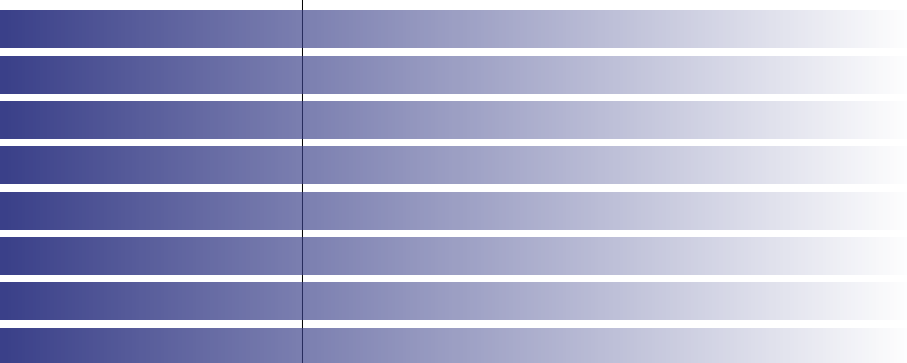


Liners and consumables for OPTIC Inlet

Liner Selection Guide



Find the right liner

Choosing a correct liner for a particular application must take several variables into account. The variables to consider are; Hot or Cold injection, Split, Splitless, LVI, pyrolysis application, solid sample, automatic liner exchange etc.. Carefully check what liner fits the best to your application, some liners can be used for many applications and others not.

To understand more about GC injection techniques, please read our available training guides:





Training Manual Injections General

Training Manual Large Volume Injections

Liner design

The OPTIC inlet is available for 2 different liner sizes; standard OD of 81 mm x 5 mm and for Thermal Desorption applications OD of ¼ inch x 3½ inch.

The shape of a liner addresses a particular sample or injection type. Use the table below to select a liner.

	Split	Splitless	Trace Analysis	Dirty Samples	Gaseous samples (headspace)	Large Volume liquid	Solid sample	SPME	High Temperature	Thermal Desorption	General Purpose	Available with InertMask
Frit 	✓			✓	✓		✓		✓		✓	✓
Frit with taper 	✓		✓		✓		✓		✓		✓	
Necked 	✓				✓				✓		✓	
Small ID ~1.0 		✓	✓					✓				✓
Medium ID ~1.8 		✓	✓					✓				
Baffled 		✓	✓									
Sintered 	✓			✓		✓			✓		✓	✓
Packed 	✓			✓		✓				✓		
DMI 	✓					✓	✓		✓		✓	✓
Wool 	✓	✓									✓	

InertMask™: ultra inert liners for OPTIC

We have developed our own deactivation process for gas chromatography inlet liners. The result; the InertMask liner deactivation process. Liners treated with InertMask results in very inert liners which are especially suited for the analysis of pesticides or polar compounds. Both acidic and basic compounds have strong responses and excellent peak shapes when the liner was deactivated with InertMask.

For example, sintered liners treated with the InertMask liner deactivation were used in combination with the QuEChERS method and large volume injections. This resulted in good peak shapes and no breakdown of pesticides (for example p,p DDT and Endrin) was seen.

InertMask has no color, so liner treated with InterMask will look the same.

InertMask is not available for the ¼ inch liners.

Liner installation

When installing a liner, use gloves or tweezers in order to keep the liner clean. After installing the liner into the inlet, it is good practice to heat the liner once to the same temperature as used in the method.

All liners will eventually get dirty from the injected sample. A dirty liner can cause one of the following problems.

- sample degradation or adsorption (poor response)
- sample discrimination resulting in loss of certain analytes
- irreproducibility of peak area
- ghost peaks

OPTIC liners





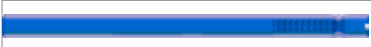





Liners for the standard OPTIC inlet. L = 81 mm, OD = 5 mm

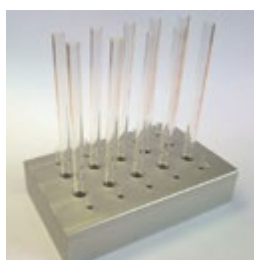
All liners are supplied in a pack of 5.

Liner	Explanation	InertMask	Max. Temperature
 P/No: 2414-1001 Fritted liner, frit on 15 mm	This liner contains a medium porosity glass frit made from sintered, deactivated glass. This liner can be used for hot and cold split and splitless injections. In addition, if used with a suitable packing material the liner can be used for large volume injection, thermal desorption, solid sampling and pyrolysis applications. If packed, a bed depth of up to 25 mm can be employed and retained in place with a plug of deactivated glass or quartz wool. This liner is the most commonly used style. I.D. = 3.4mm.	No	600°C
 P/No: 2414-1002 Fritted liner, frit on 15 mm, silanized	Same liner as 2414-1001 but treated with InertMask deactivation	Yes	320°C
 P/No: 2414-1003 Single Necked liner for split injections	This liner is specially made for hot or cold split injections. The liners large internal diameter of 3.4 mm makes for good mixing of the sample with the carrier gas. The liner may be packed with a little glass wool if desired. The bottom of the liner has a small slot to ensure free passage of gas to the split exit.	No	600°C
 P/No: 2414-1005 Empty liner for splitless injections	This liner is for hot and cold splitless injection. Injection volumes best 1µl or less. The narrow internal diameter of 1 mm ensures fast transfer of the sample to the column under splitless conditions. We advise this liner for SPME techniques. (not for SPME Arrow)	No	600°C
 P/No: 2414-1006 Empty liner for splitless injections, silanized	Same liner as 2414-1005 but treated with InertMask deactivation.	Yes	320°C
 P/No: 2414-1017 Empty liner for SPME Arrow and Splitless injections	This liner is made for SPME Arrow. The liner has an I.D. of 1.8 mm. Be sure that the OPTIC has a Top Boss Assembly made for PAL SPME Arrow. This liner can also be used for hot and cold splitless injections.	No	600°C
 P/No: 2414-1009 Baffled splitless liner	This liner is for hot and cold splitless injection of sample volumes below 3µl (best 1µl or less). The narrow internal diameter of 1 mm ensures fast transfer of the sample to the column under splitless conditions. This liner will give better results for the high boiling components.	No	600°C
 P/No: 2414-1011 Fritted liner on 20 mm with single taper	This liner contains a medium porosity glass frit made from sintered, deactivated glass. This liner can be used for hot and cold split and splitless injections. In addition, if used with a suitable packing material the liner can be used for large volume injection, thermal desorption, solid sampling and pyrolysis applications. If packed, a bed depth of up to 25 mm can be employed and retained in place with a plug of deactivated glass or quartz wool. The taper will improve the sensitivity for trace, active samples.	No	600°C
 P/No: 2414-1020 Fritted Liner packed with Chromosorb W. LVI injections	This liner contains a highly deactivated packing with a high sample capacity (in excess of 150 µl in most cases). This liner has been found to be suitable for the following classes of compound: PAHs, Mineral oils, Drugs of abuse.	No	350°C

OPTIC liners

Liners for the standard OPTIC inlet. L = 81 mm, OD = 5 mm
All liners are supplied in a pack of 5.

Liner	Explanation	InertMask	Max. Temperature
 P/No: 2414-1036 Tapered Liner packed with Silanised Quartz Wool	Liner for hot injections, the sample is injected in the quartz wool. The quartz wool will help to get a good evaporation of the sample.	No	350°C
 P/No: 2414-1019 Quartz Fritted Liner, Frit at 15 mm	This quartz liner contains a medium porosity frit made from a sintered quartz. The liner is specifically developed for the high temperature applications (> 500 °C) with a prolonged analysis time (>10-15 min) when the use of the standard borosilicate liners can be problematic. Quartz is less active as Glass.	No	> 600°C
 P/No: 2414-1007 Sintered glass liner with taper. LVI injections. Pyrolysis.	This liner is both very inert and capable of operation to 600°C. As such it is suitable for the large volume injection of high MW compounds and for compounds which suffer from adsorption. The capacity of the liner is lower than that of a packed liner (about 50 µl, depending upon solvent used). To maximize sample capacity, the liner is best used in combination with a syringe fitted with a dome tipped, side hole needle.	No	600°C
 P/No: 2414-1008, Sintered glass liner with taper for large volume injections, silanized.	Same liner as 2414-1007 but treated with InertMask deactivation. This liner can be used for US EPA 8270. (LVI Pesticides)	Yes	320°C
 P/No: 2414-1033, Single-neck Liner packed with Silanised Quartz Wool.	Liner can be used for LVI and other purposes.	No	320°C
 P/No: 2414-1013 DMI Tapered Liner. LVI, Solid sample.	This liner contains 3 small indentations made to hold the microvial in. It is used for Difficult Matrix Introduction (DMI) in combination with 2406-1010 and 2414-1015. This technique extends the capability of OPTIC to the analysis of dirty liquid samples containing non-volatiles and/or solid-like suspended matrix. Row sample or roughly filtered extract placed into a sample container (micro-vial, p/n 2406-1010), which is inserted into the liner.	No	600°C
 P/No: 2414-1014 DMI Tapered Liner, silanized	Same liner as 2414-1013 but treated with InertMask deactivation.	Yes	320°C
 P/No: 2406-1010 DMI Sample Insert (30µl micro vial)	This is a low cost micro vial and can be used in combination with 2414-1013. Volume is 30µl. ID=1.90mm. Can be used for liquid and solid samples. In order to have the needle inside the micro vial during injection, the glass needle guide (2414-1015) has to be used. Temperature conditioned.	No	600°C
 P/No: 2406-1020 DMI Sample Insert (60µl micro vial)	This is a micro vial and can be used in combination with 2414-1013. Volume is 60µl. ID=2.35mm. Can be used for liquid and solid samples. In order to have the needle inside the micro vial during injection, the glass needle guide (2414-1015) has to be used. Temperature conditioned.	No	600°C
 P/No: 2414-1015 Glass Needle Guide for DMI Liner	This needle guide used in combination with 2414-1013 or 2414-1014.	No	600°C









Micro-vial and liner block

The block facilitates the sample preparation handling when using 2406-1010 - OPTIC DMI Sample Insert, 30 µL or 2406-1020 - OPTIC DMI Sample Insert, 60 µL in combination with 2414-1013 - LINEX DMI Liners. Only available for liner with OD 5mm.
P/No: 2406-2290 Microvial and liner block

OPTIC liners for Thermal Desorption

Liners for the standard OPTIC inlet. L = 81 mm, OD = 5 mm
All liners are supplied in a pack of 5.

Liner	Explanation	Max. Temperature
 P/No: 2414-1021 Fritted Liner packed with Tenax GR, mesh 80-100	Tenax GR is a porous polymer resin based on 2,6-diphenylene-oxide plus 30% Graphite. It is a widely used adsorbent resins for use with Purge and Trap Thermal Desorption for applications such as trapping VOC's in air and liquids. Tenax GR is especially beneficial in trapping volatile organics from high moisture content samples due to its low breakthrough volume for water. Tenax GR can be used with: Hydrocarbons, Alcohols & Glycols, Aldehydes and Ketones, Halogens, Amines, Aromatics and Terpenes.	350°C
 P/No: 2414-1022 Fritted Liner packed with Tenax GR, mesh 60-80	Same as 214-1021 but with a different Mesh size.	350°C
 P/No: 2414-1023 Fritted Liner packed with Carbosieve, mesh 60-80	Very strong absorption strength. Example Analytes: Ultra volatile hydrocarbons	400°C
 P/No: 2414-1024 Fritted Liner packed with Tenax GR and Carboxen	Carboxen= Very Strong for small molecules. Approximate analyte volatility range: permanent gases and light hydrocarbons Example Analytes: Volatile and Ultra volatile hydrocarbons. Approximate analyte volatility range: n-C2 to n-C30	350°C
 P/No: 2414-1025 Fritted Liner packed with Tenax TA and Carboxen	Carboxen= Very Strong for small molecules. Approximate analyte volatility range: permanent gases and light hydrocarbons. Example Analytes: Volatile hydrocarbons. Approximate analyte volatility range: n-C3 to n-C30	350°C
 P/No: 2414-1027 Fritted Liner packed with Tenax TA, mesh 60-80	Example Analytes: Aromatic compounds (except benzene), apolar components boiling point>100°C, polar components boiling point>150°C, PAHs and PCBs.	350°C



Quartz Wool








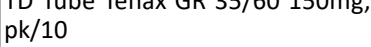

P/No: 3001-12404 Quartz Wool Fine (1-6µm) Silane treated 5 gram

Packing funnel for standard OPTIC liners (OD5 mm)
P/No: 3001-12101



OPTIC liners ¼ Inch

Liners for the OPTIC ¼ Inch inlet. L = 3½ inch, OD = ¼ inch (88.9 x 6.35 mm)
The tubes are unconditioned.

Liner	Explanation	InertMask	Max. Temperature
 P/No: 2414-1100 Thermal Desorption Tube, pk/5	Open tube for thermal desorption, can be packed by yourself. Can also be used for liquid injections, hot and cold split injections. General purpose liner/TD tube.	No	600°C
 P/No: 2414-1101 TD Tube with Frit, pk/5	Fritted tube for thermal desorption, can be packed by yourself. Can also be used for liquid injections, hot and cold split injections. General purpose liner/TD tube. Can also be used with one of the 2 DMI Sample Insert (2406-1010 or 2406-1020)	No	600°C
 P/No: 2414-1102 Liner for SPME ARROW, pk/5	Glass liner made for ¼ inch OPTIC and SPME Arrow. Can also be used for liquid injections. (small volume and splitless liquid injections.)	No	600°C
 P/No: 2414-1103 Liner with Quartz wool, pk/5	Liners packed with quartz wool can prevent non-volatile compounds from entering to column and also improve sample vaporization.	No	350°C
 P/No: 1003-74101 TD Tube Tenax TA 35/60 150mg	Example Analytes: Aromatic compounds (except benzene), apolar components boiling point>100°C, polar components boiling point>150°C, PAHs and PCBs. C6/7 to C26	No	350°C
 P/No: 1003-74102 TD Tube Tenax TA 60/80 150mg, pk/10	Example Analytes: Aromatic compounds (except benzene), apolar components boiling point>100°C, polar components boiling point>150°C, PAHs and PCBs. About C6/7 to C26.	No	350°C
 P/No: 1003-74201 TD Tube Tenax GR 35/60 150mg, pk/10	Tenax GR is a porous polymer resin based on 2,6-diphenylene-oxide plus 30% Graphite. It is used for applications such as trapping VOC's in air and liquids. Tenax GR is especially beneficial in trapping volatile organics from high moisture content samples due to its low breakthrough volume for water. Tenax GR can be used with: Hydrocarbons, Alcohols & Glycols, Aldehydes and Ketones, Halogens, Amines, Aromatics and Terpenes.	No	350°C
 P/No: 1003-74301 TD Tube Carboxen B 190mg + Carboxen 1000 140mg, pk/10	Focusing semivolatile to very volatile compounds. Carboxen has Sorbent Strength: Medium-Strong (Hydrophobic). Carboxen has Sorbent Strength: Very Strong for small molecules (not so good with humid conditions).	No	350°C
 P/No: 1003-74302 TD Tube Carbotrap 50mg + Carboxen 1000 75mg, pk/10	Carbotrap has Sorbent Strength: Medium-Weak (Hydrophobic). Carboxen has Sorbent Strength: Very Strong for small molecules (not so good with humid conditions).	No	350°C

Needle Penetration

In general the optimum needle penetration for OPTIC (and LINEX) is 43 mm measured from the top of the septum nut.

The injection speed depends a bit on the syringe type, injection volume and temperature of injection. But in general a fast injection (50-200µl/sec) is good with OPTIC.

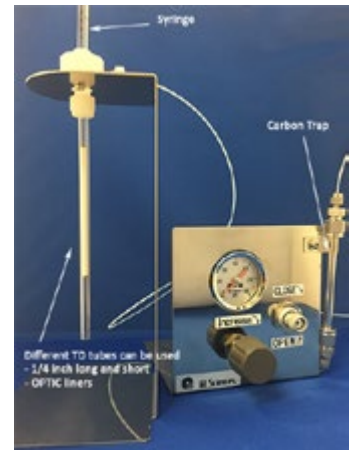
OPTIC parts

Part Number		Description	OPTIC-4	OPTIC-3
2406-4025		OPTIC-4 Split Line Filter Assy (needs to be replaced once every year)	x	
2406-2039		OPTIC Column Mounting Jig	x	x
2406-2048		Key for OPTIC Inlet Bottom Nut	x	x
2406-2047		Stainless Steel Inlet Bottom Nut, pk/ 5	x	x
3007-41125		Ultra Low Bleed Septum ULB-S-11, 11mm disc type, pk/25	x	x
410		Merlin MicroSeal High Pressure Replacement Septum	x	x
3007-16106		OPTIC Ultra Low Bleed Shimadzu Septum, Red, pk/25 (plug type septa)	x	
2406-1003		Graphite Ferrule for 0.53 mm ID Column, pk/10	x	x
2406-1004		Graphite Ferrule for 0.1 - 0.32 mm ID Column, pk/10	x	x
2406-1019		OPTIC Graphite Ferrule, no-hole, pk/10	x	x
2406-1005		Metal Ferrule, Column ID 0.25mm, pk/10 (use 2406-2049)	x	x
2406-1006		Metal Ferrule, Column ID 0.32mm, pk/10 (use 2406-2049)	x	x
2406-1007		Metal Ferrule, Column ID 0.53mm, pk/10 (use 2406-2049)	x	x
2406-2049		Inlet Bottom Nut for Metal Ferrule, pk/5	x	x
2406-1018		OPTIC non-stick O-ring Viton plasma treated, pk/10, for liners with OD 5mm	x	x
2406-1040		OPTIC ¼Inch non-stick O-ring Viton plasma treated, pk/10, for liners with OD ¼ Inch	x	x
2406-1035		Silicon O-ring for ¼ Inch liner, pk/20 (inlet type before June 2017)	x	x
2406-1036		Silicon O-ring for ¼ Inch liner, pk/20 (inlet type from June 2017)	x	x
H200050A		OPTIC-3 Split Line Filter Assy (replace once every year)		x
2406-4173		Liner Blanking Cap, pk/10 (brass) for liners with OD 5mm	x	x
A200040		Shortix Capillary GC Column Cutter	x	x
1010-41100		Ceramic Capillary GC Column Cutter, pk/4	x	x
3001-12740		Ferrule Removal kit	x	x
2406-2056		Aluminum Packing type-G, pk/10 (used in the OPTIC-4 gas line couplings)	x	
2411-4107		CDCS Liner Cap Assembly, pk/50 (for LINEX with liners of OD 5mm)	x	x
2411-4122		CDCS Liner Cap Assembly, ¼" liner, pk/50 (for LINEX with liners of OD ¼Inch)	x	x
2406-4164		OPTIC on-column tool kit	x	x
2406-4185		OPTIC-4 Top Boss Assembly, Arrow, Standard Type (disc type septa 11mm)	x	x
2406-4186		OPTIC-4 Top Boss Assembly, Arrow, Shimadzu Type (plug type septa)	x	x

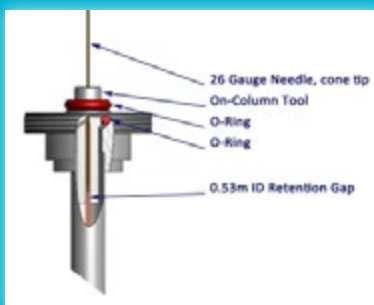
Thermal Desorption calibration curve creation tool.

This Thermal Desorption Sample Loader tool can be used to load sample or standards onto a thermal desorption tube. It is compatible with standard OPTIC liners and ¼ inch TD tubes with different lengths.

P/No: 2406-6021 Thermal Desorption calibration curve creation tool



OPTIC on-column tool kit



The OPTIC inlet can also be used for on-column injections. GL Sciences has designed a tool that enables true on-column injection using OPTIC inlet without an on-column liner. The on-column tool is very easy to install without any press fit connection. The syringe needle (gauge 26) goes really into the retention gap where the injection takes place.

P/No: 2406-4164 OPTIC on-column tool kit

Ferrule Removal Tool



Remove the ferrule out of the nut in an easy way.
P/No: 3001-12745 ferrule removal tool



Gas Leak Detector LD239

Super Compact and Light (only 95 g).
Highly Sensitive - 0.0005 ml/min (He).
USB Port Rechargeable.

P/No: 2702-19340 Gas Leak Detector LD239

Contact

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