espro® powered by SPS

HEATERS

INNOVATIVE PRODUCTS FOR SEMICONDUCTOR PROCESSES

WWW.ESPROFLOW.COM

092025REV1

Contents

Inline heater

The esPRO® inline heater uses a PFA insulated electrical resistive element heater. It is designed to safely heat acids, bases, DI water and other noncombustible liquids up to 180°C.

- HIGH EFFICIENCY AND PURITY
- HIGH RELIABILITY AND LOW MAINTENANCE
- COMPACT SIZE FOR EASE OF INSTALLATION
- NO NITROGEN PURGE REQUIRED
- SEMI S3, CE & UL COMPLIANT
- POWER RANGE: 1.0 - 40.0 kW
- GROUND WIRE WITH TANTALUM OR PLATINUM TIP
- VARIOUS TYPES OF TEMPERATURE SENSORS AVAILABLE

This series of esPRO® Ultra-Pure Inline Heaters is designed for use in ultrapure environments and industrial fluid heating applications such as Semiconductor-, PCB-, MEMS-, Electronics-, LED-, Flat Panel-, Solar cell Manufacturing, Chemical Processing, Aerospace, Life Science industry and other applications which require the highest standards of purity. Constructed of PVDF or PFA materials, these heaters can be custom designed and built for use with deionized water, acids, and other diverse process chemistries. Our heaters are engineered and made in Germany.

Example of standard inline heater configurations

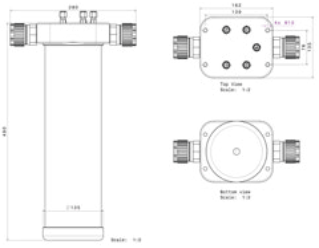
PRODUCT NUMBER	MODEL TYPE	HOUSING MATERIAL	TOTAL KW	VAC	PHASE	AMPS	IN/OUT FITTING	THERMO-COUPLE	GROUND WIRE
ESPRO-LH-T01-A-1-020-G1-A1AP09-3S	T-TYPE	PFA**	2	230	1	8.7	3/4"	Type-J	Platinum
ESPRO-LH-T01-A-1-040-G1-A1AP13-3S	T-TYPE	PFA**	4	230	1	17,4	3/4"	Type-J	Platinum
ESPRO-LH-U01-A-1-040-G1-A1AP0R-5S	U-TYPE	PFA**	4	230	1	17,4	3/4"	Type-J	Platinum
ESPRO-LH-TB2-A-1-060-G1-A1BP0E-3S	T-TYPE	PFA**	6	230	1	26.1	1"	Type-J	Platinum
ESPRO-LH-UB1-A-1-060-G1-A1AP03-5S	U-TYPE	PFA**	6	230	1	26.1	3/4"	Type-J	Platinum
ESPRO-LH-T01-A-1-060-K1-A1AP00-3S	T-TYPE	PFA**	6	400	1	15	3/4"	Type-J	Platinum
ESPRO-LH-TB3-A-1-090-O1-A1AP05-3S	T-TYPE	PFA**	9	480	1	18.8	1"	Type-J	Platinum

* Custom builts are available.
** Other materials, such as PVDF also available. Please contact us for all options!

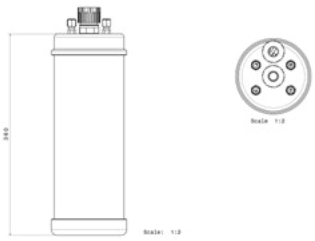
Flexible and custom configurations

In addition to our standard configurations, the esPRO® inline heaters are also available in custom builds to meet your requirements. Our heaters have a variety of options to comply with your requirements, such as various connections, ground wires, controls, and model types (outlet T, U, Z, I and L or special design S-Type). These heaters are drop-in and replace products to fit in your existing manufacturing equipment. Please fill out our configuration sheet on www.esproflow.com or contact sales@esproflow.com

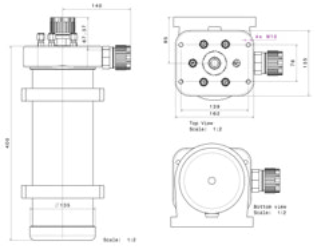
Technical drawings



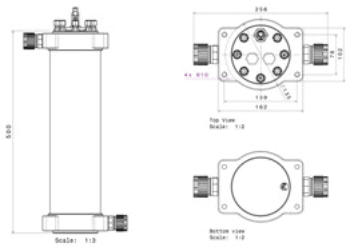
T-type model



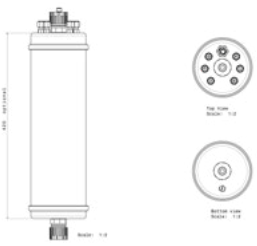
U-type model



L-type model



Z-type model



I-type model

Test reports

All our heaters are delivered including a full individual test report. On the right is an example of a test diagram of general performance for the esPRO® inline heaters:

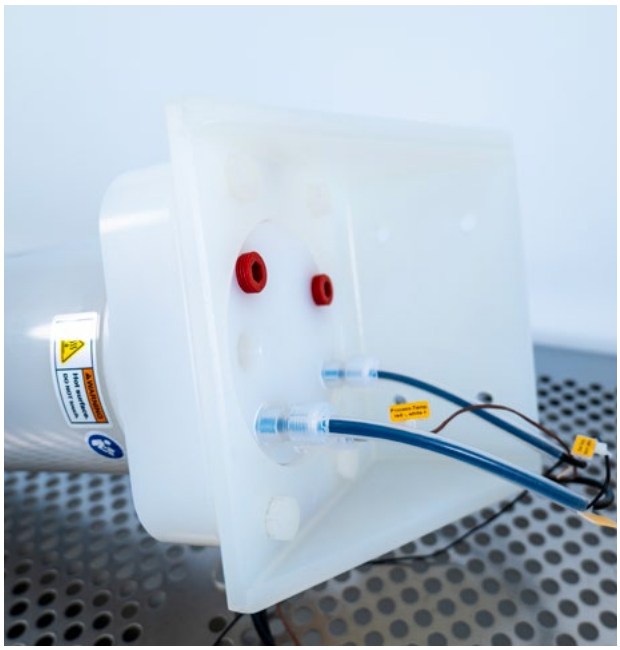
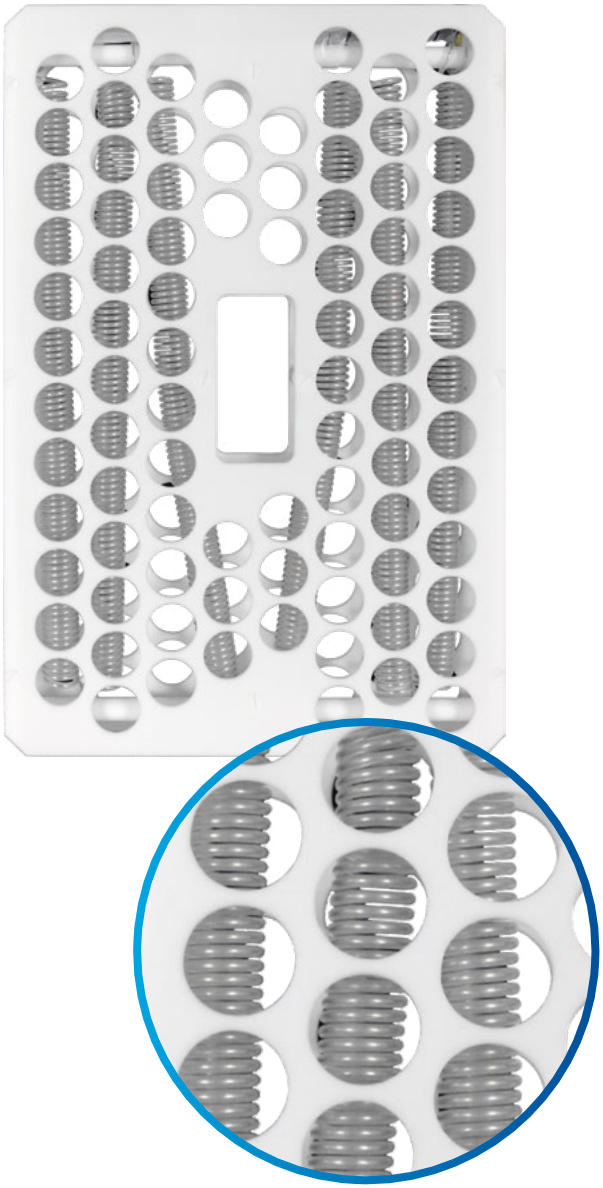


Figure 1: Testing of the esPRO® inline heaters

Immersion heater

The esPRO® immersion heater series heats liquids at a constant temperature. They are ideal for use in the semiconductor, pharmaceutical, and biomedical industries. These compact heaters are designed to integrate easily into PVDF, PFA and quartz process tanks. They safely, evenly and efficiently heat acids, bases, DI water and other noncombustible liquids up to 180°C.



- ULTRAPURE PFA (TEFLON®) WETTED SURFACES
- RELIABLE HEATING OF HARSH CHEMICALS
- EFFICIENT AND EVEN, CLEAN HEATING
- COMPACT DESIGN: MAXIMUM POWER IN A SMALL FOOTPRINT
- SEMI S3 & CE COMPLIANT
- LOW WATT DENSITY; ≤ 4 WATTS/IN²
- GROUND WIRE WITH TANTALUM OR PLATINUM TIP
- VARIOUS TYPES OF TEMPERATURE SENSORS AVAILABLE

The heat source is placed in the fluid to reduce heat loss. The heater's low mass and large surface area provide the fastest temperature response time. The system also offers the most comprehensive safety package with redundant interlocks that are integrated into every system. These rugged and durable heaters come in frame designs, with outputs of 1.0 to 40.0 kW. We can arrange a wide range of custom sizes, wattages, and voltages available, please contact us for all options!

Features

- Ultrapure PFA (Teflon®) wetted surfaces
- Reliable heating of harsh chemicals
- Maximum 180ºC heating capability
- Low Watt Density; ≤4 watts/in²
- Maximum power in compact footprint
- Heaters designed to customer specifications and process tank sizes for easy integration
- Over-temperature safety thermocouple on heater
- Ground wire with Tantalum or Platinum tip
- Perforated top and bottom floor grid as an option
- Available in several standard models, as well as custom builds. Contact us for all options!

Standard configurations

PRODUCT NUMBER	SUITABLE FOR PROCESS TANK SIZE	LENGTH (MM)	WIDTH (MM)	KW	VAC	AMPS
ESPRO-IH-R01-B-TJ-015-G1-040	1 x 4” cassette	180	180	1.5	230	6.52
ESPRO-IH-R01-B-TJ-030-G1-041	2 x 4” cassette	350	180	3.0	230	13.04
ESPRO-IH-R01-B-TJ-015-G1-042	1 x 6” cassette	180	220	1.5	230	6.52
ESPRO-IH-R01-B-TJ-030-G1-043	2 x 6” cassette	360	220	3.0	230	13.04
ESPRO-IH-R01-B-TJ-030-G1-046	1 x 8” cassette	250	280	3.0	230	13.04
ESPRO-IH-R01-B-TJ-050-K1-045	2 x 8” cassette	470	280	5.0	400	12.50

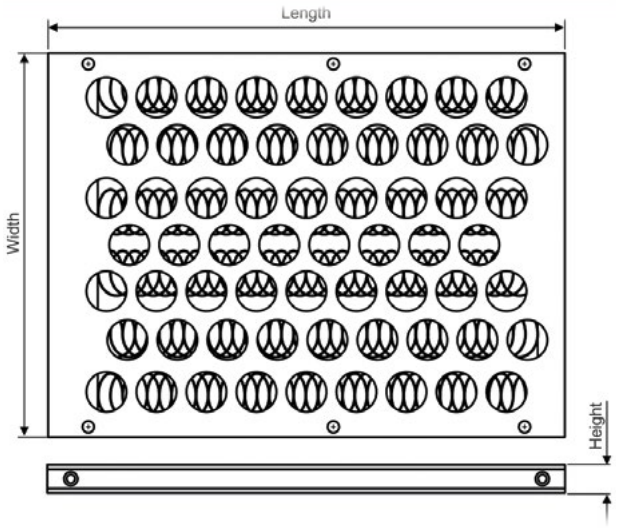
* Custom builts and other voltages are also available. Please contact us for all options!

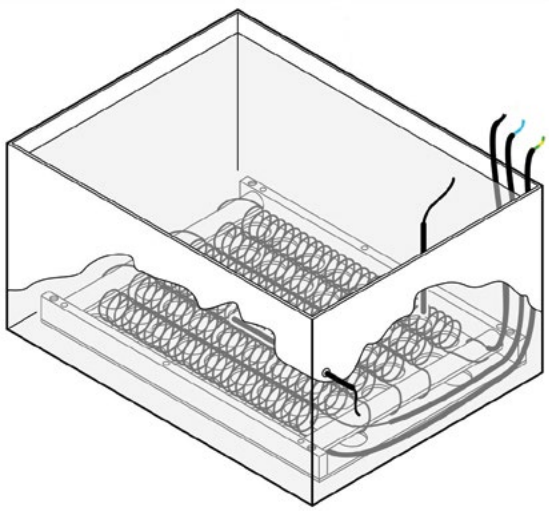
Flexible and custom configurations

In addition to our standard configurations, the esPRO® immersion heaters are also available in custom builds to meet your requirements.

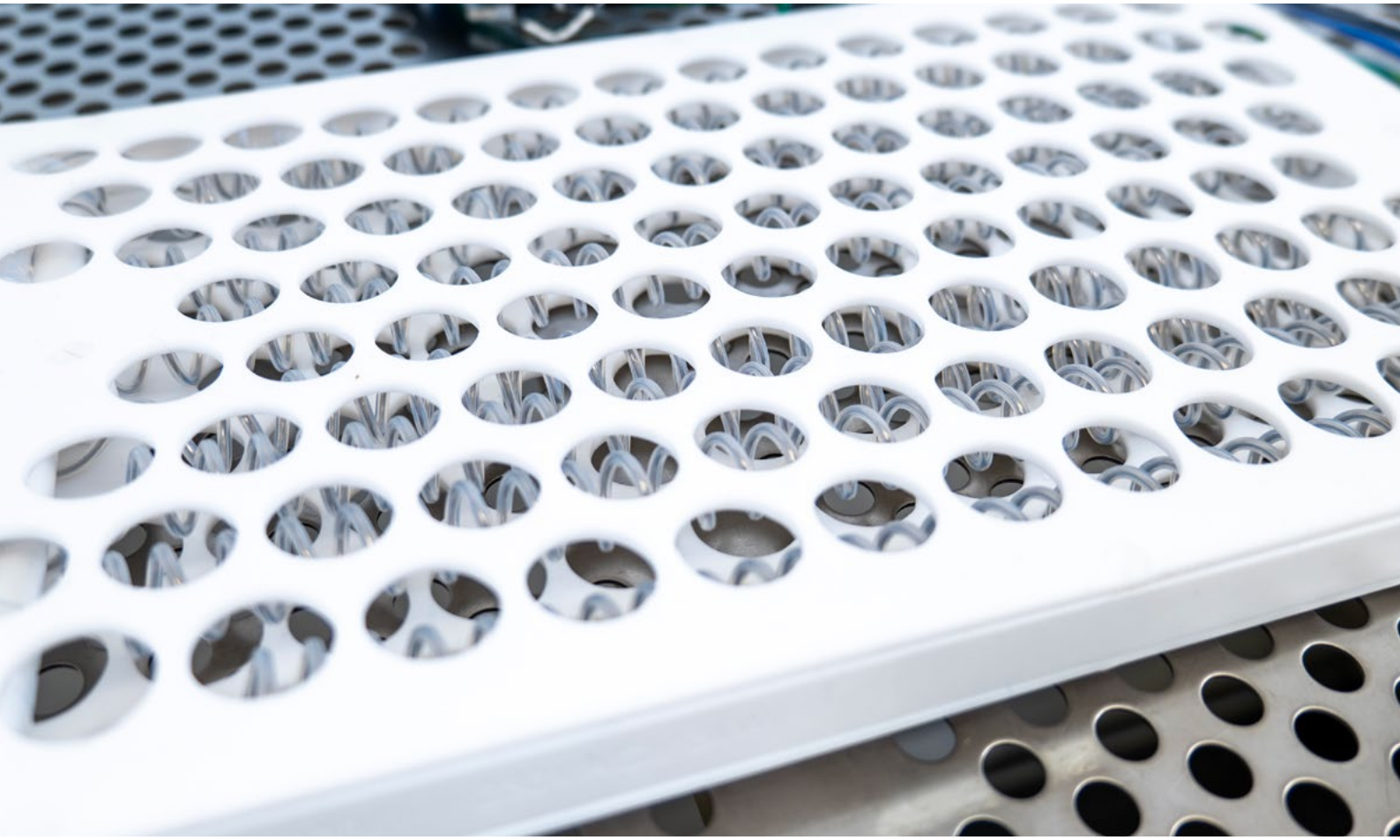
All our heaters are compatible with our quartz tanks, please also see our separate quartz tank datasheet.

Technical drawings





The dimensions (length x width x height) of our immersion heater can be customized.



Tank heater

The esPRO® tank heater series are great for heating high purity chemicals and DI water in storage and supply tanks to a constant temperature. These heaters are ideal for use in the semiconductor, pharmaceutical, and biomedical industries. The tank heaters provide clean heat evenly and efficiently within the liquid volume. Furthermore, they are compact and highly customizable to fit into any size of storage tanks or recirculation tanks. Moreover, wetted surfaces feature all-PFA materials, and may be used in tanks made of PVDF, PFA, or quartz.

- ULTRAPURE PFA (TEFLON®) WETTED SURFACES
- RELIABLE HEATING OF HARSH CHEMICALS
- MAXIMUM 180ºC HEATING CAPABILITY
- MAXIMUM POWER IN A SMALL FOOTPRINT
- LOW WATT DENSITY; ≤ 4 WATTS/IN²
- GROUND WIRE WITH TANTALUM OR PLATINUM TIP
- CUSTOM DESIGNED FOR EASY INTEGRATION
- MULTIPLE STACK CONFIGURATION AVAILABLE

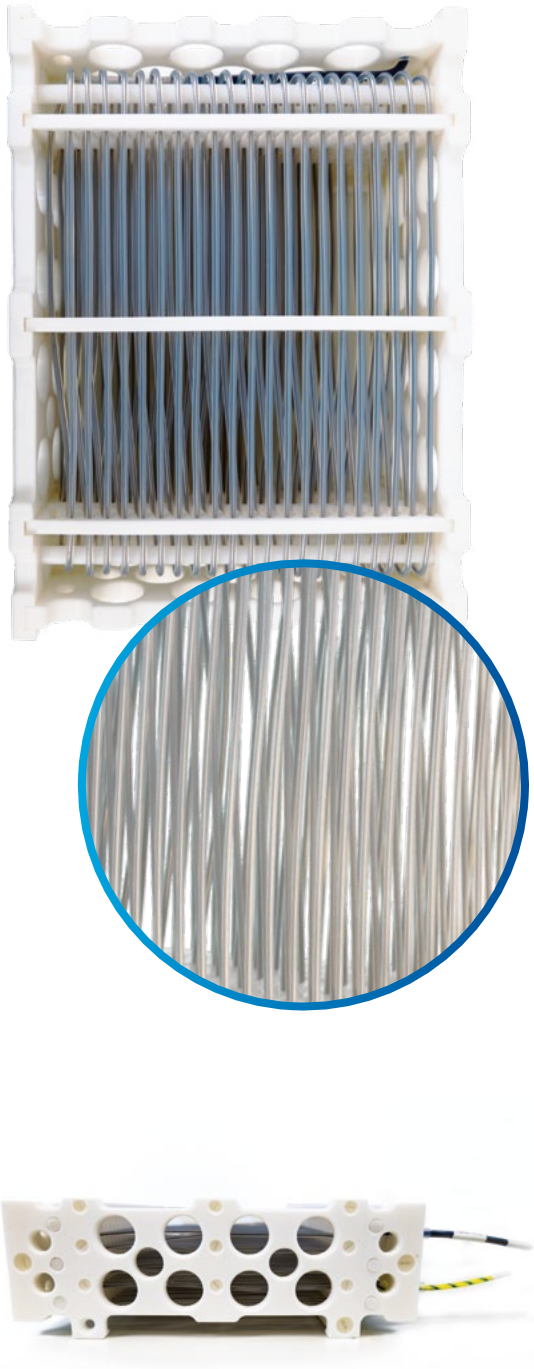


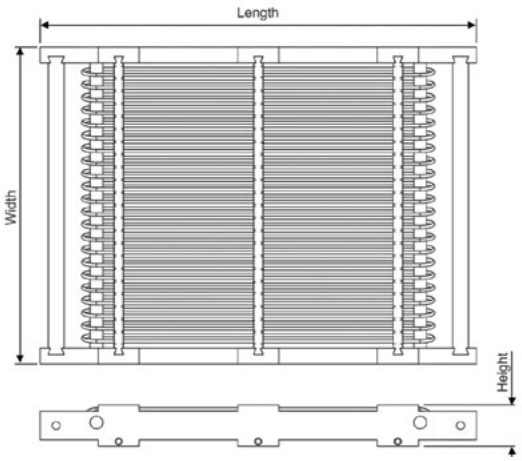
Figure 1: Side view of the esPRO® Tank Heater

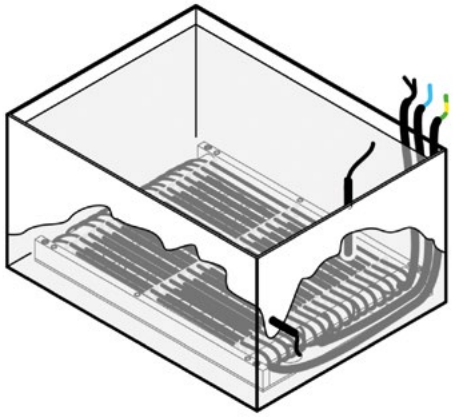
The heat source is placed directly in the liquid to eliminate any heat loss. The heater's low mass and large surface area provide the fastest temperature response time. The displacement volume is minimal due to its open design.

Features

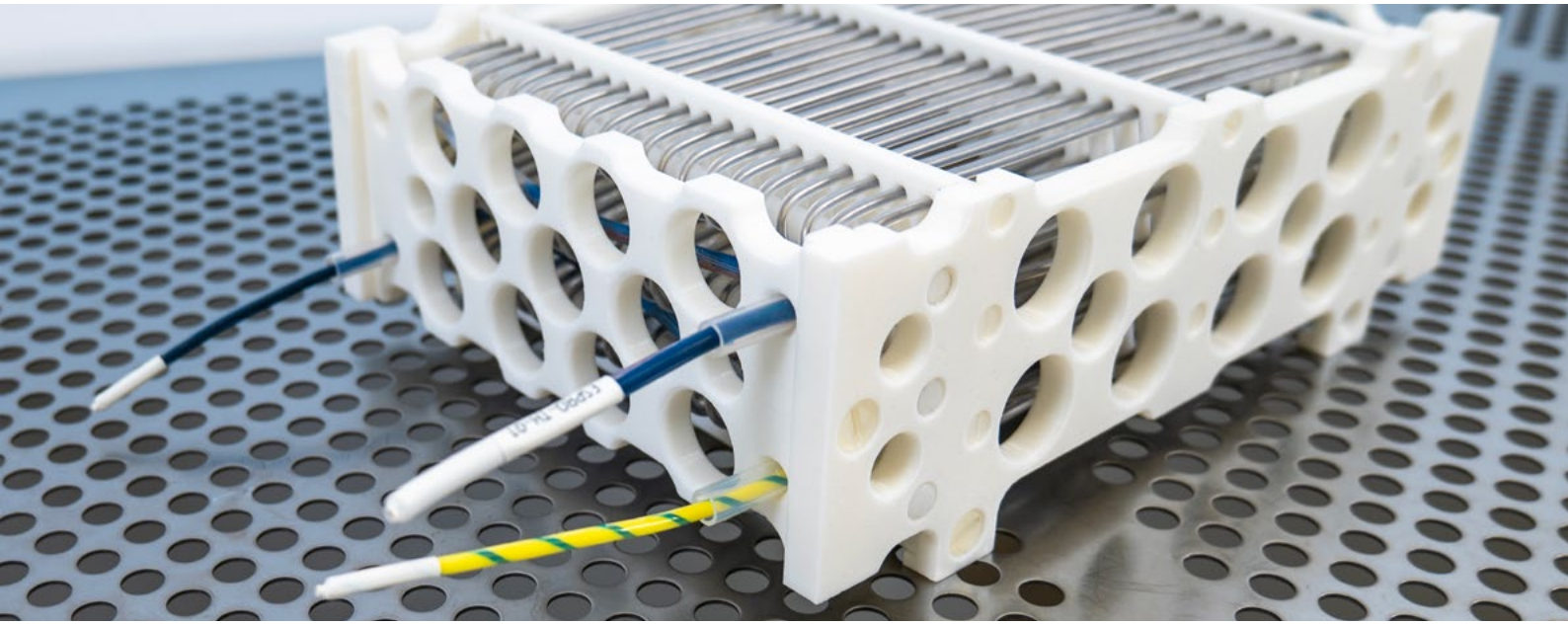
- Ultrapure PFA wetted surfaces
- Maximum 180ºC heating capability
- Low Watt Density; ≤ 4 watts/in²
- Maximum power in small footprint
- Power range from 1 - 40 kW, 100 - 500 VAC, single heater element or delta wired 3-heater elements
- Ground wire with Tantalum or Platinum tip
- Custom designed according to specifications and tank sizes for easy integration and maintenance
- Multiple stack configuration available
- Embedded heater over-temperature sensor included by default. Additional liquid overtemperature and process temperature control sensors are available

Technical drawings





The dimensions (length x width x height) of our tank heater can be customized.



KALOR Stand-Alone heater

Conserve ultra-pure water and energy with our esPRO® KALOR Ultra-Pure DI-Water Stand-Alone heater! This tool utilizes advanced heating technology to reduce water and energy consumption. This is a heated Point-of-Use system with a modular, customizable design, built for reliability and compliance with international standard norms. As it quickly responds to temperature and flow variations -eliminating excessive overshoots and drops in temperature-, KALOR ensures precision heating with seamless integration into your system.

- ULTRAPURE PVDF/PFA WETTED SURFACES
- EASY TO OPERATE, WITH A SMALL FOOTPRINT
- PLUG-AND-PLAY SYSTEM WITH COMPLETE INTEGRATION OF CONTROLS
- NO N_2 PURGE REQUIRED
- NO WASTED, UNHEATED WATER TO DRAIN
- EXCELLENT TEMPERATURE STABILITY

Flexible and custom configurations

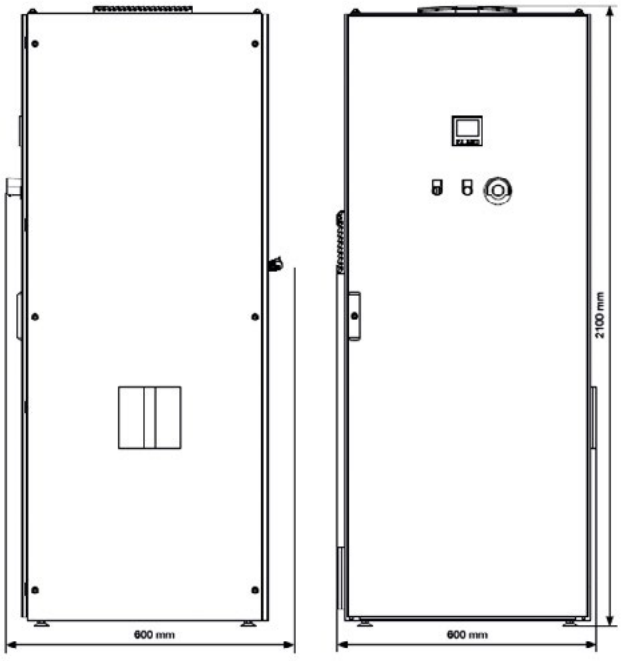
In addition to our standard configurations, the esPRO® Stand-Alone heaters are also available in custom builds. Just contact us at sales@esproflow.com and we will happily work together with you to create the perfect heater to meet your requirements

Key features

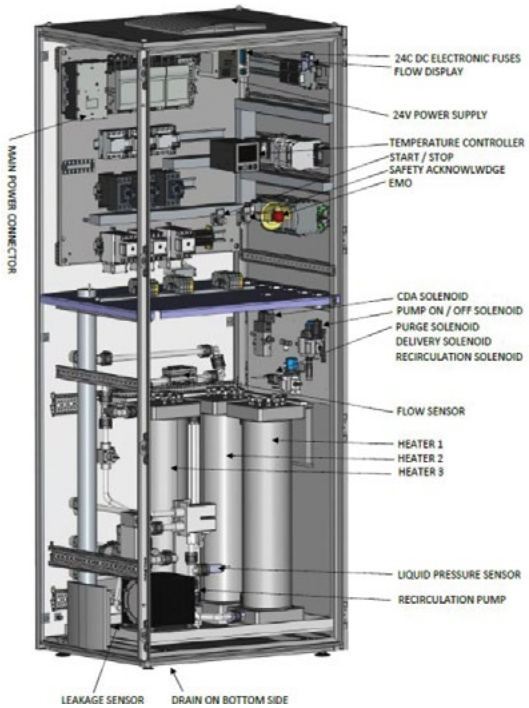
- Up to 240 kW power
- Max. 95ºC heating capability
- Ultrapure PVDF/PFA wetted surfaces
- Smallest footprint for high power applications (600 x 600 mm)
- Easy maintenance with low weight heating elements
- High flow ready (100+ lpm) with 1” connections
- < 5 psi pressure loss at any flow rate
- Temperature control according to flow
- Direct heating for highest efficiency
- Flexible and modular design for best integration in the FAB
- CE and UL compliant
- Optional - Recirculation loop
- Engineered and made in Germany

SPECIFICATIONS	
Wetted surfaces	PVDF/PFA
Sizes	40 - 240 kW (voltage dependent)
Voltages	380 - 480 VAC, 3-ph
Temperature	95º C (203º F)
Temperature accuracy	+/- 0.1º C (usage dependent)
Flow	0.5 - 32 GPM (1.9 - 122 LPM)
Pressure	6 bar @ 95ºC
Efficiency	>99 %

Technical drawings



Standard KALOR heater



KALOR heater - Helios™ replacement type

Conserve ultra-pure water and energy with our esPRO® KALOR Ultra-Pure DI-Water Stand-Alone heater! This tool utilizes advanced heating technology to reduce water and energy consumption. This is a heated Point-of-Use system with a modular, customizable design, built for reliability and compliance with international standard norms. As it quickly responds to temperature and flow variations -eliminating excessive overshoots and drops in temperature-, KALOR ensures precision heating with seamless integration into your system. This specific model is developed as a replacement tool for Helios™ type heaters.

- ULTRAPURE PVDF/PFA WETTED SURFACES
- EASY TO OPERATE, WITH A SMALL FOOTPRINT
- PLUG-AND-PLAY SYSTEM WITH COMPLETE INTEGRATION OF CONTROLS
- NO N_2 PURGE REQUIRED
- NO WASTED, UNHEATED WATER TO DRAIN
- EXCELLENT TEMPERATURE STABILITY

Flexible and custom configurations

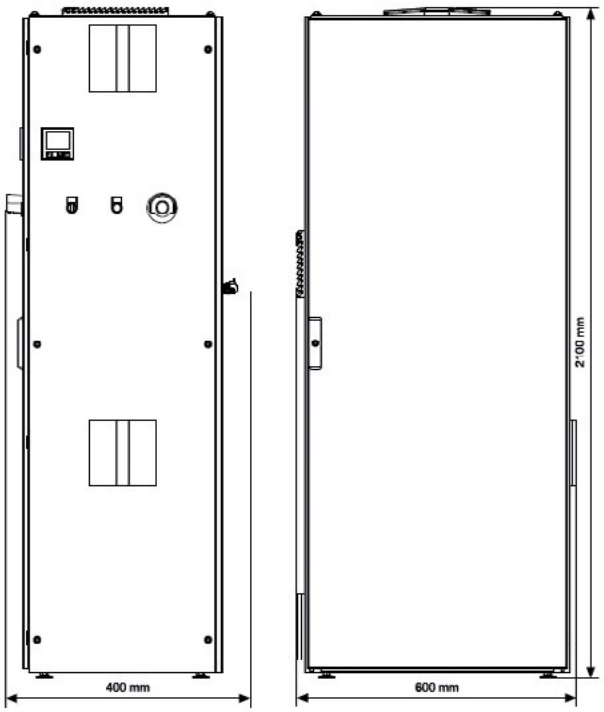
In addition to our standard configurations, the esPRO® Stand-Alone heaters are also available in custom builds. Just contact us at sales@esproflow.com and we will happily work together with you to create the perfect heater to meet your requirements

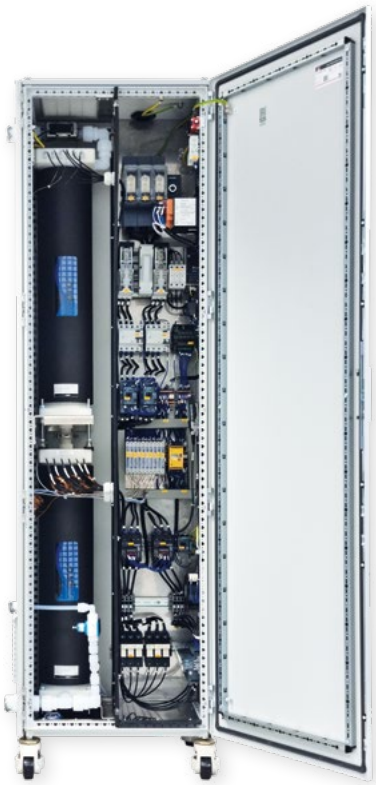
Key features

- Up to 80 kW power
- Max. 95ºC heating capability
- Ultrapure PVDF/PFA wetted surfaces
- Smallest footprint for high power applications (600 x 400 mm)
- Easy maintenance with low weight heating elements
- High flow ready (100+ lpm) with 1” connections
- < 5 psi pressure loss at any flow rate
- Temperature control according to flow
- Direct heating for highest efficiency
- Vertical separation between wet and electric cabinet for best thermal management
- CE and UL compliant
- Engineered and made in Germany

SPECIFICATIONS	
Wetted surfaces	PVDF/PFA
Sizes	40 - 80 kW (voltage dependent)
Voltages	380 - 480 VAC, 3-ph
Temperature	95º C (203º F)
Temperature accuracy	+/- 0.1º C (usage dependent)
Flow	0.5 - 32 GPM (1.9 - 122 LPM)
Pressure	6 bar @ 95ºC
Efficiency	>99 %

Technical drawings





Helios™-type unit - replaces and improves your existing heating processes.

Cabinet heater

Designed for wafer fabs and OEMs, the esPRO® Cabinet Heater delivers ultra-clean, high-performance heating for deionized water (DI-Water). Featuring a fully PFA flow path, this heater minimizes particle entrapment, ensuring contamination-free operation. Our turnkey system integrates multiple heating modules with advanced temperature control, maintaining process integrity while optimizing efficiency. Whether for facility-wide fluid heating or precise Point-of-Use applications, esPRO® Cabinet Heaters provide the reliability and performance your critical processes demand.

- ULTRAPURE PVDF/PFA WETTED SURFACES
- WALL MOUNTED, WITH A SMALL FOOTPRINT
- PLUG-AND-PLAY SYSTEM WITH COMPLETE INTEGRATION OF CONTROLS
- NO N_2 PURGE REQUIRED
- FLEXIBLE DESIGN OFFERING A VARIETY OF POWER REQUIREMENTS AND OPTIONS
- EXCELLENT TEMPERATURE STABILITY

Flexible and custom configurations

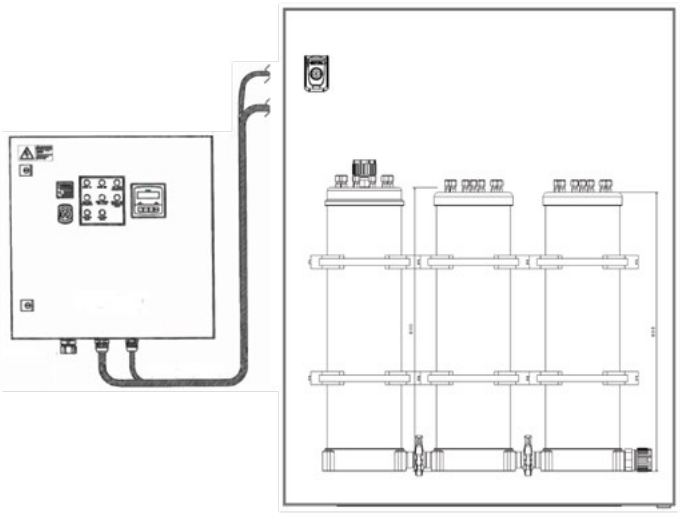
In addition to our standard configurations, the esPRO® Cabinet heaters are also available in custom builds. Just contact us at sales@esproflow.com and we will happily work together with you to create the perfect heater to meet your requirements

Key features

- Up to 200 kW power
- Max. 95ºC heating capability
- Ultrapure PVDF/PFA wetted surfaces
- Smallest footprint for high power applications
- Easy maintenance with low weight heating elements
- High flow ready (100+ lpm) with 1” connections
- < 5 psi pressure loss at any flow rate
- Temperature control according to flow
- Direct heating for highest efficiency
- Heater activation triggered by flow
- Platinum tipped safety ground wire
- Liquid overtemp and heat wire overtemp detection
- CE, Semi S2 & S3 compliant
- Engineered and made in Germany

SPECIFICATIONS	
Wetted surfaces	PVDF/PFA
Sizes	40 - 200 kW (voltage dependent)
Voltages	380 - 480 VAC, 3-ph
Temperature	95º C (203º F)
Temperature accuracy	+/- 0.1º C (usage dependent)
Flow	0.5 - 32 GPM (1.9 - 122 LPM)
Pressure	6 bar @ 95ºC
Efficiency	>99 %

Technical drawings



Heat exchanger

The esPRO® Heat exchanger provides precise and reliable temperature control of chemical solutions. It ensures that chemical baths, such as etching or cleaning solutions, remain at a constant temperature essential for maintaining uniformity and quality of the wafers.

Its multitube design increases thermal efficiency, enabling fast heat exchange between the process fluids and cooling/heating mediums. Its compact design saves space and integrates seamlessly with existing wet process equipment.

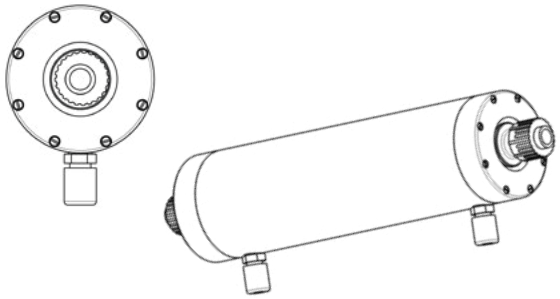
- RESISTANT TO MOST LIQUID CHEMICALS
- HIGH CLEANLINESS
- HIGH THERMAL EFFICIENCY
- COMPACT DESIGN
- HIGH-PURITY PFA TUBING WITH NPP HOUSING

The esPRO® Heat exchanger consists of high-purity fluorocarbon polymers making it long-lasting and resistant to liquid chemicals. It also features superior non-adhesiveness, preventing staining or scaling and ensuring high thermal efficiency can be maintained. The connector is all made of fluorocarbon polymers by means of fusion bonding.

Configuration

ITEM	SPECIFICATIONS
Tubing Material	PFA
Housing material	NPP
Number of tubes	109
Tube size	Ø 3.3 mm x Ø 2.5 mm
Heat exchange surface	0,26 m²
Thermal coefficient	80 - 180 Kcal/m².hr. °C
Max. pressure	0.4 MPa
Operation temperature	5 - 40°C
Connection IN/OUT	¾" S 300 type P-Series Fitting
Dimensions	Ø 110 mm x 402 mm

Technical drawings



HIGH QUALITY FLUID HANDLING SOLUTIONS

At SPS we believe technology moves the world forward. Not only in terms of growth, but also in terms of efficiency and sustainability. We are proud to be a part of an industry that holds the key to a better future for all. And we are extremely driven to help you innovate and improve your semiconductor production processes with innovative products, advice and service.

For that we have manufactured our own esPRO® line of fluid handling products including: flowmeters, pumps, heaters, spare parts and a line of filtration products. Combined with more than 35 years of experience in the semiconductor industry, SPS can truly help and inspire you towards more innovative production and a better future for all.

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