Discovery HP-TGA 7500

Site Preparation Guide

Revision A Issued March 2021

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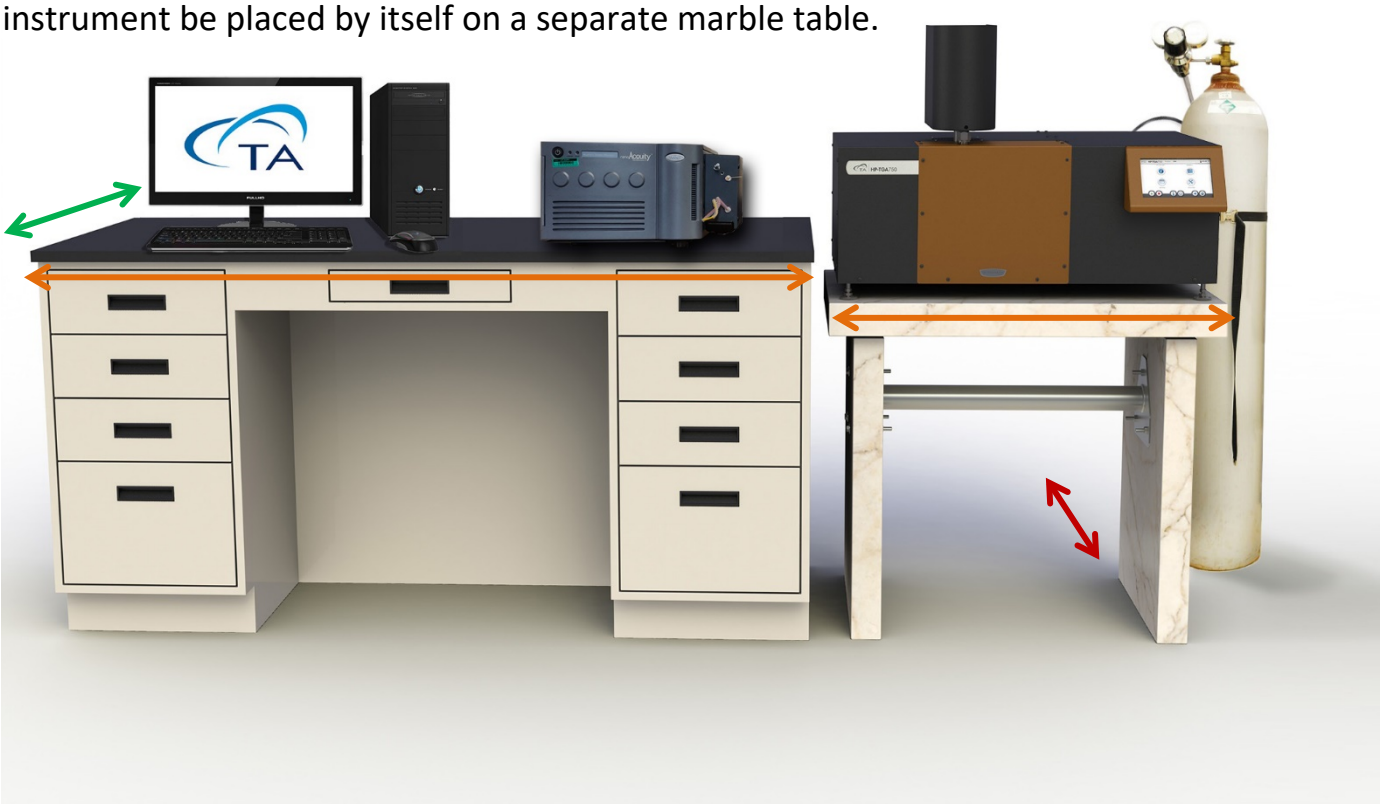
Ideal Setup

IDEAL PLACEMENT AND BENCH MEASUREMENTS

Select a location with adequate floor space and a rigid laboratory bench that is level and is in a vibration-free environment. For optimal performance, it is recommended that the instrument be placed by itself on a separate marble table.



Bench width: 183 cm (72 in)

Table width: 100 cm (39 in)

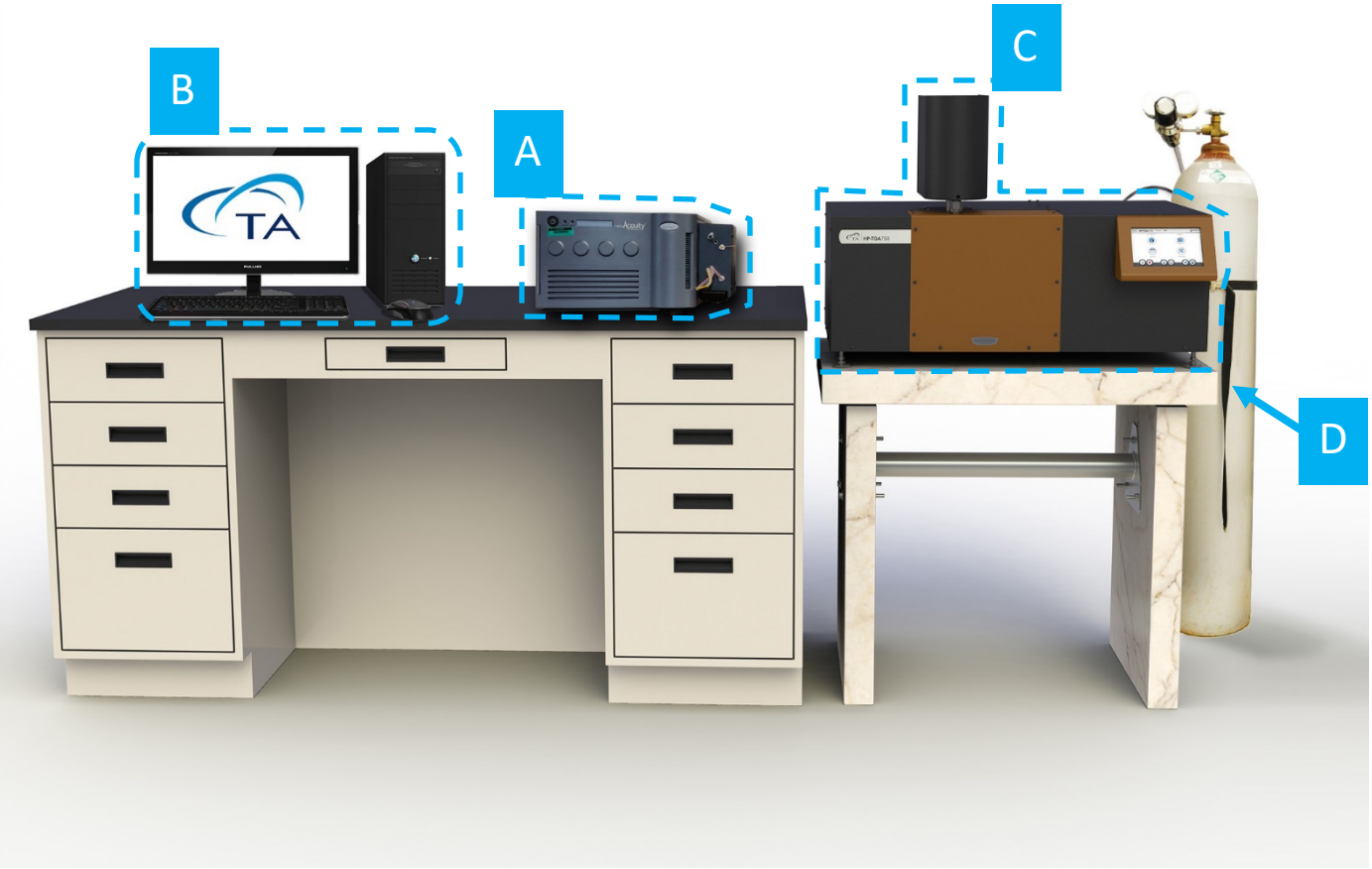
Bench depth: 76 cm (30 in)

Table depth: 76 cm (30 in)

Distance from the wall: 30.5 cm (12 in) min.

System Components

MAIN SYSTEM COMPONENTS



A. Auxiliary Solvent Manager (ASM)

B. Computer (Controller)

C. Instrument

D. Gas Tank

Instrument Measurements

MAIN INSTRUMENT

Height (Furnace Closed): 61 cm (24 in)

Height (Furnace Open): 72 cm (28 in)

Width: 86 cm (34 in)

Depth: 65 cm (25.6 in)

Weight: 60 kg (132 lbs)

AUXILIARY SOLVENT MANAGER (ASM)

Height: 23.8 cm (9.38 in)

Width: 34.3 cm (13.5 in)

Depth: 66.1 cm (26 in)

Weight: 25.9 kg (57 lbs)

Utility Requirements

POWER

Item	Requirement
Instrument Power	• 115–230 VAC, 50/60 Hz, 1000 W • Safety ground per local regulation
ASM Power	• 100–240 VAC, 50/60 Hz, 5A
Power cords provided	• NEMA 5-15P • European CEE7  5-15P CEE7

CAUTION **Use power cords with plugs appropriate for your circuit.**

CAUTION Supply voltages lower than indicated may result in a degradation of performance.

CAUTION Ensure that the mains assigned do not also supply power to noise generating equipment nearby, such as motors, welders, transformers, etc.

CAUTION An independent heavy GROUND wire must be provided through the power hookup. Improper grounding may cause severe damage for which the supplier will not accept responsibility. All power strips must be fully grounded and carry the ground through to the sockets into which the computer is plugged.

WARNING If the instrument has lost power (due to a power outage, pulling out the power cable, etc.), all valves are automatically closed, and the furnace shut off. Therefore, the instrument itself is in a secure state. Opening the furnace VCR screw while there is no power to the instrument is not recommended, as there may still be high pressure gas inside the instrument, which would then be released uncontrolled to the laboratory atmosphere. If the gas used is toxic, opening the high-pressure furnace may cause harm to the operator.

Utility Requirements

GAS

OXYGEN WARNING: If excessive amounts of **hydrocarbons** are present in the HP-TGA, energetic combustion could occur, causing damage to the HP-TGA and possible injury to the operator. Oxygen supply lines valves, gauges, and regulators must be free from hydrocarbons and rated for oxygen service. If the inside of the tubing smells oily or has liquid or black carbon residue in it, hydrocarbons may be present. Remove the pressure housing and visually inspect the HP-TGA cell for oil or other organic contaminants. Immediately discontinue use if contamination (spilled samples, oily residue, oily smell, carbon black, etc) occurs. Check that all supply tubing connecting your HP-TGA to other devices (oxygen cylinder, gauges, valves, regulators) are 0.125 in. OD, are rated for high pressure service to 21 MPa gauge, and are free of hydrocarbons.

HYDROGEN WARNING: The Sax Safety Handbook, Dangerous Properties of Industrial Materials, indicates that the lower explosion limit (LEL) under ambient conditions for hydrogen is 4.1% in air. Care should be taken to keep the concentration in the produced gas well below this value.

TOXIC GAS WARNING: Carbon monoxide, hydrogen sulfide, nitrous oxide and sulfur dioxide are toxic gases. Under certain conditions Carbon dioxide can decompose to carbon monoxide. The customer is responsible for the proper treatment and disposal of the waste gas generated by and leaving the device through the waste gas outlet. Additionally special care must be taken, that the connection between measuring cell and oven is tightly closed and that a new gasket is used every time the connection is opened.

EXPLOSIVE GAS MIXTURES WARNING: Ethane, ethene (ethylene), hydrogen sulfide, methane, propane, propene are **flammable** and can explode in certain mixtures with oxidative gases like Oxygen and Air. Care must be taken that those mixtures are not generated by dosing those gases with oxygen or air either simultaneously nor in close succession. When switching between flamable and oxidizing gases in the HP-TGA, the gas system should be initially purged thoroughly with an inert gas before introducing the other gas.

Utility Requirements

GAS

Item	Requirement	
Pressure at GAS Input	85 bar < p < 95 bar or max pressure from gas list [1][3]	
Conditions	• Must be dry • Must be free from oil, dirt, and water	
Gas connectors	Swagelock 1/8” connectors [2]	
Flow rate	100 mL/min	
Regulator	• Customer-supplied • Two-stage regulator with output range 0–1500 psig	
Sample Gas	**Gas Type**	**Conditions**
	Air, Argon, Krypton, Neon, Nitrogen	Max pressure < 80 bar Max temp < 1100°C
	Carbon dioxide	Max pressure < 30 bar
	Carbon monoxide	Oxygen-free Max pressure < 35 bar
	Ethane	Max pressure < 30 bar Max temp < 1000°C Oxygen-free
	Ethene (ethylene)	Oxygen-free Max temp < 1000°C Max pressure < 30 bar
	Forming gas (5% hydrogen in nitrogen)	Max temp < 700°C
	Helium	Max temp ~750°C
	Hydrogen sulfide	≤ 3% concentration
	Nitrous oxide	Max temp < 450°C Max pressure < 2 bar (exothermic deflagration above these limits)
	Oxygen[4]	Max temp < 500°C Max pressure < 10 bar Max sample size ≤ 10 mg

Utility Requirements

	Gas Type	Conditions
Sample Gas	Propane	Max pressure < 6 bar Max temp <1000°C Oxygen-free
	Propene (propylene)	Max pressure < 7 bar Oxygen-free Max temp < 1000°C
	Sulfur Dioxide	≤ 3% concentration
	Xenon	Max pressure < 50 bar (or RT >17°C)

1. 

The pressure 85 bar < p < 95 bar is optimal for the instrument to work up to 80 bar. Additionally, the MFCs are calibrated for an input pressure of this range. Gases used MUST be suitable for high pressure; refer to the gas list in this table to make sure you **do not exceed the given maximum pressure limits**.

2. 

Always close unused inlets with the supplied plug. Open gas inlet lines might cause leakage of the gas to the lab environment.

3. 

Customer is responsible for safe gas input pressure, safe gas handling and exhaust, and for safe gas switching (for example, from methane to nitrogen to oxygen instead of directly from methane to oxygen).

4. 

Ensure the residue from prior samples is burned off under air at 800°C (and pressure of interest) before running the sample under pure oxygen.

Utility Requirements

WATER / WASTE

Item	Requirement
Water	• MS-grade • Customer-supplied • Must be ultrapure (ex. particle-free, chemically clean, 18-megaohm cm resistivity)

Waste	• Waste container
	  ○ Large capacity carboy or glass container
	  ○ Must be positioned below the bench top
	  ○ Waste tubing must be routed in a manner that prevents formation of traps in the tubing
	• Solvent Tray Module can hold up to 2 L of spilled solvent. Customer must supply a separate waste container to collect any spill from the waste line at the rear of the tray.

Computer Requirements

HARDWARE REQUIREMENTS

Item	Requirement
Processor	• Intel® Core™ i5 8400 or better • 2.8 GHz with 9 MB L2 cache
Memory	≥ 16 GB RAM DDR4 2666 SDRAM
Hard drive	≥ 80 GB free space • 1.5 GB required for Full version of TRIOS • 675 MB required for Lite version of TRIOS (without Online help)
DVD (optional)	≥ 48x CD-ROM or DVD (optional for installing TRIOS)
Screen resolution	Required: 1280 x 1024 with 24-bit colors Recommended: 1920 x 1080 with 24-bit colors
Graphic memory	128 MB
Screen (LCD) size	Required: 19” or greater Recommended: 24” wide screen

Computer Requirements

SOFTWARE REQUIREMENTS

Item	Requirement
Operating System	• Windows 10 Ultimate, Enterprise & Professional • Home version not supported • 64-bit version
Internet	**Internet connection is strongly recommended for ongoing support after installation**
Service Pack	Microsoft Operating System Service Pack
Updates	Windows Operating System and associated Microsoft updates must be up to date
Network	*A second network card for corporate connection is recommended.* *TA Instruments is not responsible for resolving issues associated with connections to your corporate network.*
Conflicts	*TA Instruments is not responsible for resolving hardware/software conflicts created by the addition of third-party hardware or software to the computer.*
Rights	Administrative privileges are required on the controller computer

Site Preparation Checklist

Discovery HP-TGA 7500

Sufficient bench space for computer and marble table space for instrument:

- ☐ Marble table length: 60 cm (24 in)
- ☐ Marble table depth: 76 cm (30 in)
- ☐ Bench width: 183 cm (72 in)
- ☐ Bench depth: 76 cm (30 in)
- ☐ Distance from the wall: 30.5 cm (12 in) minimum

- ☐ Instrument power is 115–230 VAC, 50/60 Hz, 1000 W
- ☐ ASM power is 100–240 VAC, 50/60 Hz, 5A

Purge gas:

- ☐ Is dry and free of oil, dirt, and water
- ☐ Pressure regulator is present
- ☐ Meets the requirements as listed on page 8–9
- ☐ I have read and understand the **OXYGEN** warning
- ☐ I have read and understand the **HYDROGEN** warning
- ☐ I have read and understand the **TOXIC GAS** warning
- ☐ I have read and understand the **EXPLOSIVE GAS MIXTURES** warning

- ☐ Computer meets all hardware requirements
- ☐ Computer meets all software requirements
- ☐ Customer's IT personnel has provided Administrative privileges on the controller computer
- ☐ The Customer's IT personnel will be on site the day of installation

Water:

- ☐ Is MS-grade, ultrapure

Other Solvents:

- ☐ Are the highest chemical purity

- ☐ The Customer assumes responsibility for any damage that occurs when the instrument is moved by someone other than a trained TA Instruments Service Representative.
- ☐ The Customer has provided a separate waste container for collecting spilled solvent.

I hereby acknowledge that all utility requirements have been met per the checklist above and that they will be ready at the agreed time of installation.

<u>If all utility requirements are not met at the agreed time of installation, additional charges may be incurred for a return Service trip.</u>

_____ / _____ / _____

Customer *DD* *MM* *YYYY*

_____ _____ _____ _____

Company *City* *State* *Country*

Please send a signed copy of the completed checklist to your local Service representative.

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TA Instruments – Waters LLC
Corporate Headquarters
159 Lukens Drive
New Castle, DE 19720
USA

Telephone: 302-427-4000
Fax: 302-427-4001
Email: info@tainstruments.com