# Thermal Diffusivity Instruments

## DLF-2 with EM-1600

# Site Preparation Guide

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# Table of Contents


Table of Contents ..... 2

Ideal Setup ..... 3

System Components ..... 4

Instrument Measurements ..... 5-6

EM-1600 Measurements ..... 5

DLF-2 Measurements ..... 6

Utility Requirements ..... 7-9

Power ..... 7

Gas ..... 8

Water ..... 9

Computer Requirements ..... 10

Site Preparation Checklist ..... 11

Waters Technologies Corporation Offices ..... 12

Circulator

Power

Cooling

Gas

$LN_2$

Fluid

Light

Hardware

Software

Temp

Lab

Customer

# Ideal Setup

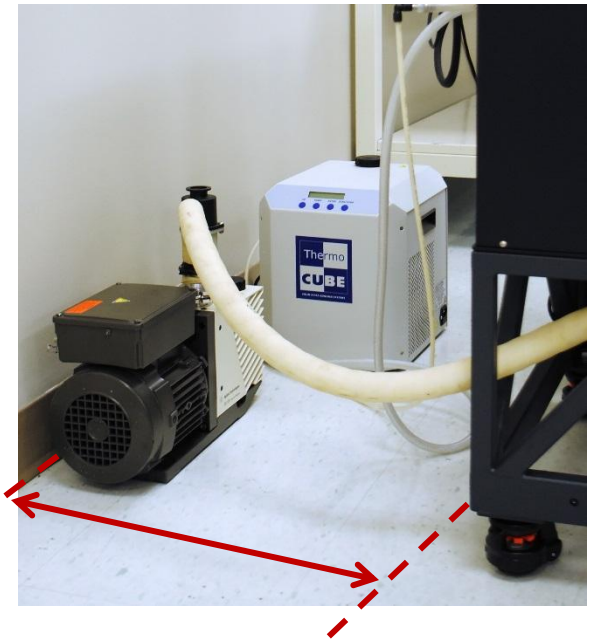
## IDEAL PLACEMENT AND BENCH MEASUREMENTS

Select a location with adequate floor space and a rigid laboratory bench that is level and is in a vibration-free environment.

Floor + bench width: 2.10 m (7 ft)

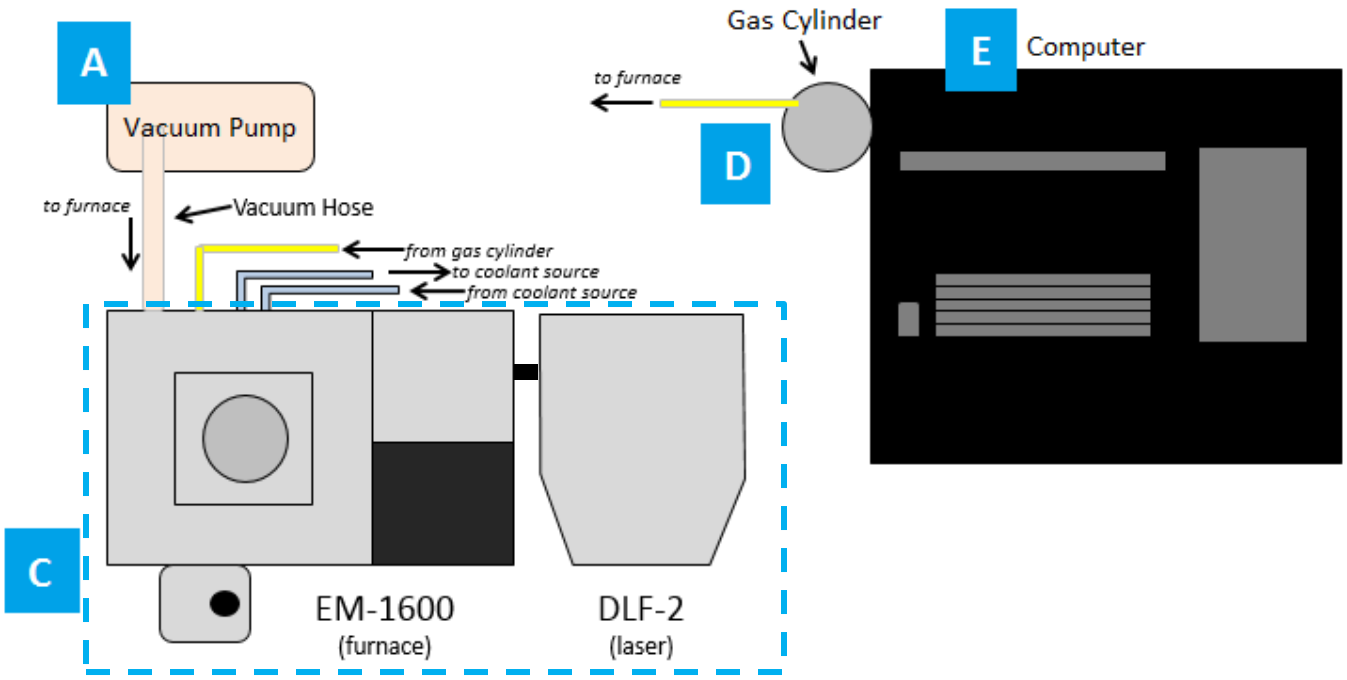
Bench depth: 90 cm (36 in)

Floor space behind the instrument: 120 cm (48 in)



# System Components

## IDEAL PLACEMENT–TOP VIEW




## COMPONENTS

**A. Vacuum Pump**

**B. Chiller/Recirculator (not shown)**

**C. Instrument (Furnace + Laser)**

**D. Bottled Gas**

**E. Computer (Controller)**

# Instrument Measurements

## EM-1600 MEASUREMENTS

Height (Head CLOSED): 114 cm (45 in)

Height (Head OPEN): 144 cm (57 in)

Width: 63 cm (25 in)

Depth: 53 cm (21 in)

Weight: 124 kg (274 lbs)

# Instrument Measurements

## DLF-2 MEASUREMENTS

Height: 90 cm (36 in)

Width: 43 cm (17 in)

Depth: 43 cm (17 in)

Weight: 71 kg (156 lbs)

# Utility Requirements

## POWER

| Item | Requirement |
|---|---|
| Instrument | • 200–240 VAC, 15 A max (Furnace: 12A, Laser: 3A), 50/60 Hz<br>• Single phase |
| Computer and Vacuum | 120V (US) or 220–240V, 6.4A max, 50/60 Hz |
| Power cords provided | • DLF-2: NEMA 6-15 plug, 2.4 m (7.5 ft) long, Rated for 10A, 250 VAC<br>• EM-1600: NEMA 6–15 plug, 2.5 m (8 ft) long, Rated for 15A, 250 VAC<br>• Computer:<br>• Monitor:<br>• Vacuum pump: } NEMA 5-15 plug, 2 m (6.5 ft) long |

NEMA 6-15 plug

NEMA 5-15

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

CAUTION Connect the DLF-2, EM-1600, computer, and monitor to wall outlets on the same circuit and make sure that the mains assigned do not also supply power to noise generating equipment nearby, such as welders, motors, transformers, etc.

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.

# Utility Requirements

## GAS

| Item | Requirement |
|---|---|
| Conditions | Must be dry |
| Type | Must be **nitrogen** or **argon** |
| Source | Must be from a **gas cylinder**, **Grade 5 purity** |
| Inlet Pressure | Minimum: 45 psig (3.10 bar)<br>Maximum: 50 psig (3.45 bar) |

**Liquid Nitrogen**

- 1 L per day usage
- Use a small handheld dewar flask ❶ to manually pour into the detector dewar ❷. A funnel ❸ is supplied for assistance.

**1/8” Urethane tubing**

- Supplied with the instrument
- Rated to 100 psig (7 bar)
- 4.5 m (15 ft) length of tubing connects to the furnace by threaded barb connection (supplied).
- A push-to-connect (Legris) 1/8” to 1/8” tubing connector is provided:
- A push-to-connect (Legris) 1/8” stem to ¼” tubing adapter is provided:


Improperly regulated, pulsating, or poor quality purge gas may cause irregular or erratic instrument operation. Containment of exhaust is recommended if noxious or poisonous gases are released by sample when heated. Venting inert gases into small rooms may reduce the oxygen content of the air and become hazardous to personnel.

# Utility Requirements

## WATER

| Item | Requirement |
|---|---|
| Cooling Capacity | • 300W at 25°C |
| Recirculation | • If plant-wide recirculation is used, a minimum inlet/outlet differential pressure of 50 psig (3.45 bar) is required<br>• ThermoCube chiller (PN 201786.001) is strongly recommended |
| Nominal Flow Rate | • 1–2 L/min<br>• Varies with Inlet pressure |
| Water Temperature | • Optimal: **25°C**<br>• Permissible: 15°C–30°C<br>• Excessively cold water will result in “sweating” and corrosion of cooled metal surfaces. Warm water may not allow sufficient cooling of critical instrument components. |

Coolant Inlet and Outlet hoses

The instrument is supplied with two hoses (1.8 meters/6 feet each) to connect to the Coolant Inlet and Outlet ports on the back of the furnace. The other end of each hose has a **male ¼” fitting** that must be connected to the coolant source.

¼” male fittings

NOTE Wall-mounted supply shutoff, open drain, and city water is required if chiller/circulator was NOT ordered.

# Computer Requirements

## HARDWARE REQUIREMENTS

The instrument comes with a computer already configured. Use the following requirements if using a computer not supplied by Waters:

- Unused RS-232 (serial) port
- Unused USB port

Instrument drivers and software are provided on a CD.

Computer should not be attached to other analytical instruments or LAN.

## SOFTWARE REQUIREMENTS

| Item | Requirement |
|---|---|
| Operating System | • Windows 7 or 10, 32- or 64-bit, Ultimate, Enterprise & Professional<br>• Home version not supported |
| Network | • *Waters is not responsible for resolving issues associated with connections to your corporate network.*<br>• *Network cards and/or certain network operation frequently interfere with the operation of the instrument and software.* |
| Conflicts | *Waters is not responsible for resolving hardware/software conflicts created by the addition of third party hardware or software to the computer.* |

# Site Preparation Checklist

## Thermal Diffusivity Instruments: DLF-2 with EM-1600

| | |
|---|---|
| | Sufficient bench space for instrument, computer, vacuum pump, and recirculator (if needed):<br>☐ Width: 2.10 m (7 ft)<br>☐ Depth: 90 cm (36 in) |
| | ☐ Instrument power is 200–240 VAC, 15 A max, 50/60 Hz<br>☐ Computer, monitor, and vacuum power is 120 V (US) or 220–240 V, 6.4 A max, 50/60 Hz |
| | Purge Gas – Dry nitrogen or argon<br>☐ Grade 5 purity cylinder<br>☐ Regulator to allow 45–50 psig (3.10–5.50 bar)<br><br>Liquid Nitrogen<br>☐ Handheld dewar, 1 L/day usage |
| | Water Circulation<br>☐ Nominal flow rate of 1–2 L/minute<br>☐ Optimal coolant temperature of 25°C<br>☐ Filtered or clean and debris-free<br>☐ ThermoCube chiller OR wall-mounted supply shutoff, open drain, and city water |
| | ☐ The Customer assumes responsibility for any damage that occurs when the instrument is moved by someone other than a trained Waters Service Representative. |

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.

# Waters Technologies Corporation Offices

For information on our latest products, contact information, and more, see our website at: http://www.tainstruments.com.

To find your local Waters office and contact information, visit http://www.tainstruments.com/contact/ta-directory/

Waters Technologies Corporation
Corporate Headquarters
34 Maple Street
Milford, MA 01757
USA

Waters Materials Sciences
159 Lukens Drive
New Castle, DE 19720
USA

Telephone: 302-427-4000
Fax: 302-427-4001
Email: tatechsupport@waters.com