

7	ADDED VESPEL SP-22 TO LIST OF EXEMPT PLASTICS. DATA IN REMARKS AND APPLICABLE SPECIFICATIONS COLUMN FOR VESPEL SP-21 WAS "MAXIMUM FILL 50% BY WEIGHT". CHANGE PER SWR XJCRW50100. <i>J.L.M. 2/27/04</i> <i>T.D.S. 2/25/04</i> (RES T1-3251)	ISSUED/CEF MAR 05 2004 3/4/04 <i>ZMS</i> 3/1/04 <i>SDM</i>				
6	FOR PARA. 2.0, CHANGED "TO THE LIMITS SPECIFIED IN SECTION 5.0" TO "AND SPECIFIES THE USE PARAMETERS UNDER WHICH THE EXEMPTION APPLIES". FOR PARA. 4.1.1, CHANGED "APPROVED FOR USE IN LOX SYSTEMS FOR PRESSURE" TO "EXEMPT FROM BATCH TESTING WHEN USED IN LOX SYSTEMS AT PRESSURES" AND CHANGED "APPROVED FOR USE FOR GAS PRESSURE" TO "EXEMPT FROM BATCH TESTING WHEN USED IN GOX SYSTEMS AT PRESSURES". RENUMBERED "MATERIAL SELECTION LIST" FROM SECTION 5.0 TO 6.0. DIRECT DRAWING CHANGE PER SWR J1DOT90002.  T.D.S. 10/4/99 MAM 10/29/99 (RES T2-2378)	ISSUED/CEF 11/1/99 11/1/99 W.W.S. S.D.M.	4	ADDED 54000-GM09 TO SECTION 3.1 AND MATERIAL CODE P09. ADDED SECTION 4.4 AND 4.5. CHANGED LOX RATING PRESSURE TO EQUAL THE GOX RATING PRESSURE FOR MATERIAL CODES M25, P01, P03, P06, P29, P12, P32, P13, P04, P33, P02, P09, PS1, AND PS2. DIRECT DRAWING CHANGE PER SWR JMFGFCE824. F.L.R. 6/19/98 (RES T1-2225) M.A.M. 6/22/98 C. ADCOX 6/19/98	ISSUED/CEF 6/22/98 W.W.S. 6/22/98 S.D.M. 6/22/98	
			3	REVISED IN ITS ENTIRETY TO INCORPORATE KENNEDY SPACE CENTER MATERIAL SELECTION LIST 79K09560 AND 79K09561. DIRECT DRAWING CHANGE BY NASA PER SWR JMFGFCE800. W.W.S. 5/1/98 T.D.S. 4/29/98	ISSUED/CEF 5/1/98 S.D.M. 5/1/98	
5	REPLACED PCTFE SPECIFICATION SAE AMS 3646 WITH SAE AMS 3645 IN SECTION 3.1; ADDED MATERIAL DESCRIPTION & P.O. NUMBER TO THE "CERTIFICATE OF CONFORMANCE" REQUIREMENTS IN SECTION 4.2.1; ADDED NEW LINE 4.4-E - "SSC PART NUMBER (IF APPLICABLE)"; CHANGED "RAW STOCK" TO "MOLDED MATERIAL" AND ADDED "RAW MATERIAL" IN SECTION 4.4-F; ADDED "(CURE DATE)" TO LINE 4.4-G; ADDED NEW SECTION 5.0; FOR MATERIAL CODE P09, a) DELETED ALL TRADE NAMES, b) DELETED MATERIAL CLASS "FOR SHEET PRODUCTS, APPLICABLE SPECIFICATION IS:" & ITS APPLICABLE SPECIFICATION "AMS 3646", c) ADDED MATERIAL CLASS FOR "RAW MATERIAL" AND d) ADDED MATERIAL CLASS FOR "COMPRESSION MOLDED MATERIAL" & ITS APPLICABLE SPECIFICATIONS; ADDED MATERIAL CODE P09.1. DIRECT DWG. CHANGE PER SWR JMFGFCE800 T.D.S. 9/21/98 F.L.R. 9/18/98 D.P.D. 9/23/98 (RES T1-2252)	ISSUED/CEF 9/24/98 9/23/98 W.W.S. S.D.M.	2	ADDED 54000-GM30-7 AND FLAGNOTES 3 AN 4. SCD WAS REVISED AND REDRAWN IN ITS ENTIRETY AND INC. ARN 1A PER FSR J1DOGPW351. MAM 9/16/93 C. ADCOX 9/16/93  CHANGED TEMP. LIMITS ON -2 THRU -5 ASSY'S. FROM "AMBIENT" TO "-297" TO 150°F. ADDED DUPONT'S GREASE. KRYTOX 240AC (54000-GM30-6). SCD REDRAWN IN ITS ENTIRETY PER J3P1P002. H. LEE 12-4-90	ISSUED/CEF 11/8/93 S.D.M. 10/28/93 ISSUED/CEF 2-4-91 S.D.M.	
SYM ZONE		DESCRIPTION		DATE	APPROVED	
REVISIONS						
SIGNATURE		DATE		NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  JOHN C. STERNIS SPACE CENTER SSC, MS 39529-6000		
DRAWN BEVERLY GARCIA		8-31-89		SPECIFICATION FOR MATERIALS USED IN LOX AND GOX SERVICE EXEMPT FROM BATCH TEST REQUIREMENTS		
CHECKED RON MITCHELL		8-31-89				
ENGINEER MIKE MOSLEY		9-27-90				
ISSUED CEF		10-12-89				
SUBMITTED B. McSPADDEN		9-28-89				
NASA SAFETY						
APPROVED S.D. McCARTY		10-12-89		SIZE B DWG. NO. 54000-GM30 AUTHORITY J9F0S005	REV. 7 SHEET 1 OF 9	
CADD CONTROLLED DRAWING CADD P/N: SCD/54000/GM30R7/SHT1		54000-0001				

COPIED CEF  
 DATE: 3/5/04  
 "VERIFY THAT THIS IS  
 THE CORRECT VERSION  
 BEFORE USE"

.0 SERVICE CONDITIONS

LIQUID OXYGEN AND GASEOUS OXYGEN

.0 SCOPE

THIS SPECIFICATION LISTS THE MATERIALS USED IN LIQUID AND GASEOUS OXYGEN SERVICE THAT ARE EXEMPT FROM THE BATCH TEST REQUIREMENTS IN NASA-STD-6001 AND SPECIFIES THE USE PARAMETERS UNDER WHICH THE EXEMPTION APPLIES.

.0 DOCUMENTATION.1 REFERENCED DOCUMENTS

THE LATEST ISSUE OF THE FOLLOWING DOCUMENTS FORM A PART OF THIS DRAWING TO THE EXTENT SPECIFIED HEREIN.

A-A-58092 TAPE, ANTISEIZE, POLYTETRAFLUORETHYLENE

ASTM D1430 STANDARD SPECIFICATION FOR POLYCHLOROTRIFLUOROETHYLENE (PCTFE) PLASTICS

ASTM D2116 STANDARD SPECIFICATION FOR FEP - FLUOROCARBON MOLDING AND EXTRUSION MATERIALS

ASTM D3293 STANDARD SPECIFICATION FOR PTFE RESIN MOLDED SHEET

ASTM D3308 STANDARD SPECIFICATION FOR PTFE RESIN SKIVED TAPE

ASTM D3369 STANDARD SPECIFICATION FOR POLYTETRAFLUOROETHYLENE (PTFE) RESIN CAST FILM

ASTM D4894 STANDARD SPECIFICATION FOR POLYTETRAFLUOROETHYLENE (PTFE) GRANULAR MOLDING AND RAM EXTRUSION MATERIALS

ASTM D4895 STANDARD SPECIFICATION FOR POLYTETRAFLUOROETHYLENE (PTFE) RESIN PRODUCED FROM DISPERSION

MIL-T-27730 TAPE, ANTISEIZE, POLYTETRAFLUOROETHYLENE, WITH DISPENSER (SUPERSEDED BY A-A-58092)

NASA-STD-6001 FLAMMABILITY, ODOR, OFFGASSING, AND COMPATIBILITY REQUIREMENTS AND TEST PROCEDURES FOR MATERIALS IN ENVIRONMENTS THAT SUPPORT COMBUSTION (PREVIOUSLY NHB 8060.1C)

SAE AMS 3645 POLYCHLOROTRIFLUOROETHYLENE (PCTFE), COMPRESSION MOLDED, HEAVY SECTIONS, UNPLASTICIZED

SAE AMS 3647 POLYFLUOROETHYLENE-PROPYLENE FILM AND SHEET (FEP)

SAE AMS 3657 POLYTETRAFLUOROETHYLENE EXTRUSIONS, PREMIUM STRENGTH, AS SINTERED

SAE AMS 3658 POLYTETRAFLUOROETHYLENE EXTRUSIONS, PREMIUM STRENGTH, SINTERED AND STRESS-RELIEVED, RADIOGRAPHICALLY INSPECTED

SAE AMS 3659 POLYTETRAFLUOROETHYLENE EXTRUSIONS, PREMIUM STRENGTH, SINTERED AND STRESS-RELIEVED

SAE AMS 3668 POLYTETRAFLUOROETHYLENE (PTFE) MOLDINGS, PREMIUM GRADE, AS SINTERED

SAE AMS 3669 POLYTETRAFLUOROETHYLENE SHEET, MOLDED, PREMIUM GRADE, AS SINTERED

SSC PTD-01-E22 MATERIAL AND PROCESS CONTROL OF CRITICAL PROPULSION FACILITIES AND SYSTEMS

SSC 54000-GM08 SPECIFICATION FOR PROCUREMENT OF VIRGIN FEP TEFLON BAGGING AND PACKAGING MATERIAL

SSC 54000-GM09 SPECIFICATION FOR PROCUREMENT OF POLYCHLOROTRIFLUOROETHYLENE (ACLAR 22A) BAGGING AND PACKAGING MATERIAL

3.2 APPLICABLE DOCUMENTS

THOUGH NOT REFERENCED IN THIS DRAWING, THE FOLLOWING DOCUMENTS CONTAIN OXYGEN COMPATIBILITY REQUIREMENTS, TEST METHODS AND TEST RESULTS THAT ARE APPLICABLE TO THIS DRAWING.

SSC STD 79-010 SSC REQUIREMENTS FOR MATERIALS USED IN LOX/GOX SERVICE

NSS 1740.15 SAFETY STANDARD FOR OXYGEN AND OXYGEN SYSTEMS, GUIDELINES FOR OXYGEN SYSTEM DESIGN, MATERIALS SELECTION, OPERATIONS, STORAGE, AND TRANSPORTATION, NASA, OFFICE OF SAFETY AND MISSION ASSURANCE, WASHINGTON, DC 20546.

MSFC-HDBK-527 MATERIALS SELECTION LIST FOR SPACE HARDWARE SYSTEMS

ASTM D2512 STANDARD TEST METHOD FOR COMPATIBILITY OF MATERIALS WITH LIQUID OXYGEN (IMPACT SENSITIVITY THRESHOLD AND PASS-FAIL TECHNIQUES)

ASTM G 63 GUIDE FOR EVALUATING NONMETALLIC MATERIALS FOR OXYGEN SERVICE

ASTM G 74 STANDARD TEST METHOD FOR IGNITION SENSITIVITY OF MATERIALS TO GASEOUS FLUID IMPACT

ASTM G 86 TEST METHOD FOR DETERMINING IGNITION SENSITIVITY OF MATERIALS TO MECHANICAL IMPACT IN PRESSURIZED OXYGEN ENVIRONMENTS

ASTM G 88 GUIDE FOR DESIGNING SYSTEMS FOR OXYGEN SERVICE

ASTM G 94 GUIDE FOR EVALUATING METALS FOR OXYGEN SERVICE

ASTM G 126 TERMINOLOGY RELATING TO THE COMPATIBILITY AND SENSITIVITY OF MATERIALS IN OXYGEN ENRICHED ATMOSPHERES

ASTM G 128 GUIDE FOR CONTROL OF HAZARDS AND RISKS IN OXYGEN ENRICHED SYSTEMS

## 3.3 HISTORICAL DOCUMENTS

THE INFORMATION CONTAINED IN SECTION 6.0 OF DRAWING 54000-GM30 REV. 3 WAS BASED ON REVISION 2 AND THE FOLLOWING KENNEDY SPACE CENTER MATERIAL SELECTION LISTS:

79K09560 MATERIAL SELECTION LIST FOR LIQUID OXYGEN SERVICE  
79K09561 MATERIAL SELECTION LIST FOR GASEOUS OXYGEN AND AIR SERVICE

DOCUMENTATION TO SUPPORT SUBSEQUENT CHANGES IS MAINTAINED BY THE MATERIALS AND PROCESSES CONTROL TEAM IN ACCORDANCE WITH SSC PTD 01-E22.

## 4.0 REQUIREMENTS

4.1 MATERIAL RATING. SECTION 6.0 LISTS THOSE MATERIALS THAT HAVE BEEN DETERMINED TO BE COMPATIBLE WITH LOX AND/OR GOX USING NASA-STD-6001 CRITERIA. RATINGS INDICATE THE FOLLOWING:

## 4.1.1 "A" RATING.

MATERIALS RATED "A" FOR LOX ARE EXEMPT FROM BATCH TESTING WHEN USED IN LOX SYSTEMS AT PRESSURES NOT EXCEEDING THAT SHOWN AND TEMPERATURES NOT EXCEEDING -275°F (-171°C). MATERIALS RATED "A" FOR GOX ARE EXEMPT FROM BATCH TESTING WHEN USED IN GOX SYSTEMS AT PRESSURES NOT EXCEEDING THAT SHOWN AND TEMPERATURES NOT EXCEEDING 160°F (71°C). BATCH TESTING IS REQUIRED FOR ANY "A" RATED MATERIAL WHEN USED AT A PRESSURE HIGHER THAN SHOWN IN SECTION 6.0 OR TEMPERATURES EXCEEDING 160°F (71°C) FOR GOX OR -275°F (-171°C) FOR LOX.

MATERIALS LISTED BY TRADE NAME. WHEN AN "A" RATED MATERIAL IS IDENTIFIED BY TRADE NAME (E.G., HALOCARBON GREASE) THE LISTED TRADE NAME MATERIAL IS EXEMPT FROM THE REQUIREMENTS FOR BATCH TESTING FOR PRESSURES NOT EXCEEDING THAT SHOWN. IF A SPECIFIC MATERIAL IS LISTED. (E.G., HALOCARBON 25-5S GREASE) ONLY THAT SPECIFIC MATERIAL IS EXEMPT. UNLISTED TRADE NAME MATERIALS WITH THE SAME COMPOSITION AS LISTED TRADE NAME MATERIALS MUST BE QUALIFIED BY BATCH TESTING UNLESS PURCHASED TO A LISTED SPECIFICATION.

MATERIALS LISTED BY SPECIFICATION. WHEN ONE OR MORE APPLICABLE SPECIFICATIONS ARE LISTED UNDER THE "REMARKS" HEADING OF THE TABLE, MATERIALS PURCHASED AND CERTIFIED TO MEET THE REQUIREMENTS OF ONE OF THE SPECIFICATIONS LISTED ARE EXEMPT FROM BATCH TESTING FOR PRESSURES NOT EXCEEDING THAT SHOWN.

## 4.1.2 "B.T." RATING.

MATERIALS RATED "B.T." (BATCH TEST) ARE APPROVED FOR USE IN OXYGEN SYSTEMS PROVIDED THAT EACH BATCH OR LOT OF THE PRODUCT IS INDIVIDUALLY TESTED AND MEETS THE ACCEPTANCE CRITERIA OF NASA-STD-6001, TESTS 13A (LOX) AND/OR TEST 13B (GOX AND LOX) AS APPROPRIATE.

## 4.1.3 "C" RATING.

MATERIALS RATED "C" ARE NOT NORMALLY USED IN OXYGEN SYSTEMS AND/OR HAVE NOT BEEN EVALUATED FOR USE IN OXYGEN.

4.2 MATERIAL CERTIFICATION. MATERIAL ORDERED FOR USE IN OXYGEN SERVICE SHALL BE CERTIFIED BY THE VENDOR FOR USE IN OXYGEN SYSTEMS BY ONE OF THE FOLLOWING METHODS:

## 4.2.1 CERTIFICATE OF CONFORMANCE FOR "A" RATED MATERIAL.

THE SUPPLIER OF ANY MATERIAL ORDERED FOR USE IN OXYGEN SERVICE THAT IS EXEMPT FROM BATCH TESTING MUST PROVIDE A "CERTIFICATE OF CONFORMANCE" WITH THE MATERIAL.

MATERIALS LISTED BY TRADE NAME. FOR "A" RATED MATERIALS LISTED BY TRADE NAME, THE SUPPLIER'S "CERTIFICATE OF CONFORMANCE" SHALL INCLUDE A DESCRIPTION OF THE MATERIAL WITH P.O. NUMBER REFERENCE, PLUS THE MATERIAL'S TRADE NAME AND CHEMICAL NAME. WHEN THE MATERIAL CONSISTS OF TWO OR MORE COMPONENTS, THE CHEMICAL NAME AND PERCENTAGE BY WEIGHT (OR VOLUME) OF EACH OF THE COMPONENTS MUST BE PROVIDED. FOR EXAMPLE, "WE CERTIFY THE MATERIAL OF THE SEAT INSERTS (P/N XXXXX) FURNISHED PER P.O. XXXXX IS HOSTAFLOX TFM 4215, A CARBON FILLED POLYTETRAFLUOROETHYLENE (PTFE), 25% CARBON BY WEIGHT."

MATERIALS LISTED BY SPECIFICATION. WHEN AN "A" RATED MATERIAL IS ORDERED PER APPLICABLE SPECIFICATION(S), THE SUPPLIER'S "CERTIFICATE OF CONFORMANCE" SHALL INCLUDE A DESCRIPTION OF THE MATERIAL WITH P.O. NUMBER REFERENCE, PLUS THE MATERIAL'S CHEMICAL NAME AND THE STATED SPECIFICATION(S). SPECIFIC DETAILS (TYPE, GRADE, CONDITION, ETC.) OF THE MATERIAL MUST ALSO BE PROVIDED WHEN THE STATED SPECIFICATION COVERS MORE THAN ONE TYPE OF MATERIAL. FOR EXAMPLE, "WE CERTIFY THE MATERIAL OF THE 1/2" ROD FURNISHED PER P.O. XXXXX IS POLYCHLOROTRIFLUOROETHYLENE (PCTFE), MEETING THE REQUIREMENTS OF ASTM D1430 TYPE I GRADE 3 HOMOPOLYMER AND THE REQUIREMENTS OF SAE AMS-3645."

## 4.2.2 PACKING SLIP AND MSDS.

FOR MATERIALS RATED "B.T." THE VENDOR SHALL INDICATE ON THE SHIPPING DOCUMENTATION THE FOLLOWING INFORMATION (AS APPLICABLE): TRADE NAME, CHEMICAL NAME, PERCENTAGE BY WEIGHT OR VOLUME OF EACH COMPONENT, SPECIFICATION, LOT AND/OR BATCH NUMBER, SIZE AND FORM, AND QUANTITY. MATERIAL SAFETY DATA SHEETS (MSDS) SHALL BE PROVIDED FOR ALL MATERIALS TO BE BATCH TESTED.

## 4.3

VARIANCES. MATERIALS NOT LISTED MAY BE USED PROVIDED THEY HAVE BEEN EVALUATED IN ACCORDANCE WITH NASA-STD-6001, TEST 13 [MECHANICAL IMPACT FOR MATERIALS IN AMBIENT PRESSURE LOX (TEST 13A) AND MECHANICAL IMPACT FOR MATERIALS IN VARIABLE PRESSURE GOX AND LOX (TEST 13B)]. VARIANCES FROM THE CRITERIA OF THIS DOCUMENT AND NASA-STD-6001 SHALL BE APPROVED IN ACCORDANCE WITH SSC PTD-01-E22. THE MATERIALS USAGE AGREEMENT FORM FROM PTD-01-E22 SHALL BE USED TO DOCUMENT VARIANCES AND USAGE OF MATERIALS NOT LISTED.

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- 4.4 IDENTIFICATION. THE VENDOR SHALL ATTACH THE FOLLOWING INFORMATION TO MATERIAL ORDERED PER THIS SPECIFICATION FOR USE IN OXYGEN SERVICE.
- A. PURCHASE ORDER NUMBER
  - B. MATERIAL CERTIFICATION (PER SECTION 4.2)
  - C. MANUFACTURER OF DELIVERED PRODUCT
  - D. VENDOR PART NUMBER (OR PART DESCRIPTION IF VENDOR P/N IS NOT AVAILABLE)
  - E. SSC PART NUMBER (IF APPLICABLE)
  - F. LOT AND/OR BATCH NUMBER FOR:
    - RAW MATERIAL (POWDER, PELLETS, ETC.)
    - MOLDED MATERIAL (SHEETS, RODS, CYLINDERS, ETC.)
    - FINISHED PRODUCTS (PIECE PARTS) WHEN REQUESTED BY PURCHASE ORDER
  - G. DATE OF MANUFACTURE (CURE DATE)
- 4.5 QUALITY REQUIREMENTS FOR ELASTOMERS AND PLASTICS
- 4.5.1 NO INK OR DYE STAMPING OR COLORING PIGMENTS WILL BE PERMITTED IN OR ON THE MATERIAL OR FINISHED PART.
- 4.5.2 LOCALIZED SURFACE SCRATCHES, IMPERFECTIONS, OR FOREIGN BODIES FOUND IN MATERIAL WILL BE CAUSE FOR REJECTION. MATERIAL SHALL BE FREE OF VOIDS, FISSURES, FOREIGN INCLUSIONS OR BUBBLES. RAW STOCK SHALL CONTAIN NO DEFECTS THAT WILL PREVENT FABRICATION OF A VOID-FREE PART.
- 4.5.3 MATERIALS THAT FAIL TO MEET THE REQUIREMENTS OF THIS SPECIFICATION SHALL BE RETURNED TO THE VENDOR AT NO COST TO THE GOVERNMENT.
- 5.0 QUALITY ASSURANCE (SSC ONLY)
- 5.1 UPON RECEIPT OF MATERIALS THAT MEET THE REQUIREMENTS OF THIS SPECIFICATION, QUALITY ASSURANCE SHALL INITIATE A CERTIFICATION/TRACEABILITY INSPECTION RECORD (CTIR) FOR EACH ITEM, AND SHALL INSURE THAT EACH ITEM IS PACKAGED INDIVIDUALLY WITH ITS RESPECTIVE CTIR.
- 5.2 FOR ALL "B.T." RATED MATERIALS AND FOR THOSE "A" RATED MATERIALS WITH USE PRESSURES OR TEMPERATURES EXCEEDING THE LIMITATIONS OF THIS SPECIFICATION, TEST SAMPLES MUST BE PROCURED AND PROCESSED FOR OXYGEN COMPATIBILITY IMPACT TESTING IN ACCORDANCE WITH TP-0133A.

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NOTICE: THE GOVERNMENT DRAWINGS, SPECIFICATIONS, AND/OR DATA ARE PREPARED FOR THE OFFICIAL USE BY, OR ON THE BEHALF OF, THE UNITED STATES GOVERNMENT. THE GOVERNMENT NEITHER WARRANTS THESE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, NOR ASSUMES ANY RESPONSIBILITY OR OBLIGATION, FOR THEIR USE FOR PURPOSES OTHER THAN THE GOVERNMENT PROJECT FOR WHICH THEY WERE PREPARED AND/OR PROVIDED BY THE GOVERNMENT, OR AN ACTIVITY DIRECTLY RELATED THERETO. THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED, BY IMPLICATION OR OTHERWISE, AS LICENSING IN ANY MANNER THE HOLDER OR ANY OTHER PERSON OR CORPORATION, NOR CONVEYING THE RIGHT OR PERMISSION, TO MANUFACTURE, USE, OR SELL PATENTED INVENTION THAT MAY RELATE THERETO.

## 6.0 MATERIAL SELECTION LIST FOR OXYGEN SYSTEMS

CODE	MATERIAL CLASS OR CHEMICAL NAME	TRADE NAME	MANUFACTURER	LOX RATING (PSIG)	GOX RATING (PSIG)	REMARKS AND APPLICABLE SPECIFICATIONS
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## ELASTOMERS

E01	FLUOROELASTOMER	VITON FLUOREL	E.I. DUPONT 3M COMPANY	C	A≤1650	
E08	PERFLUOROELASTOMER	KALREZ CHEMRAZ	E.I. DUPONT GREENE, TWEED & CO.	C	A≤1650	

## LUBRICANTS

L06	PERFLUOROPOLYALKYLETHER (PFPAE) OIL	KRYTOX 143AC FOMBLIN Y06 FOMBLIN Y16 BRAYCO 815Z OIL	E.I. DUPONT AUSIMONT, INC. AUSIMONT, INC. CASTRO NORTH AMERICA	A≤1500	A≤6700	ALSO CALLED PERFLUOROPOLYETHER (PFPE) PERFLUOROALKYLETHER (PFAE)
L01.1	PFPAE OIL WITH PTFE THICKENER	KRYTOX 240AC GREASE BRAYCOTE 640AC GREASE	E.I. DUPONT CASTROL NORTH AMERICA	A≤10000	A≤10000 (TO +550° F)	
L01.1	PERFLUOROPOLYALKYLETHER (PFPAE) GREASE (PTFE THICKENER)	BRAYCOTE 600EF TRIBOLUBE 16 BRAYCOTE 601EF	CASTROL NORTH AMERICA AEROSPACE LUBRICANTS, INC. CASTROL NORTH AMERICA	A≤1500	A≤6700	
L01.2	PERFLUOROPOLYALKYLETHER (PFPAE) GREASE	TRIBOLUBE 10C CHRISTO-LUBE BRAYCOTE 806	AEROSPACE LUBRICANTS, INC. LUBRICATION TECHNOLOGY, INC. CASTROL NORTH AMERICA	B.T.	A≤1650	
L05	LOX PUMP OIL		KSC BLENDED	A≤1500	B.T.	KSC SPECIFICATION 79K22280
L09	POLYCHLOROTRIFLUORETHYLENE (PCTFE) OIL	HALOCARBON FLUOROLUBE	HALOCARBON PRODUCTS CO. OCCIDENTAL CHEMICAL CORP.	A≤1500	A≤1650	

CODE	MATERIAL CLASS OR CHEMICAL NAME	TRADE NAME	MANUFACTURER	LOX RATING (PSIG)	GOX RATING (PSIG)	REMARKS AND APPLICABLE SPECIFICATIONS
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## LUBRICANTS

L08	PCTFE/SILICA THICKENED OR PCTFE/PCTFE POLYMER THICKENED GREASE	HALOCARBON FLUOROLUBE	HALOCARBON PRODUCTS CO. OCCIDENTAL CHEMICAL CORP.	B.T.	A≤1650	
L08.1	PCTFE/SILICA THICKENED GREASE	HALOCARBON 25-5S GREASE	HALOCARBON PRODUCTS CO.	A≤400	A≤1650	
L10		DRILUBE 701, DRILUBE 703, DRILUBE 831, DRILUBE 842	DRILUBE COMPANY	B.T.	A≤1650	
L11	SOLID FILM LUBRICANT	EVERLUBE 812 MICROSEAL 200-1	E/M CORPORATION	A≤1500	A≤6700	
L12	SOLID DRY FILM LUBRICANT WITH MOLYBDENUM DISULFIDE	TIOLUBE 1175	TIODIZE CO.	A≤1500	A≤1650	
L13	DRY FILM LUBRICANT	DOW CORNING LUBRICANT 321	DOW CORNING CORP.	A≤1500	A≤1050	DISPERSION OF MoS <sub>2</sub> , GRAPHITE AND RESIN IN A SOLVENT (CURES TO A DRY LUBRICATING FILM)

## MISCELLANEOUS

M01	CARBON SEALS		ALL MANUFACTURERS	B.T.	A≤1650	
M25	PTFE/ELECTROLESS NICKEL COATING	NIFLOR	DRESSER INDUSTRIES, CAL. TECH. PLATING	A≤6700	A≤6700	
M26		FLUOROLON 325 COATING (0.001" THICKNESS)	SOUTHWEST IMPREGON, INC.	A≤500	A≤500	
M27	DYE PENETRANTS		ALL MANUFACTURERS	B.T.	B.T.	
M31	LEAK DETECTOR FLUID	SHERLOCK	WINTON PRODUCTS	A≤1500	A≤6700	

CODE	MATERIAL CLASS OR CHEMICAL NAME	TRADE NAME	MANUFACTURER	LOX RATING (PSIG)	GOX RATING (PSIG)	REMARKS AND APPLICABLE SPECIFICATIONS
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## PLASTICS

P01	POLYTETRAFLUOROETHYLENE (VIRGIN PTFE)	TEFLON TFE	E.I. DUPONT	A≤6700	A≤6700	AMS 3657, AMS 3658, AMS 3659 ASTM D3293, AMS 3668, AMS 3669  ASTM D4894, ASTM D4895  A-A-58092 OR MIL-T-27730  ASTM D3308  ASTM D3369
		TETRAFLUOR VIRGIN TEFLON	TETRAFLUOR, INC.			
		HALON	AUSIMONT, INC.			
		ALGOFLON	AUSIMONT, INC.			
		HOSTAFLON	HOECHST AG			
		FLUON	ICI AMERICAS, INC.			
	FOR EXTRUDED PRODUCTS, APPLICABLE SPECIFICATIONS ARE:.....	.....	.....	.....	.....	
	FOR MOLDED PRODUCTS, APPLICABLE SPECIFICATIONS ARE:.....	.....	.....	.....	.....	
	FOR RESINS, APPLICABLE SPECIFICATIONS ARE:.....	.....	.....	.....	.....	
	FOR ANTISEIZE TAPE, APPLICABLE SPECIFICATION IS:.....	.....	.....	.....	.....	
	FOR RESIN SKIVED TAPE, APPLICABLE SPECIFICATION IS:.....	.....	.....	.....	.....	
	FOR CAST FILM, APPLICABLE SPECIFICATION IS:.....	.....	.....	.....	.....	
P03	PTFE, GLASS FILLED	FLUOROGOLD GARLOCK 8573	FURON CO. GARLOCK, INC.	A≤6700	A≤6700	MAXIMUM FILL 50% BY WEIGHT
P06	PTFE, GLASS FILLED	ALGOFLON	AUSIMONT, INC.	A≤1650	A≤1650	MAXIMUM FILL 50% BY WEIGHT
		HALON	AUSIMONT, INC.			
		CHEMFLUOR	NORTON PERFORMANCE PLASTICS			
		RT/DUROID	ROGERS CORP.			
		TETRAFLUOR	TETRAFLUOR, INC.			
		TETRALON	TETRAFLUOR, INC.			
		POLYCOMP	ICI AMERICAS, INC.			
		HOSTAFLON	HOECHST AG			
	GARLOCK 9405	GARLOCK, INC.				
P29	PTFE, CARBON OR GRAPHITE-FILLED	HALON	AUSIMONT, INC.	A≤1650	A≤1650	MAXIMUM FILL 50% BY WEIGHT
		CHEMFLUOR	NORTON PERFORMANCE PLASTICS			
		TETRAFLUOR	TETRAFLUOR, INC.			
		HOSTAFLON	HOECHST AG			

CODE	MATERIAL CLASS OR CHEMICAL NAME	TRADE NAME	MANUFACTURER	LOX RATING (PSIG)	GOX RATING (PSIG)	REMARKS AND APPLICABLE SPECIFICATIONS
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## PLASTICS

P12	PTFE, MINERAL FILLED	RULON A HYPERLOX	DIXON CORP. SPECIALTY BALL VALVE	A≤6700	A≤6700	
P32	PTFE, CRYSTALLINE SILICA FILLED	GYLON 3502	GARLOCK, INC.	A≤1650	A≤1650	
M30	PTFE, BRONZE FILLED	HALON HOSTAFLOX FLUOROCOMP CHEMFLUOR TETRAFLUOR TETRALON	AUSIMONT, INC. HOECHST AG ICI AMERICAS, INC. NORTON PERFORMANCE PLASTICS TETRAFLUOR, INC. TETRAFLUOR, INC.	B.T.	A≤1650	MAXIMUM FILL 50% BY WEIGHT
M28	PTFE, COMBINED GRAPHITE AND GLASS FILLED	HALON TETRAFLUOR	AUSIMONT, INC. TETRAFLUOR, INC.	B.T.	A≤1650	MAXIMUM FILL 50% BY WEIGHT
P13	PTFE, CARBON, GLASS AND GRAPHITE FILLED	MULTIFILL 427 POLYFILL	GARLOCK INC. WORCESTER CONTROLS	A≤1650	A≤1650	
M29	PTFE, COMBINED GLASS AND MOLYDISULFIDE FILLED	HALON TETRAFLUOR RT/DUROID	AUSIMONT, INC. TETRAFLUOR, INC. ROGERS CORP.	B.T.	A≤1650	MAXIMUM FILL 50% BY WEIGHT
P04	PTFE, GLASS & CR OXIDE FILLED	FLUOROGREEN E-600	THE AMICON GROUP, UFC FLUOROGREEN DIVISION	A≤6700	A≤6700	
P33	EXPANDED PTFE GASKET MATERIAL	GORE-TEX JOINT SEALANT	W.L. GORE ASSOCIATES	A≤1650	A≤1650	
P02	PERFLUORO (ETHYLENE PROPYLENE) COPOLYMER (VIRGIN FEP)	TEFLON FEP NEOFLON FEP FLUOROMELT	E.I. DUPONT DAIKIN INDUSTRIES ICI AMERICAS, INC.	A≤6700	A≤6700	ASTM D2116 AMS 3647 SSC 54000-GM08
P07	PERFLUOROALKOXYALKANE	TEFLON PFA NEOFLON PFA FLUOROMELT	E.I. DUPONT DAIKIN INDUSTRIES ICI AMERICAS, INC.	B.T.	A≤1650	

CODE	MATERIAL CLASS OR CHEMICAL NAME	TRADE NAME	MANUFACTURER	LOX RATING (PSIG)	GOX RATING (PSIG)	REMARKS AND APPLICABLE SPECIFICATIONS
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## PLASTICS

P09	POLYCHLOROTRIFLUOROETHYLENE (PCTFE) FOR RAW MATERIAL (POWDER OR PELLET), THE APPLICABLE SPECIFICATION IS:..... FOR COMPRESSION MOLDED MATERIAL (SHEET, ROD, HEAVY WALL TUBING, PIECE PARTS, ETC.), APPLICABLE SPECIFICATIONS ARE:..... FOR BAGGING AND PACKAGING MATERIAL, SEE:.....	..... ..... .....	..... ..... .....	A≤1650 ..... ..... .....	A≤1650 ..... ..... .....	ASTM D1430 (TYPE I GRADE 3 ONLY)  ASTM D1430 (TYPE I GRADE 3 ONLY) AND AMS 3645 SSC 54000-GM09
P09.1	POLYCHLOROTRIFLUOROETHYLENE (PCTFE)	KEL-F 81	3M COMPANY	A≤1650	A≤1650	NO LONGER MANUFACTURED
P14	POLYIMIDE		ALL MANUFACTURERS	B.T.	B.T.	
P14.1	POLYIMIDE, GRAPHITE FILLED	VESPEL SP-21	E.I. DUPONT	B.T.	A≤1650	NOMINAL FILL 15% BY WEIGHT
P14.2	POLYIMIDE, GRAPHITE FILLED	VESPEL SP-22	E.I. DUPONT	B.T.	A≤10000	NOMINAL FILL 40% BY WEIGHT
P34	AMORPHOUS FLUOROPOLYMERS	TEFLON AF	E.I. DUPONT	B.T.	B.T.	

## PLASTIC HOSE LINERS AND PLASTIC COATINGS

PH1	HOSE LINER - POLYTETRAFLUOROETHYLENE		RESISTOFLEX AEROQUIP TITEFLEX	B.T.	A≤1650	SEE "POLYTETRAFLUOROETHYLENE (VIRGIN PTFE)" FOR LINER MATERIAL TRADE NAMES.
PH2	HOSE LINER - POLYTETRAFLUOROETHYLENE WITH CARBON ADDITIVE		RESISTOFLEX AEROQUIP TITEFLEX TELEFLEX	B.T.	A≤1650	SEE "PTFE, CARBON OR GRAPHITE-FILLED" FOR LINER MATERIAL TRADE NAMES.
PS1	POLYTETRAFLUOROETHYLENE COATED 300 SERIES STAINLESS STEEL			A≤1650	A≤1650	SEE "POLYTETRAFLUOROETHYLENE (VIRGIN PTFE)" FOR COATING MATERIAL TRADE NAMES AND SPECIFICATIONS.
PS2	PERFLUORO (ETHYLENE PROPYLENE) COPOLYMER COATED 300 SERIES STAINLESS STEEL			A≤1650	A≤1650	SEE "PERFLUORO (ETHYLENE PROPYLENE) (VIRGIN FEP)" FOR COATING MATERIAL TRADE NAMES AND SPECIFICATIONS.