

## Septum Selection Guide

Septa for use with general chromatography vials, liquid injection

### PTFE/Natural Red Rubber

PTFE Natural Red Rubber are moderately priced seals for GC and HPLC with good chemical properties. They are ideal for multiple injections due to high resealability, but not as easy to penetrate as PTFE/RR. Natural rubber septa are offered assembled into aluminum crimp seals.

### PTFE/Synthetic Red Rubber Septa: (PTFE/RR)

PTFE/ Synthetic Red Rubber septa are an economical choice for general GC and HPLC applications. Used primarily for routine analysis in gas chromatography with FID, TCD and FPD detectors or HPLC with UV/Vis or RI detectors, PTFE/Synthetic Red Rubber septa offer good resealability and excellent chemical inertness before puncture. The low durometer of red rubber allows for easy needle penetration even with thin bore GC needles. PTFE/Red Rubber septa are not recommended for multiple injections with long run times or retention of samples for further analysis after initial puncture.

### PTFE/Silicone Septa: (T/S)

PTFE/Silicone is the most versatile septum material offered in various formulations to address specific applications requirements. Extractables from PTFE/Silicone septa are generally at lower levels compared to other resealable materials. PTFE/Silicone septa are formulated for different hardness (durometer) meeting requirements of various needle types. Formulations offering highly consistent performance, lowest background/blank value, and good chemical compatibility, effective sealing/resealing and low penetration force make PTFE/silicone septa suitable for all types of chromatographic applications. A thin film of PTFE is laminated to the side of the septum that faces the sample to limit exposure of the elastomer to the solvent. PTFE/Silicone septa are ideal for use in most HPLC and GC applications where resealability and purity are critical.

### Pre-slit PTFE/Silicone Septa

Pre-slit septa are offered in many of the same formulations as for non-slit PTFE/silicone septa and shares most of the physical and chemical characteristics. The septum is provided with a thin 0.005" PTFE layer laminated to highly pure silicone, and slit through the center for easier needle penetration and to release the vacuum that forms when a large volume of sample is withdrawn from a vial. This septum provides chromatographic characteristics similar to that of a septum without a slit, except that the ability to withstand exposure to aggressive solvents is slightly lessened. Pre-slit septa are highly recommended for Shimadzu, Hitachi, and other autosamplers with thin gauge needles.

### PTFE/Silicone/PTFE Septa: (T/S/T)

A layer of inert PTFE film is laminated to each side of high-purity, medium durometer silicone to form a septum that is resistant to coring, but still maintains good resealing characteristics. T/S/T septa are recommended for the most critical applications such as ultratrace analysis, where there is a longer time between injections. T/S/T septa provide superior performance with any autosampler employing a large diameter, blunt-tip needle. T/S/T septa can have benefits when working with solvents that tend to attack silicone by protecting both sides of the elastomer.

### PTFE Disk Septa

A solid disk of 0.010" thick pure PTFE offers superior chemical inertness against the most aggressive solvents. The thin membrane allows for penetration by most normal gauge metal HPLC needles. PTFE septa are not resealable and should not be used with highly volatile solvents, short cycle times or multiple injection methods. PTFE septa are rarely used for GC applications.

### Polyethylene (PE) Septa and Integral Molded Closures

Chemically resistant polyethylene septa are usually molded into single-piece caps. The surface for needle penetration is 0.01" thick, allowing for use with most HPLC autosamplers. Polyethylene septa are not resealable and are intended for single injection use with aqueous based sample mixtures.

### Polypropylene (PP) Septa and Integral Molded Closures

Chemically resistant polypropylene septa are available molded into single piece caps or as 0.01" thick disks inserted into closures. The surface for needle penetration is 0.01" thick, allowing for use with most HPLC autosamplers. Polypropylene septa are not resealable and are intended for single injection use with aqueous based sample mixtures. Polypropylene septa offer better solvent compatibility compared to polyethylene, but piercing force is slightly higher.

### Viton Septa

Viton septa are used in situations where a resealable septum is required for a sample matrix that aggressively attacks all other materials. Viton offers chemical resistance similar to PTFE along with limited ability to reseal after initial puncture. Viton septa have a high resistance to piercing and due to their high cost are considered to be the septum of last resort when all other materials are unsuitable.

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### 20mm Headspace Septa

#### Gray Butyl Stopper: (C4020-30)

An economical septum for lower temperature (125°C) or low-pressure applications. Gray Butyl stoppers do not provide a PTFE film barrier and are not suitable for use with alkanes, benzene, chlorinated solvents or cyclohexane. Butyl rubber stoppers are preferred for analysis of fixed gases and where absolute resistance to moisture penetration is required.

#### Gray PTFE/Red Rubber Septa: (C4020-34)

Good solvent resistance, good resealing characteristics, resistant to coring. An economical choice where a PTFE barrier is desired. PTFE facing improves solvent compatibility until initial puncture.

#### PTFE/White Silicone PurePack Septa: (C4020-32)

Excellent choice for general volatiles analysis. Septa are packed in a glass PurePak jar to assure low background, low permeability, and the highest performance of any headspace septum. PTFE/Silicone septa provide excellent resealing characteristics and broad chemical compatibility.

#### Gray PTFE/Molded Black Butyl Septa (Pharmafix Style): (C4020-36)

C4020-36 is a molded septum featuring a PTFE-faced center surface that does not extend to the edges of the septum. The PTFE center area provides good resistance to a wide variety of solvents. The center puncture area is resistant to coring and will reseal after several punctures. The grey butyl outer sealing edge conforms well to the rim of the vial affecting a more positive seal against loss of fixed gases.

#### PTFE/Blue High Purity Silicone Septum(C4020-38A and C4020-42A)

Translucent blue silicone is specially formulated and treated to reduce background from extractables or outgassing of volatile contaminants. The silicone elastomer layer is dense but still easily pierced by most headspace sampling needles.

#### Black Rubber Septa: (C4020-40)

Black Rubber septa are molded from a higher density rubber compound compared to the standard red rubber. This septum has characteristics similar to the Gray Butyl stopper. The Black Rubber septum is an economical choice for applications where reduced levels of vapor penetration are desired.

#### Temperature Stability Chart

	min. Temp °C	max. Temp °C	min. Temp °F	max. Temp °F
PTFE/Natural Red Rubber	-10	+85	14	+185
PTFE/Synthetic Red Rubber Septa: (PTFE/RR)	-30	+110	-22	+230
PTFE/ High Performance Red Rubber Septa	-40	+110	-40	+230
PTFE/Silicone Septa: (T/S)	-60	+200	-76	+392
PTFE/Silicone/PTFE Septa: (T/S/T) *	-60	+200	-76	+392
PTFE Septa *	-200	+250	-328	+482
Polyethylene (PE) *	-50	+80	-58	+176
Polypropylene (PP) *	0	+121	32	+250
Butyl/Chlorobutyl/Bromobutyl Stopper or Septa	-20	+125	-4	+257
Gray PTFE/Red Rubber	-40	+120	-40	+248
PTFE/White Silicone PurePack Septa	-60	+200	-76	+392
Gray PTFE/Molded Black Butyl (Pharmafix) Septa	-20	+125	-4	+257
Black Rubber Septa	-20	+100	-4	+212

\*This septum is used for liquid injection. 20mm version is not available.