

ETHOS™ Plus Configuration

TECHNICAL SPECIFICATIONS



I HARDWARE

- › Microwave cavity: 316 stainless steel housing with multi-layer of corrosion resistant coating
- › Inlet/Outlet ports: large flange with 36 mm ID. Additional multiple ports on the side walls of the microwave cavity
- › Chassis protected: against acids & solvents with polymer coating on both inner and outer surfaces
- › Door: completely made of stainless steel, safety self-resealing pressure responsive door, automatic door locking system
- › Safety features: four independent door safety interlocks to prevent microwave emission in case of improper door closure or misalignment
- › Exhaust system: built-in, located on the back of the microwave cavity and separated from the electronics to prevent corrosion
- › Video camera: built-in (safeVIEW)
- › Colored LED strips on the top and bottom of the door provide real-time visualization of process status
- › Magnetic stirring (optional): software-controlled in vessel magnetic stirring of solution up to a speed of 3400 rpm
- › Microwave emission: dual magnetron system with rotating diffuser for homogeneous microwave distribution in the cavity. Exclusive magnetron protection from reflected microwave power. Simultaneous microwave emission from both magnetrons
- › Magnetron frequency: 2450 MHz
- › Magnetron output: 2 x 950 Watt, continuous and PID-controlled microwave emission at all power levels
- › Microwave cavity volume: 70,5 L
- › Microwave cavity dimensions: 430 (w) x 400 (d) x 410 (h) mm

I USER INTERFACE

- › Control terminal with 10,1" display, 1280 RGB (H) X 800 (V) resolution. Multiple USB ports for connection with balance, printer, mouse and keyboard
- › Operating software: icon-driven multi-language software (Chinese, English, French, German, Italian, Japanese, Polish, Portuguese, Russian, Spanish, and Turkish), software with multilevel access allowing the user/administrator the edit, save and run a virtually unlimited number of methods
- › Built-in documentation: library of methods (with sample mass/ acid mixture/ microwave program), industry reports, user manual, tutorial videos
- › Rotor diagram visualizes the temperature of individual vessels during the digestion process
- › Additional features: PDF creator; sample table; 21 CFR part 11 compliant; auto-save of the runs; selectable exhaust speed
- › Connection to the network via LAN. Wi-Fi connection optional

I MILESTONE CONNECT POWERED BY AI

- › Web-based platform accessible from any device (PC, tablet, or smartphone)
- › 24/7 AI support through MAIA, the Milestone AI Agent, for troubleshooting, method development, maintenance, and routine tasks
- › User interaction with MAIA via integrated chat or voice commands
- › MAIA Lens for automatic recognition of consumables with step-by-step guidance for maintenance and replacement
- › Knowledge hub with extensive documentation, including spare parts lists, technical notes, user manuals, video tutorials, updated application notes, and a complete library of relevant scientific articles

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| REACTION SENSORS

- › **easyTEMP:** contact-less direct temperature control in all vessels up to 300°C
- › **T1:** direct temperature monitor and control via shielded thermocouple or microwave-transparent fiber optic sensor up to 300°C in a reference vessel
- › **P1:** direct pressure monitor and control up to 100 bar (ca.1500 psi) in a reference vessel
- › **P2:** contact-less pressure monitor and control up to 100 bar (ca.1500 psi) in all vessels

| PRESSURE VESSELS

- › **MAXI-44:** high throughput rotor up to 44 PTFE-TFM-Teflon vessels, with a volume up to 100 mL. Maximum temperature 300°C, maximum pressure 35 bar (ca. 500 psi). Vent & Reseal technology for individual pressure control
- › **MAXI-24 HP:** high throughput and high performance rotor up to 24 positions with PTFE-TFM-Teflon vessels, with a volume of 80 mL. Maximum temperature 300°C, maximum pressure 60 bar (C.a 900 psi). Vent & Reseal technology for individual pressure control
- › **SK-15:** high pressure rotor up to 15 PTFE-TFM-Teflon vessels, with a volume up to 100 mL. Maximum temperature 300°C, maximum pressure 100 bar (ca. 1500 psi). Vent & Reseal technology for individual pressure control
- › **SK-10:** up to 10 TFM-Teflon vessels, with a volume up to 100mL. Maximum temperature 300°C, maximum pressure 100 bar (1500 psi)
- › **Versatility:** with the suitable selection of accessories, ETHOS can perform microwave solvent extraction, solvent-free extraction microwave evaporation/ concentration, microwave synthesis and fusion/ ashing within the same platform

| STANDARD METHOD COMPLIANCE

- › **US EPA 3052:** Microwave-assisted acid digestion of siliceous and organically based matrices
- › **US EPA 3051A:** Microwave-assisted acid digestion of sediments, sludge, soils, and oils
- › **US EPA 3015A:** Microwave-assisted acid leach of aqueous samples and extracts
- › **US EPA 3546:** Microwave extraction of semi-volatile organic compounds, organophosphorus and organochlorine pesticides, chlorinated and phenoxyacid herbicides, substituted phenols, PCBs, and PCDDs/PCDFs, which may then be analyzed by a variety of chromatographic procedures
- › **ASTM D4309-96:** Standard practice for sample digestion using closed-vessel microwave heating technique for the determination of total metals in water
- › **ASTM D-5765:** Standard Practice for solvent extraction of total petroleum hydrocarbons from soils and sediments using closed vessel microwave heating
- › **ASTM D-6010:** Standard practice for closed vessel microwave solvent extraction of organic compounds from solid matrices
- › **RoHS, WEEE and ELV** Suitable for RoHS (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment), WEEE (Waste Electrical and Electronic Equipment) and ELV (End-of-Life Vehicles) sample preparation
- › **ICH Q3D, USP <232>, <233>:** to be implemented respectively Dec, 2017 and Jan, 2018. EMA and ICH Q3D applicable for authorized drug products in the EU and Implementation of USP new chapter <232>/<233>

| GENERAL INFORMATION

- › Dimensions: 545 (w) x 700 (d) x 680 (h) mm
- › Weight: 82 Kg
- › Power supply: 230 V, 50-60 Hz