



Sample preparation | Methods | Analysis

# Biodiesel

Analysis guide

Biodiesel is taking its place as one of the new cleaner and greener solutions required to meet the world's growing energy needs. New feedstocks, production techniques and applications are continuing to drive the production capabilities of biodiesel to meet consumer demand. This is increasing the analysis required by biodiesel producers.

This guide has been created as a resource for biodiesel analysis. Inside you will find method information, products and solutions designed to ensure you can effectively and reliably complete fuels testing according to either ASTM International or European National (EN) methods.

The latest information about our products and applications can always be found at our website: [www.trajanscimed.com](http://www.trajanscimed.com)

Sample preparation | Methods | Analysis



## Introduction to biodiesel analysis

The rising price of oil is driving fuel prices to new highs, causing substantial global economic impacts. This economic situation combined with the desire for cleaner and greener energy solutions has created the demand for new fuels. Companies and consumers are looking for alternative ways of deriving fuel from available sources.

One alternative fuel achieving both environmental and economic requirements is biodiesel.

Biodiesel is diesel derived from vegetable oils, animal fats and waste food by-products, usually cooking oil. Major investment is currently being made into the development of algae and other specifically bred plant crops that will increase yield and enable biodiesel to become a major component of our energy infrastructure.



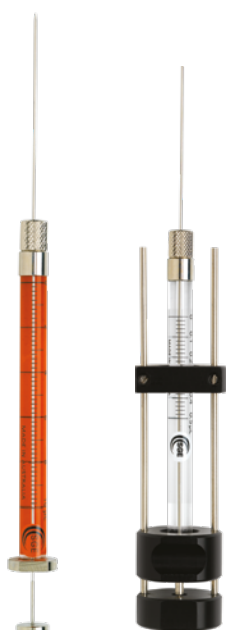


## Product process

The most widely accepted form of biodiesel production is trans-esterification, where typically oil is mixed with a solvent, usually methanol, and catalyzed by sodium methoxide, which causes the oil to be split into biodiesel and glycerine by-products. The biodiesel will then be processed for use in vehicles and the waste products split-off and sold separately. Glycerols, the major waste components, need to be minimized to trace levels within the fuel to prevent engine malfunction. Both the ASTM International and European National (EN) standards for biodiesel fuel certification require the fuel to be tested for total glycerol content before it can be released for sale. The European biodiesel standard mandates the completion of additional tests such as methanol and FAMES.

## Contents

Trajan consumables   GC selection	6
Sample preparation	8
BPX-BIOD GC	9
Application note	10
Biodiesel analysis	12
Agilent Technologies   GC supplies	14
PerkinElmer   GC supplies	16
Shimadzu   GC supplies	18
Thermo Scientific   GC supplies	20
Information resources	23





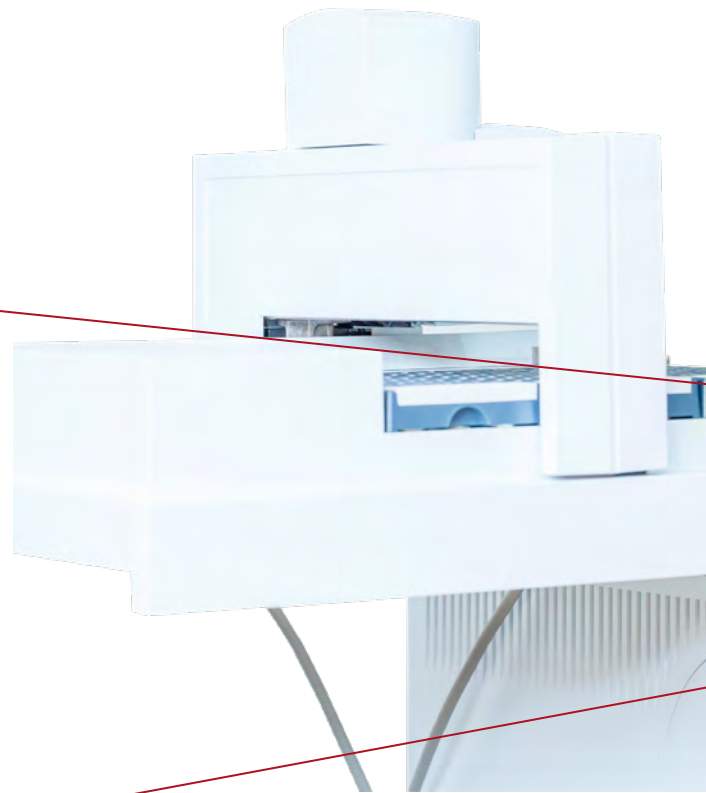
**SGE Syringes**

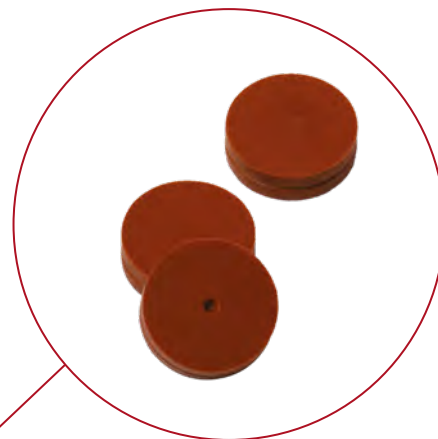
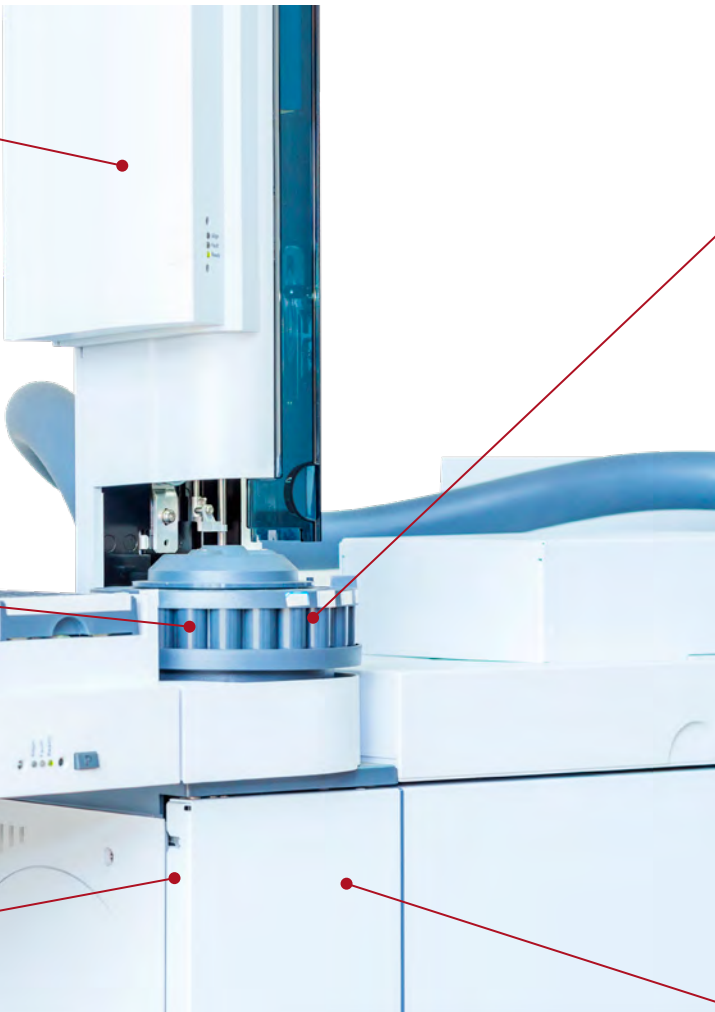


**SGE Inlet liners**



Ferrules



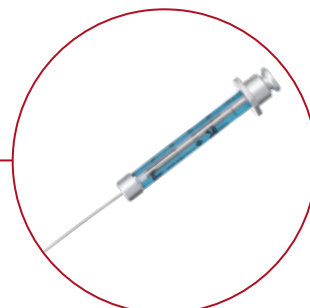


Septa

The combination of components selected for your instrument make an important contribution to successful separations. Choose Trajan to improve your chromatography.



# Trajan consumables | GC selection

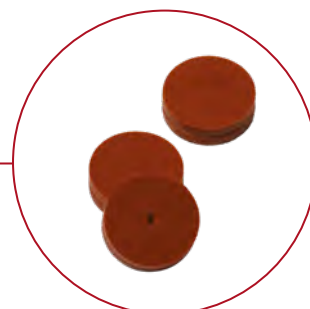


SGE syringes for autosamplers incorporate a vibrant color scheme, distinguished by volume, enabling easy identification of syringes installed in instruments.

Choose from a comprehensive range of SGE syringe options including plunger protection, removable or fixed needles, a range of needle gauge and length options as well as needle tip style alternatives.

Color	Syringe volumes			
Yellow	1000 nL (1 µL)		1 mL	1000 mL (1 L)
Lime	5000 nL (5 µL)	5 µL	5 mL	
Dark orange		10 µL	10 mL	
Green		25 µL	25 mL	
Purple		50 µL	50 mL	
Aqua		100 µL	100 mL	
Gray		250 µL	2.5 mL	2000 mL (2 L)
Light orange	500 nL (0.5 µL)	500 µL		500 mL (0.5 L)

## Septa



The role of septa for GC analysis is key as many chromatographic problems are caused by use of inappropriate septa material or inappropriate handling of the septa.

### Desired septa attributes:

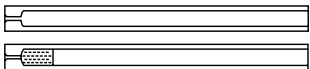
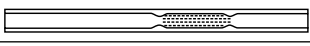
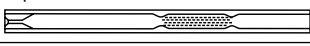
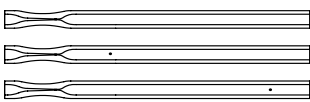
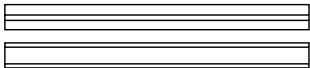
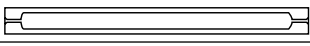

- Reliably seal against the carrier gas pressure in the inlet.
- Capable of being pierced and resealed time after time.
- Must not contaminate or bleed material into the chromatographic system.

Material	Max operating temperature	Key features
GP grade	275°C	Low temperature applications
EC grade	350°C, 300°C for 17 mm size	Low bleed
MN grade	350°C, 300°C for 17 mm size	Premium septa for autosamplers
HT grade	400°C, 330°C for 17 mm size	Outstanding mechanical properties for the highest temperature applications





The inlet liner is where the sample is introduced and vaporized into the gaseous phase. The design of the liner is crucial, as is liner deactivation, to ensure reproducible and accurate chromatography. To optimize your results for different sample types, SGE Inlet liners are color coded by geometry for ease of selection.

Color	Injection technique	Sample types	Liner geometry
Dark Green	Splitless	<ul style="list-style-type: none"> <li>Trace level analyses.</li> <li>Active compounds.</li> </ul>	Taper / Gooseneck 
Blue	Split	<ul style="list-style-type: none"> <li>General purpose.</li> <li>Concentrated samples.</li> <li>Dirty samples.</li> </ul>	FocusLiner® 
Aqua	Splitless	<ul style="list-style-type: none"> <li>Trace level analyses.</li> <li>Dirty samples.</li> <li>Wide boiling point range.</li> </ul>	Tapered FocusLiner® 
Orange	Direct	<ul style="list-style-type: none"> <li>Trace level analyses.</li> <li>Active compounds.</li> </ul>	ConnectTite 
Purple	Split Splitless	<ul style="list-style-type: none"> <li>General purpose.</li> <li>Concentrated samples.</li> <li>Dirty samples (only if quartz wool is present).</li> <li>Gaseous samples (also Purge and Trap, Headspace).</li> </ul>	Straight 
Yellow	Splitless LVI	<ul style="list-style-type: none"> <li>Trace level analyses.</li> <li>Low boiling point compounds.</li> <li>Active compounds.</li> </ul>	Double Taper 
Gray	PTV LVI	<ul style="list-style-type: none"> <li>Trace level analyses.</li> <li>Large volume injections.</li> </ul>	PTV/LVI 

## Connectors and ferrules

GC connections are designed to minimize time spent on installation, and are suitable for a wide range of applications.

Poorly defined or selected connections can lead to an increase in dead volume, leaks and mismatched tubing sizes after temperature cycling.



Material	Uses	Advantages	Limitations
100% Graphite	FID, NPD, high temperature	<ul style="list-style-type: none"> <li>Easy-to-use stable seal</li> <li>Higher temperature limit</li> <li>Can be easily removed</li> <li>Can be re-used</li> </ul>	<ul style="list-style-type: none"> <li>Not for MS or oxygen-sensitive detectors</li> <li>Soft, easily deformed or destroyed</li> <li>Possible system contamination</li> </ul>
15% Graphite/ 85% Vespel®	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> <li>Long lifetime</li> <li>High temperature limit</li> <li>MS compatible</li> </ul>	<ul style="list-style-type: none"> <li>Cannot be re-used</li> <li>Must be re-tightened after initial temperature cycles</li> </ul>
SilTite® metal	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> <li>Long lifetime</li> <li>High temperature limit</li> <li>MS compatible</li> </ul>	<ul style="list-style-type: none"> <li>Cannot be re-used</li> </ul>

# Sample preparation

Biodiesel requires quantitative measurement of the composition of the sample. Consequently liquid handling accuracy and precision are critical to the success of the final application.

eVol®, the world's first digitally controlled analytical syringe and 2010 R&D100 award winner, provides the accuracy and precision required in biodiesel analytical laboratories.

## eVol® XR makes everyone an expert

- Speed up and simplify laboratory workflow
- Improve accuracy and reproducibility
- Standardize results independent of operator skill

eVol is the coupling of two precision devices: a digitally controlled electronic drive and an XCHANGE® enabled analytical syringe.

- XCHANGE syringes are easily and quickly changed allowing them to be dedicated to individual liquids or methods to prevent possible cross-contamination of reagents.
- eVol is ergonomic, comfortable and easy to use.
- eVol is easily calibrated and calibration factors saved for each syringe, enabling laboratories to comply with stringent global laboratory standards.
- eVol is suitable for use with volatile samples.
- eVol is programmable to store a laboratory workflow (up to 98 steps).
- eVol is suitable for direct injection onto a chromatography column with a consistent flow rate.
- eVol's stainless steel needle enables direct injection through septa.



### Now available! eVol XR 1 mL syringe

- Password protection options enabling standardization of work processes.
- Slow aspirate and dispense for titrations and reaction rate control.
- 1 mL syringe provides more flexibility to improve workflows.

### eVol Electronic Syringe starter kit contains:

Description	Part number
<b>eVol XR kit contains:</b>	<b>291 0200</b>
- 3 eVol syringes – 5 µL, 100 µL and 1 mL - Stand - Universal charger - Comprehensive instruction manual - Disc with manual in multiple languages	
<b>eVol only</b>	<b>291 0205</b>



## SGE GC columns



Each ASTM and EN biodiesel method has been evaluated to demonstrate the suitability of BPX-BIOD GC columns to achieve optimal separation.

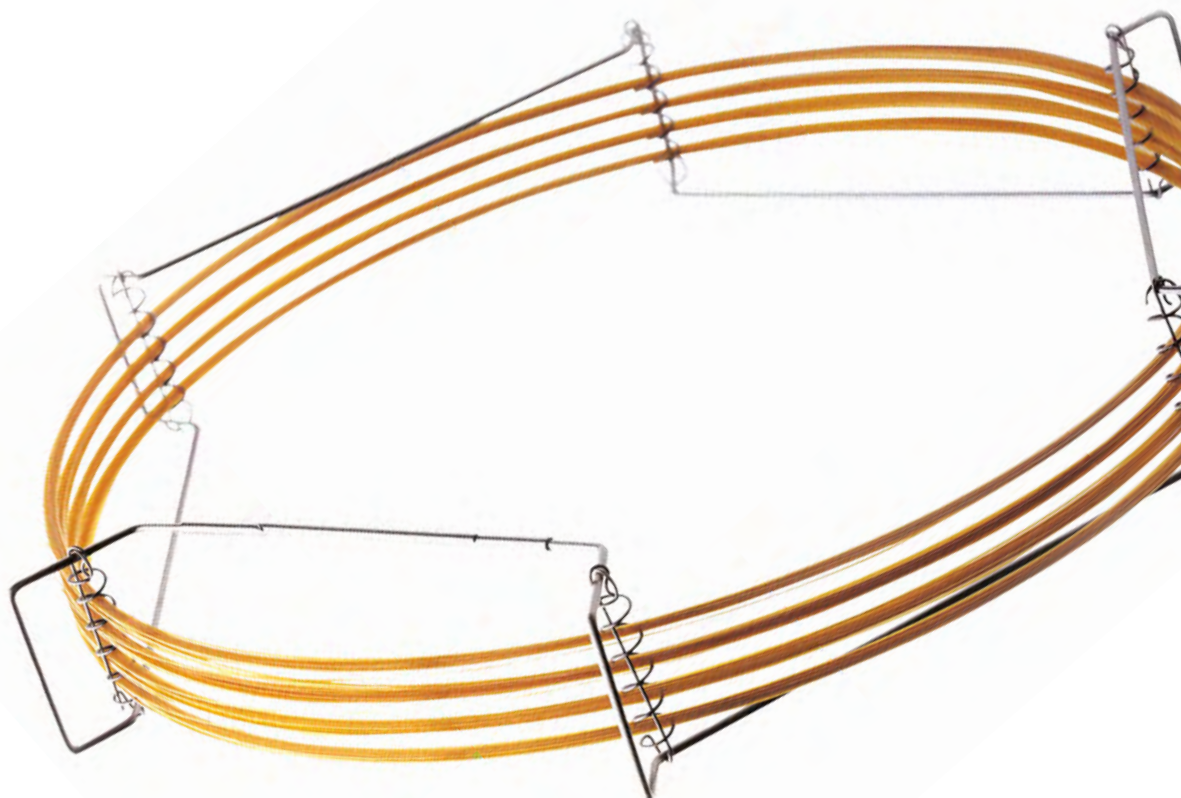
Each BPX-BIOD GC column is tested at the maximum operating temperature for the column, and specific tests are undertaken to ensure the column meets inertness specifications and separation performance. This means you can be confident of a reliable separation, column after column.

Please refer to the table below and application note on the following pages (10-11) to find the best high temperature column for your biodiesel analysis.

Method	Description	Column ID	Length (m)	Film thickness ( $\mu\text{m}$ )	Part number
ASTM D6584*¥	BPX – BIOD6584	0.32	10	0.1	0541180SG53
ASTM D6584¥	BPX – BIOD6584	0.32	15	0.1	0541181SG53

\*Recommended column in method.

¥ Includes guard column.

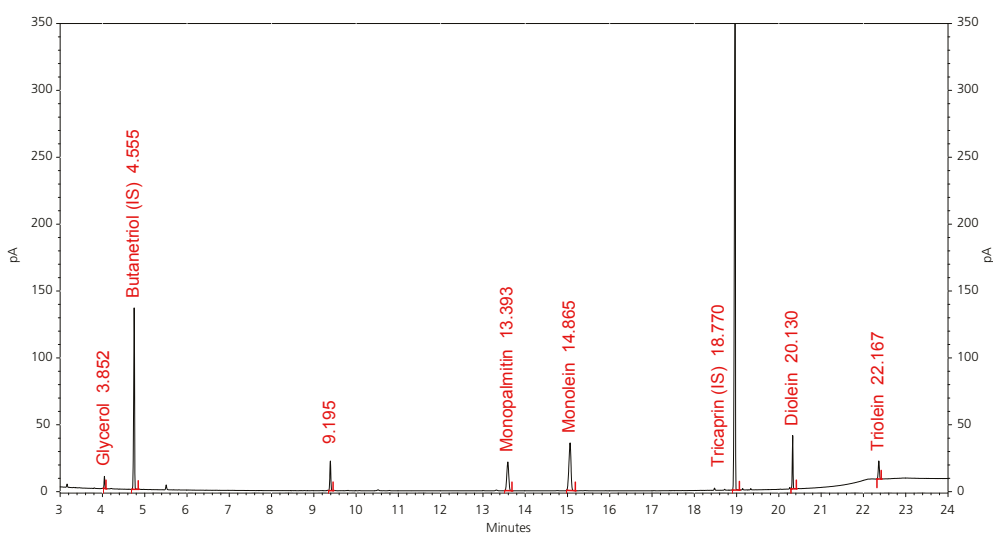


# Application note

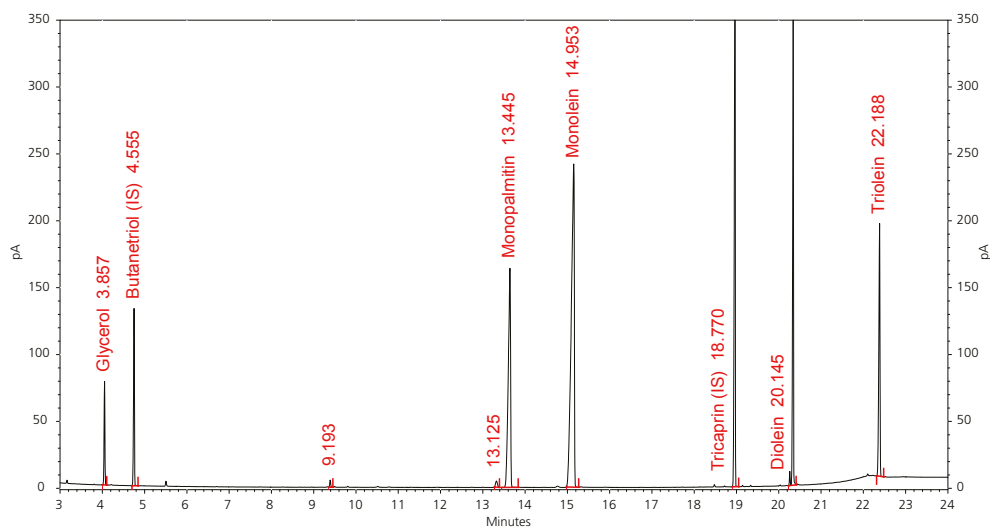
## ASTM D6584 / EN 14105 free and total glycerine

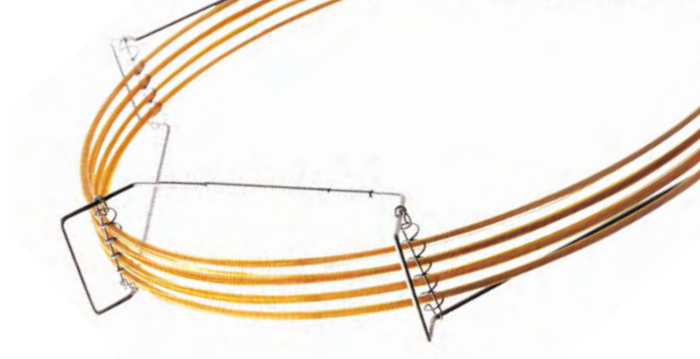
Column part number	0541180SG53		
Phase	BIOD-BPX6584 or BPX-BIOD5	Rate 3	7°C/min
Column	10 m x 0.32 mm ID x 0.10 µm with 2 m x 0.53 mm ID guard column	Final temperature	380°C, 10 min
		Detector	FID at 400°C
Initial temperature	50°C, 1 min	Carrier gas	He
Rate 1	15°C/min to 180°C	Carrier gas flow	3 mL/min
Rate 2	7°C/min to 230°C		

### Low level ASTMD6584 / EN14105 standard

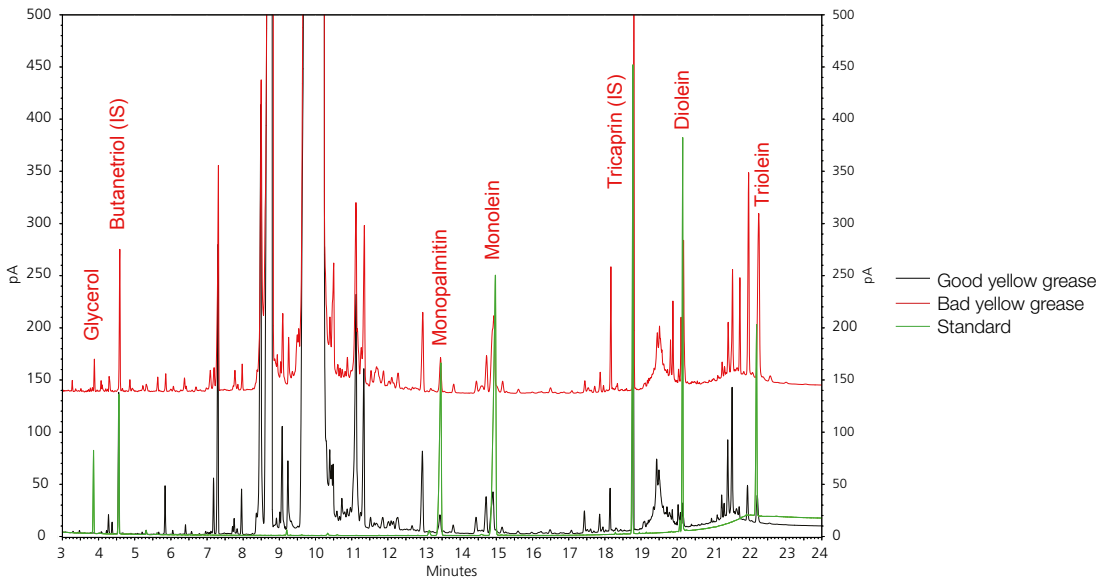


### High level ASTMD6584 / EN14105 standard

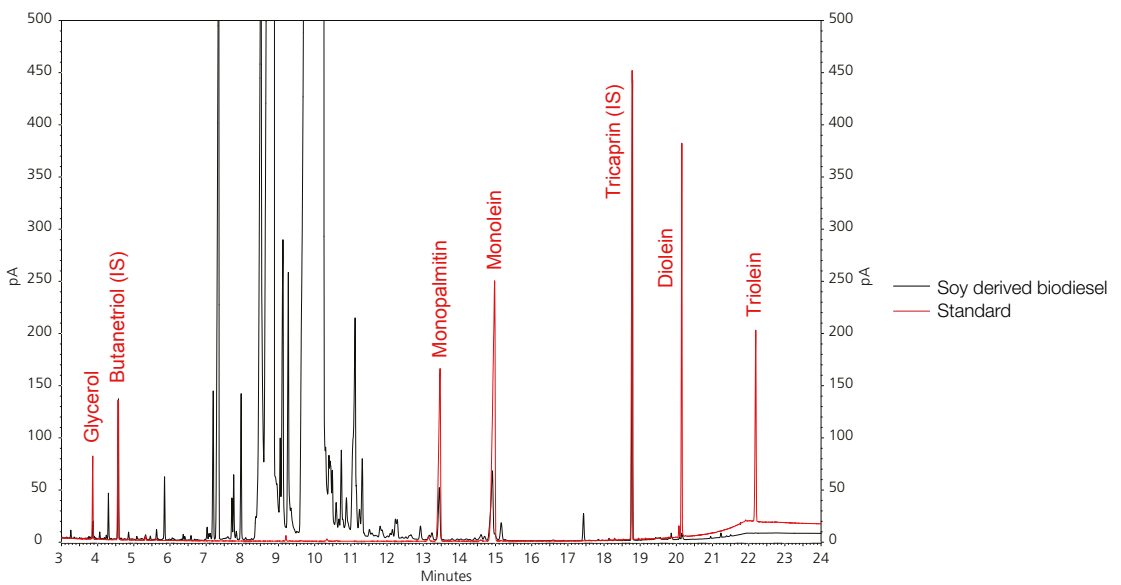




**Good yellow grease biodiesel and bad yellow grease biodiesel compared with ASTMD6584 / EN14105 standard**



**Soy derived biodiesel sample compared to ASTMD6584 / EN14105 standard**



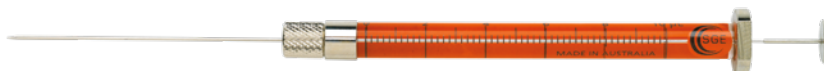
# Biodiesel analysis

Optimized chromatography supplies



## SGE syringes

### 1 - 5 µL NanoVolume



Specifications	
Accuracy and reproducibility	± 2 % (dispensed volume)
Borosilicate glass barrel outer diameter (OD)	6.5 mm and 8 mm
Scale length	0.5 µL (6.5 mm OD barrel) = 27.05 mm, 0.5 µL (8 mm OD barrel) = 63.7 mm, 1 µL = 54.1 mm, 63.7 mm, 5 µL = 48.7 mm
International standards traceability	

Syringe volume	Needle length (mm)	Needle gauge	Needle OD (mm)	Needle ID (mm)	Needle tip	Description	Replacement needle and plunger part no.	Syringe part no.
<b>8.0 mm outer diameter (OD) barrel</b>								
1 µL	50	23	0.63	0.155	Cone	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle	034055	000500
1 µL	50	23	0.63	0.155	Bevel	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD bevel tipped needle	034056	000501
1 µL	70	23	0.63	0.155	Cone	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	034057	000505
1 µL	70	23	0.63	0.155	Bevel	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	034060	000506
1 µL	115	23	0.63	0.155	Cone	1.0 µL NanoVolume syringe with 11.5 cm 0.63 mm OD bevel tipped needle	034059	000510
1 µL	70	26	0.47	0.155	Cone	1.0 µL NanoVolume syringe with 7 cm 0.47 mm OD cone tipped needle	034610	000570
5 µL	50	23	0.63	0.365	Cone	5.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle	035055	000800
5 µL	50	23	0.63	0.365	Bevel	5.0 µL NanoVolume syringe with 5 cm 0.63 mm OD bevel tipped needle	035056	000801
5 µL	70	23	0.63	0.365	Cone	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle	035057	000802
5 µL	70	23	0.63	0.365	Bevel	5.0 µL NanoVolume syringe with 7 cm 0.63 mm OD bevel tipped needle	035058	000803
5 µL	115	23	0.63	0.365	Cone	5.0 µL NanoVolume syringe with 11.5 cm 0.63 mm OD cone tipped needle	-	000804

### Syringes fitted with repeating adaptor

The SGE repeating adaptor (RAX) is attached to a syringe to ensure reproducibility of sample volumes.



Syringe volume	Needle length (mm)	Needle gauge	Needle OD (mm)	Needle ID (mm)	Needle tip	Description	Replacement needle and plunger part no.	Syringe part no.
<b>8.0 mm outer diameter (OD) barrel</b>								
1 µL	50	23	0.63	0.155	Cone	1.0 µL NanoVolume syringe with 5 cm 0.63 mm OD cone tipped needle and repeating adaptor	034055	000550
1 µL	70	23	0.63	0.155	Cone	1.0 µL NanoVolume syringe with 7 cm 0.63 mm OD cone tipped needle and repeating adaptor	034057	000553

## Manual and on-column syringes

### 10 - 500 µL PTFE tipped plunger



Specifications	
Accuracy and reproducibility	± 1 % (dispensed volume)
Borosilicate glass barrel outer diameter (OD)	10 µL = 6.5 mm, 25 - 500 µL = 8 mm
Scale length	10 µL = 54.1 mm, 25 - 500 µL = 60 mm
International standards traceability	

Syringe volume	PTFE tipped plunger	Needle length (mm)	Needle gauge	Needle OD (mm)	Needle ID (mm)	Needle tip	Description	Replacement needle part no.	Replacement plunger part no.	6 PK syringe part no.	Syringe part no.
<b>Fixed needle</b>											
10 µL	✓	50	26	0.47	0.11	Bevel	10 µL fixed needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	-	031810	002202	002200
10 µL	✓	70	26	0.47	0.11	Bevel	10 µL fixed needle syringe with GT plunger and 7 cm 0.47 mm OD bevel tipped needle	-	031810	-	002208
25 µL	✓	50	25	0.50	0.20	Bevel	25 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031815	-	003200
50 µL	✓	50	25	0.50	0.20	Bevel	50 µL fixed needle syringe with GT Plunger & 5 cm 0.5 mm OD bevel tipped needle	-	031820	-	004200
100 µL	✓	50	25	0.50	0.20	Bevel	100 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031825	-	005200
250 µL	✓	50	25	0.50	0.20	Bevel	250 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031830	-	006200
500 µL	✓	50	25	0.50	0.20	Bevel	500 µL fixed needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	-	031835	-	007200
<b>Removable needle</b>											
10 µL	✓	50	26	0.47	0.11	Bevel	10 µL removable needle syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	037110	031811	002252	002250
25 µL	✓	50	25	0.50	0.20	Bevel	25 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031815	-	003250
50 µL	✓	50	25	0.50	0.20	Bevel	50 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031820	-	004250
100 µL	✓	50	25	0.50	0.20	Bevel	100 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031825	-	005250
250 µL	✓	50	25	0.50	0.20	Bevel	250 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031830	-	006250
500 µL	✓	50	25	0.50	0.20	Bevel	500 µL removable needle syringe with GT plunger and 5 cm 0.5 mm OD bevel tipped needle	038110	031835	-	007250
<b>Guided plunger</b>											
10 µL	✓	50	26	0.47	0.11	Bevel	10 µL removable needle guided plunger syringe with GT plunger and 5 cm 0.47 mm OD bevel tipped needle	037110	031805	-	002455
<b>On-column</b>											
10 µL	✓	75	-	0.17	0.11	On-column	10R-GT-OCCE	037675	031811	-	002500



## SGE autosampler syringes

All needles are 42 mm long with a cone tip.

### Agilent 7673, 7683, 7693A and 6850 ALS

Volume	Needle gauge (OD mm)	Description	Syringe part no.	Pack size	Spare needle part no.	Pack size	Spare plunger part no.	Pack size
<b>Fixed tapered needle</b>								
5 µL	23-26s (0.63/0.47)	5 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	001821	1	-	-	-	-
10 µL	23-26s (0.63/0.47)	10 µL fixed needle Agilent syringe with 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	002821	1	-	-	-	-
10 µL gas tight	23-26s (0.63/0.47)	10 µL fixed needle Agilent syringe with GT plunger and 4.2 cm 0.63/0.47 mm OD cone tipped dual gauge needle	002826	1	-	-	031808	2
<b>Fixed straight needle</b>								
5 µL	23 (0.63)	5 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	001810	1	-	-	-	-
10 µL	23 (0.63)	10 µL fixed needle Agilent syringe with 4.2 cm 0.63 mm OD cone tipped needle	002810	1	-	-	-	-
<b>Removable tapered needle</b>								
5 µL	23-26s (0.63/0.47)	5R-AG-0.63/0.47C	001825	1	036730	2	-	-
10 µL	23-26s (0.63/0.47)	10R-AG-0.63/0.47C	002825	1	037730	2	-	-
<b>Removable straight needle</b>								
1 µL	23 (0.63)	1BR-AG-0.63C	000610	1	034715	1**	-	-


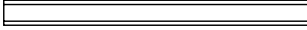
\*\* Denotes plunger and needle kit.

## Septa

Instrument	Diameter	Septa type	Pack size	Part no.
<b>For Agilent 7890, 6890, 6850, 5890 and HP4890</b>				
	11	HT	25	041898
	11	EC	25	041902

## SGE Inlet liners



Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part no.
<b>For Agilent 7890, 6890, 6850, 5890 and HP4890</b>					
 Split/splitless FocusLiner™	6.3	4	78.5	1	09200201
				5	092002
				25	092219
 Split, straight-through liner	6.3	4	78.5	1	09200701
				5	092007
				25	092222



- FocusLiner
- Straight

The SGE Inlet liner range is color coded by geometry to simplify selection.



## Ferrules

Instrument	Column ID	Ferrule ID	Pack size	Part no.
<b>15% graphite / 85% Vespel ferrules</b>				
For injectors and detectors at atmospheric pressure e.g. FID	0.1-0.25 mm	0.4 mm	10	073109
	0.32 mm	0.5 mm	10	073111
	0.53 mm	0.8 mm	10	073113
	for 1/8" OD packed columns	1/8"	10	072669
	for 1/4" OD packed columns	1/4"	10	072667
	0.1-0.25 mm	0.4 mm	10	072663
	0.32 mm	0.5 mm	10	072654
	0.53 mm	0.8 mm	10	072655
<b>SilTite™ metal ferrules</b>				
For GC-MS interface connection (starter kit)	0.1-0.25 mm	0.4 mm	10	*073200
	0.32 mm	0.5 mm	10	*073201
	0.53 mm	0.8 mm	10	*073202
For split/splitless injectors (starter kit)	0.1-0.25 mm	0.4 mm	10	#073270
	0.32 mm	0.5 mm	10	#073271
	0.45-0.53 mm	0.8 mm	10	#073272
	1/32"	0.81 mm	10	#073273
<b>Replacement SilTite metal ferrules</b>				
For all connections	0.1-0.25 mm	0.4 mm	10	073220
	0.32 mm	0.5 mm	10	073221
	0.53 mm	0.8 mm	10	073222
	1/32"	0.81 mm	10	073219
<b>Replacement SilTite™ nuts</b>				
For GC-MS interface connection	–	–	5	073224
For split/splitless injector	–	–	5	073226
<b>Replacement SilTite™ base seals</b>				
For split/splitless injector	–	–	2	073400
	–	–	10	073401

\* Includes 10 ferrules, 2 SilTite nuts. # Includes 10 ferrules, 2 SilTite nuts and 2 SilTite inlet base seals.



## SGE autosampler syringes

All needles are 70 mm long with a cone tip style.

### PerkinElmer AutoSystem


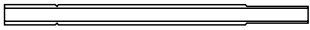
Volume	Needle gauge (OD mm)	Description	Syringe part no.	Pack size	Spare plunger part no.	Pack size
<b>Fixed needle</b>						
5 µL	26 (0.47)	5 µL fixed needle PerkinElmer syringe with 7 cm 0.47 mm OD cone tipped needle	001953	1	-	-
5 µL	23 (0.63)	5 µL fixed needle PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	001954	1	-	-
5 µL gas tight	26 (0.47)	0.5 µL NanoVolume Agilent Syringe with 4.2 cm 0.47 mm OD cone tipped needle	001955	1	031807	2
5 µL gas tight	23 (0.63)	5 µL fixed needle PerkinElmer syringe with GT plunger and 7 cm 0.63 mm OD cone tipped needle	001957	1	031807	2
50 µL	23 (0.63)	50 µL fixed needle PerkinElmer syringe with 7 cm 0.63 mm OD cone tipped needle	004670	1	-	-

## Septa

Instrument	Diameter	Septa type	Pack size	Part no.
<b>For PerkinElmer AutoSystem and Clarus 500, 600</b>				
	11	HT	25	041898
	11	HT	25	041902

## SGE Inlet liners



Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part no.
<b>For PerkinElmer AutoSystem and Clarus 500, 600</b>					
 Split/splitless FocusLiner	6.2	4	92	5	092092
				25	09209225
 Split, straight-through liner	6.2	4	92	5	092100
				25	09210025



- FocusLiner
- Straight

The SGE Inlet liner range is color coded by geometry to simplify selection.

## Ferrules

Instrument	Column ID	Size of nut	Ferrule ID	Pack size	Part no.
<b>15% graphite / 85% Vespel ferrules</b>					
For injectors and detectors at atmospheric pressure e.g. FID	0.1-0.25 mm	1/16"	0.4 mm	10	072663
	0.1-0.25 mm	1/8"	0.4 mm	10	0726703
	0.32 mm	1/16"	0.5 mm	10	072654
	0.32 mm	1/8"	0.5 mm	10	0726702
	0.45-0.53 mm	1/16"	0.8 mm	10	072655
	0.45-0.53 mm	1/8"	0.8 mm	10	072671
	1/8" OD packed columns	1/8"	1/8"	10	072669
1/4" OD packed columns	1/4"	1/4"	10	072667	
<b>SilTite metal ferrules</b>					
For GC-MS interface connection (starter kit)	0.1-0.25 mm	–	0.4 mm	10*	073200
	0.32 mm	–	0.5 mm	10*	073201
	0.53 mm	–	0.8 mm	10*	073202
<b>Replacement SilTite ferrules</b>					
For GC-MS interface connection	0.1-0.25 mm	–	0.4 mm	10	073220
	0.32 mm	–	0.5 mm	10	073221
	0.53 mm	–	0.8 mm	10	073222
	1/32"	–	0.81 mm	10	073219
<b>Replacement SilTite nuts</b>					
For GC-MS interface connection	–	–	5	–	073224
For split/splitless injector	–	–	5	–	073226

\*Includes 10 ferrules, 2 SilTite nuts.



## SGE autosampler syringes

All needles are 42 mm long with a cone tip style.

### Shimadzu AOC6000

Volume	Needle gauge (OD mm)	Description	Syringe part no.	Pack size	Spare needle part no.	Pack size	Spare plunger part no.	Pack size
<b>Fixed needle</b>								
5 µL	26 (0.47)	5F-5.7-0.63C	001865	1	–	–	–	–
10 µL	26 (0.47)	10F-5.7-0.63C	002865	1	–	–	–	–
10 µL gas tight	26 (0.47)	10F-GT-5.7-0.63C	002866	1	–	–	032810	1
25 µL gas tight	26 (0.47)	25F-GT-5.7-0.63C	003866	1	–	–	032815	1
100 µL gas tight	26 (0.47)	100F-GT-5.7-0.63C	005866	1	–	–	032825	1
<b>Removable needle</b>								
1 µL	23 (0.63)	1BR-5.7-0.63C	000680	1	034780*	1	034780*	1



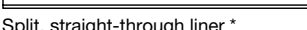
\* Replacement needle and plunger is supplied as a set.

## Septa

Instrument	Septa type	Pack size	Part no.
For Shimadzu GC-2030, GC-2010, GC-2014 and GC-17A			
	HT	50	041895
	EC	50	041905

## SGE Inlet liners



Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part no.
For GC-2030 (SPL-2030 injector), GC-2010 (SPL-2010 injector), GC-2014 (SPL-2014 injector) and GC-17A (SPL-17 injector)					
 Split/splitless FocusLiner *	5	3.4	95	1	09205901
				5	092059
				25	09205925
 Split/splitless FocusLiner *	5	3.4	95	1	09206201
				5	092062
 Split, straight-through liner *	6.3	4	95	1	09206401
				5	092064



- FocusLiner
- Straight

\* When using a standard 42 mm needle for autosamplers, the sample will be injected on top of the wool for this liner.

The SGE Inlet liner range is color coded by geometry to simplify selection.

## O-rings and sealing rings

Description	Usage	Pack size	Part no.
Graphite sealing ring	Can be used at temperatures up to 450°C. For GC-17A (SPL-17 injector)	10	0726007
Viton o-ring	Can be used at temperatures up to 300°C. For GC-2030 (SPL-2030 injector), GC-2010 (SPL-2010 injector) and GC-2014 (SPL-2014 injector)	10	0726533

## Ferrules

Column ID	Description	Pack size	Part no.
<b>For GC-2030, GC-2010, GC-2014 and GC-17A detectors/injectors (not for MS interfaces or QP2010 injector)</b>			
0.10-0.25 mm ID columns	SiTite metal - initial installation	10*	073350
0.10-0.25 mm ID columns	SiTite ferrules	10	073227
0.32 mm ID columns	SiTite metal - initial installation	10*	073351
0.32 mm ID columns	SiTite ferrules	10	073228
0.45-0.53 mm ID columns	SiTite metal - initial installation	10*	073352
0.53 mm ID columns	SiTite ferrules	10	073229
n/a	SiTite metal nuts - slotted	5	073232
<b>QP5000/5050 standard MS interface</b>			
QP5000-I 0.10-0.25 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	0726563
QP5000-I 0.32 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	0726564
QP5000-II and QP5050 0.10-0.25 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	0726561
QP5000-II and QP5050 0.32 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	0726562
0.10-0.25 mm ID columns	SiTite metal - initial installation	10*	073204
0.10-0.25 mm ID columns	SiTite ferrules	10	073227
0.32 mm ID columns	SiTite metal - initial installation	10*	073205
0.32 mm ID columns	SiTite ferrules	10	073228
0.53 mm ID columns	SiTite metal - initial installation	10*	073206
0.53 mm ID columns	SiTite ferrules	10	073229
<b>QP5000/5050 wide bore MS interface, QP2010 injector and QP2010 standard MS interface</b>			
0.10-0.25 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	072663
0.32 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	072654
0.45-0.53 mm ID columns	15% Graphite/ 85% Vespel ferrules	10	072655
0.10-0.25 mm ID columns	SiTite metal - initial installation	10*	073200
0.10-0.25 mm ID columns	SiTite ferrules	10	073220
0.32 mm ID columns	SiTite metal - initial installation	10*	073201
0.32 mm ID columns	SiTite ferrules	10	073221
0.45-0.53 mm ID columns	SiTite metal - initial installation	10*	073202
0.45-0.53 mm ID columns	SiTite ferrules	10	073222
n/a	SiTite metal nuts	5	073224

\* Includes 10 ferrules, 2 SiTite nuts.

## Replacement parts

Material	Pack size	Part no.
<b>Replacement SiTite nuts</b>		
For GC-2010 and GC-2030 GC-MS system	5	073224
For GC-2010 and GC-2030 GC-MS system with QP5000 series MS	5	073224
For GC-2010/GC-2030/GC-2014 GC injectors and atmospheric detectors	5	073224
QP5000 jet separator MS interface	5	073224
QP5000 direct MS interface	5	073233
For all injectors jet separator (starter kit), except GC-2010/GC-2030/GC-2014	5	073232



## SGE autosampler syringes

All needles have a cone tip style.

### Thermo Scientific TriPlus RSH

Volume	Needle gauge (OD mm)	Needle length (mm)	Description	Syringe part no.	Pack size
<b>Removable needle</b>					
5 µL	23 (0.47)	57	5 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	001871	1
5 µL	26 (0.47)	57	5 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	001875	1
10 µL	23 (0.47)	57	10 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	002871	1
10 µL	26 (0.47)	57	10 µL removable needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	002875	1
<b>Fixed needle</b>					
10 µL	23 (0.63)	57	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.63 mm OD cone tipped needle	002861	1
10 µL gas tight	23 (0.63)	57	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.63 mm OD cone tipped needle	002862	1
10 µL	23 (0.63)	85	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.63 mm OD cone tipped needle	002863	1
10 µL gas tight	23 (0.63)	85	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.63 mm OD cone tipped needle	002864	1
10 µL	26 (0.47)	57	10 µL fixed needle CTC RTC and Thermo RSH syringe with 5.7 cm 0.47 mm OD cone tipped needle	002865	1
10 µL gas tight	26 (0.47)	57	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 5.7 cm 0.47 mm OD cone tipped needle	002866	1
10 µL	26 (0.47)	85	10 µL fixed needle CTC RTC and Thermo RSH syringe with 8.5 cm 0.47 mm OD cone tipped needle	002867	1
10 µL gas tight	26 (0.47)	85	10 µL fixed needle CTC RTC and Thermo RSH syringe with GT plunger and 8.5 cm 0.47 mm OD cone tipped needle	002868	1


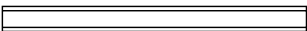
## Septa

Instrument	Diameter	Septa type	Pack size	Part no.
<b>For Thermo Scientific TRACE 1300 Series GC</b>				
	11	HT	25	041898
	11	EC	25	041902



## SGE Inlet liners



Description and geometry sketch	OD (mm)	ID (mm)	Length (mm)	Pack size	Part no.
For Thermo Scientific TRACE 1300 Series GC					
 Split/splitless FocusLiner	6.3	4	78.5	1	09200201
				5	092002
				25	092219
 Split, straight-through liner	6.3	4	78.5	1	09200701
				5	092007
				25	092222

The SGE Inlet liner range is color coded by geometry to simplify selection.

- FocusLiner
- Straight

## O-rings and sealing rings

Description	Usage	Pack size	Part no.
For Thermo Scientific TRACE 1300 Series GC			
Viton o-ring	Temperatures up to 300°C. Suitable for liners with OD of 6.3 mm	10	0726532
Graphite sealing ring	Temperatures up to 450°C. Suitable for all inlet liners above except 092004 and 09200401	10	0726005
Graphite sealing ring	Temperatures up to 450°C. Suitable for use with liners 092004 and 09200401	10	0726006

## SilTite® FingerTite ferrules

Description	Column ID	Ferrule ID	Pack size	Part no.
For Thermo Scientific TRACE 1300 Series GC				
SilTite FingerTite INJ / FID starter kit	0.1-0.25 mm	0.4 mm	*	073610
SilTite FingerTite capillary / FID starter kit	0.1-0.25 mm	0.4 mm	*	073611
SilTite FingerTite INJ / MS starter kit	0.1-0.25 mm	0.4 mm	*	073612
Replacement parts				
SilTite FingerTite ferrule 0.4 mm	0.1-0.25 mm	0.4 mm	10	073630
SilTite FingerTite ferrule 0.5 mm	0.32 mm	0.5 mm	10	073631
SilTite FingerTite ferrule 0.7 mm	0.53 mm	0.7 mm	10	073632
SilTite FingerTite ferrule blanking	-	-	2	073633
SilTite FingerTite female nut	-	-	5	073636
SilTite FingerTite INJ base seal	0.1-0.25 mm	-	2	073640
SilTite FingerTite MS adaptor	-	-	1	0736102
SilTite FingerTite injector	0.1-0.25 mm	-	1	0736104

\* Each starter kit includes all the parts necessary to convert one GC system (one injector and one detector) to the SilTite FingerTite system. In addition there are five SilTite FingerTite nuts, ten SilTite FingerTite ferrules, and a ferrule install tool which allows you to seat the ferrule in the correct position on the capillary column.

## Ferrules

Instrument	Column ID	Ferrule ID	Pack size	Part no.
<b>15% graphite / 85% Vespel ferrules</b>				
For TRACE 1300 injectors and detectors at atmospheric pressure e.g. FID	0.1-0.25 mm	0.4 mm	10	073109
	0.32 mm	0.5 mm	10	073111
	0.53 mm	0.8 mm	10	073113
	for 1/8" OD packed columns	1/8"	10	072669
	for 1/4" OD packed columns	1/4"	10	072667
For TRACE 1300 GC-MS interface connection	0.1-0.25 mm	0.4 mm	10	072663
	0.32 mm	0.5 mm	10	072654
	0.53 mm	0.8 mm	10	072655
<b>100% graphite ferrules</b>				
For TRACE 1300 injectors and detectors at atmospheric pressure e.g. FID (not for GC-MS)	0.1-0.32 mm	0.5 mm	10	072635
	0.45-0.53 mm	0.8 mm	10	072636
	for 1/8" OD packed columns	1/8"	10	072602
	for 1/4" OD packed columns	1/4"	10	072601
<b>SiITite metal ferrules</b>				
GC-MS interface connection (starter kit)	0.1-0.25 mm	0.4 mm	10*	073450
	0.32 mm	0.5 mm	10*	073451
	0.53 mm	0.8 mm	10*	073452
For TRACE 1300 split/splitless injectors (starter kit)	0.1-0.25 mm	0.4 mm	10	073270
	0.32 mm	0.5 mm	10	073271
	0.45-0.53 mm	0.8 mm	10	073272
	1/32"	0.81 mm	10	073273
<b>Replacement SiITite nuts</b>				
SiITite metal nuts	-	-	5	073224
<b>Replacement SiITite metal ferrules</b>				
For All GC-MS interface connections	0.1-0.25 mm	0.4 mm	10	073330
	0.32 mm	0.5 mm	10	073331
	0.53 mm	0.8 mm	10	073332
	1/32"	0.81 mm	10	073333
For TRACE 1300 connections	0.1-0.25 mm	0.4 mm	10	073220
	0.32 mm	0.5 mm	10	073221
	0.53 mm	0.8 mm	10	073222
	1/32"	0.81 mm	10	073219
<b>Replacement SiITite nuts</b>				
SiITite metal nuts	-	-	5	073230
For TRACE 1300 GC-MS interface connection	-	-	5	073224
For TRACE 1300 split/splitless injector	-	-	5	073226
<b>Replacement SiITite base seals</b>				
For TRACE 1300 split/splitless injector	-	-	2	073400
	-	-	10	073401

\* Includes ten ferrules, two SiITite nuts. # To be used in combination with brass nut (part no. 1034085).

# Information resources

## For official methodology

### **ASTM International**

ASTM International, formerly known as the American Society for Testing and Materials (ASTM), is a globally recognized leader in the development and delivery of international voluntary consensus standards.

[www.astm.org/Standards/D6584.htm](http://www.astm.org/Standards/D6584.htm)

### **DIN – Deutsches Institut für Normung**

A range of international standards and reference for EN methods.

[www.din.de](http://www.din.de)

## Industry resources

### **National Biodiesel Board**

Body responsible for the development of the US biodiesel industry.

[www.biodiesel.org](http://www.biodiesel.org)

## Journals

### **BioDiesel Magazine**

Biodiesel industry journal for news on commercial and technical developments.

[www.biodieselmagazine.com](http://www.biodieselmagazine.com)

### **BioFuels International**

Industry journal for biofuels that features biodiesel related news.

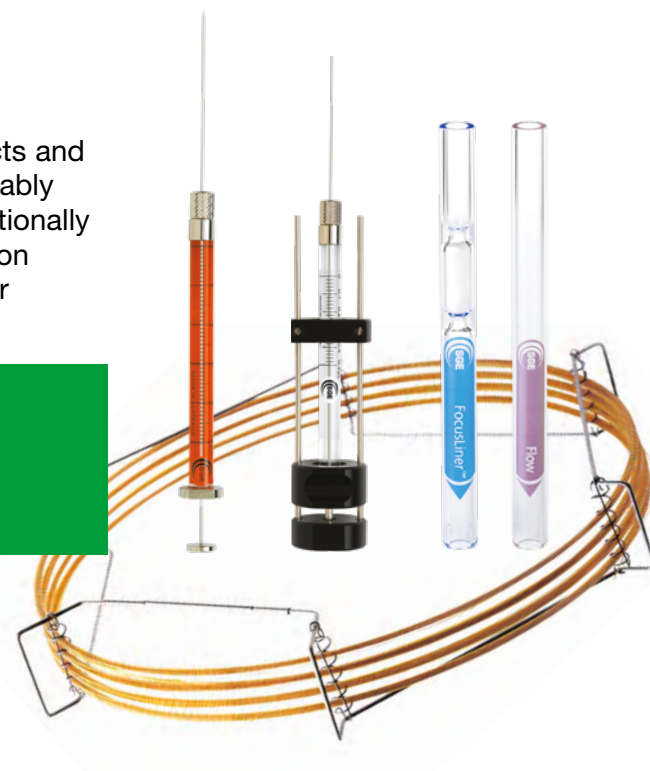
[www.biofuels-news.com](http://www.biofuels-news.com)

## Biodiesel

### Analysis guide

This guide has been created as a resource for biodiesel analysis. Inside you will find method information, products and solutions designed to ensure you can effectively and reliably complete fuels testing according to either ASTM Internationally or European National (EN) methods. The latest information about our products and applications can be found at our website: [www.trajanscimed.com](http://www.trajanscimed.com).

Visit us at [www.trajanscimed.com](http://www.trajanscimed.com) or contact your regional Trajan representative for assistance and further information.



## Trajan Scientific and Medical

### Science that benefits people

Trajan is actively engaged in developing and delivering solutions that have a positive impact on human wellbeing. Our vision revolves around collaborative partnerships that improve workflows, delivering better results.