Common or Trade Names	Chemical Name	ASTM D1418 Designation	ASTM D2000 SAE J200 Class or Type	MIL-R-3065 (MIL-STD-417) Classification	General Temperature Range	Recommended Shelf Life* in Years per SAE ARP 5316 Mil-HDBK-695D		Relative Cost	General Characteristics and Uses
Non Oil Resistant									
Butyl	Polyisobutylene Chlorobutyl Bromobutyl	IIR CIIR BIIR	AA, BA	RS	-20°F to 250°F	---	10	Low to Moderate	**Butyl rubbe**r is a copolymer of Isobutylene and Isoprene that has excellent impermeability and good flex properties, and is used in applications requiring airtight rubber. IIR is used in linings and inner tubes, tires, hoses & conveyor belts, adhesives and sealants. **Advantages**: Good ozone and weathering resistance; very low permeability to gasses; high energy absorption; high heat resistance. IIR performs well in hot water & steam, Silicone fluids and greases, and Phosphate ester type hydraulic fluids (skydrol®, Fyrquel®, Pydraul®) **Limitations**: Only moderate abrasion and compression set; low tensile strength and resilience; readily combustible. Very slow curing unless modified to chloro and bromo butyl (CIIR & BIIR). IIR performs poorly in mineral oil and grease as well as Hydrocarbon oil and fuels.
Ethylene Propylene	Ethylene Propylene Diene Monomer Ethylene Propylene Monomer	EPDM EPM	AA , BA, CA, DA	RS	-55°F to 250°F	Unlimited	5 to 10	Low to Moderate	**EPDM** is one of the most widely used synthetic rubbers, having both specialty and general-purpose applications. It is commonly used in outdoor applications as well as, appliance hose, tubing, belts, electrical insulation, and rubber mechanical goods. **Advantages**: Color stable with good electrical resistivity and higher heat resistance than other hydrocarbon rubbers; unaffected by ozone; high ageing resistance. Easily processed. EPDM performs well in Phosphate ester hydraulic fluids (Skydrol®, Fyrquel® & Pydraul®), Alcohols, brake fluids, dilute acids & alkalis, ketones (MEK, acetone), Silicone oils & grease, steam and water. **Limitations**: Lack of tack (difficult to bond) EPDM performs poorly in Aliphatic & aromatic hydrocarbons, Di-ester based lubricants, Halogenated solvents, and petroleum oils.
Natural Rubber Pure Gum Rubber	Polyisoprene Latex	NR	AA	RN	-76°F to 212°F	---	3 to 5	Low to Moderate	**Natural Rubbe**r is the original rubber! NR is mainly produced from tree sap (latex). NR was the sole rubber polymer before the development of synthetic elastomers in the 1930s. **Advantage**s: NR offers low heat build up, high resilience and elongation, good abrasion resistance, and low temperature flexibility. It has both high tensile strength and good tear strength and undergoes low compression set. NR offers good dynamic, mechanical and fatigue properties, with good creep and stress relaxation resistance. NR Can be compounded to maintain good flexibility to -76°F. NR performs well in Alcohols, organic Acids and as non-hydraulic seals. **Limitations**: Suffers from poor oxidation, ozone, oil and solvent resistance. Temperature resistance is also relatively poor. NR performs poorly in aromatic, aliphatic, and halogenated hydrocarbons, ozone, and petroleum oils.

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Isoprene Synthetic Latex	Synthetic Polyisoprene	IR	AA	RN	-76°F to 212°F	---	3 to 5	Low to Moderate	**Synthetic Latex** is essentially the same as natural rubber but made synthetically and is used in the same type of products such as shock mounts, gaskets, sporting goods and healthcare items. **Advantages**: IR does not contain proteins and can be utilized in latex allergy applications. **Limitations**: IR demonstrates lower green strength, slower cure rates, lower hot tear, and lower aged properties than natural rubber.
PolyButadiene	Polybutadiene	BR	AA, BA	RN	-40°F to 175°F	---	3 to 5	Low to Moderate	**Polybutadiene Rubber** is the second largest volume synthetic rubber produced, next to SBR. The major application is the sidewall and tread of tires. Due to its outstanding resiliency, it is also used in golf ball cores and high bounce "super balls". **Advantages**: Good low temperature properties; excellent resilience and abrasion resistance. A very high level of cure can be achieved. Blended with other polymers it reduces heat build up and improves abrasion resistance. **Limitations**: Not oil resistant and prone to ozone cracking. Moderate heat resistance. Can be difficult to process.
SBR Buna-S GRS	Styrene Butadiene	SBR	AA, BA	RS	0°F to 225°F	---	3 to 5	Low	**SBR** was first developed in the 1930's as demand for rubber tires increased, as well as a synthetic substitute for natural rubber during WWII. SBR is still used for some tires in addition to belts and hoses for machinery and engines, gaskets, and break and clutch pads for vehicles. **Advantages**: Good dynamic, mechanical and fatigue properties; high strength, resilience and abrasion properties. SBR performs well in Water, Alcohol, Silicone oil & grease, Automotive brake systems. **Limitations**: Suffers from poor oxidation, ozone, oil and solvent resistance. Temperature resistance is also poor. SBR performs poorly in Petroleum oils and fuels, strong Acids, aromatic, aliphatic and halogenated hydrocarbons, mineral oils.
Oil Resistant									

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Acrylate HyTemp®	Polyacrylate	ACM ANM	DF, DH	TB	0°F to 250°F	---	20	Moderate	**Acrylate** has resistance to hot air that is slightly superior to nitrile polymers, but strength, compression set and water resistance are inferior to many of the other polymers. Greatest usage of ACM is by the automotive industry in automatic transmission and power steering seals, O-rings, hose, tubing and cable coverings. **Advantages**: Resistant to flex cracking as well as damage from oxidation, sunlight and ozone. Good resistance to high temperatures in both air and oil environments; ozone and oxygen resistant. Cheaper alternative to silicones and fluorinated elastomers. ACM performs well in Automatic transmission fluid, Hot oils and Type A power steering fluid. **Limitations**: Generally poor physical properties and chemical resistance. ACM performs poorly in Alcohol, Alkalis, Brake fluids, Glycols, and Hydrocarbons (aromatic & chlorinated).
Hydrin	Epichlorhydrin Epichlorhydrin Oxide	CO ECO	BG, BK, CE, CH, DH, DJ, DK	SB	-50°F to 250°F	---	5 to 10	Moderate	**Hydrin** combines low gas and solvent permeability with excellent resistance to hydrocarbon oils and fuels. It is very resistant to weathering and ozone. ECO remains stable during low to high temperature cycling and is often used in place of Nitrile and Neoprene for applications requiring resistance to low temperatures. Used for hoses, seals, O-rings, gaskets, diaphragms, and printing rollers. **Advantages**: Good low temperature resistance; Resistant to ozone, weathering and oils; good heat resistance; very low permeability to gasses; flame retardant. ECO performs well in Aliphatic hydrocarbons, Mineral oil & grease, Silicone oil & grease and ozone. **Limitations**: Electrically conductive; relatively expensive; low resilience; can be corrosive. ECO performs poorly in Aldehydes, Brake fluids, Esters, Hydrocarbons (chlorinated, nitro), Ketones (MEK, acetone), Peroxides.
Hypalon®	Chlorosulfonated Polyethylene	CSM	BG, CE, CH	---	-30°F to 250°F	Unlimited	5 to 10	Moderate	**Hypalon®** is noted for its resistance to chemicals, temperature extremes, and ultraviolet light. Along with PVC, CSM is often used to make inflatable boats and kayaks. Its also used in roofing materials and as a surface coat on radomes due to its radar-transparent quality. **Advantages**: Resistance to chemicals, temperature extremes and ultraviolet light. Better low temperature properties and tear resistance than FKM. CSM performs well in Acids, Alkalis, Silicone oil & grease, water and water solvents, refrigerants (Freon®), and Ozone. **Limitations**: Poor resistance to non synthetic hydraulic fluid, gasoline, and aromatic and halogenated solvents. CSM does not perform well in Aldehydes, Esters, Ethers, Hydrocarbons (aromatic, chlorinated, nitro), and Ketones (MEK, acetone).

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Chloroprene Neoprene®	Polychloroprene	CR	BC, BA	SE	-40°F to 250°F	15	5 to 10	Moderate	**Neoprene®** is generally comparable to natural rubber with the added benefit of greater oil resistance. First produced in 1932, CR continues to be an outstanding performer due to its favorable combination of technical properties. Typical uses are as hoses and tubing, linings and seals. Some CR compounds are FDA approved for use in the food and beverage industries. **Advantages**: Good mechanical strength; high ozone and weather resistance; good aging resistance; low flammability; good resistance to chemicals; moderate oil and fuel resistance; adhesion to many substrates. CR performs well in high aniline point petroleum oils, mild Acids, Refrigeration seals (resistance to Freon® & ammonia), Silicone oil and grease, and water. **Limitations**: Relatively high water absorption; some grades crystalize at low ambient temperatures. CR does not perform well in Hydrocarbons, (aromatic, chlorinated, nitro), Ketones (MEK, acetone), Phosphate ester fluids and strong oxidizing Acids.
Nitrile Buna-N Paracril®	Acrylonitrile-Butadiene	NBR	BF,BG,BK,CH	SB	-40°F to 212°F/250°F	15	3 to 5 and 5 to 10	Low to Moderate	**Nitrile** is the workhorse of the industrial and automotive rubber products industries. NBR materials can withstand all but the most severe automotive applications, and is used in hose, seals and grommets, and water handling applications. On the industrial side, NBR finds uses in roll covers, belting, gaskets and seals, along with many plumbing and appliance applications. Acryonitrile (ACN) content varies with the higher the ACN content, the better the resistance to fuel and oil, at the same time adversely affecting elasticity & compression set. **Advantages**: NBR performs well in Petroleum oils & fuels; Silicone oils & greases; Ethylene glycol; Dilute Acids; Water (below 212°F). **Limitations**: Moderate ageing resistance; relatively poor resistance to low temperatures; limited ozone resistance. NBR performs poorly in Aromatic hydrocarbons (benzene, toluene, xylene); brake fluid; Halogen derivatives (carbon tetrachloride, trichloroethylene); Ketones (MEK, acetone); Phosphate ester hydraulic fluids (Skydrol®, Pydraul®,); strong Acids.

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Carboxylated Nitrile	Carboxylated Acryonitrile-Butadiene	XNBR	BF, BG, BK	SB	-20°F to 300°F	---	15	Moderate to High	**Carboxylated Nitrile** has significantly more abrasion resistance than NBR while retaining excellent oil and solvent resistance. For this reason it is often specified for dynamic applications such as rod seals and rod wipers. **Advantages**: XNBR performs well in Aliphatic hydrocarbons (propane, butane, petroleum oil, mineral oil and grease, diesel fuel, fuel oils) HFA, HFB, and HFC hydraulic fluids, and diluted Acids, alkali and salt solutions at low temperature. **Limitations**: Poor ozone, weather and atmospheric aging resistance. Less flexible than NBR. XNBR performs poorly in aromatic fuels; aromatic hydrocarbons (benzene); Chlorinated hydrocarbons (trichloroethylene); strong Acids, brake fluid with a glycol base; Ketones (MEK, acetone); strong Acids.
Hydrogenated Nitrile HSN	Hydrogenated Acrylonitrile-Butadiene	HNBR	DH	SB	-40°F to 300°F	---	15	Moderate to High	**Hydrogenated Nitrile** has proven itself in a variety of uses in the oil field as a lower cost alternative to FKM in certain products such as O-rings, packing's, wellhead seals, drill bit seals, blowout preventers and drill pipe protectors. It is also used in automotive applications, (O-rings, timing belts, fuel injector seals, fuel hose, shaft seals, diaphragms, particularly in A/C systems where R-134a refrigerant gas has replaced the CFC containing R12 refrigerant). **Advantages**: HNBR features improved ozone, heat and aging resistance and improved physical strength and retention of properties after long-term exposure to heat, oil, and chemicals. HNBR performs well in petroleum based oils and fuels. **Limitations**: Increased cold flow creep and decreased low temperature elasticity. HNBR does not perform well in Esters, Ethers, Chlorinated hydrocarbons and Ketones (MEK, acetone).
Thiokol®	Polysulfide	T	SK	SA	-65° to 160°F	---	20	Moderate to High	**Thiokol®** Polysulfide rubber is a good low temperature flexible rubber that is impermeable to gases. It is used in Aerospace, Aviation, Marine and Railway industries . **Advantages:** Resistant to Oxygen and Ozone with good flex-crack resistance; impermeable to gases. Thiokol° performs well in petroleum solvents, ketones (MEK, acetone), and ethers. **Limitations:** Poor tensile strength, abrasion resistance, compression set and heat resistance. Strong sulphurous odor. Difficult to process. Must be manufactured apart from other polymers to keep from contaminating them.

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Urethane	Polyester-Urethane, Polyether-Urethane	AU, EU	BF, BG, BK	SB	-60°F to 180°F	5	3 to 5 and 5 to 10	Moderate	**Urethanes** exhibit outstanding mechanical and physical properties in comparison with other elastomers. Typical uses are in O-rings, solid tires, rollers, belting, and bushings. Cast urethanes (BF, BK) typically have higher physical properties than thermoset Millable gum urethanes (BG). **Advantages**: Resistant to abrasion; High load-bearing capacity; High impact resistivity, a wide resilience range; ideal for high flex applications; Resistant of all elastomers; good resistance to ozone and radiation; Resistant to Ozone and Oxygen. Urethane performs well in Water, solvents, oils and chemicals. **Limitations**: Susceptible to hydrolysis in hot and damp conditions.
Specialty Elastomers									
Aflas® Viton VTR®	Tetralfluoroethylene Propylene	FEPM	HK	---	0°F to 400°F	Unlimited	---	High	**Aflas®** provides a unique combination of chemical, heat and electrical resistance. FEPM is widely used in the Aerospace, Automotive and Chemical processing industries. **Advantages**: Resists both acids and bases in high pressure and temperature environments. FEPM performs well in numerous Acids & Bases, Brake fluids, Amine based corrosion inhibitors, Petroleum fluids, Phosphate esters and Steam. **Limitations:** High cost, FEPM undergoes substantial swell after immersion in solvents like acetone. Notable compression set may rule FEPM out for some applications. FEPM performs poorly in Aromatic fuels, Esthers, Ketones (MEK, acetone), and Toluene.
Viton ETP® Viton Extreme™	Ethylene Tetralfluoroethylene Perfluoromethyl	FEPM	HK	---	0°F to 400°F	Unlimited	---	High	**Viton Extreme™** offers the most comprehensive fluids resistance of any FEPM compound combined with the high resistance to hydrocarbons (including fuels), and high temperature resistance of FKM, with good low temperature flexibility and good processibility. **Advantages**: Viton Extreme™ performs well in Acids, hydrocarbon and low molecular weight esters, Ketones (MEK, acetone), and Aldehydes. **Limitations**: Viton Extreme performs poorly in Ammonia, Hydrofluoric Acid, and Steam.

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Fluorosilicone	Fluoro Methyl Vinyl Silicone	FVMQ	FK	TA	-100°F to 350°F	Unlimited	20	High	**Fluorosilicone**s combine the best properties of fluorocarbons (FKM) and silicones (PVMQ) Widely used in aerospace fuel systems and automotive fuel emission controls. **Advantages**: Superior as a static seal. Resist solvents, fuel and oil while maintaining low compression set and high resiliency. Excellent weathering, ozone and heat resistance. Good for special applications where general resistance to oxidizing chemicals, aromatic and chlorinated solvent bases are required. FVMQ performs well in Hot air, aromatic and chlorinated hydrocarbons, ozone and sunlight. **Limitations**: High friction tendencies, limited strength, and poor abrasion resistance disqualify them from dynamic uses. FVMQ performs poorly in Brake fluids, Hydrazine and Ketones (MEK, acetone).
Silicone Siloxane	Methyl Vinyl Silicone Polysiloxane	Q, MQ, PMQ, VMQ, PVMQ,	FC, FE, GE	TA	-65°F to 450°F	Unlimited	20	Moderate to High	**Silicones**, also known as siloxanes, are inert, synthetic compounds with a variety of forms and uses. Typically heat resistant and flexible, they are used in tubing, sealants, adhesives, medical applications, cooking utensils and insulation. **Advantages:** Excellent heat and low temperature properties. Low compression set and good resilience. Moderate solvent resistance. Good release characteristics. Silicone performs well in Engine & transmission oils (mineral oils), Ozone, and dry heat. **Limitations:** Poor dynamic use due to high friction characteristic, low abrasion resistance, and poor tear and tensile strength. Silicones are very gas permeable. Silicone performs poorly in Petroleum oils and fuels, Ketones (MEK, acetone), Steam, concentrated Acids.
Kalrez® Chemraz® Simriz® Aegis®	Perfluorocarbon	FFKM	JK, HK	---	-35°F to 600°F	Unlimited	20	Very High	**Kalrez®** features the chemical resistance of Teflon®, with the high temperature stability of Viton®. Resistant to over 1,600 solvents, chemicals and plasmas, with minimal swell, FFKM functions in almost any chemical or petrochemical situation such as oil exploration and refining as well as in chemical processing and transportation seals. FFKM is also used in the semiconductor and automotive industries. **Advantages**: Superior chemical resistance and thermal stability in harsh environments. FFKM performs well in Most chemical & petrochemical situations. **Limitations**: Compression set increases as temperature increases. Does not perform well in Fully halogenated freons, Uranium hexafluoride and some fluorinated solvents. Difficult to process. Extremely high cost.

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Vamac®	Ethylene Acrylic	AEM	EE, EF, EG	---	-30°F to 275°F	---	---	Moderate	**Vamac®** offers exceptional weatherability with resistance to ozone, sunlight, and heat, as well as low gas permeability and moderate oil swell resistance. **Advantages**: Flex life is good, as are tear, abrasion, and compression set properties. AEM performs well in alkalies, dilute acids, glycols, particularly as seals in power steering and automatic transmission systems. **Limitations**: Moderate oil swell resistance. Poor processibility. AEM does not perform well in aromatic hydrocarbons (benzene, toluene, xylene), brake fluids, gasoline, ketones (MEK), phosphate esters and strong acids.
Viton® Fluorel®	Fluorocarbon	FKM	HK	TB	-15°F to 400°F	Unlimited	20	High	**Viton®** was developed in the mid 1950's for Aerospace applications, FKM achieves extraordinary levels of resistance to chemicals, oil and heat, while providing useful service life above 390°F with a low compression set. FKM is selected for a wide variety of high-performance applications as it provides long term reliability in harsh environments. Depending on the specific needs of your application there are 3 types of FKM "Viton" formulations. **"Viton-A"** - is a co-polymer and is considered the general purpose type and most widely used FKM. This compound offers excellent resistance against many automotive and aviation fuels, as well as both aliphatic and aromatic hydrocarbon process fluids and chemicals. It is also resistant to engine lubricating oils, aqueous fluids, steam and mineral acids. **"Viton-B"** - is a more complex terpolymer that offers better fluids resistance than Viton A copolymers. **"Viton-GF"** - is an even more complex tetrapolymer that is the most fluid resistant FKM and offers improved resistance to water, steam, and acids. **Advantages**: High heat resistance; resistant to oil and almost all inorganic chemicals and organic compounds. Self extinguishing. FKM performs well in; Acids, Aircraft engine applications, Gasoline & alcohol blends, Hard vacuum applications, Petroleum products, Silicone fluids and greases and solvents. **Limitations**: Electrically conductive, low resilience; relatively high cost, Difficult to process. FKM does not perform well in; Amines, Hot chlorosulfonic acid, Hot hydrofluoric acid, Hydrocarbons (nitro), ketones, low molecular weight esters and ethers, fireproof hydraulic fluids (skydrol®).
Sheet and Gasket Material (Solid & Cellular)									
Acetate Film	Cellulose Acetate	---	---	---	to 225°	---	---	Low	**Acetate film** is approved world wide for indirect and direct food and medical applications. **Advantages**: Glass-like clarity; good dimensional stability; Easily die cut. **Limitations**: Low tear strength

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Cork	Composition Cork	---	---	---	to 392°	---	---	Low	**Cork** is an environmentally sustainable material harvested from tree bark. Uses include stoppers, bulletin boards and floor and wall tiles as well as floats and fishing tackle. **Advantages**: Environmentally sustainable, Cork is light weight; impermeable; buoyant; non allergenic and fire retardant. **Limitations**: Cork is compressed with a natural binder and has poor tear strength. **Specification**s: HH-C-576b
Cork & Rubber	Composition Cork with a Rubber binder, various polymers	---	---	---	to 275°	---	---	Low to Moderate	**Cork and rubber** are gasket materials manufactured by combining cork with various rubber polymers as a binder. Cork and rubber gaskets are used in automotive, railroad, aviation and agricultural industries. These materials can be used as gaskets on machinery, pumps, meters, transformers to name a few applications. **Polymers**: Neoprene, Nitrile, Viton and Silicone. **Advantages**: great compressibility combined with resiliency. Good for very narrow flange gaskets and low bolt load applications. **Limitations**: Higher cost than composition cork sheet.
CI Sheet	Cloth Inserted Rubber Sheet	---	---	---	-20°F to 170°F	Dependent on Compound	Dependent on Compound	Moderate	**Cloth inserted sheet rubbe**r is used when a combination of rubber for sealing and cloth insertion for strength is required, or when movement in service (bolt holes, clamps and pressure) requires a reinforced rubber gasket. **Thickness range**: .062" to .250", generally with 1 ply of fabric for every .062" of thickness. **Cloth Fibers**: Cotton duck, polyester **Polymers**: Nitrile, Neoprene and SBR are generally used polymers.
Diaphragm Sheeting	Rubber Coated Fabrics, various polymers	---	---	---	Dependent on Compound	Dependent on Compound	Dependent on Compound	High	**Diaphragm sheets** are engineered fabrics in many combinations of fibers and polymers that are woven dependent on requirements to offer solutions to diaphragm applications in a wide variety of environments. Nitrile on Nylon is an example of diaphragm sheet for general purpose oil resistant diaphragms. **Thickness range:** from .05mm (.002") to 10mm (.393") per side of fabric. **Fibers**: Aramid, (Kevlar®, Nomex®) Cotton, Fiberglass, Nylon, Polyester, Silk, and Rayon. **Polymers**: Butyl, EPDM, ECO, Fluorosilicone, Hydrin, HNBR, Hypalon®, Neoprene®, Nitrile, Acrylic, Natural Rubber, Polyacrylate, Urethane, SBR, Silicone, Viton®

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EMI/RFI Shielding PolaSheet®	Oriented Wire in Silicone or Fluorosilicone Expanded Metal/Polymer	---	---	---	-100°F to 400°F	---	---	High	**PolaSheet®** is engineered from Silicone sheet material with oriented wires for EMI shielding and IP sealing. It is used in military, industrial and commercial products requiring EMI suppression, grounding, or static discharge. **Wire type**: Monel or aluminum **Polymers**: Silicone and Fluorosilicone, both solid and sponge.
EMI/RFI Silver loaded Conductive Polymers	Conductive Particle Filled Elastomers	---	---	---	-55°F to 160°F	---	---	High	**Silver loaded Silicone** as well as other polymer bases and conductive particles are compounded for use in EMI/RFI suppression. Each compound has its own unique properties . **Polymers**: Silicone, Fluorosilicone, EPDM, Viton® **Conductive fillers**: Silver, Nickel, Carbon, Copper
EMI/RFI Rubber/Screen Composite	Expanded Metal Screen Cloth with Elastomers	---	---	---		---	---	Moderate to High	**Rubber/Screen Composites** yield a highly conductive, yet resilient gasketing material for EMIO/RFI shielding as well as a pressure and environmental seal. **Polymers**: Silicone, Fluorosilicone, Fuel Resistant Synthetics. **Expanded Metals**: Expanded Monel, Aluminum, Copper, Nickel. **Woven Metals**: Woven Aluminum, Woven Monel.
Felt	Felt Wool & Polyester	---	---	---	-80°F to 200°F	---	---	Low to Moderate	**Felt** is available in various grades and used in a number of industries such as BSR (buzz, squeak & rattle) applications, steel wiping felt, crate lining felt for the display and exhibit industry, felt squeegees for the sign industry, and felt gaskets and washers for the bearing and seal industry.
Fishpaper Fish Paper Armite® Vulcanex® Peerless®	Vulcanized Fibre Electrical Grade	---	---	---	-184°F to 239°F	---	---	Low to Moderate	**FishPaper** is one of the first "plastics" ever developed. It is a strong, yet light weight paperboard insulation known for its excellent electrical insulating properties. FishPaper retains its strength and resilience at a range of low to high temperatures. **Advantages**: Excellent electrical and insulating properties. High tensile and tear strength. It is UL-recognized and rated UL94-HB. **Limitations**: Fishpaper is hygroscopic unless coated.

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Gasket Sheet Garlock® Klinger® Armstrong® Vellumoid®	Synthetic Fiber with Polymer Binder	---	---	---	Dependent on Compound	Dependent on Compound	Dependent on Compound	Low to Moderate	**General application gasketing** materials are designed to meet virtually any fluid sealing need. **Compressed Inorganic Fiber gasketing** is used for steam, load bearing and chemical resistance. **Carbon Fiber gasketing** is used in high temperature and internal pressure with good steam and chemical resistance. **Chemical Resistant gasketing** is used in Caustic and Acid environments. **Neoprene, Nitrile & SBR binder gasketing** have the benefits of the base polymers with good anti stick properties. **Metal reinforced gasketing** is used in high temperature, high load, vibration, & stress environments. **Flexible Graphite** can be used alone or bonded to Stainless Steel Foil and has low gas permeability, low electrical resistance and excellent anti-stick and high compressibility. **Milam Laminate** gasketing is suitable for use in hot, dry gas applications such as exhaust manifolds, turbines, turbo chargers and air heat exchangers. **Vegetable Fiber Gasketing is used for** low cost gaskets to seal in low pressure, low temperature applications.
Grafoil® Thermoseal®	Flexible Graphite	---	---	---	-400°F to 750°F	---	---	Moderate	**Flexible Graphite** is a fluid sealing material comprised of natural graphite flake. Its resistance to heat, fire, corrosion and aggressive chemicals make it a perfect gasket material for sealing in harsh environments.
Kapton®	Polymide Film	---	---	---	-452°F to 752°F	---	---	Moderate	**Kapton®** film is used where extremes of heat and vibration are the norm. Used as the primary electrical insulation in aerospace applications, Kapton film provides high temperature resistance as well as weight and space savings.
Mylar®	Polyester film				to 440°F				**Mylar®** Polyester film is preferred whenever an industrial application calls for an economical, fast, durable product with excellent heat resistance.
Nomex® Paper	Meta-Aramid Polymer	---	---	---	to 400°F	---	---	Moderate	**Nomex®** flame resistant paper has excellent thermal, chemical and radiation resistance. Used in electrical laminates such as circuit boards and transformer cores. Nomex helps improve electrical equipment performance, reliability and service life.

Common or Trade Names	Chemical Name	ASTM D1418 Designation	ASTM D2000 SAE J200 Class or Type	MIL-R-3065 (MIL-STD-417) Classification	General Temperature Range	Recommended Shelf Life* in Years per SAE ARP 5316	Mil-HDBK-695D	Relative Cost	General Characteristics and Uses
Polyethylene High Density	Polyethylene Thermoplastic	HDPE	---	---	-148° to 230°F	Unlimited per PCIA	---	Low	**HDPE** is a rigid polyethylene thermoplastic known for its large strength to density ratio. Used for many food related products with FDA, NSF, and USDA approved for direct contact. (depending on grade). It is commonly used in plastic bottles, geomembranes and plastic lumber. **Advantages**: Good impact resistance, light weight, very low moisture absorption and high tensile strength. HDPE performs well in dilute and concentrated Acids, Alcohols and Bases. **Limitations**: Not a good candidate for gluing. Preferably joined by hot air, ultrasonic or infrared welding. Not auctoclavable. Poor UV resistance. HDPE does poorly in halogenated hydrocarbons and oxidizing agents.
Polyethylene Low Density	Polyethylene Thermoplastic	LDPE	---	---	-58°F to 176°F	Unlimited per PCIA	---	Low	**LDPE** is a flexible polyolefin thermoplastic that is robust enough to be virtually unbreakable while maintaining good flexibility. **Advantages**: Excellent flexibility. LDPE performs well in dilute and concentrated Acids, Alcohols and Bases. LDPE has limited resistance to Aliphatic and Aromatic Hydrocarbons, Mineral Oils and Oxidizing agents. **Limitations**: Poor UV resistance. LDPE does poorly in Halogenated Hydrocarbons.
Poron®	Polyurethane Foam	PUR PU	---	---	-292°F to 294°F	3 per Manufacturer	---	Low to Moderate	**Poron®** is a durable, flexible microcellular urethane that die cuts cleanly and interacts well with a large number of adhesives. It offers a broad range of design solutions for gasketing, sealing, vibration, sound dampening and energy absorption and are ideal for use in communications, automotive, electronics and other industrial device applications. **Thickness range**: .012" to.500" **Firmness**: Extra soft to very firm. **Advantages**: Poron® features Low compression set; low outgassing and non fogging; flame retardant per UL HBF and MVSS 302 requirements. **Limitations**: While Poron may appear to look like a closed cell foam, it is
Sponge Rubber Closed Cell	Closed Cell Expanded Rubber Various Polymers	---	---	---	Dependent on Compound	Dependent on Compound	Dependent on Compound	Moderate	**Closed Cell Sponge Rubber** is used in many gasket applications dependent on polymer base and density. Used in water sealing applications and with low compression set requirements. Physical characteristics vary dependent on polymer. **Polymers**: Neoprene, EPDM, Epichlorhydrin, SBR, Silicone, Vinyl and blends of each.
Sponge Rubber Open Cell	Open Cell Expanded Rubber Various Polymers	---	---	---	Dependent on Compound	Dependent on Compound	Dependent on Compound	Moderate	**Open Cell Sponge Rubber** is used where a good compression set resistance is required. Physical characteristics vary dependent on polymer. **Polymers**: Neoprene, SBR, Nitrile, and blends of each.

Common or Trade Names	Chemical Name	ASTM D1418 Designation	ASTM D2000 SAE J200 Class or Type	MIL-R-3065 (MIL-STD-417) Classification	General Temperature Range	Recommended Shelf Life* in Years per SAE ARP 5316	Recommended Shelf Life* in Years per Mil-HDBK-695D	Relative Cost	General Characteristics and Uses
Sil-Pad® Gap-Pad®	Thermal Interface Materials	---	---	---	-76°F to 356°F	---	---	High	**Sil-Pad®** thermally conductive insulators are reinforced with Fiberglass or Kapton and are a clean and efficient alternative to mica, ceramics or grease for a wide range of electronic applications to electrically isolate power sources from heat sinks. Typical applications include power supplies, power semiconductors, and motor controls. **Advantages:** Excellent thermal performance; Low mounting pressures Available with or without pressure sensitive adhesive (PSA). Flame rated to UL94V-O. **Limitations**: High cost
Teflon®	Tetralfluoroethylene	FEP, PTFE	---	---	-300°F to 450°F	Unlimited per DuPont	---	High	**Teflon®** is a chemically inert (inactive or non-reactive) polymer that can handle a wide range of temperatures. Teflon can be filled with many fillers to improve specific physical properties such as glass, carbon, graphite, bronze, Molybdenum disulfide (MoS2) and polyimide among others. **Advantages**: Low Friction, and impact resistant. Chemically resistant to most industrial chemicals. PTFE performs well in Ozone, Solvents (MEK, acetone, xylene), and in weather. **Limitations**: PTFE does not possess a good elastic memory at or below normal temperatures and is subject to creep (cold flow). It may need to be heated to facilitate installation. It has poor cut and tear resistance. PTFE does not perform well in Gaseous fluorine, Highly fluoridated greasing oils, Melted alkali metals (sodium and potassium).
Thermoplastics Santoprene® Sarlink® Kraton® Geolast ®	Thermoplastic Rubber Elastomer Vulcanizate	TPR TPE TPV	AA, BA, BC, CA	---	-50°F to 275°F	Dependent on Compound	Dependent on Compound	Moderate	**Thermoplastic Rubber** is a diverse family of materials that have rubber-like characteristics and that can be processed and recycled like Plastics. TPE is used in automotive, construction, medical, food and beverage, electrical, appliance and consumer electronic industries. **Advantages**: Environmental resistance comparable to EPDM Faster processing than thermoset rubber. **Limitations**: Difficult to bond. Generally lower physical properties compared to organic rubber compounds.

* Per SAE ARP 5316 Rev B 2002-11 and MIL-HDBK-695D May,2005. These documents and above guidelines do not establish limitations or storage times for assembled components for the estimated or actual shelf, storage or operation life of said components.

The estimated or actual shelf, storage or operating life of said components is up to the End User to determine based upon their specific applications. Ames Rubber Manufacturing supplies these guidelines as a free service and assumes no liability for their use.

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