

**ReactIR™ Instruments  
Specifications, Care, Use, and Safety**

**iC10**



**45m**



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You can find additional information regarding our ReactIR™ product lines and accessories at [www.mt.com/reactir](http://www.mt.com/reactir).

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## ReactIR System Introduction

The METTLER TOLEDO ReactIR™ iC10 and 45m instruments are Fourier Transform infrared (FTIR) spectrometers designed to optically measure and monitor changes in chemical species as they react over a period of time. A ReactIR iC10 and 45m system consists of the following:

- ReactIR iC10 and 45m base unit (infrared spectrometer)
- 1.0 meter USB Communications Cable
- 24-hour cooling capacity, Mercury Cadmium Telluride (MCT) Detector
- iC IR™ software

### Additional Items

In addition to the base unit, a system requires your choice of sampling technologies that may be ordered separately or with the base unit.

- 6.35mm dia. AgX (Silver Halide) FiberConduit™
- 9.5mm dia. AgX (Silver Halide) FiberConduit
- 6.35mm dia. DS Series AgX (Silver Halide) FiberConduit
- 9.5mm dia. DS Series AgX (Silver Halide) FiberConduit
- DS Series Optical Interface Module
- DS Series MultiplexIR Module
- DS Micro Flow Cell
- 16mm Diameter Probes
- Mirror-based optical Conduit (4– or 6–mirror version)

### Optional Items

- Deuterated TriGlycine Sulfide (DTGS) Detector
- Stabilization Foot (for use with mirrored conduit to provide instrument stability)
- PC Workstation with installed iC IR software

## Statement of Overview and Safety

### Overview Statement

The iC IR™ software is a comprehensive application package that controls all system functions of the ReactIR iC10 and 45m spectrometer from a single user interface. iC IR allows the user to configure hardware options, define data acquisition parameters (sample interval, duration of acquisition, etc.) as well as specify mathematical treatments to analyze the data.

### Use and Safety Statement

Use of this product in a manner other than described in this manual may result in serious injury, damage to equipment, and/or void the warranty of the system.

## Site Preparation

| Site Preparation Description   |            | System(s)            | Requirement   | Status    |
|--|------------|----------------------|---|-----------|
| <b>Electrical</b>  | Computer   | iC IR Workstation PC | See specific computer manual for voltages.          | Yes<br>No |
|  | Instrument | ReactIR iC10 and 45m | 100-240VAC +/- 7%, 50/60Hz, 5A (dedicated circuit)  | Yes<br>No |
| <b>Space Requirement</b> —System can be installed either on bench top or inside fume hood.   |            | ReactIR iC10         | 190 x 290 x 406 mm [7.5 x 11.4 x 16 in] (W x H x D) | Yes<br>No |
|  |            | ReactIR 45m          | 213 x 279 x 381 mm [8.4 x 11 x 15 in] (W x H x D)   | Yes<br>No |
| <b>Purge</b> —Clean, dry Instrument grade air, Nitrogen, or equivalent inert gas.<br><b>NOTE: Gauge and pressure regulators are NOT supplied with the equipment.</b> |            | ReactIR iC10 and 45m | 10 psig/ 0.69 barg                                  | Yes       |
|  |            |                      | 10 SCFH / 4.7 LPM                                   | No        |

## Installation

See the Installation sections in one of the documents below.

| ReactIR Base Unit | Installation Document(s)   |
|-------------------|--|
| iC 10             | IPAC ReactIR iC10 <u>or</u> Installation and Operational Qualifications (IQ/OQ) ReactIR iC10 |
| 45m               | IPAC ReactIR 45m <u>or</u> Installation and Operational Qualifications (IQ/OQ) ReactIR 45m   |

## Product Information and Specifications

### Product Information

|                         |   |
|-------------------------|---|
| Manufacturer Name:      | METTLER TOLEDO AutoChem   |
| Manufacturer's Address: | 7075 Samuel Morse Drive<br>Columbia, Maryland USA 21046   |
| Product:                | ReactIR™  |
| Model No.:              | iC10 and 45m  |
| Trademark:              | METTLER TOLEDO  |
| Intended Use:           | The use of this product is to provide unattended, <i>in situ</i> data collection and simultaneous data analysis of chemical reactions. This product is designed to be used in a ventilated fume hood. Alternatively, this system can be used on a bench top with the flexible fiber optic conduit positioned inside the fume hood where the reactor is located. |

### Product Specifications

The tables below provide power, system purge, temperature/humidity ranges, and system dimensions and weight specifications.

| Power | ReactIR | AC                              | DC (Supplied)   |
|-------|---------|---------------------------------|---|
|       | iC10    | 100–240VAC, 50–60Hz, 2.0A (max) | 13.6VDC, 6A<br>5A, Mini Fuse (Fast Acting, internal)                      |
|       | 45m     | 100–240VAC, 50–60Hz, 2.0A (max) | 13.6VDC, 6A and<br>± 12VDC, 2.5A<br>5A, Mini Fuse (Fast Acting, internal) |

| System Purge | ReactIR      | Description | Dew Point  | Pressure        | Flow Rate                 |
|--------------|--------------|-------------|--|-----------------|---------------------------|
|              | iC10 and 45m |             | Clean, dry Instrument Grade Air, Nitrogen, or other suitable inert gas | -50°C dew point | 10psig (max)/<br>0.69barg |

| Temperature Range | ReactIR      | Temperature | Humidity   |
|-------------------|--------------|-------------|--|
|                   | iC10 and 45m |             | <b>Operating:</b> 19 to 25°C (recommended range for proper system stability)<br><b>Ambient (max):</b> 40°C (invalidates performance specification) |

| Dimensions / Weight | ReactIR | Dimensions (W x H x D)                     | Weight                |
|---------------------|---------|--|-----------------------|
|                     | iC10    | 190 x 290 x 406 mm<br>[7.5 x 11.4 x 16 in] | 11.7 kg<br>[25.8 lbs] |
|                     | 45m     | 213 x 279 x 381mm<br>[8.4 x 11 x 15 in]    | 16 kg<br>[35.3 lbs]   |

# Product Safety

## Compliance

- **EMC Directive 2004/108/EC**  
IEC 61326-1: Electrical Equipment for Measurement, Control, and Laboratory Use
- **Low Voltage Directive 2006/95/IEC**  
EN61010-1: Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

## Laser Classification

All ReactIR iC10 and 45m instruments are in compliance with the U.S Department of Health and Human Services (DHHS) Radiation Performance and in accordance with International Standards.

### Class 1 Laser Product

Compliant with **21 CFR 1040.10** and **1040.11**



except for deviations per Laser Notice 50, dated June 24, 2007







and

Compliant with **IEC 60825-1**

## Safety Measures for ReactIR iC10 and 45m

To avoid unexpected personal injury or damage to the equipment, please observe these measures for your protection and for operational safety:


| Measures for your protection   |   |
|--|---|
| <br>Risk of an electric shock | <p><b>Grounding the power supply outlet</b></p> <p>Make sure that you plug the power cable supplied with the ReactIR iC10 or 45m system into power supply outlets that are grounded. A technical fault could otherwise result in death or serious injury.</p>   |
| Measures for operational safety  |   |
| <br>Caution                   | <p><b>Connection of cables</b></p> <p>Connect all cables (power and communications) of ReactIR iC10 or 45m system to their respective inputs and outputs before you switch on the system. Do not disconnect any cables while the system is in operation as this may cause damage to internal electrical components.</p> |

|  |  |
|--|--|
| <br>Caution   | <p><b>Handling Liquid Nitrogen</b></p> <p>Liquid Nitrogen is used with the ReactIR iC10 and 45m systems to cool the MCT detector for optimum detector performance. Liquid Nitrogen will cause severe burns to exposed skin. Ensure use of proper clothing (gloves) and eye protection before handling liquid Nitrogen.</p> <p><b>NOTE:</b> A caution label is located on the top of the ReactIR iC10 and 45m base unit, next to the Liquid Nitrogen fill port.</p>   |
| <br>Caution   | <p><b>Liquid Nitrogen "Blow Off"</b></p> <p>When filling the MCT detector with Liquid Nitrogen there is a chance that the Liquid Nitrogen may "Blow Off" once sufficient pressure is reached inside the detector cooling chamber. It is recommended to add liquid Nitrogen slowly to allow sufficient time for entrained pressure to release from the cooling chamber and prevent "Blow Off."</p>  |
| <br>Caution   | <p><b>Cold Surfaces (Liquid Nitrogen Spills)</b></p> <p>Spills will most likely occur when filling the MCT cooling chamber with Liquid Nitrogen. Normal Liquid Nitrogen spillage, such as Blow Off, will not damage components of the ReactIR iC10 or 45m system BUT will create COLD surfaces. Avoid touching these cold surfaces without proper protective clothing. These cold surfaces typically warm to room temperature within a few minutes (~15min).</p>   |
| <br>Caution  | <p><b>Instrument Purge</b></p> <p>The ReactIR iC10 and 45m systems should be purged AT ALL TIMES (whether system is powered on or not) using instrument grade air, Nitrogen, or other suitable inert gas. The purge prevents water vapor from collecting inside the optics that otherwise can obscure the spectral data.</p> <p>Purge fittings are located (1) on the rear panel of the unit and (2) at the back end of the probe, if applicable. Refer to Product Specifications on 6 for purge setting values.</p> |
| <br>Caution | <p><b>Service</b></p> <p>Never open the enclosure of the ReactIR iC10, or 45m system or any of its components. These items are serviced only by a qualified METTLER TOLEDO AutoChem Service Engineer.</p>  |
| <br>Caution | <p><b>General</b></p> <p>Exclude the following environmental influences:</p> <ul style="list-style-type: none"> <li>• powerful vibrations</li> <li>• direct sunlight</li> <li>• atmospheric humidity greater than 60%</li> <li>• temperatures below 15°C and above 40°C</li> <li>• powerful electric or magnetic fields</li> </ul>   |



## System Handling

Below are handling instructions and cautions.

|   |  |
|---|--|
|  | <p><b>CAUTION</b>—The system can be awkward when handling. Follow the basic safety steps outlined below.</p> |
|---|--|

- When moving the ReactIR iC10 or 45m system, it is highly recommended to use a cart or similar type device. This will prevent any possible damage to the unit or personnel.
- ONLY lift the ReactIR iC10 and 45m system using BOTH the handle in the rear and the sampling port on the front of the unit. Lifting the unit in another manner may cause damage to the system or personal injury should the cover unexpectedly become detached.
- DO NOT hand-carry the system with the fiber optic, mirrored conduit, or DS Micro Flow Cell attached to the system. Always remove the sampling technology first before hand-carrying the unit.
- The ReactIR iC10 or 45m base unit can be hand-carried by using the integrated handle on the rear of the unit along with the front sampling attachment port.
- Position the ReactIR iC10 and 45m base units to enable easy access to the ON/OFF switch.


## Operation—System Startup

1. Power up the ReactIR base unit and the computer workstation by one of the following procedures:
  - FROM A COLD START—You must allow the **minimum warm-up** time specified below before you can proceed with the system startup. Ensure the MCT dewar is full before you begin the required warm-up period.
    - iC 10—**Minimum of four (4) hours warm-up time**
    - iC 45m—**Minimum of three (3) hours warm-up time**
  - IF REACTIR SYSTEM HAS BEEN POWERED OVERNIGHT for the above minimum time—You may proceed directly to launch the iC IR software application.

2. Launch the iC IR software application by selecting the desktop icon.



3. Fill the mercury cadmium telluride (MCT) detector with liquid nitrogen.

|   |  |
|---|--|
|  | <p><b>CAUTION</b>—Liquid nitrogen must be handled in accordance with applicable safety procedures.</p> |
|---|--|

- a. Remove the plug from the top of the ReactIR base unit and insert the supplied funnel into the opening.
- b. Pour liquid nitrogen into the funnel. Add several funnels full.

**NOTE:** At some point, the nitrogen may blow back, creating a jet of nitrogen vapor and possibly liquid.

- c. After blowback subsides, add several more funnels full of liquid nitrogen.
- d. Once liquid nitrogen spills from the top of the detector, replace the plug.

## Maintenance

Follow the cleaning instructions below for ReactIR iC10 and 45m base units.

- Ensure the unit is powered off before doing any cleaning.
- Clean all exterior surfaces only with water and mild detergent.
- Do not use any alcohols, acids, bases or any flammable material to clean any part of the system.
- Be careful not to submerge any parts of the system with washing liquid.
- Be certain to dry all surfaces of the system after washing to avoid pooling of any liquid.
- Leave system powered off for at least 30 minutes after washing to avoid accidental short circuit of the electronics.

## Replacement/Spare Items

| Component                 | Part Number |
|---------------------------|-------------|
| ReactIR iC10 Power Supply | 14147006    |
| ReactIR 45m Power Supply  | 14183054    |
| Infrared Source Element   | 14147003    |