



Rtx-5 / MXT-5

□ Rtx-5 / MXT-5

- Excellent general purpose stationary phase.
- 340°C thermal stability (MXT® stable to 360°C).
- Crossbond stationary phase results in longer lifetimes and low bleed and allows solvent rejuvenation.
- Available in unbreakable stainless steel tubing.
- Similar to DB-5, SPB-5, HP-5, & Ultra-2.

The Rtx-5/MXT-5 columns are coated with crossbonded 5% diphenyl 95% dimethyl polysiloxane stationary phase. This phase is the most popular stationary phase chosen by chromatographers and is used in a wide variety of applications including semi-volatile pollutants, drug analysis, flavors & fragrances, and pesticides. The small percentage of phenyl groups in the siloxane backbone also offers an ideal selectivity for purity analysis.

The synthesis procedures and crosslinking mechanisms for the Rtx-5 polymer were carefully investigated to produce the highest quality 5% phenyl columns available. All residual catalyst, which could cause degradation and increased bleed, is removed from the polymer. The polymer is then carefully fractionated to remove low molecular weight fragments, providing a tight mono-modal distribution which results in extremely low bleed. The polymer is fully characterized to ensure long-term reproducibility. Characterization testing includes RI, FTIR, Kovats Indices, % crosslinking, efficiency, and a five-day thermal bake-out to ensure column longevity. New batches of polymers are used only when they meet Restek's stringent QA tests, and each lot is subsequently tracked in an extensive data base for future reference.

The MXT-5 column is an unbreakable fused-silica-lined stainless steel column offering comparable efficiency and inertness to fused silica tubing with increased durability. MXT columns are caged in 4" diameter coils or smaller, which are ideal for compact GCs with small ovens. MXT®-5 columns are also ideal for process or portable GCs where column integrity is of great importance or for any lab wanting to avoid down-time due to column breakage.

CROSSBOND®

Restek's Crossbond® procedure produces columns with lower bleed and longer lifetime and allows rejuvenation through solvent rinsing.

Applications: pesticides PCBs, aromatic hydrocarbons, environ-

□ Rtx-5 (Silcosteel) (Crossbond® 5% diphenyl 95% dimethyl polysiloxane) Stable to 340°C

ID	df(um)	temp. limits	15-meter	30-meter	60-meter	105-meter
0.25mm	0.10	-60 to 330/350C	10205	10208	10211	10214
	0.25	-60 to 330/350C	10220	10223	10220	1022~
	0.50	-60 to 330/350°C	10235	10238	10241	10244
	1.00	-60 to 320/340°C	10250	10253	10256	10259
0.32mm	0.10	-60 to 330/350°C	10206	10210	10212	10215
	0.25	-60 to 330/350°C	10221	10224	1022#	10230
	0.50	-60 to 330/350°C	10236	10239	10242	10245
	1.00	-60 to 330/350°C	10251	10254	10257	10260
	1.50	-60 to 310/330°C	10266	10269	10272	10275
0.53mm	3.00	-60 to 280/300°C	10281	10284	10287	10290
	0.10	-60 to 320/340°C	10207	10210	10213	
	0.25	-60 to 320/340°C	10222	10225	10228	
	0.50	-60 to 310/330°C	10237	10240	10243	
	1.00	-60 to 310/330°C	10252	10255	10258	
	1.50	-60 to 310/330°C	10267	10270	10273	
	3.00	-60 to 270/290°C	10282	10285	10288	
	5.00	-60 to 270/290°C	10277	10279	10283	
ID	df(um)	temp. limits	10-meter	20-meter	40-meter	
0.10mm	0.10	-60 to 330/350 C	41201	41202		
	0.40	-60 to 320/340°C	41203	41204		
0.18mm	0.20	-60 to 325/340°C	40201	40202	40203	
	0.40	-60 to 325/330°C	40210	40212	40212	

The maximum temperatures listed are for 15 and 30-meter lengths. longer lengths may have a slightly reduced maximum temperature.

(MXT-5 listing continued on next page)



MXT-5 / Rtx-5MS

Restek's
MXT®
 columns
 rugged, flexible
 fused-silica-
 lined, stainless
 steel

Custom lengths
 and film
 thicknesses
 are also available
 - Please Enquire !

Applications:
 semi-volatiles

☐ **MXT-5** (Silcosteel) (Crossbond® 5% diphenyl 95% dimethyl polysiloxane) Stable to 360°C

ID	df(um)	temp. limits	15-Meter	30-Meter	60-Meter
0.20mm	0.25	-60 to 360°C	70221	70224	70222
	0.50	-60 to 330°C	70236	70239	70242
	1.00	-60 to 325°C	70251	70254	70257
	3.00	-60 to 290°C	70281	70284	70287
0.53mm	0.25	-60 to 360°C	70222	70225	70228
	0.50	-60 to 330°C	70237	70240	70243
	1.00	-60 to 325°C	70252	70255	70258
	1.50	-60 to 300°C	70267	70270	70273
	3.00	-60 to 290°C	70282	70285	70288
	5.00	-60 to 270°C	70277	70270	70283

☐ **Rtx-5MS**

- Polymer batches are tested by mass spec to guarantee low bleed.
- Specially developed to exceed the requirements of the semi-volatile pollutants EPA Methods 625 & 8270.
- Crossbond® stationary phase results in longer lifetimes, low bleed, and solvent rejuvenation.
- Special test mix emulates the analysis of tough, adsorptive environmental compounds.
- Thermally stable to 360°C.
- Similar to DB-5MS and ItP-5MS.

Column bleed can present several problems when analyzing base-neutral and acid extractables with sensitive detectors such as ITD, MS, GCD or even FID. The rise in baseline associated with column bleed can lead to inaccurate quantitative results, misleading spectral interpretation, decreased sensitivity, and, in extreme cases, misidentification.

The synthesis and bonding procedures for the Rtx-5MS were modified from standard 5% phenyl polymers to address specific bleed concerns by mass spectroscopists. Attention was paid to reduce bleed fragments and baseline rise. A residual catalyst, which could cause degradation and increased bleed, is removed from the polymer. The polymer is then carefully fractionated for a tight mono-modal distribution and is fully characterized to ensure reproducibility. Characterization testing includes RI, FTIR, Kovats Indices, % crosslinking, efficiency, and a five-day thermal bake-out to ensure column longevity. New batches of polymers are used only when they

☐ **Rtx-5MS** (Fused Silica) (Crossbond® 5% diphenyl 95% dimethyl polysiloxane) Stable to 360°C

ID	df(um)	temp. limits	15-Meter	30-Meter
0.25mm	0.10	-60 to 330/350°C	12605	12608
	0.25	-60 to 330/350°C	12620	12623
	0.50	-60 to 330/350°C	12635	12638
	1.00	-60 to 325/350°C	12650	12653
0.32mm	0.10	-60 to 330/350°C	12606	12609
	0.25	-60 to 330/350°C	12621	12624
	0.50	-60 to 330/350°C	12636	12639
0.53mm	1.00	-60 to 325/350°C	12651	12654
	0.50	-60 to 320/340°C	12637	12640
	1.00	-60 to 320/340°C	12652	12655
	1.50	-60 to 310/330°C	12667	12670

Thorough testing of every Rtx-5MS column guarantees consistent results. Each batch of Rtx-5MS polymer is tested by mass spec and must pass demanding criteria for low bleed and minimal siloxane fragmentation. All Rtx®-5MS columns are evaluated with a stringent test mix composed of many of the most adsorptive target compounds. Minimum response factor specifications have been established to ensure that every column exceeds the requirements of the semi-volatile pollutants method. A bleed profile of each column ensures ultra low bleed levels at its maximum operating temperature. Each column is shipped with the actual test chromatogram that demonstrates the Rtx®-5MS column's high degree of inertness for stringent environmental compounds. Also included is a test chromatogram showing the polymer bleed profile by a MS detector.

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XTI-5 / MXT-5

❑ XTI-5 / MXT-5

- Excellent for semi-volatile pollutants.
- Highest thermal stability and lowest bleed of any 5% phenyl capillary column.
- 360°C maximum polymer operating temperature.
- Specially tested with a test mix that emulates the analysis of tough, adsorptive environmental compounds.
- Crossbond® stationary phase results in reduced bleed, increased column lifetime, and solvent rinsability.
- Similar to DB-5HT, DB-SXLT, and PTE-5.

**Custom lengths
and film
thicknesses
are also available
- Please Enquire !**

XTI-5 and MXT®-5 columns were specifically designed for the analysis of semi-volatile pollutants. The technology used to produce XTI®-5 columns increases the maximum operating temperature by 20°C over our standard Rtx-5 column, giving them the highest operating temperature and lowest bleed of any 5% diphenyl -95% dimethyl polysiloxane capillary column available. The XTI®-5 exhibits excellent inertness for all reactive environmental compounds and it has the necessary efficiency to resolve closely eluting isomers. The XTI -5 is a crossbonded stationary phase.

The synthesis procedures and bonding mechanisms for the XTI®-5 polymer were modified over standard 5% phenyl polymers to facilitate low bleed at elevated operating temperatures. Careful attention was paid to reduce baseline rise during a temperature programmed analysis. All residual catalyst, which could cause degradation and increased bleed, is removed from the polymer. The polymer is then carefully fractionated for a tight mono-modal distribution and is fully characterized to ensure reproducibility. Characterization testing includes RI, FTIR, Kovats Indices, % crosslinking, efficiency, and a five-day thermal bake-out to ensure column longevity. New batches of polymers are used only when they meet Restek's stringent QA tests, and each lot is subsequently tracked in an extensive data base for future reference.

Applications:
semi-volatiles
pesticides, PCBs,
environmental
samples, essential
oils.

Thorough testing of every XTI®-5 column guarantees consistent results. All XTI-5 columns are evaluated with a stringent test mix composed of many of the most adsorptive environmental target compounds. Like our Rtx®-5MS minimum response factor specifications have been established to ensure that every column exceeds the requirements of the semi-volatile pollutants method. A temperature program bleed profile test is utilized so that each column can be monitored to provide ultra low bleed levels at its maximum operating temperature. Each column is shipped with the actual test chromatogram that demonstrates the XTI-5 column's high degree of inertness for stringent environmental compounds and shows minimal baseline rise at the column's upper operating temperature.

XTI-5 (Fused Silica) bonded 5% phenyl-extended temperature and inertness) Stable to 360C

ID	df(um)	temp. limits	15-Meter	30-Meter
0.25mm	0.25	-60 to 360°C	12220	12223
	0.50	-60 to 330/350°C	12235	12238
	1.00	-60 to 325/350°C	12250	12253
0.32mm	0.25	-60 to 0 360°C	12221	12224
	0.50	-60 to 330/350°C	12236	12239
	1.00	-60 to 325/350°C	12251	12254
0.53mm	0.50	-60 to 330/360°C	12237	12240
	1.00	-60 to 325/350°C	12252	12255
	1.50	-60 to 340/350°C	12267	12270

see page 24 for MXT-5 product listing

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Rtx-5 Amine

□ Rtx-5 Amine

- Excellent for the analysis of mono-, di-, triamines, and ethanolamine and other alkanolamines.
- Eliminates the need to derivatize basic compounds.
- Column priming not required, even at ppm levels.
- Same polarity as the widely used Rtx®-5 (5% diphenyl/95% dimethyl polysiloxane) stationary phases.
- Crossbonded stationary phase results in reduced bleed, increased column lifetime, and solvent rinsability
- Inject samples in a water matrix.

The reproducible analysis of basic compounds by capillary gas chromatography has always been difficult. The presence of silanol groups (Si OH) causes an inherent acidity on the tubing surface. When basic compounds such as amines are analyzed on an acidic surface, they are adsorbed due to acid/base interactions.

The Rtx-5 Amine column has been developed with a unique deactivation technology that reduces adsorption and improves response of basic compounds. Analyses of active basic compounds that previously required derivatization or another analytical technique such as HPLC can now be performed on the Rtx-5 Amine column. The tubing surface (not the stationary phase) is chemically altered to eliminate tailing of basic compounds, thereby eliminating the need for column priming. The Rtx-5 Amine is a strong departure from outdated technology still being utilized by most column manufacturers. Such outdated procedures typically add stationary phase dopants (such as KOH) during the coating procedure to make a column suitable for the analysis of amines.

The Rtx-5 Amine is ideal for analyzing a wide variety of basic compounds such as alkylamines, diamines, triamines, ethanolamines, and nitrogen-containing heterocycles. The breakthrough technology of this column also allows the analysis of neutral compounds, adsorptive compounds with oxygen groups susceptible to hydrogen bonding, and even mildly acidic compounds such as phenols.

Thorough testing of every Rtx-5 Amine column with a special test mixture consisting of basic, neutral, and oxygenated compounds guarantees consistent results. Minimum response factor specifications have been established to ensure that every column exceeds the requirements for analyzing ppm levels of amines, without priming. A temperature program bleed profile test is also utilized so that each column can be monitored to ensure low bleed at its maximum operating temperature.

Each column is shipped with the actual test chromatogram demonstrating the ability to reproducibly analyze basic compounds (such as diethylenetriamine and diethanolamine). All Rtx-5 Amine columns are bonded and can be rejuvenated by solvent 0.32mm rinsing with common organic lab solvents.

Rtx-5 Amine (Fused Silica)

(Crossbond® 5% diphenyl 95% dimethyl polysiloxane) Stable to 340°C

ID	df(um)	temp. limits	15-Metre	30-Meter
0.25mm	0.50	-60 to 300/315°C	12335	12338
	1.00	-60 to 300/315°C	12350	12353
0.32mm	1.00	.60 to 300/315°C	12351	12354
	1.50	-60 to 290/305°C	12366	12369
0.53mm	1.00	.60 to 290/305°C	12352	12355
	3.00	-60 to 280/295°C	12382	12385

Base Deactivated Fused Silica Guard Columns for use with Rtx-5 Amine columns are also available. Please see page 301 for details

The Rtx-5 Amine column provides consistent and reproducible results for analyzing basic compounds Guaranteed !



Dave Smith
Research Chemist/Basic Analysis Specialist

Applications:
basic and neutral compounds

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