thermo scientific

Reacti-Therm Sample Derivatization System

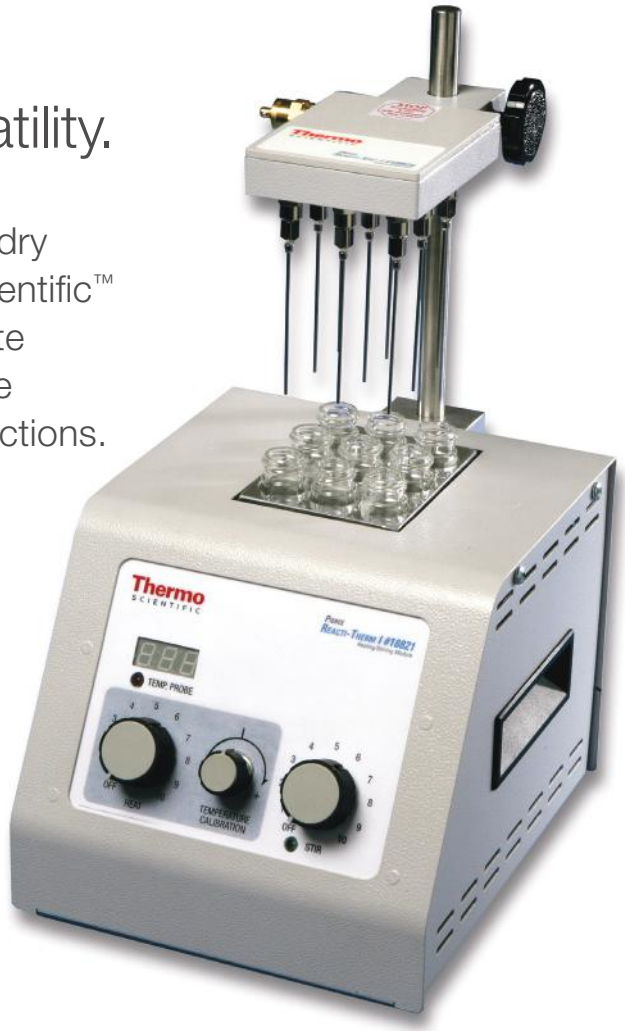
Heating, stirring and evaporation

ThermoFisher SCIENTIFIC

Reacti-Therm

Combines heating, stirring, and evaporation for unmatched versatility.

Thermo Scientific offers the Thermo Scientific™ Reacti-Therm™ Heating/Stirring Module (uniform dry heat to the sample) coupled with the Thermo Scientific™ Reacti-Vap™ Evaporator (simultaneous or separate delivery of pressurized gas) to provide a complete solution for derivatization or other small scale reactions.



- Derivatization reactions for HPLC and GC
- Protein hydrolysis
- Small-scale reactions
- Sample incubation
- Vacuum hydrolysis for amino acid analysis
- Sample evaporation

Visit **thermofisher.com/chromatography** for the latest news, applications and downloads for the product range.

Select your flexible system

Available options

Step **1** page 4

Heating only or **Heating & stirring**

Step **2** page 4

Single block (9 positions) or **Triple block** (27 positions)

Step **3** page 5 — **Heating block selection** (make sure you order at least the number of blocks in base unit)

Step **4** page 6 — **Option - thermometer or remote temperature probe**

Step **5** page 7 — **Option - Reacti-Vap module** (as appropriate to your base module)

Step **6** pages 6, 8 and 9 — **Option - Magnetic stirrers and vials**

Step **7** pages 10-11 — **Option - Derivatization reagents**

Specifications

Closure type	Single block	Triple block
Electrical Input		
Voltage	120V or 240V	120V or 240V
AC Input Voltage Tolerance	+/– 10%	+/– 10%
Wattage (Maximum)	130W	260W
Frequency	50/60Hz	50/60Hz
Performance		
Temperature Range*	ambient + 10°C to 200°C	ambient + 10°C to 200°C
Temperature Uniformity*	± 0.5°C	± 0.5°C
Temperature Stability*	± 0.5°C at 37°C	± 0.5°C at 37°C
Stirrer Operating Range	150-700 ± 100RPM	150-700 ± 100RPM
Maximum Inlet		
Gas pressure	2psi	2psi

Visit thermofisher.com/chromatography for more information.

The flexible system for your laboratory

Modular base systems

Modules

Product No.	Description	Pkg. Size
TS-18820	ThermoFisher™ Reacti-Probe™ Remote Temperature Probe	1 unit
TS-18821	Reacti-Therm Heating/Stirring Module (Single Block)	1 unit
TS-18822	Reacti-Therm Heating Module (Single Block)	1 unit
TS-18823	Reacti-Therm Heating/Stirring Module (Triple Block)	1 unit
TS-18824	Reacti-Therm III Heating Module (Triple Block)	1 unit
TS-18825	Reacti-Vap Evaporator	1 unit
TS-18826	Reacti-Vap Evaporator	1 unit

Underwriters Laboratories, Inc. Listed

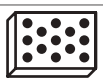
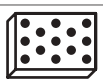
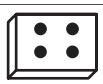
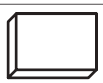
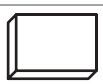
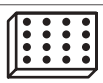
Note: Our Reacti-Therm Modules bear a CE marking for meeting the requirements of the European Union's Low-Voltage and EMC Directives.

The flexible system for your laboratory

Choice of heating blocks

Thermo Scientific™ Reacti-Block™ Aluminium Blocks are available with many hole configurations, machine-drilled to accommodate almost any size Thermo Scientific™ Reacti-Vial™ Small Reaction Vial (page 8), test tube or microcentrifuge tube. These highly efficient units are constructed of an aluminium alloy for optimal thermal conductivity. To ensure proper heat transference, be sure to have a close block-to-sample container fit.

Ordering information

Product No.		Description
TS-18801		**Reacti-Block A-1** Holds 13 × 0.3ml or 1ml Reacti-Vials; 13 holes/14mm dia. × 23mm deep
TS-18802		**Reacti-Block B-1** Holds 9 × 3ml or 5ml Reacti-Vials; 9 holes/21mm dia. × 32mm deep
TS-18803		**Reacti-Block C-1** Holds 13 × 3.5ml Screw Cap Septum Vials; 13 holes/15mm dia. × 34mm deep
TS-18804		**Reacti-Block Z-1** Holds 9 × 0.1mm Reacti-Vials; 9 holes/12mm dia. × 21mm deep
TS-18811		**Reacti-Block M-1** Holds 6 × 27.5ml Reacti-Vials; 6 holes/28.5mm dia. × 70mm deep
TS-18814		**Reacti-Block Q-1** Holds 10 Reacti-Vials; Small Reaction Vials 8 holes 25mm × 46mm deep
TS-18816		**Reacti-Block S-1** Holds 13 × 13mm dia. Test Tubes; 13 holes/14mm dia. × 45mm deep
TS-18817		**Reacti-Block T-1** Holds 9 × 16mm dia. Test Tubes; 9 holes/17mm dia. × 45mm deep
TS-18818		**Reacti-Block U-1** Holds 8 × 20mm dia. Test Tubes; 8 holes/21mm dia. × 45mm deep
TS-18819		**Reacti-Block V-1** Holds 17 Microcentrifuge Test Tubes; 17 holes/11mm dia. × 45mm deep
The Reacti-Block Aluminum Blocks featured below are designed to be used exclusively with the Reacti-Therm Modules. The hole patterns do not match the needle configuration of Reacti-Vap Evaporators.		
TS-18806		**Reacti-Block F** Holds 8 × 6ml Vacuum Hydrolysis Tubes; 8 holes/10mm dia. × 64mm deep
TS-18807		**Reacti-Block G** Holds 4 × 18ml Vacuum Hydrolysis Tubes; 4 holes/19mm dia. × 64mm deep
TS-18809		**Reacti-Block J** Blank/no holes (for custom drilling) 7.6cm tall
TS-18810		**Reacti-Block K** Blank/no holes (for custom drilling) 5.1cm tall
TS-18812		**Reacti-Block L** Holds 16 × 0.1ml Reacti-Vials; 16 holes/12mm dia. × 21mm deep

Visit thermofisher.com/chromatography for more information.

The flexible system for your laboratory

Reacti-Vial magnetic stirrers

Faster reaction times with smooth, efficient mixing of small reaction samples

- PTFE-coated stirring bars fit the cone portion of the Reacti-Vial
- Solubilization of sticky concentrated residues such as those found on evaporation of sugar solutions
- Increased speed-of-surface reactions by keeping insoluble reactants in suspension
- More information about appropriate vials on page 8
- More information about derivatisation reagents on pages 10 and 11

Ordering information

Product No.	Description	Pkg. Size
TS-16000	**Reacti-Vial Magnetic Stirrers** For use with 3.0, 5.0. and 10ml Reacti-Vial Small Reaction Vials	Pkg. of 6
TS-16010	**Reacti-Vial Magnetic Stirrers** For use with 0.3 and 1.0ml Reacti-Vial Small Reaction Vials	Pkg. of 6

Flexible system for your requirements

Reacti-Therm Remote Temperature Probe and Thermometers

PTFE-coated, designed specifically for dry incubations.
Remote Temperature Probe (RTP) provides more accurate and responsive control of the heating function, is not a substitute for temperature calibration to an independent thermometer.

For best results, perform temperature calibration with the RTP placed in the aluminum block thermometer well and a standard thermometer placed in a reaction vial in one of the aluminum block wells.

Ordering information

Product No.	Description	Pkg. Size
TS-18914	**Reacti-Therm Thermometer,** Mercury-free (0-100°C)	Pkg. of 1
TS-18915	**Reacti-Therm Thermometer,** Mercury-free (0-200°C)	Pkg. of 1
TS-18820	**Reacti-Probe** Remote Temperature Probe	Pkg. of 1

The flexible system for your laboratory
Reacti-Vap Evaporator

Thermo Scientific Reacti-Vap Evaporators are precision-machined gas manifolds. They provide simple, efficient evaporation by allowing the simultaneous or separate delivery of nonreactive pressurized gas to samples.

The evaporators attach simply to the Reacti-Thermo modules and the evaporating head tilts back for easy needle attachment and removal. PTFE-coated needles are available for applications using strong acids. Each Reacti-Vap Needle has a Luer-Lok® hub for leak-proof attachment to Reacti-Vap Evaporators Needles are available in 4- and 6-inch lengths.

Ordering information

Product No.	Description	Pkg. Size
TS-18825	**Reacti-Vap Evaporator (9-port)** For use with Reacti-Therm Single Block Modules; TS-18822 and TS-18821, Includes 9 needles and plugs	–
TS-18826	**Reacti-Vap III Evaporator (27-port)** For use with Reacti-Therm III Modules; TS-18823 and TS-18824, Includes 27 needles and plugs	–
TS-18782	**Reacti-Vap Replacement Tube Kit** 2.5 inch (64mm)	Pkg. of 9 and plugs
TS-18784	**Reacti-Vap PTFE Coated Needles** 4-inch (102mm) × 19 gauge	Pkg. of 9
TS-18786	**Reacti-Vap PTFE Coated Needles** 6-inch (152mm) × 19 gauge	Pkg. of 9
TS-18827	**Replacement Luer-Lok Fitting**	Pkg. of 1
TS-18828	**Replacement Screws for Mounting Bracket**	Pkg. of 4
TS-18829	**Replacement Height Adjustment Knob**	Pkg. of 1
TS-18830	**Replacement Mounting Bracket**	Pkg. of 1
TS-18831	**Replacement Metal Rod**	Pkg. of 1
TS-18832	**Replacement Dial for Flow Control**	Pkg. of 1
TS-18833	**Replacement Long Screws for Mounting Bracket**	Pkg. of 4

The flexible system for your laboratory

Reacti-Vials

Thermo Scientific Reacti-Vial Small Reaction Vials have an internal cone designed to make small-sample collection and handling easy and convenient. The cone feature is particularly useful for removing small quantities of sample with a syringe, even into the microliter range. The extra thick glass wall magnifies the sample, making these units ideal for observing chemical reactions.

Ideal for:

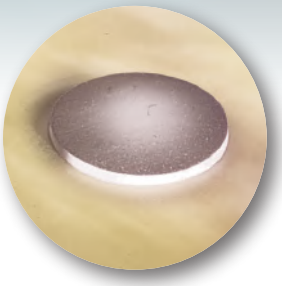
- Derivative preparation
- Residue isolation
- Digestion or hydrolysis
- Sample storage

Reacti-Vial Small Reaction Vials

				Clear Pkg. of 12	Amber Pkg. of 12
Size	**Dimensions (Diam. x Height) (mm ± 1mm)**	**Inside Diameter (mm)**	**Thread Style**	**Product #**	**Product #**
100 µl	12 x 32	8	425-8	TS-13100	–
0.3 ml	13 x 32	11	425-13	TS-13220	–
1.0 ml	13 x 45	11	425-13	TS-13221	TS-13097
3.0 ml	20 x 47	18	425-20	TS-13222	–
5.0 ml	20 x 60	18	425-20	TS-13223	TS-13099
10.0 ml	25 x 69	22	425-24	TS-13225	–

All Reacti-Vial Small Reaction Vials are supplied complete with Open-Top Screw Caps and PTFE/Rubber Septa (other septa can be ordered separately, see optional accessories overleaf).

Accessories



PTFE/Rubber Septa

For a highly inert and nonreactive seal.

PTFE/Silicone Septa

Unique septa that combine the inertness of a PTFE coating with the resealability of silicone.

Mininert Valves

Ideal for chemicals that deteriorate or evaporate in conventionally sealed containers.

Vacuum Hydrolysis Tubes

For fast, effective protein and peptide hydrolysis

- The upper temperature limit of the Vacuum Hydrolysis Tubes is 260°C; however, do not heat the tubes greater than 100°C in an oven
- Vacuum Hydrolysis Tubes fit conveniently into Reacti-Block Aluminium Heating Blocks

Optional accessories

	PTFE/ silicone septa pkg. of 72	Rubber laminated septa pkg. of 72	Open-Top screw caps pkg. of 72	Miniert valves pkg. of 72	Reacti-Vial Magnetic Stirrers pkg. of 6
Vial Size	**Product #**	**Product #**	**Product #**	**Product #**	**Product #**
100 µl	TS-12708	–	TS-13208	–	–
0.3 ml	TS-12712	TS-12412	TS-13215	–	TS-16010
1.0 ml	TS-12712	TS-12412	TS-13215	–	TS-16010
3.0 ml	TS-12718	TS-12418	TS-13218	TS-10135	TS-16000
5.0 ml	TS-12718	TS-12418	TS-13218	TS-10135	TS-16000
10.0 ml	TS-12722	TS-12422	TS-13219	TS-10130	TS-16000

Septa compatibility guide optional accessories

Closure type	Resealability	Recommended for use with	Not recommended for use with
PTFE/Silicone Septa	Excellent	DMF, DMSO, organic solvents, pyridine, THF and silylation reactions	Strong corrosives, such as chlorosilanes
PTFE/Rubber Laminated Septa	Poor	Corrosives such as chlorosilanes, DMF, DMSO, organic solvents, pyridine and THF	Trifluoracetic anhydride

The flexible system for your laboratory

GC Derivatization reagents

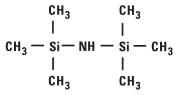
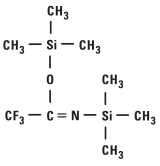
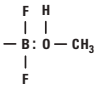
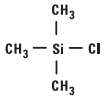
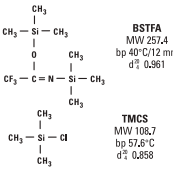
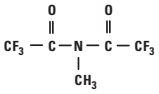
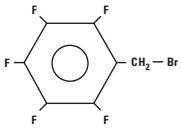
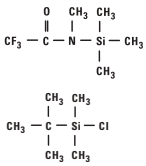
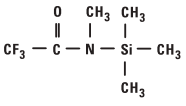
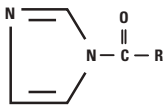
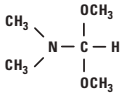
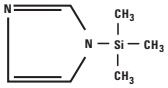
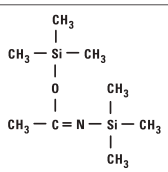
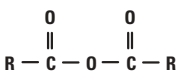
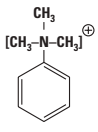
Why do we derivatize?

- To make a compound that otherwise could not be analysed by a particular method suitable for analysis
- To improve the analytical efficiency of the compound
- To improve the detectability of the compound

Often compounds cannot be analysed because they are not in a form that is suitable for the particular analytical technique. Examples include non-volatile compounds for GC analysis, insoluble compounds for HPLC analysis and materials that are not stable using the conditions of the technique. The derivatization procedure modifies the chemical structure of the compounds, allowing analysis by a desired technique.

Main types of derivatization

- Silylation
- Acylation
- Alkylation

Silylation		Acylation	Alkylation
 **HMDS** MW 161.4 bp 125°C n_d^{20} 1.4071	 **BSTFA** MW 257.4 bp 40°C/12 mm d_4^{20} 0.961	 **Pentafluoropropanol** MW 150.05 bp 80.6°C d_4^{20} 1.2880	 **BF_3-Methanol** 14% BF_3 MW 67.82 86% CH_3OH MW 32.04
 **TMCS** MW 108.7 bp 57.6°C d_4^{20} 0.858	 **BSTFA** MW 257.4 bp 40°C/12 mm d_4^{20} 0.961 **TMCS** MW 108.7 bp 57.6°C d_4^{20} 0.858	 **MBTFA** MW 223.08 bp 123-124°C d_4^{20} 1.55	 **PFBBr** MW 260.9 bp 174-175°C d_4^{20} 1.86
 **MSTFA** MW 199.1 bp 70°C/75 mm d_4^{20} 1.11 **TBDMCS** MW 150.73 bp 125°C	 **MSTFA** MW 199.1 bp 70°C/75 mm d_4^{20} 1.11	 **MBTFA** MW 223.08 bp 123-124°C d_4^{20} 1.55	 **Methylate Reagent** MW 119.17 bp 102-104°C d_4^{20} 0.897
 **TMSI** MW 140.26 bp 99°C/14 mm Hg d_4^{20} 0.957	 **BSA** MW 203.4 bp 71-73°C/35 mm d_4^{20} 0.832		 **TMPAH**

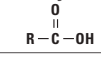
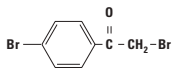
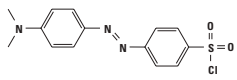
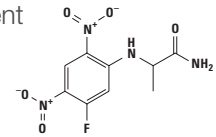
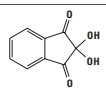
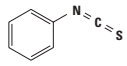
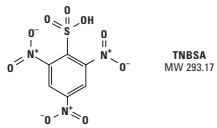
The flexible system for your laboratory

Detection and Hydrolysis Reagents

Pre- and post-chromatographic techniques are both used in HPLC derivatization. Pre-chromatographic (or pre-column techniques) offer more than greater selectivity and sensitivity in detection and can be used to enhance stability, improve resolution, improve peak symmetry and increase or decrease retention of solutes.

Most protein samples require some form of chemical treatment before their component amino acids are suitable for analysis. Protein and peptide samples must be hydrolyzed to free amino acids from peptide linkages. Acids (usually HCl) are the most widely used agents for hydrolyzing proteins.

Thermo Scientific Detection Reagents for HPLC

Functional Group	Description	Detection*
Carboxylic Acid 	*p*-Bromophenacylate 	UV
Primary Amine 	Dabsyl Chloride 	Vis
	FDAA, Marfey's Reagent 	UV
	Ninhydrin 	Vis
	PITC 	UV
	TNBSA 	EC, UV
Secondary Amine	Ninhydrin (see structure above)	Vis
	PITC (see structure above)	UV

**EC = electrochemical; F = fluorescence; UV = ultraviolet; Vis = visible.*

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