facility[5] in Osterode am Harz, Germany using 100% renewable electricity.

The Thermo Scientific™ BIOS A and 16 Bioprocessing centrifuges with GreenCool Technology are designed for sustainability and energy efficiency while delivering excellent performance and versatility in the bioprocessing space. The improvement of the environmental impact includes a reduction in weight by 60 kg (132 lbs) which makes it much easier to transport and install in the lab. The transition to the innovative GreenCool technology with CO_2 refrigerant enables more energy efficiency and decreasing the environmental impact while preserving outstanding performance.

Table 4. Comparison of average warranty periods for Fiberlite carbon fiber rotor and metal rotors.*

Rotor type	Warranty (years)
Fiberlite carbon fiber rotor	15
Aluminum rotor**	7
Titanium rotor**	5

* Average warranty periods were calculated based on industry averages of years an aluminum or titanium rotor may be covered under warranty per manufacturers' published specifications.

** Warranty coverage may vary by rotor. Please refer to the manufacturer for specific warranty coverage for each rotor.

References

1. Details on recycling program for United States can be found at https://www.thermofisher.com/us/en/home/global/forms/life-science/centrifuge-recycling.html
2. US EPA Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator - Accessed 02 September, 2025.
3. Based on an energy rate of $0.1363 as reported as the national average commercial rate by the US Energy Information Administration: https://www.eia.gov/electricity/monthly - Accessed 02 September, 2025.
4. Subject to standard limited warranty by Thermo Fisher Scientific. See thermofisher.com or contact your sales representative for details.
5. Zero Waste is defined as diverting at least 90% of non-hazardous waste from landfill, waste to energy, and incineration.

Find out more at **thermofisher.com/centrifuges**

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