iCAP MX Series ICP-MS

Introduction

We are committed to designing our products with the environment in mind. This fact sheet provides the rationale behind the environmental claim that the Thermo Scientific™ iCAP™ MX Series ICP-MS uses up to 28% less energy. It is also responsibly packaged using 29% less material by weight and reduced in size by 22%.

Product description

The Thermo Scientific™ iCAP™ MSX Series ICP-MS offers the simplicity and productivity required in analytical testing laboratories, while the Thermo Scientific™ iCAP™ MTX ICP-MS provides the performance and flexibility needed to perform cutting-edge applications in research-oriented and testing laboratories.

Figure 1. iCAP MX Series ICP-MS systems

Green features

More energy efficient

The previous model Thermo Scientific™ iCAP™ RQplus ICP-MS used 34.31 kWh during an 8-hour operating day. The new iCAP MSX ICP-MS uses 24.67 kWh during an 8-hour operating day, reducing the energy use by 28%.[1] The iCAP MTX ICP-MS can be run interchangeably with a dry vacuum pump or the traditional oil vacuum pump, resulting in an energy savings of 25% when paired with the oil pump and 10% when paired with the dry pump (Table 1).

Table 1. Comparison of energy use between the iCAP RQplus ICP-MS and the iCAP MX Series ICP-MS

Model and vacuum pump	Energy usage (kWh/day)	Energy use reduction (%)	Energy usage for one year (kWh/year)	Energy use reduction (kWh/year)
iCAP RQplus (Sogevac™ SV 40 BI Oil Pump)	34.31		8,955	
iCAP MSX (Pfeiffer SmartVane™ 70 Oil Pump)	24.67	28%	6,439	2,516
iCAP MTX (Pfeiffer SmartVane™ 70 Oil Pump)	25.63	25%	6,689	2,266
iCAP MTX (Leybold ECODRY™ 65 plus Dry Pump)	31.06	10%	8,107	848

This savings represents 1.7 metric tons of CO_2 equivalents annually, or the greenhouse gas emissions from driving approximately 4,305 miles in an average passenger car.[2]

The change in energy efficiency is due to the optimized vacuum pumps and decreased pumping speed in stand-by mode. When taking the chiller into account, we can expect an even higher energy efficiency as the new Thermo Scientific™ Qtegra™ ISDS Software controls the chiller, switching it off for stand-by mode.

Responsibly packaged

The weight of the packaging was reduced by 25 kg, which is equivalent to a 29% decrease. This was achieved by changing the material from poplar plywood to lighter softwood, reducing the panel width from 12 mm to 10 mm, and reducing the transport box size by 23% in volume and 22% in footprint (Tables 2 and 3). This translates to less waste from packaging for our customers to manage in their labs.

Table 2. Comparison of packaging weight as waste generated at packaging's end of life

Packaging	Material	iCAP RQ/TQ ICP-MS	iCAP MX Series ICP-MS
Wooden crate		78 kg, poplar plywood	55.5 kg, softwood
ESD bag	Polyethylene	0.4 kg	0.4 kg
Damping foam	Polythene foam (65% recycled material by weight)	2 kg	2 kg
Stainless steel clips	Stainless steel	4.75 kg	1.18 kg
Desiccant bag	Bentonite – natural mineral	0.6 kg	0.6 kg
Packaging weight		**85 kg**	**60 kg**
Weight reduction			**-25 kg**
Waste reduction			**-29%**

Table 3. Comparison of volume and footprint of the packaging transport box

	iCAP RQ/TQ ICP-MS	iCAP MX Series ICP-MS
Length	1,320 mm	995 mm
Width	858 mm	884 mm
Height	1,325 mm	1,312 mm
Volume	**1.5 m^3**	**1.154 m^3**
Volume reduction		**-23%**
Footprint	**1.13 m^2**	**0.88 m^2**
Footprint reduction		**-22%**

Our commitment to environmental responsibility doesn't end there. Our mass spectrometers are manufactured at a fossil fuel-free site in Bremen, Germany, that is ISO 14001:2015 and Zero Waste certified.[3]

Designing the Thermo Scientific iCAP MX Series ICP-MS to generate significantly less packaging waste and operate with up to 28% less energy while still delivering unparalleled performance and flexibility is a win for our customers, our company, and the planet.

References

1. Standard operating procedure to measure energy use: Starting of the instrument with autotune procedures, measuring 8 hours per day. Matrix mode with Tune B analytes, neglecting tuning and startup. Automatic switching off after scheduled measurements. Measuring with SKU only, chillers are not included.
2. US EPA Greenhouse Gas Equivalencies Calculator. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (assuming 8-hour operation on every weekday, annually; accessed December 23, 2024).
3. Zero Waste is defined as diverting at least 90% of non-hazardous waste from landfills, incinerators, and waste to energy.

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