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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE INFORMATION REPORT

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REV. B

AEROSPACE FLUID SYSTEM STANDARDS, METRIC, NATIONAL AND INTERNATIONAL

1.0 PURPOSE AND SCOPE

1.1 LIST OF METRIC STANDARDS

It is the purpose of this AIR to provide a listing of existing and forthcoming metric standards for aerospace fluid systems. It is shown which ISO/TC20 and ISO/TC131 or other ISO Technical Committee documents have been approved by the United States Technical Advisory Group (U.S. TAG) to TC20. This AIR also lists U.S. Aerospace accepted AECMA and international De-Facto standards, also the forthcoming standards being developed in ISO/TC20/SC10.

1.2 ORGANIZATION

Metric Aerospace Fluid System Standards are being prepared and coordinated for acceptance in TC20 by the Subcommittee 10 of TC20. The United States Subcommittee Advisory Group (U.S. SCAG) of this subcommittee functions in compliance with the Charter for the U.S. Technical Advisory Group for ISO/TC20 (SAE Organization and Operating Guide) and the American National Standards Institute's (ANSI) "Operating Procedure for the International Activities of the American National Standards Institute."

Depending on the subject matter, the work in the U.S. SCAG will be coordinated with the following industry organizations.

AIA/NASC	National Aerospace Standards Committee
SAE AE-5	Aerospace Fuel, Oil and Oxidizer System
SAE AC-9	Aircraft Environmental Systems
SAE A-6	Aerospace Fluid Power and Control Technologies
SAE A-10	Aircraft Oxygen Equipment
SAE G-4	Elastic Seals
SAE E-25	Engine and Propeller Standard Utility Parts
SAE AMS	Aerospace Materials Division
NFPA	National Fluid Power Association
RMA	Rubber Manufacturers Association

2.0 DEFINITIONS

Approved TC20 documents	- Coordinated and approved by the TC20 U.S. Technical Advisory Group and the SAE Aerospace Council.
Not Endorsed	- No record of coordination or approval status by the TC20 U.S. TAG.
Disapproved	- ISO documents not acceptable to TC20 U.S. TAG for Aerospace use.
Approved TC131 and other	- Non-TC20 international standards having been accepted for Aerospace use by the TC20 U.S. TAG. Any future revisions of such documents require TC20 U.S. SCAG concurrence for aerospace acceptance.

3.0 APPROVED METRIC FLUID SYSTEM STANDARDS

3.1 TC20 DOCUMENTS

3.1.1 APPROVED TC20 DOCUMENTS B

ISO 12	Aerospace—Pipelines—Identification Scheme
ISO 45	Aircraft—Pressure Refueling Connections
ISO 102	Aircraft—Gravity Filling Orifices
ISO 1034	Aircraft—Ground Air-Conditioning Connections
ISO 2434	Compressed Nonbreathing Air for Use in Aircraft
ISO 2563	Aircraft Ducting and Piping—Profile Dimensions for Flanges of V-band Couplings
ISO/TR 2685	Aircraft—Environmental Conditions and Test Procedures for Airborne Equipment—Resistance to Fire in Designated Fire Zones
ISO 2964	Aircraft—Tubing Outside Diameters and Thicknesses—Metric Dimensions
ISO 3174	Aircraft—Connections for Checking Hydraulic Systems by Ground Appliances
ISO 3323	Aircraft—Hydraulic Components—Marking To Indicate Fluid for Which Component Is Approved
ISO/DP 5859	Aerospace—Graphic Symbols for Aircraft Hydraulic and Pneumatic Systems (see ISO 1219)
ISO/DP 5884	Measurement of Contamination of Aircraft Hydraulic Fittings
ISO 5887	Aircraft—Joints for Connecting Crew Members' Regulator Masks to Oxygen Sources
ISO/DIS 6404	Test Methods for Electro Hydraulic Servovalves
ISO 6771	Aerospace Construction—Fluid Systems and Components—Pressure and Temperature Classifications
ISO 6772	Aerospace Fluid Systems—Impulse Testing of Hydraulic Hose, Tubing and Fitting Assemblies
ISO 6773	Aerospace Fluid Systems—Thermal Shock Testing of Piping and Fittings
ISO 7169	Aerospace Construction—Separable Tube Fittings for Fluid Systems—General Specification
ISO 7257	Aircraft—Hydraulic Tubing Joints and Fittings—Rotary Flexure Test
ISO 7258	Polytetrafluorethylene (PTFE) Tubing for Aerospace Applications—Methods for the Determination of the Density and Relative Density

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ISO 7313	Aircraft—High Temperature Convoluted Hose Assemblies in Polyltetrafluoroethylene (PTFE)
ISO 7314	Aircraft—Medium Pressure, High Temperature, Flexible Metal Hose Assemblies
ISO/DIS 7315	Aerospace—P-clamps (Loop Clamps) for Fluid Tubing Installations—Dimensions
ISO/DP 7317	Aerospace Fluid Systems—24-deg Cone Fitting (Thick Wall)—Part Standards
ISO 7319	Aerospace Construction—Fluid Systems—Interface of Metric Couplings
ISO/DIS 7320	Aerospace Fluid Systems—Port Connection, Seal and Fitting End—Dimensions
ISO/DP 7321	Geometrical Definition of a 24-deg Cone Coupling
ISO 7661	Aerospace Fluid Systems—Clamp Blocks for Tubes Having Axial Alignment—Design Standard and Qualification Testing—Metric Series
ISO/DP 8153	Terminology for Hose Assemblies, Design Standard, Omega Clamp
ISO 8177	Aerospace—Omega Clamps (Saddle Clamps) for Tubing Installations—Dimensions
ISO/DIS 8278	Aerospace—Fluid Systems and Components—Hydraulic, Pressure Compensated, Variable Delivery Pumps—General Requirements
ISO/DP 8305	Aerospace—Lightweight 24-deg Cone Fittings—Part Standards
IOS/DP 8479	Aerospace—Q-clamps (Center-Mounted Clamps) for Fluid Tubing Installations—Dimensions
ISO/DP 8574	Aerospace—Rigid Tubing—Qualification Testing
ISO/DIS 8575	Aerospace—Hydraulic and Pneumatic Tubing—Dimensions
ISO/DP 8625	Aerospace—Pressure Terms and Definitions
ISO/DP 8775	Aerospace—Gaseous Oxygen Replenishment Coupling
ISO/DP 8829	Aerospace—PTFE Hose Assemblies—Qualification Test Methods
ISO/DP 8913	Aerospace—PTFE Hose Assemblies—Procurement Specification

3.1.2 NOT APPROVED TC20 DOCUMENTS

3.1.2.1 Not Endorsed

ISO R 443	Marking of Aircraft Gas Cylinders
ISO 450	Aircraft—Connection for Water of Drinkable Quality
ISO 485	Aircraft—Water-Methanol Pressure Connections
ISO 1023	Aircraft—High Pressure Air Charging Valves
ISO 1465	Aircraft—Liquid Oxygen Replenishment Couplings—Mating
ISO 1749	Aircraft—Elastomeric Sealing Rings—Packaging and Identification

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3.1.2.2 Disapproved TC20 Documents

B

ISO 451	Aircraft—Pressure Re-Oiling Connection
ISO R 1022	Gaseous Oxygen Replenishment Couplings for Aircraft
ISO 2046	Gaseous Breathing Oxygen Supplies for Aircraft
ISO 2435	Nitrogen for Use in Aircraft

3.2 TC131 Documents

3.2.1 Approved TC131 Documents

ISO 2942	Hydraulic Fluid Power-Filter Elements—Determination of Fabrication Integrity	B
ISO/DIS 3968.2	Filters—Evaluation of Pressure Drop vs. Flow Charactertistics	
ISO/DIS 6075/1	Mineral Oils—Characteristics Part 1 Standard Tests	
ISO/DP 4412/11	Test Code for the Determination of the Airborne Noise Levels	
ISO 4412/1	Test Code for the Determination of Airborne Noise Levels	B

NOTE: The above listed documents have been given full approval following review of all documents released by ISO/TC131.

3.2.2 Disapproved TC 131 Documents

DIS 3019/1	Pumps & Motors Mounting and Shafts
DIS 3019-11	Motors-Mounting Flange and Shafts
DIS 4400	Three Pin Electrical Plug Connector
DIS 4401	Four Port Directional Valves Mounting Surfaces
DIS 4404	Fire Resistant Fluids (Cat. A, B, C) Details of Anti-Corrosion
DIS 4406	Fluids - Solid Contamination Code
DIS 4409	Pump, Motors Integral Transmissions Methods of Test to Determine Steady State Performance
DIS 4411	Valves-Method of Determining Pressure Differential Flow Characteristics
DIS 4414	Recommendations for the Applications of Equipment to Transmission and Control System
DIS 4572	Filters-Multipass Method of Testing
DIS 5591/1	Five Port Directional Contol Valves Mounting Surfaces
DIS 5591/11	Five Port Directional Control Valves Part II
DIS 5595	Accumulators Pressure & Volume
DIS 5597/1	Hyd. Fluid Power-Seals Housing-Dimensions and Tolerances-Pt. 1: Cylinder Rod and Piston Seals for Reciprocating Applications-Nominal Series
DIS 5783	Code for Identification of Value
DIS 6020/1	Single Rod Cylinders-160 Bar Series (1)
DIS 6020/11	Single Rod Cylinders-160 Bar Series (11)
DIS 6022	Single Rod Cylinders-250 Bar Series
DIS 6074	Mineral Oils-Classification & Designation
DIS 6182	Flanged Tube, Pipe & Hose Connections
DIS 6163	Flanged Joints & Connector-Four Bolt Flanges
DIS 6164	One Piece Square Flange-Dim. & Identifying Codes
DIS 6431	Cylinders-Dimensions for Detachable Mounting (10)
DIS 6432	Cylinders-Bores 8mm to 25mm Dim.
DIS 6436	Cylinders-Dimensions & Mounting 10 Bar Series
DIS 6537	Pneumatic Cylinder Bowls-Non Ferrous Tubes
DIS 6547	Hydraulic Fluid Power - Piston Seal Housings, Incorporating Bearing Rings - Dimensions and Tolerances
DP 3601/11	Fluid Systems-O-Rings-Pt. 11: Design Criteria for Standard Applications
DP 3601/111	Fluid Systems-O-Rings-Pt. 111: Quality Acceptance Criteria
DP 4392	Startability of Fluid Motors
DP 4407	Power Fluids Determination of Solid Particle Contamination by Counting Method Using Microscope-Trans.
DP 4408	Determination of Fluid Contamination by the Counting Method Under-Light
DP 5505	Determination of Fluid Contamination by the Gravimetric Measure
DP 5599/111	5 Port Directional Control Valve Mounting Surfaces-Electrical Connector Optional
DP 5781E	Pressure Control Valves (Excluding Relief Valve) Sequence Valves, Throttle and Check Mounting

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DP 5782E	Compressed Air Filters Characteristics & Reg. (2nd Rev.)
DP 5784	Symbols for Binary Logics and Related Junctions for Data Processing
DP 6052	Code of Identification for Mounting Surfaces Directional Control Valves and Regulating Valves
DP 6099	Cylinders-Mounting Dimensions and Types
DP 6150/11	Pneumatic Cyl. Quick Action Coupler 10/16/25 Bg.
DP 6163/11	Flanged Heads-Dimension(40 Bar)
DP 6163/111	Flanged (Heads) Joints and Connectors Dimensions for the (40 Bar)
DP 6194/11	Sealing Devices-Rotary Shaft Lip Seals Pt. 11: Terminology
DP 6195	Fluid Power Systems and Components Wiper Ring-Housings-Rod Reciprocating Applications-Dimensions and Tolerances
DP 6263	Mounting Surfaces for Compensating Hydraulic Flow Control Valves
DP 6264E	Pressure Relief Valves-Mounting Surfaces
DP 6301	Compressed Air Lubricators Characteristics & Reg.
DP 6358	Draft Proposal for an ISO Standard for Flow Ratio Characteristics for Compressible Fluid Flow
DP 6403	Method of Test-Valves Controlling Flow and Pressure
ISO 2944	Fluid Pressure Systems and Components Nominal Pressure
ISO 3091/1	Positive Disp. Pump & Motors-Dimension & Identification Code for Mounting Flanges & Shaft Ends
ISO 3320	Cylinder Bores & Piston Rod Diameters Metric Series
ISO 3321	Cylinder Bores & Piston Rod Diameters Inch Series
ISO 3322	Cylinders-Nominal Pressure
ISO 3601/1	Fluid Systems-O-Rings-Pt. 1: Inside Diameters, Cross Sections, Tolerances and Size Identification Code
ISO 3662	Pumps and Motors-Geometric Displ.
ISO 3722	Fluid Sample Containers-Qualifying & Controlling Cleaning Methods
ISO 3723	Filter Elements-Method for End Seal Test
ISO 3724	Filter Elements-Verification of Flow Fatigue Characteristics
ISO 3939	Fluid Power Systems and Components-Multiple Lip Packing Sets-Methods for Measuring Stack Heights
ISO 4021	Particle Contamination Analysis-Extraction of Fluid Samples from Lines of an Operating System
ISO 4393	Cylinders Basic Series of Piston Strokes
ISO 4395	Cylinders-Threads of Bowl and Types
ISO 4402	Calibration of Liquid Automatic Particle Counter Instrument-Method Using Air Cleaner Fine Test Dust Contaminant
ISO 4413	General Rules for the Application of Equipment to Transmission on Control Systems
ISO 2941	Hydraulic Fluid Power-Filter Elements - Verification of Collapse/Burst Resistance
PFNW1 N74E	Hydraulic Pumps & Motor Life & Rel.
PFNWZ N93E	Metal Threaded Port for Fluid Power at Low Pressures

Working Document 3C6(CETOP-7)151E	Guide Lines for the Use of Fire Resistant Fluids in Industrial Hydraulic Systems
Working Document 6N 41	Conditions for Rating Compressed Air Dryers
Working Document 6N 91E	Contamination Sensitivity of Hydraulic Components
Working Document 6(W 63-5)159	Characteristics of Mineral Oils Part II-Special Test
Working Document 6(W65-4)162E	Characteristics and Test Methods of Fire Resistant Fluids
Working Document (SC3/W61) 168 DP 5597	Piston and Rod Seal Housing Dimension

3.3 APPROVED EUROPEAN STANDARDS, AECMA, EN

(To be added)

4.0 METRIC FLUID SYSTEM STANDARDS BEING DEVELOPED

4.1 ORDER OF PRIORITIES

The sequence of work is based on the aims and priorities as established by ISO/TC20 and the Aerospace Industry Association, International Standards Advisory Group (AIA/ISAG). Applied to fluid system needs the priorities are ranked as follows:

1. Performance and safety
   - Qualifications affecting flight safety
   - Basic system requirements
2. Basic
   - Interface standards, primary flight components specifications
   - Primary system elements
3. Interoperability and servicing
   - Service points interface standards, general
   - Parts standards, safety of flight items
   - System components specifications, general
4. Testing and inspection
   - General test procedures
   - Quality control requirements
5. Product standards, specifications
   - Standards for high-use items and primary system elements
   - Low-use items, standardization
6. Terminology, symbols, and identification

4.2 FLUID SYSTEM STANDARDS, LISTING

(SEE FOLLOWING PAGES)

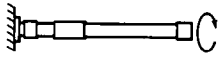
5.0 NOTES

5.1 PREPARATORY AND COORDINATING COMMITTEES

The "Prep Agency" column (following pages) identifies the SAE committee responsible for preparing the MA documents listed in this report. In parenthesis, this column lists other SAE committees interested in the standard. All committees listed in this column must approve the standard prior to submitting the standard to the Aerospace Council for approval. B

PREPARED BY
SAE COMMITTEE G-3
AEROSPACE FITTINGS, HOSE AND TUBING ASSEMBLIES

B = Revised

CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
S		FLUID SYSTEM PRESSURE AND TEMPERATURE CLASSIFICATIONS	MA 2001	SAE G-3 (E-25) (A-6)	1979		1981	MIL-H-5440	ISO 6771 SC10.08.02	1
SP		HYDRAULIC IMPULSE TEST	MA 2002	SAE G-3	1979		1981	ARP 603	ISO 6772 SC10.07.02	1
SP		FLEXURE FATIGUE TEST, TUBE CONNECTIONS	MA 2003	SAE G-3	1979		1982	ARP 1185	ISO 7527 SC10.07.04	1
SP		THERMAL SHOCK TEST	MA 2004	SAE G-3 (E-25)	1979		1981	AS 1055	ISO 6773 SC10.07.03	1
PS		FLUID SYSTEM FITTINGS GENERAL SPECIFICATION	MA 2005	SAE G-3 (E-25)	1980		1982	MIL-F-18280	ISO 7169 SC10.06.03	2
SP		HYDRAULIC TUBING QUALIFICATION TEST REQUIREMENTS	MA 2006	SAE G-3	1979	1986		MIL-H-544D	DP 8574 SC10.03.05	1
PS		HOSE ASSEMBLY TFE, CRES REINFORCED, 204°C, 21 000 kPa, PROCUREMENT SPECIFICATION	MA 2007	SAE G-3	1982		1983	AS 1339	DP 8913 SC10.05.09	2
PS		HYDRAULIC HOSE ASSEMBLIES PTFE, 10 500 kPa	MA 2008	SAE G-3	1983	1987		MIL-H-25579	SC10.05	2
M		FIRE RESISTANT FLUID FOR AIRCRAFT	MA 2009	SAE A-6	1979	1986		AS 1241	SC10/P-53	2
D		ELASTOMERIC SEAL RING (O-RING) DIMENSIONS AND SIZES, DESIGN STANDARD	MA 2010	SAE E-25 & G-4	1975	1986			DIS 3601/1 SC10.02.01	3
D		PORT CONNECTION DESIGN STANDARD	MA 2012	(SAE G-3) (E-25)	1979		1985	MS33649	ISO 7320 SC10.06.10	2

(*) D — DESIGN STANDARD
I — ISO STANDARD, GENERAL
M — MATERIAL
P PART STANDARD
PS PROCUREMENT SPECIFICATION
PR PROCESS SPECIFICATION
S SYSTEMS
SP STANDARD PRACTICE
NMVP — NO METRIC VERSION PLANNED

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CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
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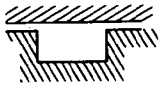
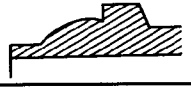
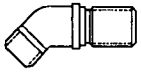
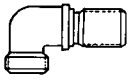
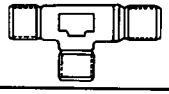
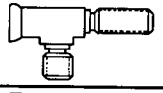
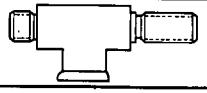
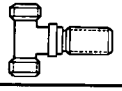
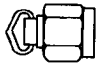
D		GLAND DIMENSIONS FOR ELASTOMERIC SEAL RINGS (O-RINGS)	MA 2013	SAE G-4 (A-6) (E-25)	1976	1987			N.-143 SC10.02.04	3
D		FITTING INSERT, DESIGN STANDARD, 24-deg CONE	MA 2014	SAE G-3	1980	1986		NAS1760	DP 7321 SC10.06.02	2
D		TUBING SIZES AND THICKNESSES	MA 2015	SAE G-3 (E-25)	1979	1986			ISO 2964 SC10.03.02	5
D		TUBING SIZES AND THICKNESSES, PREFERRED STANDARDS LIST	MA 2016	SAE G-3					DIS 8575 SC10.03.03	3
D		U-CLAMP, DESIGN STANDARD	MA 2017	SAE G-3 (E-25)	1983	1985			ISO 8177 SC10.04.03	3
D		LOOP CLAMP, DESIGN STANDARD	MA 2018	SAE G-3 (E-25)	1983	1985			ISO 7315 SC10.04.01	3
D		PRESSURE REFUELING VALVE	MA 2019	SAE AE-5					ISO 45	
D		GASEOUS OXYGEN REPLENISHMENT COUPLING, DESIGN STANDARD	MA 2020	SAE A-10				AS 1290 AND 10089	DIS 8775 SC10.08.04	3
D		AIRCRAFT OXYGEN CONNECTION FOR CREW MASK REGULATORS	MA 2021	SAE A-10					ISO 5887 SC10.08.05	3
D		GRAVITY FILL ORIFICES	MA 2022	SAE AE-5					ISO 102	3
D		AIR DUCT — V-BAND FLANGE	MA 2024	SAE G-3 (AC-9) (E-25)				MS24563	ISO 2563	2

CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
P		UNION, FLARELESS TUBE, 24-deg CONE	MA 2025	SAE G-3	1980	1985			DP 7317 SC10.06.04	5
P		ELBOW, FLARELESS TUBE, 90-deg, 24-deg CONE	MA 2026	SAE G-3	1980		1985	MS21904	DP 7317 SC10.06.04	5
P		TEE, FLARELESS TUBE, 24-deg CONE	MA 2027	SAE G-3	1980		1985	MS21905	DP 7317 SC10.06.04	5
P		CROSS, FLARELESS TUBE, 24-deg CONE	MA 2028	SAE G-3	1980		1985	MS21906	DP 7317 SC10.06.04	5
P		ELBOW, FLARELESS TUBE AND UNIVERSAL 45 deg, 24-deg CONE	MA 2029	SAE G-3	1980		1985	MS21907	DP 7317 SC10.06.04	5
P		ELBOW, BULKHEAD UNIVERSAL 90 deg, FLARELESS TUBE, 24-deg CONE	MA 2030	SAE G-3	1980		1985	MS21908	DP 7317 SC10.06.04	5
P		TEE, FLARELESS TUBE, BULKHEAD ON RUN, 24-deg CONE	MA 2031	SAE G-3	1980		1985	MS21912	DP 7317 SC10.06.04	5
P		TEE, FLARELESS TUBE, BULKHEAD AND PORT ON RUN, 24-deg CONE	MA 2032	SAE G-3	1980		1985	MS21911	DP 7317 SC10.06.04	5
P		TEE, FLARELESS TUBE, BULKHEAD ON RUN, PORT ON SIDE, 24-deg CONE	MA 2033	SAE G-3	1980		1985	MS21910	DP 7317 SC10.06.04	5
P		TEE, BULKHEAD ON SIDE, FLARELESS TUBE, 24-deg CONE	MA 2034	SAE G-3	1980		1985	MS21909	DP 7317 SC10.06.04	5
P		PLUG, FLARELESS TUBE, 24-deg CONE	MA 2035	SAE G-3	1980	1985		MS21913	DP 7317 SC10.06.04	5
P		CAP, PRESSURE SEAL, FLARELESS TUBE FITTING, 24-deg CONE	MA 2036	SAE G-3	1980	1985		MS21914	DP 7317 SC10.06.04	5

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CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
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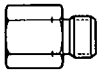
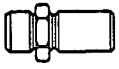
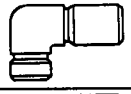
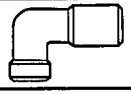
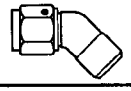
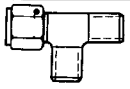
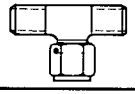
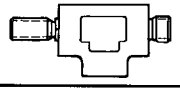
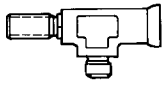
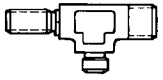
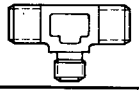
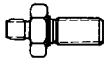
P		BUSHING, SCREW THREAD EXPANDER, FLARELESS TUBE CONNECTIDN, 24-deg CONE	MA 2037	SAE G-3	1980	1985		MS21915	SC10.06.04	5
P		REDUCER, EXTERNAL THREAD, FLARELESS TUBE, 24-deg CONE	MA 2038	SAE G-3	1980	1985		MS21916	DP 7317 SC10.06.04	5
P		PLUG — "D"-RING SEAL, PORT	MA 2039	SAE G-3 (E-25)	1983	1985				5
P		NUT — SLEEVE COUPLING FLARELESS, 24-deg CONE	MA 2040	SAE G-3	1980	1985		MS21921	DP 7317 SC10.06.04	5
P		SLEEVE — COUPLING, FLARELESS, 24-deg CONE	MA 2041	SAE G-3	1980		1983	MS21922	DP 7317 SC10.06.04	5
P		UNION, FLARELESS TUBE BULKHEAD AND UNIVERSAL, 24-deg CONE	MA 2043	SAE G-3	1980	1985		MS21924	DP 7317 SC10.06.04	5
P		ELBOW, 90-deg UNIVERSAL, FLARELESS TUBE, HIGH PROFILE, 24-deg CONE	MA 2044	SAE G-3	1980		1985	MS21925	DP 7317 SC10.06.04	5
P		ELBOW, 90-deg UNIVERSAL, FLARELESS TUBE, LOW PROFILE, 24-deg CONE	MA 2045	SAE G-3	1980		1985	MS21926	DP 7317 SC10.06.04	5
P		ADAPTER, FLARELESS, METRIC TO INCH, 24-deg CONE	MA 2046	SAE G-3	1980	1985	1985		DP 7317 SC10.06.04	5
P		NUT, FITTING, WIRE LOCKED, FLARED AND FLARELESS	MA 2047	SAE G-3	1984	1985		AS 1790		
P		ELBOW, 45 deg. FLARELESS TUBE TO SWIVEL, 24-deg CONE	MA 2048	SAE G-3	1980	1985			DP 7317 SC10.06.04	5

CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
P		TEE, FLARELESS, TUBE TO SWIVEL, SWIVEL ON RUN, 24-deg CONE	MA 2049	SAE G-3	1980		1985		OP 7317 SC10.06.04	5
P		ELBOW, 90-deg FLARELESS TUBE TO SWIVEL, 24-deg CONE	MA 2050	SAE G-3	1980		1985		OP 7317 SC10.06.04	5
P		TEE, FLARELESS TUBE TO SWIVEL, SWIVEL ON SIDE, 24-deg CONE	MA 2051	SAE G-3	1980		1985		DP 7317 SC10.06.04	5
P		TEE, REDUCER, BULKHEAD ON RUN, INTERNAL PORT ON SIDE, FLARELESS TUBE, 24-deg CONE.	MA 2052	SAE G-3				AS 1001		3
P		TEE, REDUCER, BULKHEAD AND INTERNAL PORT ON RUN, FLARELESS, 24-deg CONE	MA 2053	SAE G-3				AS 1002		3
P		TEE, REDUCER, BULKHEAD ON RUN, FLARELESS TUBE, 24-deg CONE	MA 2054	SAE G-3				AS 1003		3
P		ELBOW, 90-deg, REOUCER, FLARELESS TUBE, 24-deg CONE	MA 2055	SAE G-3				AS 1004		3
P		TEE, REDUCER, FLARELESS TUBE, 24-deg CONE	MA 2056	SAE G-3				AS 1005		3
P		CROSS, REDUCER, FLARELESS TUBE, 24-deg CONE	MA 2057	SAE G-3				AS 1006		3
P		UNION, REDUCER, BULKHEAD FLARELESS TUBE, 24-deg CDNE	MA 2058	SAE G-3				AS 1007		3
P		ELBOW, 90-deg, REDUCER, BULKHEAD, FLARELESS TUBE, 24-deg CONE	MA 2059	SAE G-3				AS 1008		3

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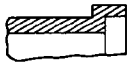
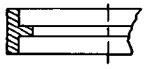
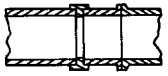
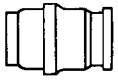
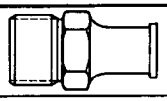
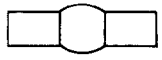
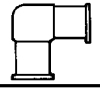
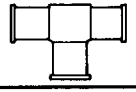
CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
PS		WELDED FITTINGS, HYDRAULIC, TITANIUM AND CRES, 20 000 kPa PROCUREMENT SPECIFICATION	MA 2060	SAE G-3	1980		1982	AS 1576		2
D		FITTING END, WELDED, DIMENSIONS, 21 000 kPa, HYDRAULIC	MA 2061	SAE G-3	1980		1984	AS 1579		3
P		T-RING, TUBE WELD, 21 000 kPa, HYDRAULIC	MA 2062	SAE G-3	1980		1984	AS 1893		3
D		WELD INSTALLATION, FITTING AND TUBE ENDS	MA 2063	SAE G-3	1980		1984			3
P		SLEEVE, TUBE WELD, FLARELESS, 21 000 kPa, HYDRAULIC, 24-deg CONE	MA 2064	SAE G-3	1980		1984	AS 1581		3
P		UNION, TUBE WELD, FLARELESS, 21 000 kPa, HYDRAULIC, 24-deg CONE	MA 2065	SAE G-3	1980		1984	AS 1582		3
P		REDUCER, TUBE WELD, 21 000 kPa, HYDRAULIC	MA 2066	SAE G-3	1980		1984	AS 1585		3
P		SLEEVE, SEAL, ACORN TO WELD, 21 000 kPa, HYDRAULIC	MA 2067	SAE G-3	1980		1984			3
P		UNION, ACORN MALE TO FLARELESS, 21 000 kPa, HYDRAULIC, 24-deg CONE	MA 2068	SAE G-3	1980		1984			3
P		ELBOW, 90-deg, TUBE WELD, METRIC, 21 000 kPa, HYDRAULIC	MA 2069	SAE G-3	1980		1984	AS 1584		3
P		TEE-TUBE WELD, 21 000 kPa, HYDRAULIC	MA 2070	SAE G-3	1980		1984	AS 1583		3
P		CROSS TUBE WELD, 21 000 kPa, HYDRAULIC	MA 2071	SAE G-3	1980		1984			3

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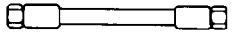
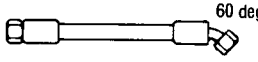
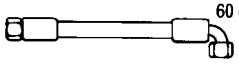
CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
P		NUT, OLIVE, FLARELESS, FEMALE, 21 000 kPa, METRIC	MA 2072	SAE G-3	1980		1984			
P		NUT, MALE, OLIVE, FLARELESS, 21 000 kPa, METRIC	MA 2073	SAE G-3	1980		1984			
P		SEAL RING, OLIVE, 21 000 kPa, METRIC	MA 2074	SAE G-3	1980		1984			
SP		MEASUREMENT OF CONTAMINATION IN HYDRAULIC FLUID	MA 2075	SAE A-6					SC10.52	4
PS		QUALITY CONTROL FOR O-RINGS	MA 2076	SAE G-4/ E25	1983	1987			DP3601/3 SC10.02.03	4
SP		TEST METHODS FOR TETRAFLUOROETHYLENE, HOSE ASSEMBLIES	MA 2078	SAE G-3	1984	1986			DP 8829 SC10.05.09	1
PS		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CONVOLUTED, CRES REINFORCED, 204°C, PROCUREMENT SPECIFICATION	MA 2079	SAE G-3	1977		1985	AS 620	ISO 7313 SC10.05.03	3
P	 60 deg	HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 60-deg CONE, STRAIGHT TO STRAIGHT, LIGHTWEIGHT	MA 2080	SAE G-3	1983	1988		AS 153		5
P	 60 deg	HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21,000 kPa, 60-deg CONE, STRAIGHT TO 45 deg. LIGHTWEIGHT	MA 2081	SAE G-3	1983	1988		AS 154		5
P	 60 deg	HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 60-deg CONE, STRAIGHT TO 90-deg LIGHTWEIGHT	MA 2082	SAE G-3	1983	1988		AS 155		5
P	 60 deg	HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 60-deg CONE, 45 deg TO 45 deg LIGHTWEIGHT	MA 2083	SAE G-3	1983	1988		AS 156		5

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CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT ND.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
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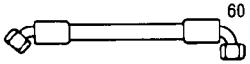
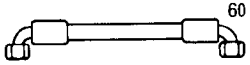
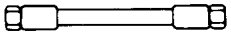
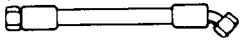
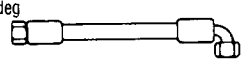
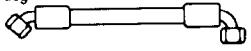
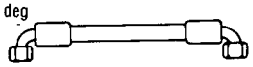
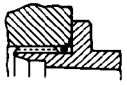
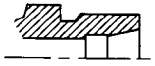
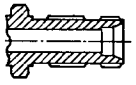
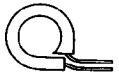
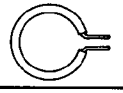
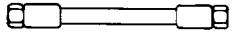
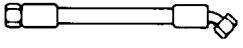
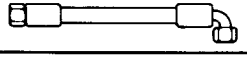
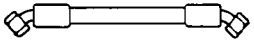
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 60-deg CONE, 45 deg TO 90 deg, LIGHTWEIGHT	MA 2084	SAE G-3	1983	1988		AS 157		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 60-deg CONE, 90 deg TO 90 deg, LIGHTWEIGHT	MA 2085	SAE G-3	1983	1988		AS 158		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, STRAIGHT TO STRAIGHT, LIGHTWEIGHT	MA 2086	SAE G-3	1982	1986		AS 115		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, STRAIGHT TO 45 deg, LIGHTWEIGHT	MA 2087	SAE G-3	1982	1986		AS 116		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, STRAIGHT TO 90 deg, LIGHTWEIGHT	MA 2088	SAE G-3	1982	1986		AS 117		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, 45 deg TO 45 deg, LIGHTWEIGHT	MA 2089	SAE G-3	1982	1986		AS 118		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, 45 deg TO 90 deg, LIGHTWEIGHT	MA 2090	SAE G-3	1982	1986		AS 119		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES REINFORCED, 204°C, 21 000 kPa, 24-deg CONE, 90 deg TO 90 deg, LIGHTWEIGHT	MA 2091	SAE G-3	1982	1986		AS 120		3

CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
D		ASSEMBLY, 24-deg CONE FITTING, DESIGN STANDARD	MA 2092	SAE G-3					DP 7321 SC10.06.02	
D		ASSEMBLY, PORT FITTING, DESIGN STANDARD	MA 2093	SAE E-25				MA 2012		
D		ASSEMBLY, 60-deg CONE FITTING, DESIGN STANDARD	MA 2094	SAE E-25					SC10.06.08	
D		FITTING DESIGN STANDARD 24-deg CONE	MA 2095	SAE G-3	1979		1985	MS33514	DP 7321 SC10.06.02	2
D		FITTING DESIGN STANDARD BULKHEAD 24-deg CONE	MA 2096	SAE G-3	1979	1984		MS33515	DP 7321 SC10.06.02	
P		CLAMP, LOOP-TYPE, CUSHIONED, ELECTRICAL	MA 2097	SAE G-3 (E-25)	1985			DS14241 MS21919 MIL-C-8603		
P		CLAMP, LOOP-TYPE, BONDING	MA 2098	SAE G-3	1985			DS14244 AN735		
PS		HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, PROCUREMENT SPECIFICATION	MA 2100	SAE G-3	1981	1984		AS 1424	ISO 7314 SC10.05	3
P	24 deg 	HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, 24-deg CONE, STRAIGHT TO STRAIGHT	MA 2101	SAE G-3	1981	1985		AS 136	ISO 7314	5
P	24 deg 	HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, 24-deg CONE, STRAIGHT TO 45 deg	MA 2102	SAE G-3	1981	1985		AS 137	ISO 7314	5
P	24 deg 	HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, 24-deg CONE, STRAIGHT TO 90 deg	MA 2103	SAE G-3	1981	1985		AS 138	ISO 7314	5
P	24 deg 	HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, FLARELESS, WELDED, 45 deg TO 45 deg	MA 2104	SAE G-3	1981	1985		AS 139	ISO 7314	5

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CATEGORY CODE (*)	SYMBDL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
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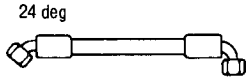
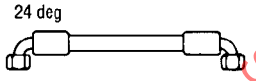
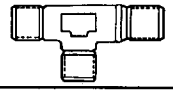
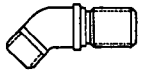
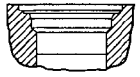
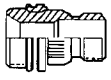
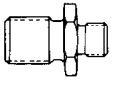
P		HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, 24-deg CONE, 45 deg TO 90 deg	MA 2105	SAE G-3	1981	1985		AS 140	ISO 7314	5
P		HOSE ASSEMBLY, CRES CONVOLUTED AND REINFORCED, 450°C, 24-deg CONE, 90 deg TO 90 deg	MA 2106	SAE G-3	1981	1985		AS 141	ISO 7314	5
P		TEE, REDUCER, BULKHEAD, FLARELESS, 24-deg CONE	MA 2108	SAE G-3	1985	1987		AS1009		5
P		ELBOW, 45-deg, REDUCER, BULKHEAD, FLARELESS 24-deg CONE	MA 2109	SAE G-3	1985	1987		AS1010		5
D		PORT, RING LOCKED, DESIGN STANDARD, DIMENSIONS FOR	MA 2110	SAE G-3	1984		1985	AS 1300		1
P		ADAPTER, PORT CONNECTION, RING LOCKED TO 8 deg 30 min, LIP SEAL FITTING	MA 2111	SAE G-3	1984		1985			3
P		ADAPTER, PORT CONNECTION RING LOCKED TO 24-deg CONE FITTING	MA 2112	SAE G-3	1984		1985	AS 1299		3
P		ADAPTER, PORT CONNECTION, RING LOCKED TO 60-deg CONE FITTING	MA 2113	SAE G-3	1984		1985			3
P		ADAPTER, PORT CONNECTION, RING LOCKED, INSTALLATION AND REMOVAL	MA 2114	SAE G-3	1984		1985	AS 1301		2
P		UNION, FLARELESS, PORT TO TUBE, 24-deg CONE	MA 2115	SAE G-3	1985	1985		MS21902	DP 7317 SC10.06.04	5
P		UNION, REDUCER, FLARELESS, PORT TO TUBE, 24-deg CONE	MA 2116	SAE G-3	1985	1985		MS21916	DP 7317 SC10.06.04	5
P		WIRE, RETAINER, TUBE COUPLING NUT	MA 2117	SAE G-3	1985	1985		AS 1791		
P		NUT, BULKHEAD, TUBE FITTING	MA 2118	SAE G-3	1984	1985		AN 924	DP 7321 SC10.06.02	

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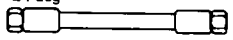
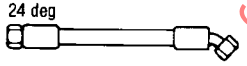
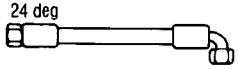
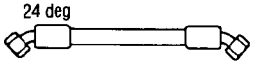
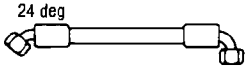
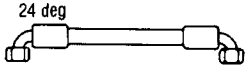
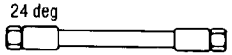
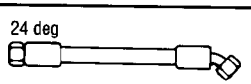
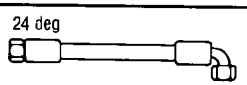
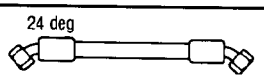
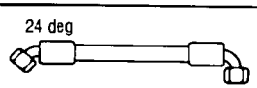
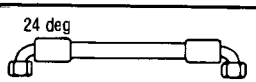
CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECO	COMPL	U.S.	ISO AND TC20/SC10	
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CONE, STRAIGHT TO STRAIGHT	MA 2120	SAE G-3	1985	1987		AS 1633		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CONE, STRAIGHT TO 45 deg	MA 2121	SAE G-3	1985	1987		AS 1634		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CONE, STRAIGHT TO 90 deg	MA 2122	SAE G-3	1985	1987		AS 1635		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CONE, 45 deg TO 45 deg	MA 2123	SAE G-3	1985	1987		AS 1636		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CDNE, 45 deg TO 90 deg	MA 2124	SAE G-3	1985	1987		AS 1637		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CONVOLUTED, CRES REINFORCED, 204°C, 24-deg CONE, 90 deg TO 90 deg	MA 2125	SAE G-3	1985	1987		AS 1638		5
PS		HOSE ASSEMBLY, TETRAFLUORDETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, PROCUREMENT SPECIFICATION	MA 2126	SAE G-3	1985			MIL-H-25579		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, STRAIGHT TO STRAIGHT	MA 2127	SAE G-3						5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, STRAIGHT TO 45 deg	MA 2128	SAE G-3						5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, STRAIGHT TO 90 deg	MA 2129	SAE G-3						5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, 45 deg TO 45 deg	MA 2130	SAE G-3						5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, 45 deg to 90 deg	MA 2131	SAE G-3						5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE, CRES REINFORCED, 204°C,10 500 kPa, 24-deg CONE, 90 deg to 90 deg	MA 2132	SAE G-3						5

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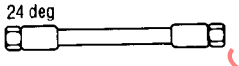
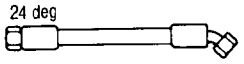
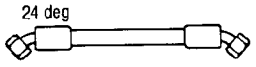
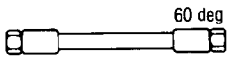
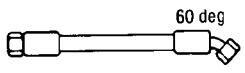
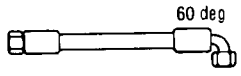
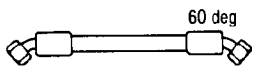
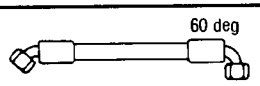
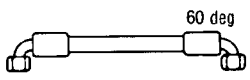
CATEGORY CODE (*)	SYMBOL	TITLE	DOCUMENT NO.	PREP AGENCY	DATES			REFERENCE DOCUMENTS		PRIORITY
					START	ECD	COMPL	U.S.	ISO AND TC20/SC10	
PS		HOSE ASSEMBLY, TETRAFLUOROETHYLENE METALLIC BRAID, HEAVYWEIGHT, 204°C, 21 000 kPa, PROCUREMENT SPECIFICATION	MA 2133	SAE G-3	1985	1987		AS 604		3
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO STRAIGHT, HEAVYWEIGHT	MA 2134	SAE G-3	1985	1990		AS 621		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO 45 deg, HEAVYWEIGHT	MA 2135	SAE G-3	1985	1990		AS 622		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO 90 deg, HEAVYWEIGHT	MA 2136	SAE G-3	1985	1990		AS 623		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 45 deg TO 45 deg, HEAVYWEIGHT	MA 2137	SAE G-3	1985	1990		AS 624		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 45 deg TO 90 deg, HEAVYWEIGHT	MA 213B	SAE G-3	1985	1990		AS 625		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 90 deg TO 90 deg HEAVYWEIGHT	MA 2139	SAE G-3	1985	1990		AS 626		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO STRAIGHT, HEAVYWEIGHT	MA 2140	SAE G-3	1985	1990		AS 627		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO 45 deg, HEAVYWEIGHT	MA 2141	SAE G-3	1985	1990		AS 628		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, STRAIGHT TO 90 deg, HEAVYWEIGHT	MA 2142	SAE G-3	1985	1990		AS 629		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 45 deg TO 45 deg, HEAVYWEIGHT	MA 2143	SAE G-3	1985	1990				5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 45 deg TO 90 deg, HEAVYWEIGHT	MA 2144	SAE G-3	1985	1990		AS 631		5
P		HOSE ASSEMBLY, TETRAFLUOROETHYLENE CRES BRAID, 21 000 kPa, 24-deg CONE, 90 deg TO 90 deg, HEAVYWEIGHT	MA 2145	SAE G-3	1985	1990		AS 632		5