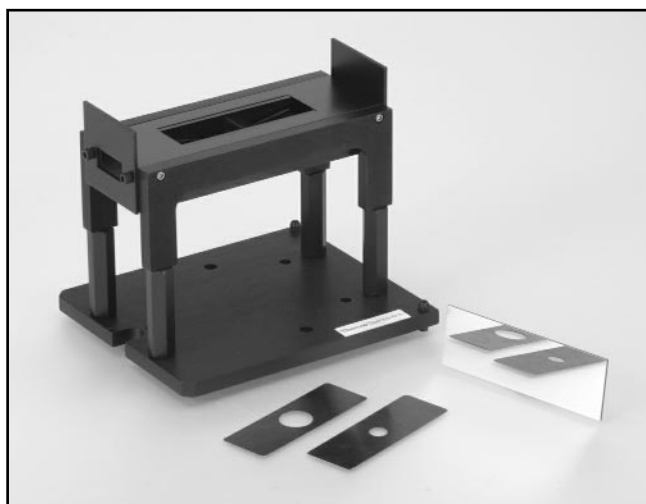


FT-85

Fixed 85° Grazing Angle Accessory

User's Manual

0014-2XX



P/N 700-0034

Thermo Spectra-Tech

Version 2.8

A Thermo Electron business

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Table of Contents

General Information

The Manual	1
Packing & Unpacking.....	1
Technical Support Center	1
Copyrights & Trademarks	1
Contact Thermo Spectra-Tech	1

Introduction

Introduction to External Reflectance	2
Product Description	2

Installation & Alignment

Installation.....	3
Alignment	4

FT-85 Operation

Operation	5
-----------------	---

Appendix

Replacement Parts	6
-------------------------	---

General Information

The Manual

This manual is designed as a tutorial to guide you through the installation of the FT-85 and through a typical analysis. If you have any questions, please contact a Thermo Spectra-Tech Technical Representative.

Packing & Unpacking

The FT-85 is shipped in a protective foam filled cardboard box. Upon arrival please check the box to ensure that all pieces have been received and that no pieces are damaged. Save the box for storage and shipment of the kit.

Technical Support Center

Technical materials describing the use and theory of attenuated total reflectance, diffuse reflectance and specular reflectance are available from Thermo Spectra-Tech. Additionally, a team of scientists is available at Thermo Spectra-Tech to answer any of your questions. If you encounter any problems or difficulties, or desire additional information please contact the Technical Support Center at 800-THE-FTIR.

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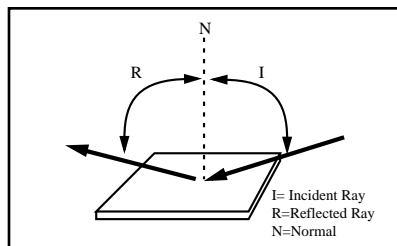
info@thermospectra-tech.com

Introduction

Introduction to External Reflectance

External reflectance provides a nondestructive method for measuring surface coatings without sample preparation. These include surface treated metals, thin resins and polymer coatings, paints, hard disks, and many more.

External reflectance is a mirror-like reflection from the surface of a sample. The infrared radiation is directed onto the surface of the sample at an angle of incidence, I . For external reflectance, the angle of the reflection, R , is equal to the angle of incidence, I . The amount of radiation reflected depends on the angle of incidence, the index of refraction of the sample, surface roughness, and the absorption properties of the sample.

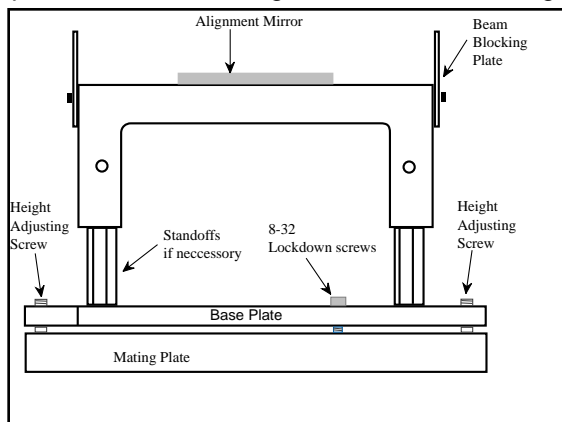


The angle of incidence is selected depending on the thickness of the coating which is being studied. For very thin coatings in the nanometer thickness range, an 85° angle of incidence is used. Reflectance measurements at this angle of incidence are often referred to as grazing angle measurements. For more routine samples with coatings in the micrometer range, a 30° angle of incidence is normally chosen.

Product Description

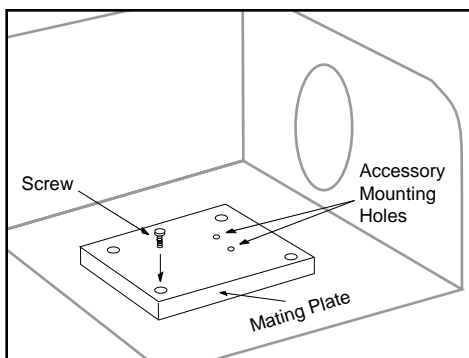
The FT-85 Fixed 85° Grazing Angle accessory is an external reflectance accessory designed to simplify surface analysis. Refracting optics provide a fixed 85° angle of incidence, making this technique ideal for the analysis of very thin coatings and adsorbed species on metal substrates.

The horizontal operating position ensures convenient sampling without any special clamps or holders. Two sampling masks (7 mm and 13 mm) are supplied for smaller samples and for isolating small areas on large samples.



Installation & Alignment

Installation

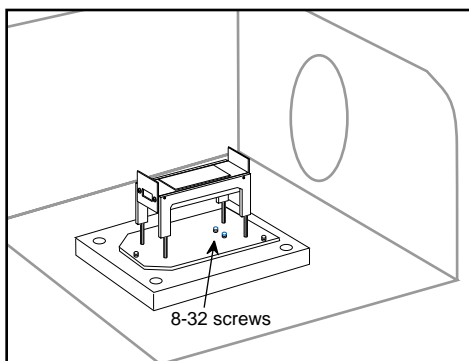


Prepare the Sample Compartment

Place the mating plate (supplied when required for your FT-IR spectrometer) in the sample compartment and secure it with the enclosed socket cap screws.

Monitor Open Beam Energy

Set the FT-IR spectrometer to monitor energy throughput and record the open beam energy (the sample compartment must be empty).



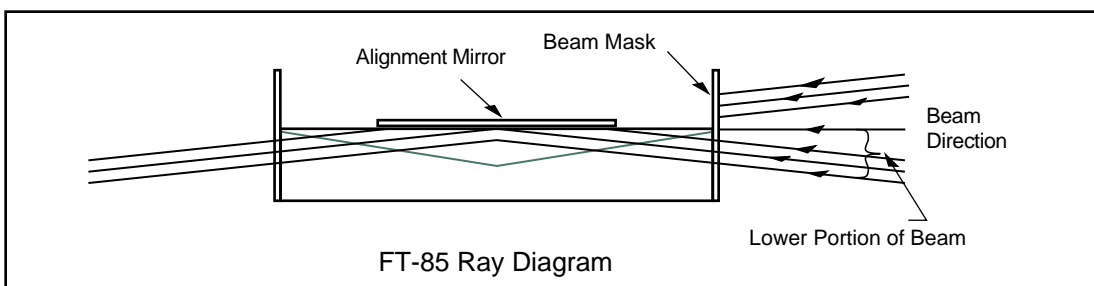
Place the FT-85 in the Sample Compartment

Place the FT-85 accessory into the FT-IR spectrometer's sample compartment.

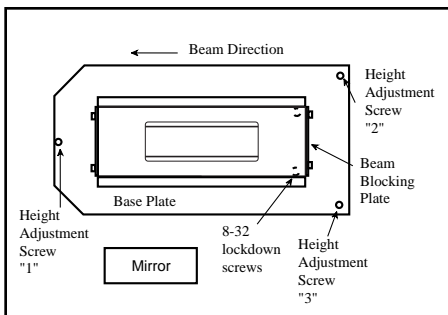
Use the two 8-32 lockdown screws to secure the accessory to the mating plate (if necessary). Do not tighten yet.

Installation & Alignment

Alignment



The FT-85 uses the bottom half of the spectrometer's IR beam. The accessory is aligned in the IR beam so that only the bottom half of the beam is allowed to enter the FT-85. All alignment is made by the height adjustment screws on the base plate.



Maximize Signal

Place the gold alignment mirror (supplied) gold side down on the platform of the FT-85.

To maximize the signal, adjust the height and tilt of the sample platform by adjusting the three screws located on the base plate. Turn the height adjustment screws a little bit at a time. Begin with 1 then go to 2 then 3. Use the supplied 3/32 balldriver to make the adjustment.

Remove the alignment mirror and check that the energy goes to zero.

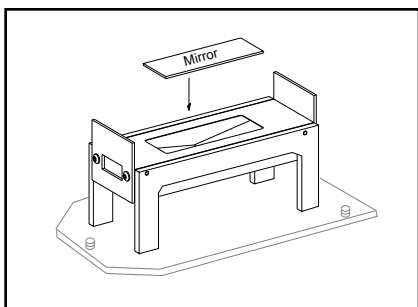
Tighten lockdown Screws.

Note: A non-zero reading indicates that energy is passing through the FT-85 without striking the sample plane. This occurs when the FT-85 has too much of the top portion of the IR beam passing through it. To correct this the FT-85 needs to be lower. The position of the FT-85 should be parallel to the sample compartment.

CAUTION: Never touch the mirror-like surfaces. Use clean compressed air when it is necessary to remove dust.

FT-85 Operation

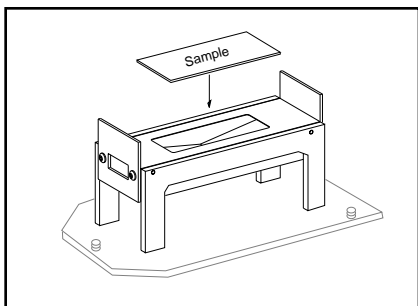
Operation



Collect a Background Spectrum

Place the alignment mirror (or other suitable reference material) face down on the platform of the FT-85.

Collect a background spectrum.

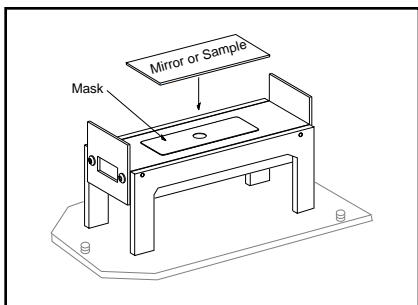


Collect a Sample Spectrum

Replace the reference material with the sample to be analyzed.

Collect a sample spectrum.

Ratio the sample spectrum to the reference spectrum.



Using a Mask

A mask is used to limit the sample size.

The sample mask must be blackened with the soot of a candle to provide absorption of the sample *only*.

Place the mask on the platform in the grooved opening.

Note: If a mask is going to be used with the sample, then the same mask should be used in acquiring the background spectrum.

Appendix

Replacement Parts

- | | |
|----------------------------|----------|
| • Alignment Mirror | 7004-000 |
| • 7 mm diameter hole mask | 2002-372 |
| • 13 mm diameter hole mask | 2002-373 |

