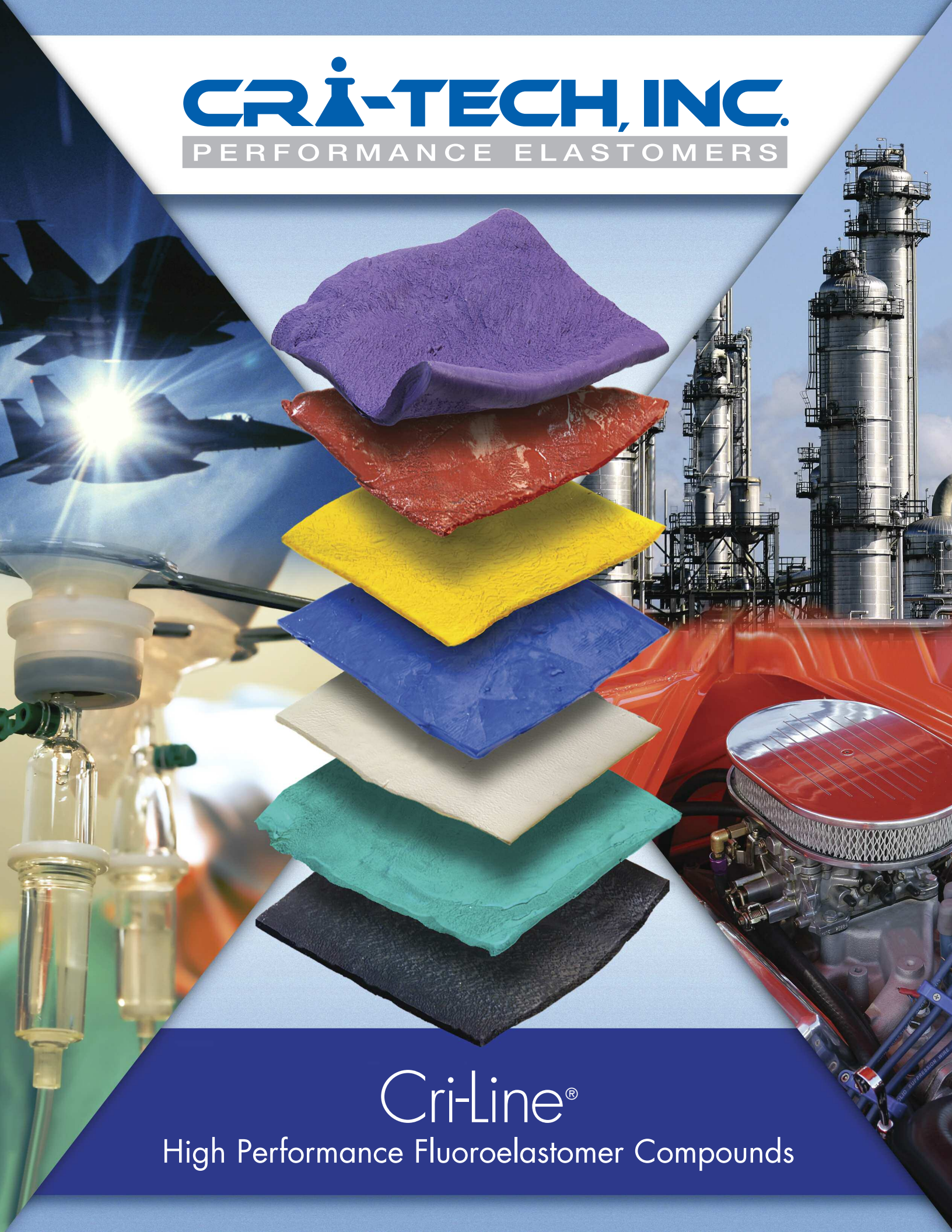
CRI-TECH, INC.

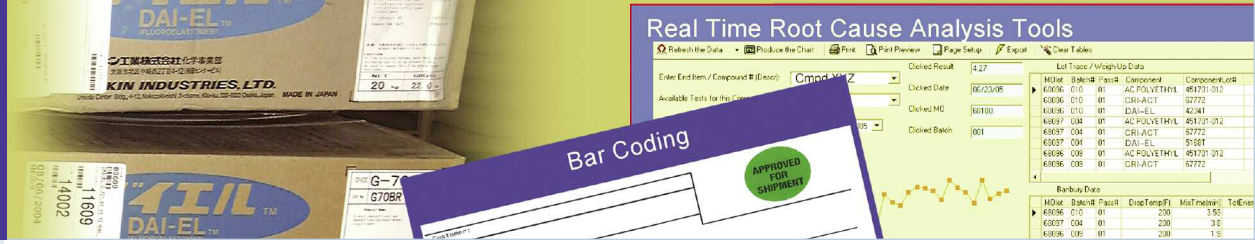
PERFORMANCE ELASTOMERS



Cri-Line®

High Performance Fluoroelastomer Compounds

Full-Service Custom Compounder



WHEN YOU'RE READY FOR THE BEST...

Company overview.

- Founded in 1977, Cri-Tech is a full service custom compounder of high performance FKM compounds, specialty compounds, and additives
- Headquarters, technical development, laboratories, and manufacturing facilities are located in Hanover, Massachusetts, USA
- ISO 9001:2000 certified and QS9000/TS16949 compliant
- Extensive portfolio of specialty compounds and standard products
- Expert compound development and technical service
- Dedicated Sales, Customer Service, Technical Service, Quality, Research and Development, and Manufacturing staff to meet your demanding needs

Cri-Tech mission.

We make high performance elastomers easy for our customers with world class:

- Service
- Technology
- Compound consistency
- Competitive pricing

Quality policy.

We accomplish our mission through the use of:

- Innovative, business minded, technical solutions
- Company-wide, measured, continuous improvement
- A dedicated and highly skilled workforce
- Relationships with key suppliers to provide quality materials at competitive pricing

TÜV ISO 9001

Full-Service Custom Compounder

FKM Compounds

Grade	Fluorine Content	Description	Suitable Applications	Page
SP	66%	Excellent compression set	O-rings	5
LC	66%	Formulated for low cost	Lathe cuts and custom molded goods	5
LC-LV	66%	Formulated for low cost	Injection molding	5
LC-THK	66%	Formulated for low cost	Thick X-sections, enhanced rubber to metal bonding	6
GP	66%	Improved hot tear resistance	Molding complex geometric shapes	6
GP-LV	66%	Improved hot tear resistance	Injection molding	6
IF	68%	Improved chemical resistance	Fuel applications	7
HF	70%	High chemical resistance	Fuel applications including methanol containing fuels	7
HFLT	67%	Low temperature flexibility	Fuel applications including methanol containing fuels	7
LT	65%	Low temperature flexibility	Low temperature seals	7
SPECIALTY	—	See page 8 for complete Specialty Compounds description	O-rings, packings, gaskets, oil seals, oil hose, diaphragms, flexible boots, transmission seals, brake boots and more	8
TFEP	55%	Resistant to hot water, steam, acids, alkalis. Also superior performance in amines and phosphate esters	Oil field/petrochemical applications, cable coatings	8

Cri-Spersions®

	Description	
	Activator Dispersions	9

Hydrogenated Nitrile (HNBR) Compounds

Grade	Description	
60 to 90	General purpose, black reinforced, 60 to 90 durometer, medium ACN	9

New Formulations

Grade	Description	
FKHT-717	70 Durometer, high temperature resistant, low compression set, 66% fluorine compound	9
NM-7-8A-1	75 Durometer, 66% fluorine compound suitable for valve stem seals that meets Daimler Chrysler Corporation Material Specification MS-BZ832-A3	9
HC-715	70 Durometer, peroxide cured, non-post cured capable, 71% fluorine hose compound	9
Cri-Clean	A preventative maintenance, mold cleaning compound	9

Presenting Cri-Line®

Nomenclature Key

BL Blue
BR Brown
GP General purpose
GR Green
HF High fluorine
HFLT High fluorine for low temperature performance
IF Intermediate fluorine
LC Low cost
LV Low viscosity
LS Low shrinkage
LT Low temperature performance
NPC No post cure
OR Orange
SP Specification grade
TFEP Tetrafluoroethylene/ propylene
THK Thick cross-section curing
WH White
YW Yellow

High performance Cri-Spersions, Hydrogenated Nitrile (HNBR) and Fluoroelastomer compounds. Tested, proven and ready for processing.

The Cri-Line® compounds described in this bulletin are fully formulated high performance compounds, developed, tested and guaranteed by Cri-Tech, Inc.

On the following pages, a Product Selection Guide will enable you to quickly locate compounds that meet your specifications. Our sales and technical staffs will be glad to discuss properties, processing characteristics, precautions, end-uses and custom-formulation.

This bulletin lists compounds grouped in four product families. Among them are products for every major FKM end-use and for every common manufacturing process. Cri-Line® FKM compounds range from 50 to 95 durometer and from 65% to 71% Fluorine, and are supplied in several standard colors. Compounds can be modified to support any color program.

Product availability

A Cri-Line® compound that you have ordered will arrive at your receiving dock accompanied by a certificate of compliance (including test data) for the lot shipped and ready for immediate processing without further modification.

CRI-TECH, INC.
PERFORMANCE ELASTOMERS

Industry Applications

SPECIFICATION GRADE COMPOUNDS

66% Fluorine copolymers formulated for the ultimate in compression resistance. SP compounds are the best choice for O-rings.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
SP-508	50	1.83	1124	335	194	4	
SP-510-55	56	1.84	1470	260	300	4	65
SP-612	60	1.84	1720	230	410	5	
SP-615-65	64	1.83	1881	285	414	4	
SP-715	71	1.84	2020	200	800	7	75
SP-715-THK	69	1.84	1820	200	720	11	65
SP-715-75*	75	1.87	2300	200	1000	8	90
SP-715-75-LV	76	1.84	2050	180	1120	9	70
SP-815	80	1.84	2270	160	1350	9	90
SP-918**	90	1.84	2330	120	2000	17	110

Note: For SP compounds, all the physical properties are typical values derived from ASTM Test Methods (test slabs are post-cured 16 hours at 250°C).

** Meets SAE AMS 7276G and SAE AMS 3216F*
*** Meets SAE AMS 7259D and SAE AMS 3218B*

LOW COST COMPOUNDS

66% Fluorine copolymers formulated for low cost. LC compounds are used in lathe cut and custom molded goods, including valve stem seals.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
LC-508-55	58	1.83	1627	323	282	14	
LC-512-55-BR	56	1.93	1450	275	300	16	65
LC-608	61	1.83	1820	316	355	19	
LC-612	63	1.83	1530	263	386	15	
LC-615-65	65	1.85	1584	224	475	16	
LC-715	70	1.85	2077	244	625	15	
LC-712-BR	70	2.01	1650	225	800	19	80
LC-715-75	75	1.83	2098	222	749	17	
LC-815	80	1.83	1902	190	871	18	
LC-815-85	84	1.85	2000	140	1400	18	
LC-915	92	1.83	2218	135	1619	25	
LC-915-BR	89	2.13	2050	90	1490*	33	125

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).
**50% Modulus*

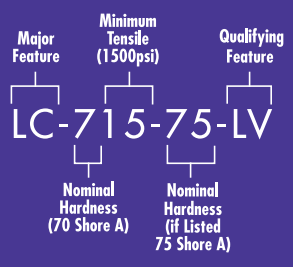
LOW COST - LOW VISCOSITY COMPOUNDS

66% Fluorine copolymers formulated for low cost. LC-LV compounds are also injection moldable.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
LC-612-LV	60	1.87	1490	240	360	14	50
LC-615-65-LV	65	1.85	1730	250	480	15	60
LC-715-LV	71	1.85	2000	250	590	15	55
LC-715-75-LV	75	1.85	2050	240	650	17	60
LC-815-LV	82	1.84	2110	200	860	22	75
LC-915-LV	92	1.83	2190	140	1540	27	90

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

Product Name Key



Industry Applications

LOW COST - THICK CROSS SECTION COMPOUNDS

66% Fluorine copolymers formulated for low cost. LC-THK compounds are fissure resistant in thick cross sections; these compounds also exhibit enhanced rubber-to-metal bonding.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
LC-612-THK	63	1.85	1485	247	375	17	
LC-615-65-THK	68	1.82	1753	209	632	21	65
LC-715-THK	72	1.83	1955	208	729	18	
LC-715-75-THK	76	1.84	1984	217	735	19	
LC-815-THK	82	1.84	1826	176	944	25	
LC-815-85-THK	86	1.85	1720	150	1220	18	
LC-915-THK	91	1.84	1892	127	1540	32	

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

GENERAL PURPOSE

66% Fluorine copolymers formulated for molding complex geometric shapes. GP compounds exhibit improved hot tear resistant properties and offer a variety of colors

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
GP-615	62	1.88	1788	260	434	13	
GP-715	73	1.82	1857	277	554	14	
GP-715-BL	72	2.02	1750	240	810	14	60
GP-715-BR	71	1.94	1904	238	684	12	
GP-715-OR	70	2.15	2010	190	1180	13	55
GP-715-YW	69	2.12	1760	240	720	14	60
GP-815	80	1.83	1980	195	970	23	85
GP-918	92	1.84	2032	136	1501	31	

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

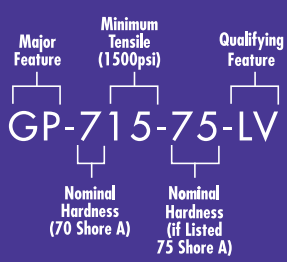
GENERAL PURPOSE - LOW VISCOSITY

66% Fluorine copolymers formulated for injection molding. GP-LV compounds also exhibit the improved hot tear resistance compared to their higher viscosity counterparts.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
GP-612-LV	58	1.84	1480	320	310	14	45
GP-615-65-LV	61	1.82	1564	293	401	16	
GP-715-LV	70	1.84	1782	260	492	17	
GP-715-75-LV	74	1.83	1940	220	760	16	55
GP-815-LV	81	1.83	1709	190	930	24	60
GP-915-LV	91	1.83	1920	140	1440	30	75

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

Product Name Key



Industry Applications

INTERMEDIATE FLUORINE

68% Fluorine terpolymers formulated for improved chemical resistance.
IF compounds are good choices for fuel applications.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Elongation (psi)	Compression Set Modulus 22 hrs @ 200°C	Mooney Viscosity (Plied Discs) ML1+10 @ 121°C
IF-615	59	1.87	1670	330	290	19	45
IF-615-65	64	1.87	1630	290	420	21	50
IF-715	69	1.86	1820	260	510	20	60
IF-715-75	72	1.87	1840	250	600	25	60
IF-815	81	1.87	1890	220	800	33	75
IF-915	90	1.87	1780	180	1070	37	90

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

HIGH FLUORINE

70% Fluorine terpolymers formulated for much improved chemical resistance. HF compounds are excellent choices for fuel applications, including methanol-containing fuels.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
HF-615	60	1.91	2073	263	512	14	80
HF-618-65	67	1.91	2056	245	783	18	90
HF-718	71	1.91	2024	220	855	23	85
HF-718-75	73	1.90	2108	213	935	27	85
HF-818	82	1.90	2081	189	1156	30	90
HF-918	89	1.90	1998	157	1280	33	110

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

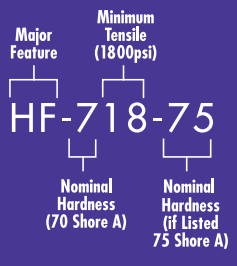
HIGH FLUORINE - LOW TEMPERATURE

High fluorine tetrapolymers formulated for low temperature flexibility.
HFLT compounds are excellent choices for fuel applications, including methanol-containing fuels, where low temperature flexibility is also essential. The LT compounds are designed for low temperature applications.

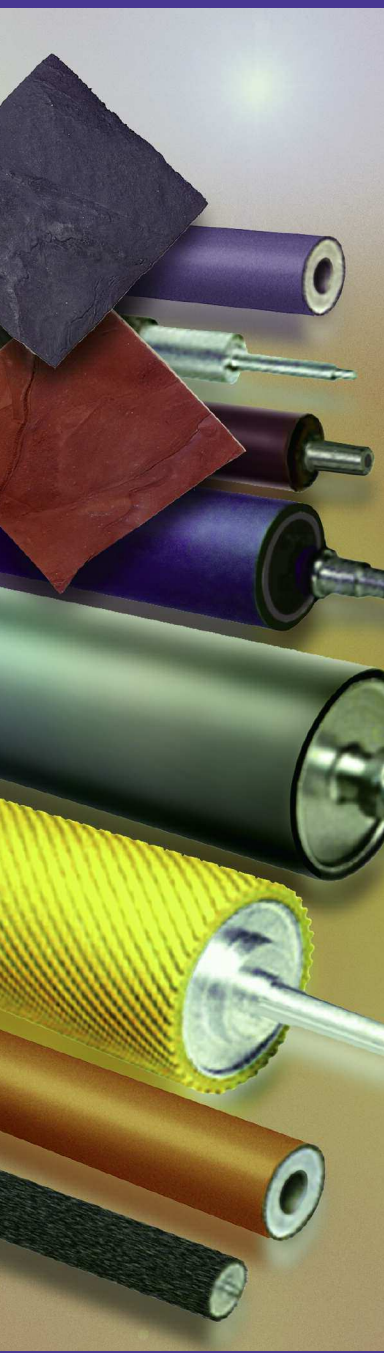
Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
HFLT-615	60	1.90	2214	241	425	5	
HFLT-618-65	65	1.89	2219	218	557	6	
HFLT-720	70	1.89	2575	211	773	5	
HFLT-720-75	74	1.89	3142	202	1071	5	
HFLT-820	82	1.88	2572	182	1260	16	
HFLT-920	92	1.88	3156	119	2683	14	
LT-718	69	1.82	2110	150	1100	21	75
LT-718-75	76	1.85	2735	260	903	20	80

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

Product Name Key



Industry Applications



SPECIALTY COMPOUNDS

This family includes low shrinkage, non-post cure, high temperature and dynamic vulcanized fluorocarbon elastomer compounds.
The LS compounds are designed to give part shrinkage (out of the mold) and post-curing operation comparable to a nitrile or similar elastomers. In most cases, tooling changes are not required when switching over to an LS compound. NPC indicates no post-cure required to achieve high tensile and modulus values with good compression set and aging characteristics. FKHT is a high temperature resistant, low compression set compound. FKX is a high viscosity, high green strength, black fluorocarbon compound formulated for HAV and/or salt bath curing of O-ring cord and extruded profiles.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
FKHT-717	72	1.83	2231	184	1083	3**	
FKX-719-75	76	1.85	1898	131	1482	11	
LS-715	70	1.96	1700	300	640	21	70
LS-918	90	2.06	2640	110	1580*	36	85
NPC-720	69	1.86	1708	190	690	20	35
NPC-820	79	1.86	2250	210	1200	20	

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C). Except NPC.

**50% Modulus **22 hours at 175°C*

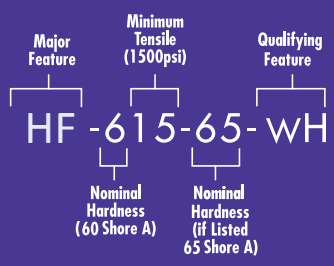
TFEP

55% Fluorine copolymers of tetrafluoroethylene and propylene. TFEP compounds exhibit outstanding resistance to hot water, steam, acids and alkalis. These compounds also give superior performance in amines and phosphate esters as compared to conventional fluoroelastomers.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 22 hrs @ 200°C	Mooney Viscosity ML1+10 @ 121°C
TFEP-720-75	76	1.57	2700	190	1590	25	115
TFEP-820	81	1.58	3060	200	1640	36	130
TFEP-920	87	1.60	2020	110	1880	40	150

Note: All the physical properties are typical values derived from ASTM Test Methods (test slabs post-cured 16 hours at 232°C).

Product Name Key



Cri-Spersions are dispersions of activators or other rubber chemicals on a fluoroelastomer base. These unique proprietary products, first developed by Cri-Tech for its fully formulated FKM compounds, are available to fabricators who elect to mix all or some of their FKM requirements. Use of Cri-Spersions is an alternative to the conventional incorporation of activators in powder form. They eliminate the problems associated with direct incorporation of powders and ensure optimum activator dispersion, thereby increasing quality, lowering costs, resisting moisture absorbtion and speeding production.

Cri-Spersions®

Grade	Description
Cri-Act-45-S	45% Dispersion of a 2/1 ratio of calcium hydroxide and magnesium oxide
Cri-Act-45-LV-S	45% Dispersion of a 2/1 ratio of calcium hydroxide and magnesium oxide, for use in low viscosity compounds
Cri-C-50-S	50% Dispersion of calcium hydroxide
Cri-Diak-50-S	50% Dispersion of dicinnamylidene-hexanediamine, commonly referred to as Diak #3
Cri-Mag-H-40-S	40% Dispersion of high activity magnesium oxide
Cri-Mag-M-40	40% Dispersion of low activity magnesium oxide
Cri-Ox-50-S	50% Dispersion of calcium oxide
Cri-Pro-A-100	A high quality, general purpose reprocessed fluorocarbon elastomer

HYDROGENATED NITRILE (HNBR) COMPOUNDS

General purpose, black reinforced, medium ACN, hydrogenated nitrile molding compound.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)
HNBR-60-01	60	1.09	3030	390	360
HNBR-70-01	70	1.14	3350	370	740
HNBR-75-01	74	1.18	3380	310	1130
HNBR-80-01	80	1.20	3200	250	1150
HNBR-90-01	90	1.22	3180	140	2610

Note: All the physical properties are typical values derived from ASTM Test Methods.

NEW PRODUCTS

70 Durometer, high temperature resistant, low compression set, 66% fluorine compound

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 100 hrs @ 275°C
FKHT-717	72	1.83	2231	184	1083	55

75 Durometer, 66% fluorine compound suitable for valve stem seals that meets Daimler Chrysler Corporation Material Specification MS-BZ832-A3

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 70 hrs @ 150°C
NM-7-8A-1	75	1.84	1784	195	841	5

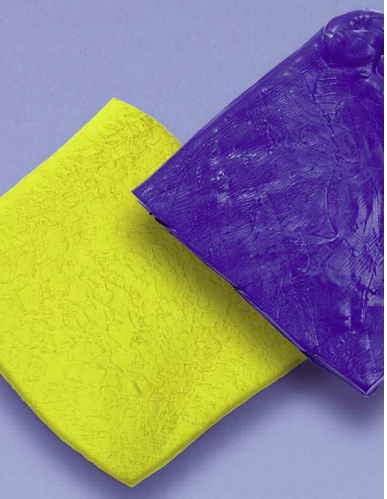
70 Durometer, peroxide cured, non-post cured capable, 71% fluorine hose compound. This material is an excellent choice for standard fuel, diesel fuel and biodiesel applications.

Product	Durometer Type A	Specific Gravity	Tensile (psi)	Elongation (%)	100% Modulus (psi)	Compression Set (Plied Discs) 24 hrs @ 135°C
HC-715	72	1.83	1784	358	350	24

Cri-Clean is a preventative maintenance, mold cleaning compound that can be used for injection-compression, transfer, or compression molds. This material can be cured at temperatures from 340° F to 400° F.

Product
Cri-Clean

Product Suitability



Cri-Tech formulates and supplies compounds for numerous applications in the automotive/off-highway, aerospace, pneumatics, oil field, pollution control, roller, diesel, small engine, plumbing and chemical processing industries.

Top-level professionals monitor and approve incoming raw materials, plant procedures, and all factors affecting final product quality.

Product Suitability for Selected Applications

Industry	Product	Cri-Line Compounds
Automotive/off highway	Fuel hose	IF HF
	Valve stem seals	GP LC
	Shaft seals	SP IF HF
	O-rings	SP
	Valve cover gaskets	SP LC
	Diaphragms	GP IF
Aerospace	O-rings Gaskets Molded goods	SP SP GP
Pneumatics	O-rings	SP
	Packings	GP LC
Oil field/petrochemical	Blowout preventers	SP
	Down-hole packers	HF
	Cable coatings	TFEP
Industrial pollution control	Flu duct expansion joints	IF
	Pipe and tank liners	IF HF
Other	Roll covers	GP LC
	Sheet packings	SP
	Diesel	IF HF
	Small engine	GP SP
	Plumbing	GP
	Chemical processing	IF HF TFEP

...THE FUTURE IS NOW

Working in partnership with Cri-Tech you have everything to gain.

- North America's pre-eminent compounder and mixer of high performance FKM compounds
- The most comprehensive process and quality control systems in the industry, including:
  - Bar coding throughout the entire process
  - Computer controlled mixers/processing equipment
  - Real time data acquisition
- Our Chemists are on staff to modify or create original formulas for your exclusive use
- Close personal attention to your needs

With Cri-Tech's focus on the customer, we tailor our services to exactly match your performance requirements and delivery schedules. We have spent years researching our standard Cri-Line products in addition to our ongoing custom compounding and mixing. Our goal is to ensure that you get to your market fast with an effective and economical product.

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