

# MICROWAVE DIGESTION SYSTEM



## ANTITECK LIFE SCIENCES LIMITED

---

Add: A1-519, XingGang GuoJi, Yingbin Road, Huadu, Guangzhou, China

Tel: +86 133 1286 3972

Web: <https://antiteck.com>

E-mail: [info@antiteck.com](mailto:info@antiteck.com)

## TANK 40

### Microwave Digestion Workstation

- Comprehensive Safety Guarantee
- Excellent Digestion Capability
- Smart Software Functions
- High Reliability
- Versatile Extensibility



#### Main Features

#### Comprehensive safety guarantee, combined with anti-corrosion capability

The furnace cavity is made of Grade 316L stainless steel, with a warranty of 5 years. The 3D adjustable, explosion-proof security door, installed with buffer and choke (to prevent microwave leakage), is self-sealing, impact-resistant and with interlocking linkage mechanism. The aerospace composite fiber outer vessel, wholly sprayed with PFA coating, boasts both higher anti-corrosion and higher pressure-resistance levels, compared to those of PEEK materials. The 70MPa pressure-resistance and the 600 °C heat-resistance capabilities guarantee the safe operation of users under extreme conditions.



#### Dual magnetron inverter control system ensures consistent sample digestion

TANK 40 Microwave Digestion Workstation adopts dual magnetron inverter control system and high-frequency closed-loop PID control, thereby realizing microwave continuous non-pulse output, more uniform microwave field in the cavity, higher energy utilization rate, and consistent sample digestion.

#### Two LCD screen, displaying real-time operation and experiment status

The 7-inch color LCD touch screen displays real-time data, such as temperature, power, time, and steps. Swift switch to display of coordinate curves greatly facilitates users to better know what is going on with the experiment. The 5-inch color LCD screen allows clear, real-time observation of operation inside the furnace cavity. Equipped with interfaces, such as USB, network port or Wi-Fi, the vessel, once permitted, can be remotely operated and monitored through computer or Pad.



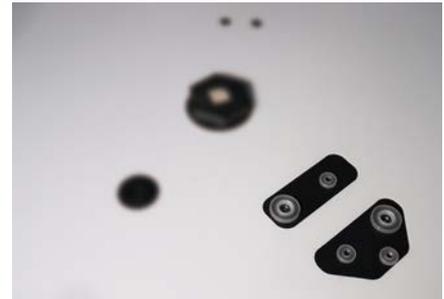
### Full-vessel pressure control technology

The high-pressure digestion vessel adopts elastic pressure relief and self-sealing technology. Under normal operation conditions, the vessel is completely sealed without leakage. Under overpressure conditions, the pressure is automatically and safely released together with excessive reaction gas (CO<sub>2</sub> and nitrogen oxides); then, it is immediately sealed, ensuring smooth progress of subsequent experiments.



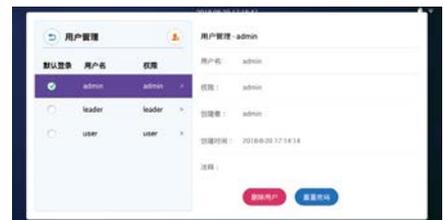
### Full-vessel precise temperature control and monitoring, ensuring safety and digestion performance

Non-contact mid-infrared sensors at bottom monitor and visualize real-time temperature change of sample solution inside each digestion vessel. The whole vessel temperature control system effectively monitors abnormal conditions during digestion experiment. Once abnormal temperature is detected, the vessel immediately stops microwave emission and starts to sound the alarm, so that experimental safety is not disturbed.



### Smart software operation, conforming to FDA21CFRPart11

The vessel, running on the Android operating system, is convenient and multi-functional. It offers many functions, such as electronic signature, hierarchical permission and audit trail, all in conformity with relevant regulations of FDA21CFRPart11. The software automatically identifies model of the turntable and automatically counts the number of vessels, making the experiment easier and faster, with the absence of tedious manual counting and input.



### Various supporting tools, making experiment easy and convenient

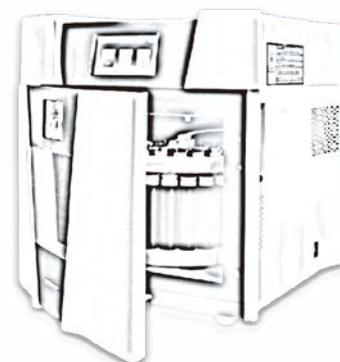
Various tools are supplied to reduce workload for operators and improve the work efficiency of sample preparation. For example, a mobile and flexible tool trolley is able to transfer rotor loaded with sample into and out of furnace cavity, avoiding direct contact between operator and digestion vessel for safety concerns.



## TANK40 Microwave Digestion Workstation Parameters:

Power	220~240VAC50/60Hz20A
Working environment temperature	0~40 C
Relative humidity for working environment	15~80%RH
Microwave source	2450MHZ; Maximun microwave output power 2000W, emitted from Dual magnetron inverter high-energy microwave field; non-pulse continuous microwave output
Installed power	3800W
Microwave cavity	Grade 316L stainless steel microwave resonant cavity, with a wall thickness of more than 3mm, sprayed with multi-layer PFA coating
Furnace exhaust system	Automatically adjusted air volume; cooling to room temperature in less than 15 minutes
Software system	Android operating system (8G memory), built-in video SOP, application method library, electronic door lock, etc.
Overall physical size/net weight	600×685×660 (W*D*H) /62kg

Batch amount	24 vessels	40 vessels
Inner vessel material	TFM	TFM
Outer vessel material	Aerospace composite fiber	Aerospace composite fiber with TEFLON coating
Inner vessel volume	110mL	55mL
Maximum temperature	300 C	300 C
Maximum pressure	15Mpa	15Mpa
Image		



## Wide range of applications

Microwave digestion technology heats reagents and samples in closed containers through microwave penetration and activation. It greatly speeds up reaction and shortens sample preparation time, with increased pressure and reaction temperature in digestion vessel. Microwave digestion is a commonly seen digestion technology widely applied in many fields.



Environmental monitoring



Food safety



Public health and disease prevention and control



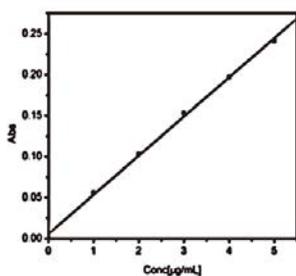
Petrochemical industry



Education and research



Metallurgy



Curve equation:  $[A] = K_1[C] + K_0$   
 $K_1 = 0.0478$ ,  $K_0 = 0.0057$  Linear  
 correlation coefficient: 0.99925

NO.	Sample mass/g	Cd concentration /ng·mL <sup>-1</sup>	Cd content/ng·g <sup>-1</sup>	RSD/%				
1	1.01034	1.562	38.65	1.4252				
2	1.01257	1.480	36.54	1.1046				
3	1.01083	1.457	35.97	1.0832				
4	1.01256	1.529	37.75	1.1430				
5	1.01155	1.533	37.85	1.3106				
6	1.01281	1.526	37.68	1.0844				
Mean value		1.515	37.40	—				
RSD/%		3.9						
Unassay sample	Spike amount /ng·mL <sup>-1</sup>	Recovery rate /%		Quality control sample	Measured value /ng·mL <sup>-1</sup>	Standard value /ng·mL <sup>-1</sup>	Uncertainty /ng·mL <sup>-1</sup>	
	1	0.4	98.75		1	75.5	74	3
	2	0.6	97.00		2	76.9		
	3	0.8	92.88		3	74.9		
	4	1.0	93.4					

## TANK eco

### Microwave Digestion/Extraction System

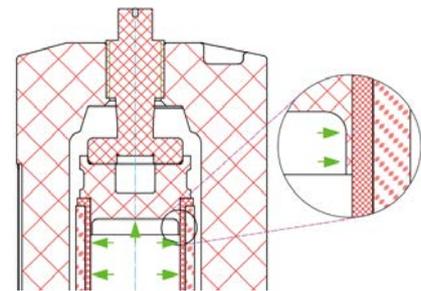
- Safe Operation
- Good Flexibility
- High Durability



#### Technical Features of Product

The fully-enclosed high-pressure digestion technology effectively improves the recovery rate and ensures the accuracy of results

Its patented fully-enclosed high-pressure digestion technology (invention patent: CN 102901663B), it will not leak during the entire digestion process and can improve the digestion ability; it demonstrates better digestion in the tough samples and those prone to high pressure, especially for the elements that are easily volatile, and the test results are satisfactory.



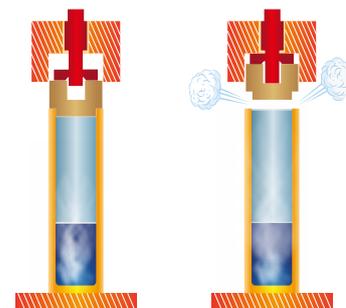
Outer vessel made of high-strength aerospace composite fiber, with both mechanical strength and anti-corrosion ability

The outer vessel of high-strength aerospace composite fiber; the overall coating of PFA completely wraps the composite fiber, which is non-bursting, non-explosive and non-tearable and whose comprehensive performance in terms of pressure resistance, anti-corrosion, etc. is better than the conventional PEEK materials (especially the protective capability at the edge of the outer vessel). The compressive strength is up to 70MPa (about 10,000psi), and the temperature resistance is as high as 600°C, ensuring the user's safe operation.



The patented safety bolt design can provide quantitative and safe pressure relief

With nearly 30 years of experience in this industry, Sineo employs a safety bolt structure design (invention patent: CN 104971787 B) to ensure that the digestion vessel is completely sealed and leak-free under the normal working conditions, and the safety bolt will be automatically raised to trigger a pressure relief once overpressure, ensuring the safe operation. Under normal operating conditions, the safety bolt will not break or need to be replaced, and therefore, no consumables are required.



## The optical fiber and IR temperature measurement system provides precise temperature control while monitoring any abnormality, thereby ensuring accurate results and safety

TANK eco Microwave Digestion/Extraction System is provided with a full vessel IR temperature monitoring system as standard configuration, with a multi-core integrated optical fiber temperature measurement system OPTIONAL. The full vessel temperature monitoring system can effectively monitor any abnormal conditions. If a temperature abnormality occurs, the microwave transmission will be immediately stopped and a beep will alarm. The diameter of optical fiber is 2mm with Teflon protective layer; the bending radius of curvature is small, and the bending resistance and flexibility is strong; its service life is 5 times longer that of single-core optical fiber. The optical fiber temperature control system is precise, and also avoids the antenna effect of the conventional metal temperature sensors in the microwave field.



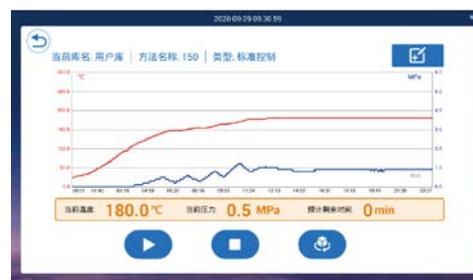
## High-precision semiconductor pressure sensor, with strong corrosion resistance and high mechanical strength

TANK eco utilizes an improved semiconductor pressure sensor, whose entire pressure transmission path has undergone special anti-corrosion treatment. In addition to accurate pressure measurement, the service life of the sensor has been greatly extended with improved reliability.



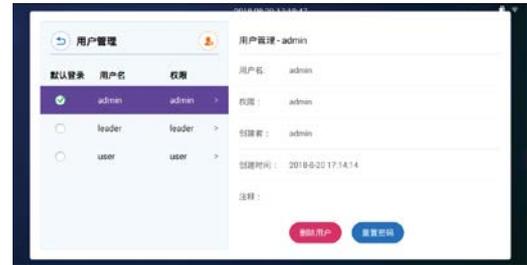
## 7-inch LCD touch screen clearly displays the digestion status and experiment process

The operating software can display the parameters such as temperature, pressure, time and steps in real time and switch to the coordinate curve interface at any time to check the real-time temperature and pressure changes during the experiment. It can help users understand the experiment process and improve the digestion plans.



## Powerful and convenient software with FDA 21 CFR Part 11

The software was designed and developed based on the Android system, provided with the functions such as electronic signature, limits of authority and audit trail, and in line with FDA 21 CFR Part 11 rule. 8G storage, built-in expert method library, and a 7-inch LCD touch screen that can display the temperature-pressure curve during the operation in real time. The software can automatically count the number of vessels, making the experiment easier and simpler.



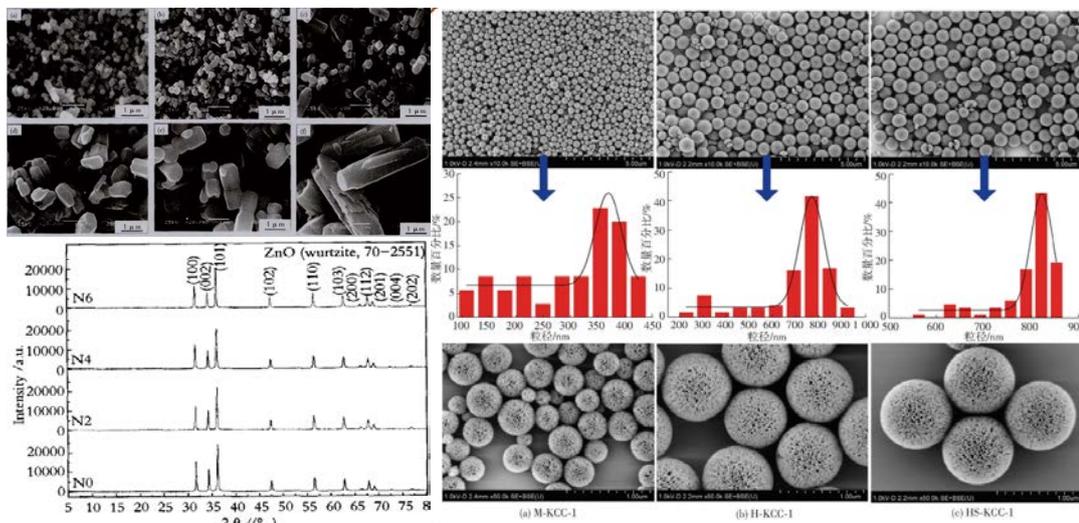
## "Cloud Service" function, the storage can be unlimitedly expanded while ensuring data security

TANK eco is equipped with the "cloud service" function so that data, methods and other information can be stored and shared in the cloud, unlimited expansion of data storage under the premise of ensuring data security can be provided, and the latest version of the software can also be downloaded from public cloud servers to provide an online update of the system, comprehensively improving the user experience.



## Multiple functions of microwave digestion, microwave extraction and microwave synthesis

TANK eco workstation can provide multiple functions, which can be equipped with an organic solvent leakage sensor, complete pre-processing before microwave digestion and extraction and can also be capable of research of microwave assisted synthesis.



## Specification of TANK eco:

Power supply	220~240VAC 50/60Hz 20A
Microwave source	2450MHz, high-energy microwave field transmission
Installed power	1800W
Maximum output power	1000W
Microwave cavity	Large-volume 316L stainless steel cavity, internally and externally coated with multi-layer corrosion-resistant Teflon
Explosion-proof door design	Self-popping explosion-proof sliding furnace door, integrated structure design with prevention of microwave leakage
Pressure measurement system	High-precision semiconductor pressure sensor, with pressure control range: 0~15MPa, accuracy $\pm 0.01$ MPa
Temperature measurement	Full vessel IR temperature control system, with temperature control range: -40~305°C, accuracy: $\pm 0.1$ °C;
control system	Optional multi-core integrated optical fiber temperature control system, with temperature control range: -40~305°C, accuracy: $\pm 0.1$ °C
Passive protection system	COT real-time abnormality monitoring system, which can automatically beep and cut off the microwave when an abnormality occurs to any reaction vessel; Safety Bolt design, providing vertical and quantitative release of overpressure
Software system	Android system; Built-in method library; Cloud methods, data storage and sharing; Wi-Fi remote connection, etc.
Communication interface	USB interface and internet interface
Exhaust system	High-power corrosion-resistant turbo fan, high-efficiency turbulent air cooling, less than 15 minutes cooling down to room temperature
Working environment	0~40°C / 15~80%RH
Physical size / net weight	480mm×560mm×575mm (Width × depth × height) /45kg

Model of reaction vessel	MP-100
Batch capacity	Standard configuration 6 vessels, up to 8 vessels
Material of inner vessel	TFM
Material of outer vessel	Aerospace composite fiber
Rotor frame type	Single Frame type
Volume of reaction vessel	100mL
Designed temperature	300°C
Designed pressure	15MPa (2,200psi)



**MWD-700 MICROWAVE DIGESTION SYSTEM**  
**MWD-650 MICROWAVE DIGESTION SYSTEM**

- Vent and Self-reseal digestion vessel: self vent and reseal structure with patented law ensures that vessels will release pressure and instantly reseal when a sudden over-pressurization occurs. This prevents waste of batch samples and solutions, and also avoids sample vessel damage.
- Temperature-pressure monitoring/protection system: Advanced contactless temperature control technology which measures real temperature of solution in each digestion vessel. Meanwhile, it adopts multi-fiber to monitor pressure in a contactless way. This realizes isolation between temperature and pressure control system, avoids cross-contamination of all samples and also ensures temperature and pressure monitor and control for each and every vessel. All temperature and pressure data are displayed in real time during the microwave run, allowing a visual check of digestion conditions. It prevents over-pressurization and over-heating.
- Large storage capacity: can edit and store 255 programs according to user's requirements and each method program can set 10 digestion steps. Users can set parameters (temperature, pressure, time, microwave power) according to their own requirements which provides convenient operation for users.
- Multi safety protection functions: high strength double security door, temperature monitoring, high temperature prevention, pressure monitoring, high pressure prevention, instruments fault monitoring alert, innovative stopping running when opening door, instruments abnormal sound monitoring.
- Power and power regulation mode: using variable frequency resonance or non-pulse (optional) continuous rotating mode to ensure high efficient and even microwave throughput. Users can adjust it according to users' requirement between 0-3000W.



## Quality components

- 360°continuous rotator: Realize continuous rotation in the same direction in cavity to ensure even and complete digestion of different vessel. The 360° continuous rotating reduces impact on rotary motor, which greatly extends the service life of rotary motor.
- Color touch-screen display: 7 inch LCD touch-screen display to show real-time temperature, pressure, time and curves. It also contains a real time display for pressure and temperature of each individual vessel to give a clear check of digestion processing.
- Digestion vessel material: imported TFM material for inner vessel, imported PEEK and glass fiber for outer protection vessel, which prevents high temperature, high pressure and corrosion, and assures safe operation.



Interface



Functions



Methods



Calibration



Self-diagnosis



Work interface

## Technical Specification

Model	MWD-700	MWD-650	Outer vessel pressure limit	20MPa
Pressure Control	18 vessels	12 vessels	Temperature control Range	50-400°C
Temperature Control	18 vessels	12 vessels	Maximum working temperature	250°C
Vessel Volume	100ml		Temperature control accuracy	±0.3°C
Pressure Testing	Contactless		Inner vessel temperature limit	300°C
Temperature Testing	No-contact		Microwave power	0-3000W adjustable/0-2000W adjustable
Vessel Material	Inner vessel : imported TFM Outer vessel: imported PEEK+glass fiber		Microwave Frequency	2450MHz
Display	8" inches touch screen external		Rotation Mode	360 continuous rotation
			Microwave leak	<5mw/cm <sup>2</sup>
Pressure control range	0-10MPa		Power	AC 220V, 16A, 50/60HZ
Maximum working pressure	6MPa		Dimension	640mm*630mm*590mm
Pressure control accuracy	0.01MPa		weight	75kg/70kg



**MWD-850 MICROWAVE DIGESTION SYSTEM**  
**MWD-800 MICROWAVE DIGESTION SYSTEM**

- Vent and Self-reseal digestion vessel: self vent and reseal structure with patented law ensures that vessels will release pressure and instantly reseal when a sudden over-pressurization occurs. This prevents waste of batch samples and solutions, and also avoids sample vessel damage.
- Temperature-pressure monitoring/protection system: Advanced contactless temperature control technology which measures real temperature of solution in each digestion vessel. Meanwhile, it adopts multi-fiber to monitor pressure in a contactless way. This realizes isolation between temperature and pressure control system, avoids cross-contamination of all samples and also ensures temperature and pressure monitor and control for each and every vessel. All temperature and pressure data are displayed in real time during the microwave run, allowing a visual check of digestion conditions. It prevents over-pressurization and over-heating.
- Large storage capacity: can edit and store 255 programs according to user's requirements and each method program can set 10 digestion steps. Users can set parameters (temperature, pressure, time, microwave power) according to their own requirements which provides convenient operation for users.
- Multi safety protection functions: high strength double security door, temperature monitoring, high temperature prevention, pressure monitoring, high pressure prevention, instruments fault monitoring alert, innovative stopping running when opening door, instruments abnormal sound monitoring.
- Power and power regulation mode: using variable frequency resonance or non-pulse (optional) continuous rotating mode to ensure high efficient and even microwave throughput. Users can adjust it according to users' requirement between 0-3000W.



## Quality components

- 360°continuous rotator: Realize continuous rotation in the same direction in cavity to ensure even and complete digestion of different vessel. The 360° continuous rotating reduces impact on rotary motor, which greatly extends the service life of rotary motor.
- Color touch-screen display: 7 inch LCD touch-screen display to show real-time temperature, pressure, time and curves. It also contains a real time display for pressure and temperature of each individual vessel to give a clear check of digestion processing.
- Digestion vessel material: imported TFM material for inner vessel, imported PEEK and glass fiber for outer protection vessel, which prevents high temperature, high pressure and corrosion, and assures safe operation.



Interface



Functions



Methods



Calibration



Self-diagnosis



Work interface

## Technical Specification

Model	MWD-850	MWD-800	Outer vessel pressure limit	20MPA
Pressure Control	50 vessels	40 vessels	Temperature control Range	50-400°C
Temperature Control	50 vessel scan temperature control	40 vessel scan temperature control	Maximum working temperature	250°C
Vessel Volume	50ml		Temperature control accuracy	±0.3°C
Pressure Testing	Contactless		Inner vessel temperature limit	300°C
Temperature Testing	No-contact		Microwave power	0-3000W adjustable
Vessel Material	Inner vessel : imported TFM Outer vessel: imported PEEK+glass fiber		Microwave Frequency	2450MHz
Display Display	External 8" inches touch screen		Rotation Mode	360 continuous rotation
			Microwave leak	<5mw/cm <sup>2</sup>
Pressure control range	0-10MPA(0-100KG/CM)		Power	AC 220V, 16A, 50/60HZ
Maximum working pressure	6MPA		Dimension	640mm*630mm*590mm
Pressure control accuracy	0.01MPA(1KG/CM)		weight	88kg/78kg