AEROSPACE STANDARD

AS5258™ REV. A

Issued 1998-10
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Reaffirmed 2021-10

Superseding AS5258

(R) Insulating Component, Molded, Electrical, Heat Shrinkable, Connector and Cable Accessory, Sealing Strain Relief, General Specification For

RATIONALE

AS5258A has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

1.1 Scope

This specification covers connector and cable accessory heat shrinkable, electrical insulating, molded components fabricated from various polymer based compositions. These components are intended for use as connector and cable accessory components to provide strain relief, electrical insulation, and environmental sealing.

1.2 Classification

The component materials shall be the following types, as specified (see 3.1 and 6.2):

TYPES

Type A - Insulating components, molded, electrical, heat shrinkable polyolefin, crosslinked, semirigid in accordance with SAE AS81765/1 Type I.

Type B - Insulating components, molded, electrical, heat shrinkable polyolefin, crosslinked, flexible in accordance with SAE AS81765/1 Type II.

Type C - Insulating components, molded, electrical, heat shrinkable silicone rubber, flexible, crosslinked in accordance with SAE AS81765/3.

Type D – Insulating components, molded, electrical, heat shrinkable fluoroelastomer, flexible, crosslinked in accordance with SAE AS81765/4.

Type E - Insulating components, molded, electrical, heat shrinkable fluoropolymer, semi-rigid, crosslinked in accordance with SAE AS81765/6.

Type F - Insulating components, molded, electrical, heat shrinkable fluoropolymer composite, semirigid, crosslinked in accordance with SAE AS81765/7.

Type G - Insulating components, molded, electrical, heat shrinkable polyolefin crosslinked, semirigid, limited fire hazard in accordance with Table 4.

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Type H - Insulating components, molded, electrical, heat shrinkable polymer, elastomeric blend, semi-rigid, crosslinked in accordance with Table 5.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of the other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.2 SAE Publications

Application for copies should be addressed to SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS1424 Deicing / Anti-icing Fluid, Aircraft SAE Type 1.

AMS-DTL-23053 Insulation Sleeving, Electrical, Heat Shrinkable, General Specification for

AS81765/1 Insulating Components, Molded, Electrical, Heat Shrinkable Polyoefin, Crosslinked, Semi-rigid and Flexible

AS81765/3 Insulating Components, Molded, Electrical, Heat Shrinkable Silicone Rubber, Flexible, Crosslinked

AS81765/4 Insulating Components, Molded, Electrical, Heat Shrinkable Fluoroelastomer, Flexible, Crosslinked

AS81765/6 Insulating Components, Molded, Electrical, Heat Shrinkable Fluoropolymer, Semi-rigid, Crosslinked

AS81765/7 Insulating Components, Molded, Electrical, Heat Shrinkable Fluoropolymer Composite, Semi-rigid, Crosslinked

AS85049/60 Connector Accessories, Electrical, Adapter, Shrink Boot, Category 5 (for AS50151 Crimp, MIL-DTL-26482 Series 2, AS81703 Series 3 and MIL-DTL-83723 Series III Connectors).

AS85049/140 Connector Accessories, Electrical Boots, Heat-Shrinkable, Straight, Category 7

AS85049/141 Connector Accessories, Electrical Boots, Heat-Shrinkable, 90°, Category 7

AS85049/142 Connector Accessories, Electrical Boots and Sleeves, Transitions, Heat-Shrinkable, Category 7

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI/NCSL L540-1 Calibration Laboratories and Measuring and Test Equipment General Requirements

2.4 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 149 Standard Test Method for Dielectric Breakdown Voltage & Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

ASTM D 257 DC resistance or Conductance of Insulating Materials

ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermo Plastic Elastomers Tension

ASTM D 570 Water Absorption of Plastics

ASTM D 635 Standard Test method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

ASTM D 792 Standard Test Method for Density & Specific Gravity (relative density) of Plastics by Displacement

ASTM D 1974 Standard Practice for Method of Closing, Sealing, and Reinforcing Fiberboard Boxes

ASTM D 2863 Plastics, Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of (Oxygen Index)

ASTM D 3487 Mineral Insulating Oil used in Electrical Apparatus

ASTM D 3951 Standard Practice for Commercial Packaging

ASTM D 4814 Fuel, Automotive, Spark-Ignition Engine

2.5 ISO Publications

Available from the International Organization for Standardization, 1, ch. De la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland, Tel: +44 22 749 01 11, Fax: +41 22 733 34 30, www.iso.org.

ISO 846 Plastics – Evaulation of the Action of Microorganisms

2.6 Naval Engineering Standards

Available from the Defence Procurement Agency, An Executive Agency of the Ministry of Defence, UK Defence Standization, Kentigen House Room 1138, 65 Brown Street, Glasgow G2 8EX,Tel: 0141-224-2513, http://www.mod.uk

DEF STAN 02-711 Determination Of The Smoke Index Of The Products Of Combustion From Small Specimens Of Materials.

DEF STAN 02-713 Determination Of The Toxicity Index Of The Products Of Combustion From Small Specimens Of Materials.

2.7 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

SD-6 Provisions Governing Qualification

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-202 Test Methods for Electronic and Electrical Component Parts

A-A-52557 Fuel Oil, Diesel, for Posts, Camps and Stations

A-A-59133 Cleaning Compound, High Pressure (steam) Cleaner

PPP-B-566 Boxes, Folding, Paper Board

PPP-B-676 Boxes, Setup

MIL-DTL-5624 Turbine Fuel, Aviation, Grades JP-4, JP-5/JP-8 ST

MIL-PRF-23699 Lubrication Oil, Aircraft Turbine Engine; Synthetic Base, NATO Code 0-156

MIL-DTL-24640 Cable, Electrical, Lightweight For Shipboard Use

MIL-PRF-6083 Hydraulic Fluid, Petroleum Base for Preservation and Operation

MIL-PRF-87257 Hydrulic Fluid, Fire Resistant, Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile

MIL-PRF-83282 Hydrulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, Nato Code number H-537

3. REQUIREMENTS

3.1 Specifications Sheets

The individual component requirements shall be as specified herein and in accordance with the applicable detail specification sheet. In the event of any conflict between the requirements of this specification and the detail specification sheet, the latter shall govern.

3.2 Material Properties

The component material properties shall be certified to meet the requirements as defined herein and as specified in accordance with the applicable specification and/or tables as defined in paragraph 1.2.

3.3 Dimensions

When measured as specified in 4.5.1, the dimensions as supplied and after unrestricted recovery shall conform to the requirements of the applicable specification sheet.

3.3.1 Shelf Life: The manufacturer shall certify that the molded components, after storage at a temperature of 18 °C to 35 °C (65 °F to 95 °F), as supplied and after unrestricted recovery shall conform to the dimensional requirements of the applicable specification sheet for the duration of the shelf life as defined herein for that material, if the material has a limited shelf life. Material types, A and B shall be 4 years, material types C, D and E shall be 1 year, material type F shall be 2 years and material types G and H shall be 5 years.

3.4 Color

The color of the molded component shall be black, unless otherwise specified (see 3.1).

3.5 Performance Requirements

When tested in accordance with the specified methods of Section 4, the components shall meet the performance requirements specified herein.

3.5.1 Dynamic Shear: When tested in accordance with 4.5.3, the components shall meet the requirements of Table 1 at the specified temperatures.

3.5.2 Static Load: When tested in accordance with 4.5.4, the cable shall not have pulled out of the boot more than 0.25 in (6.4 mm). After cooling to room temperature, the specimen assemblies shall meet the requirements of 3.5.1 when tested at 25 ± 2 °C (77 ± 4 °F).

3.5.3 Fluid Immersion: Specimen assemblies shall be tested in accordance with 4.5.5. The specimen assemblies shall then meet the requirements of 3.5.1 and 3.5.6.

3.5.4 Thermal Age: Specimen assemblies shall be tested in accordance with 4.5.6. The assemblies shall then meet the requirements of 3.5.1 and 3.5.6 when tested at 25 ± 2 °C (77 ± 4 °F).

3.5.5 Peel Adhesion: When tested in accordance with 4.5.7, the specimen assemblies shall meet the requirements of Table 1. The manufacturer shall select the type of adhesive to be used. The adhesive shall meet all the requirements specified herein.

TABLE 1 – PERFORMANCE REQUIREMENTS AND TEST PARAMETERS FOR INDIVIDUAL MATERIALS

Property	Size	Type A	Type B	Type C	Type D	Type E	Type F	Type G 1/	Type H
Tensile Strength, PSI, Min.		1500	1200	600	1800	4000	2200	1000	1500
Ultimate Elongation, % Min		250	250	200	300	300	300	250	250
Heat Shock, Temperature, °C		225	225	250	300	300	225	175	225
Low Temperature, Flexibility, °C		-55	-55	-75	-55	-55	-55	-20	-55
Dynamic Shear, Pounds Force (Newtons), Min Temperature 25 ± 2 °C (77 ± 4 °F) 100 ± 2 °C (212 ± 4 °F) (Except W1 and W2 Adhesives)	 18 18	 67 (300) 25 (110)	 67 (300) N/A	 67 (300)	 67 (300) 25 (110)	 67 (300)	 67 (300)	 67 (300) 6.7 (30)	 67 (300) 25 (110)
Static Load, Pounds (Kilograms) Temperature 25 ± 2 °C (77 ± 4 °F) 100 ± 2 °C (212 ± 4 °F) (Except W1 and W2 Adhesives) Followed by requirement for Dynamic Shear at 25 ± 10 °C Pounds Force (Newtons), Min.	18	 44 (20) 11 (5) 67 (300)	 44 (20) N/A 67 (300)	 44 (20)	 44 (20) 11 (5) 67 (300)	 44 (20)	 44 (20)	 22 (10) 1.1 (0.5) 67 (300)	 44 (20) 11 (5) 67 (300)
Fluid Immersion, Temperature °C MIL-PRF-87257 or MIL-PRF-83282 MIL-DTL-5624, Grade JP-5 MIL-PRF-23699 Salt Solution, 5% AMS 1424 ASTM D 3487 (type G only) ASTM D 4814 (type H only) A-A-52557 (type H only) MIL-PRF-6083 (type H only) A-A-59133 (type H only) Followed by Requirements for Dynamic Shear at 25 ± 2 °C Pounds Force (Newton), Min.	18	50 ± 2 34 (150)	25 ± 2 34 (150)	25 ± 2 34 (150)	70 ± 2 34 (150)	70 ± 2 34 (150)	70 ± 2 34 (150)	25 ± 2 34 (150)	25 ± 2 34 (150)

TABLE 1 – REQUIREMENTS AND TEST PARAMETERS FOR INDIVIDUAL MATERIALS (CONT'D)

Property	Size	Type A	Type B	Type C	Type D	Type E	Type F	Type G 1/	Type H
Thermal Age, Temperature °C Followed by Requirements for Dynamic Shear at 25 ± 2°C Pounds Force (Newtons), Min.	18	175 ± 3 67 (300)	135 ± 3 67 (300)	175 ± 3 67 (300)	200 ± 3 67 (300)	200 ± 3 67 (300)	200 ± 3 67 (300)	100 ± 3 67 (300)	150 ± 3 67 (300)
Dynamic Shear at 25 ± 2°C	18	67 (300)	67 (300)		67 (300)			67 (300)	67 (300)
Peel Adhesion Pounds Per Inch Width, Min. (N/25 mm)	18	15 (67)	15 (67)	15 (67)	15 (67)	15 (67)	15 (67)	15 (67)	15 (67)

1/ the properties listed are based on performance with W1 adhesive. This material was developed where low fire hazard characteristics was its primary consideration. Therefore the use of hot melt adhesive is recommended.

3.5.6 Insulation Resistance: When tested in accordance with 4.5.8, the insulation resistance shall not be less than 1000 MΩ.

3.5.7 Altitude Immersion: Specimen assemblies shall be tested in accordance with 4.5.9. Discoloration of materials during this test shall not be cause for rejection.

3.5.8 Tensile Strength and Ultimate Elongation: When tested in accordance with 4.5.10, the specimens shall meet the requirements of Table 1.

3.5.9 Heat Shock: When tested in accordance with 4.5.11, the specimens shall show no evidence of flowing, cracking, or dripping during the conditioning period or after removal from the oven.

3.5.10 Low Temperature Flexibility: When tested in accordance with 4.5.12, the specimens shall show no evidence of cracking.

3.5.11 Acid Gas Generation (Type G only): Acid generation shall be 1.5% maximum when tested per 4.5.13.

3.5.12 Limited Oxygen Index (Type G only): The limiting oxygen index shall be 30 minimum when tested per 4.5.14.

3.5.13 Temperature Index (Type G only): The temperature index shall be 225 °C minimum when tested per 4.5.15. The temperature index of a material is the temperature at which the limiting oxygen index of a material is 20.8%.

3.5.14 Toxicity Index (Type G only): Toxicity index shall be 3.0 maximum when tested per 4.5.16.

3.5.15 Smoke Index (Type G only): The smoke index shall be 80 maximum when tested per 4.5.17.

3.5.16 Fungus Resistance: When tested in accordance with 4.5.18, the test specimens shall exhibit tensile strength, ultimate elongation, and dielectric strength not worse than the original values for tensile, elongation and dielectric strength for the unconditioned material. Visual growth rating shall not be applicable. Material type G is not applicable.

3.6 Workmanship

When examined as specified in 4.5.1, the components shall be free from foreign material, flaws, pinholes, bubbles, cracks and inclusions.

4. QUALITY ASSURANCE

4.1 Responsibility for Inspection

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all contract inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein. The purchaser reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for Compliance: All items must meet all requirements of Sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the purchaser for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the purchaser to acceptance of defective material.

4.1.2 Test Equipment and Inspection Facilities: Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with ANSI/NCSL L540-1 or equivalent standards.

4.2 Classification of Inspections

The inspections specified herein are classified as follows:

a. Qualification by Certification Inspection (see 4.3).

b. Retention of Qualification by Certification Inspection (see 4.4).

4.2.1 Inspection Conditions: All test specimens, measurement gages and test equipment shall be conditioned for 4 h at 25 ± 2 °C (77 ± 4 °F) and a relative humidity of 50 ± 5% prior to testing. When components are tested after heat shrinking, the component shall be conditioned after shrinking. Time and temperature of shrinking shall be as specified in the applicable specification sheet.

4.3 Initial Qualification by Certification Inspection

The manufacturer shall develop initial qualification inspection data, which consists of all applicable examination and tests performed in the group sequence as specified in Table 2. A request for qualification shall be made to the qualifying activity (see 7.1). The request shall include a test report indicating the results of all test requirements specified herein. The qualifying activity has the authority to impose specific specification test requirements to resolve test failures/discrepancies. The manufacturer shall not make any changes in process control inspections, quality conformance inspections, or manufacturing control drawings (editorial changes are acceptable) without the express approval of the manufacturers quality assurance activity.

4.3.1 Initial Qualification Samples: For each component part number tested, the number of samples subjected to each test shall be in accordance with Table 2. Sample units shall be produced with equipment and procedures normally used in production. Samples shall be from the same production lot for each sample type submiited for qualification.

4.3.2 Qualification by Similarity: For parts which differ only in geometry from those submitted for qualification, the manufacturer shall provide data from control drawings which describes the dimensions specified in 3.1 and 3.3. This data shall be tabulated and compared against the dimensional requirements. The extent of qualification testing by similarity shall be specified by the qualifying activity.

4.4 Retention of Qualification by Certification Inspection: Retention of qualification by certification inspection shall occur every 36 months after the initial qualification date. The qualifying actvitiy shall impose the same requirements as for initial qualification by certification (see 4.3) except the test report shall only consist of those tests in the sequence shown as specified in Table 2.

4.4.1 Retention of Qualification Samples: Sample units shall be selected from those types covered by a single detail specification sheet in accrodance with 3.1. One sample representing each configuration and material type previously qualified shall be tested.

TABLE 2 – QUALIFICATION BY CERTIFICATION INSPECTION

Examination of Test	Test Specimens Size (1)	Test Specimens Size (2)	Requirement Paragraph	Test Method Paragraph
Group I Examination of Product	All	All	3.1, 3.2, 3.3, 3.4, 3.6	4.5.1
Group II – Material Properties Tensile Strength Ultimate Elongation Heat Shock Low Temperature Flexibility	M (150 x 150 X 2 mm)	5 5 3 3	3.5.8 3.5.8 3.5.9 3.5.10	4.5.10 4.5.10 4.5.11 4.5.12
Group II – Material Properties (Type G only) Acid Gas Generation Limited Oxygen Index	M M (150 x 150 X 3 mm)	3 3	3.5.11 3.5.12	4.5.13 4.5.14
Temperature Index	M (150 x 150 X 3 mm)	3	3.5.13	4.5.15
Toxicity Index Smoke Index	M M	3 3	3.5.14 3.5.15	4.5.16 4.5.17
Fungus Resistance Followed by Tensile Strength Ultimate Elongation Dielectric Strength		3	3.5.16 3.5.8 3.5.8	4.5.18 4.5.10 4.5.10 ASTM D149
Group III – Performance Tests Dynamic Shear 25 °C 100 °C Static Load 25 °C 100 °C Followed by Dynamic Shear at 25 °C ± 2 °C Fluid Immersion MIL-PRF-87257 or MIL-PRF-83282 MIL-DTL-5624, Grade JP-5 MIL-PRF-23699 Salt Solution, 5% AMS 1424 ASTM D 3487 (type G only) ASTM D 4814 (type H only) A-A-52557 (type H only) MIL-PRF-6083 (type H only) A-A-59133 (type H only) Followed by Dynamic Shear at 25 °C ± 2 °C Peel Adhesion Thermal Age	18 18 18 18 18 18 18 18 18	3D 3D 3D 3D 3D, 3P 3D, 3P 3D, 3P 3D, 3P 3D, 3P 3D, 3P	3.5.1 3.5.2 3.5.1 3.5.3 3.5.1 3.5.5 3.5.4	4.5.3 4.5.3 4.5.5 4.5.3 4.5.7 4.5.6

TABLE 2 – CERTIFICATION COMPLIANCE INSPECTION (CONT'D)

Examination of Test	Test Specimens Size (1)	Test Specimens Size (2)	Requirement Paragraph	Test Method Paragraph
Dynamic Shear at 25 °C ± 2 °C Peel Adhesion Followed by Dynamic Shear at 25 °C ± 2 °C Peel Adhesion	18	3P	3.5.1 3.5.5 3.5.1 3.5.5	4.5.3 4.5.7 4.5.3 4.5.7
Group IV – Sealing Performance Following Test are Sequential Insulation Resistance Altitude Immersion Insulation Resistance Altitude Immersion Insulation Resistance (1) M = Molded Sheet Specimen (2) D = Dynamic Adhesion Specimen P = Peel Adhesion Specimen A = Altitude Immersion Specimen	18	3A	 3.5.6 3.5.7 3.5.6 3.5.7 3.5.6	 4.5.8 4.5.9 4.5.8 4.5.9 4.5.8

4.5 Methods of Examination and Test

4.5.1 Examination of molded components: The molded components shall be examined to assure compliance with the following requirements:

a. SAE detail specification sheet (see 3.1).

b. Material properties (see 3.2).

c. Dimensions (see 3.3).

d. Color (see 3.4).

e. Workmanship (see 3.6)

4.5.2 Specimen Preparation: Prepare test specimen assemblies as required for the individual test procedures. An assembly will consist of a metal backshell adapter (such as M85049/60), a heat-shrinkable boot, a cable stub and a suitable adhesive to bond the components together. Guidance concerning the selection of adhesives is given in Table 3. One size will be used. A description of the assembly and the components to be used is shown in Figure 1 and Figure 2.

Use tubing complying with the design specification shown for the individual molded component materials.

Type A – AMS-DTL-23053/16

Type B – AMS-DTL-23053/1 Class 2

Type D – AMS-DTL-23053/13

Type G – AMS-DTL-23053/5

Type H – AMS-DTL-23053/13

The adhesive used shall be fully described by the applicant for qualification, selected from Table 3 and shall be approved by the qualifying activity.

4.5.3 Dynamic Shear: For each test temperature to be used in this test, prepare three assemblies of the shell sizes described in Figure 1. Carry out the test in a tensile test machine equipped with an environmental chamber which will permit selection of the specified test temperature (see Figure 3). The rate of jaw separation shall be 2 in (50 mm) per minute. The test specimens shall be conditioned for at least one hour at the specified temperature of Table 1 prior to performance of the test. Allow 5 min for temperature stabilization after closing the chamber after installation of each specimen in the jaws. Record the maximum force to separate the assembly. The test result shall be the average of the three individual breaking forces (see 3.5.1).

TABLE 3 – ADHESIVE COMPATIBILITY GUIDE

Bonding Adhesives Type Code	Bonding Adhesives Description	Bonding Adhesives Properties	Bonding Adhesives Guide to Temperature Range °C	Bonding Adhesives Guide to Storage Life	Compatible Materials Molded Shape Material Type (see 1.2)	Tubing Type
R	Curable Single Component	Thermosetting Flexible Fluid Resistant	-75 to +150	2 Years at below 25 °C	A, B, G, H	AMS-DTL-23053/1, /5, /6, /13 and /16
S	Curable Hot Melt	Thermosetting Flexible	-75 to +150	2 Years at below 25 °C	A, B. G	AMS-DTL-23053/1 and /5
U	Epoxy Resin with Polyamine/amide Hardener	Thermosetting More Flexible Than Z Fluid Resistant	-75 to +150	2 Years at below 25 °C	A, B. D, G, H	AMS-DTL-23053/1, /5, /13 and /16
T	Pre-Catalyzed Epoxy Resin	Thermosetting Fluid Resistant	-75 to + 150	3 Years at below 25 °C	H	AMS-DTL-23053/16
V	Silicone Compatible	Very Flexible Low Operating Temperature	-75 to +140	1 Year at below 25 °C	C	Not Applicable
W1	Hot Melt-Limited Temperature Range	Thermoplastic Flexible	-55 to +105	N/A	A, B. G, H	AMS-DTL-23053/1, /5 and /16
W2	Hot Melt-Limited Temperature Range	Thermoplastic Flexible	-40 to +70	N/A	A, B. G, H	AMS-DTL-23053/1, /5 and /16
Z	Epoxy Resin with Polyamide Hardener	Thermosetting Fluid Resistant	-55 to +135	1 Year at below 25 °C	A, B, D, G, H	AMS-DTL-23053/1, /5, /13 and /16

Notes:

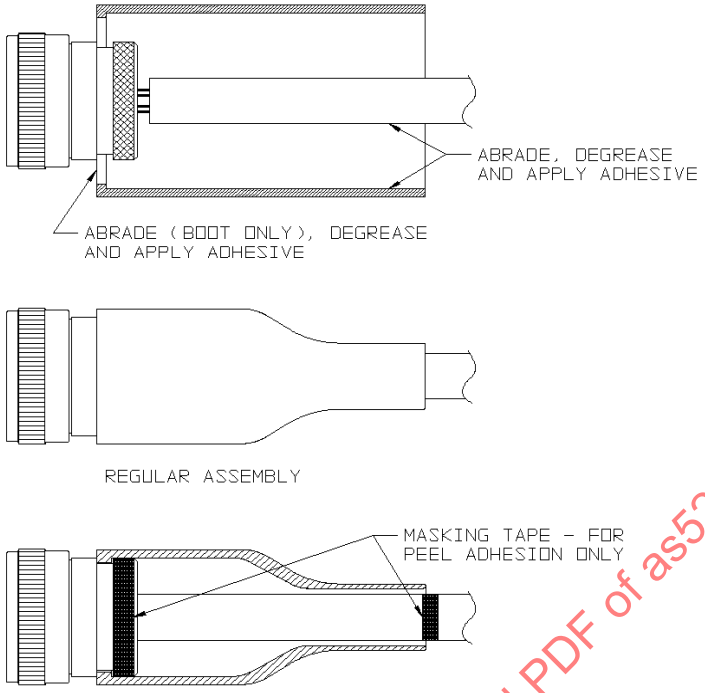
1. Warning: Users are advised to seek guidance from the manufacturer or supplier where adhesives are required to bond to jackets and/or backshells.
2. The purchaser shall specify the materials and adhesives for compatibility.

TABLE 4 – PHYSICAL PROPERTIES FOR TYPE G

Property	Requirement	Test Method
Dimensions, Inches as received after shrinkage	Shall be in accordance with the applicable drawing specification or procurement document	120 °C (248 °F)
Tensile strength, psi, min	1000	4.5.10
Ultimate elongation, %, min	100	4.5.10
Low temperature flexibility	No cracking	3.5.10, -30 ± 2 °C, 4h ± 15m
Heat shock	No dripping, flowing or cracking	3.5.9, 175 ± 2 °C, 4h ± 15m psi
Heat resistance Tensile strength, psi, min Elongation, %, min	 720 100	150 ± 3 °C, 168h ± 2 hr
Fluid resistance Tensile strength, psi, min Elongation, %, min	 1450 250	4.5.5
Dielectric strength, Volts/mil, min	200	ASTM D 149
Volume resistivity, Ohm-cm, min	10^{12}	ASTM D 257
Water absorption 24 ± 2 h at 25 ± 2 °C, % max 24 ± 2 h at 70 ± 2 °C, % max	0.5	ASTM D 570
Flammability Ave. time of burning Sec., max Ave. extent of burning, In. (mm) max	 100 25	ASTM D 635
Specific gravity, max	1.5	ASTM D 792

TABLE 5 – PHYSICAL PROPERTIES FOR TYPE H

Property	Requirement	Test Method
Dimensions, Inches as received after shrinkage	Shall be in accordance with the applicable drawing specification or procurement document	135 °C (275 °F)
Elastic memory, %, min Expansion Retraction	190 95	AS81765, paragraph 4.6.2
Tensile strength, psi, min	1500	4.5.10
Ultimate elongation, %, min	250	4.5.10
Low temperature flexibility	No cracking	3.5.10, -75 ± 2 °C, 4h ± 15m
Heat shock Tensile strength, psi max Ultimate Elongation, % min	1400 250	3.5.9, 175 ± 2 °C, 4h ± 15m psi
Heat resistance Tensile strength Ultimate elongation, %, min	1400 250	3.5.8, 160 ± 3 °C for 168 h ± 2 h
Fluid resistance Tensile strength, psi, min Elongation, %, min	1450 250	4.5.5
Dielectric strength, Volts/mil, min	200	ASTM D 149
Volume resistivity, Ohm-cm, min	10^{12}	ASTM D 257
Copper mirror corrosion Visual examination	No corrosion mirrors	AS81765 paragraph 4.6.8
Water absorption 24 ± 2 h at 25 ± 2 °C, % max	0.5	ASTM D 570
Flammability Ave. time of burning Sec., max Ave. extent of burning, In. (mm) max	30 25	ASTM D 635
Fungus resistance	3.5.16	4.5.18
Specific gravity, max	1.4	ASTM D 792



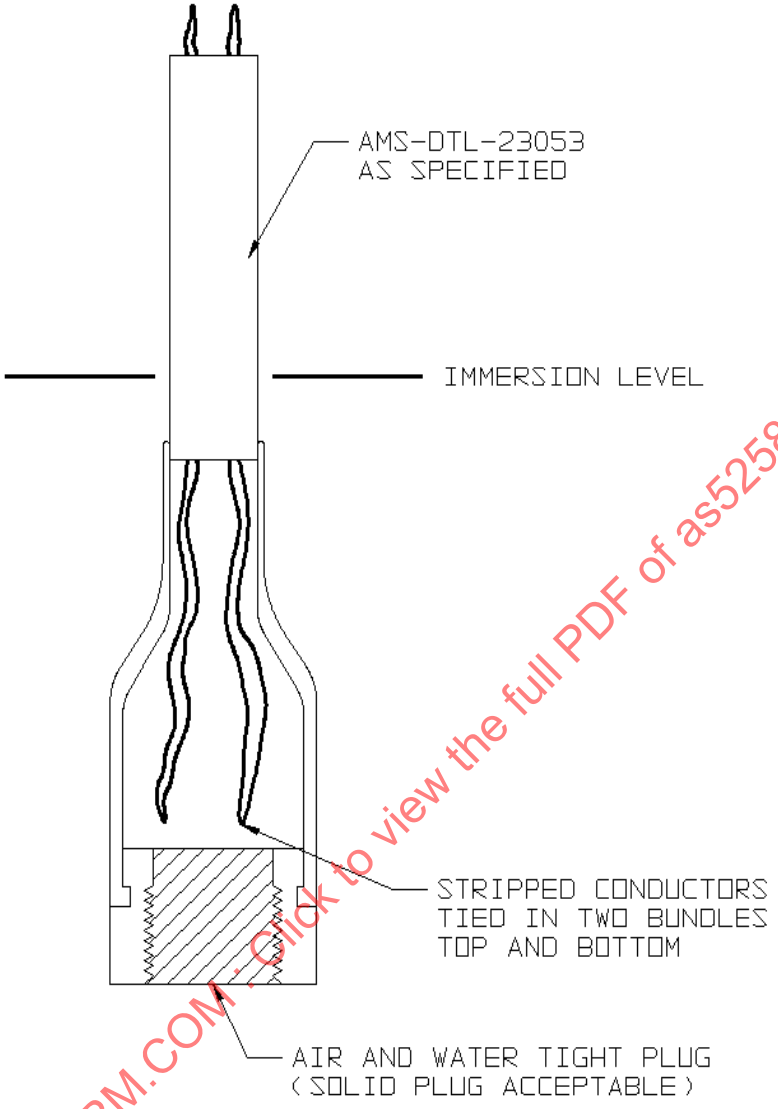
Specimen Assemblies

Component	Size
Adapter M85049/60-1-XXX	18
Molded Component Dash Number M85049/140-XXXXXX M85049/141-XXXXXX M85049/142-XXXXX	04
Cable Diameter Range	0.40 ± .02 (10.2 ± 0.51 mm)

NOTES:

1. Adhesive selection and application to be specified by component manufacturer.
2. Prepare the cable by covering an unjacketed cable with heat-shrinkable sleeve selected from AMS-DTL-23053 and known to be compatible with molded component material being tested. The heat shrinkable sleeving is allowed to be recovered onto the cable jacket to ensure a more uniform diameter. The object of the test is to a) measure the shear strength of the actual adhesive and b) the shear strength of the adhesive to the heat shrink sleeving and molded shape. To ensure repeatability the interface needs to be symmetrical.
3. Prepare the regular assembly for all tests except peel adhesion. Prepare the peel adhesion assembly only for those tests where peel adhesion is required. Place a strip of ½-inch (13 mm) wide masking tape in the location indicated on the peel adhesion specimens to provide a starting point for the test. Follow manufacturer's instructions for installation of adhesive and molded component.

FIGURE 1 – PREPARATION OF TEST SPECIMEN ASSEMBLIES



NOTE: Measure conductor to conductor insulation resistance before and after altitude immersion cycle.

FIGURE 2 – ALTITUDE IMMERSION TEST ASSEMBLY

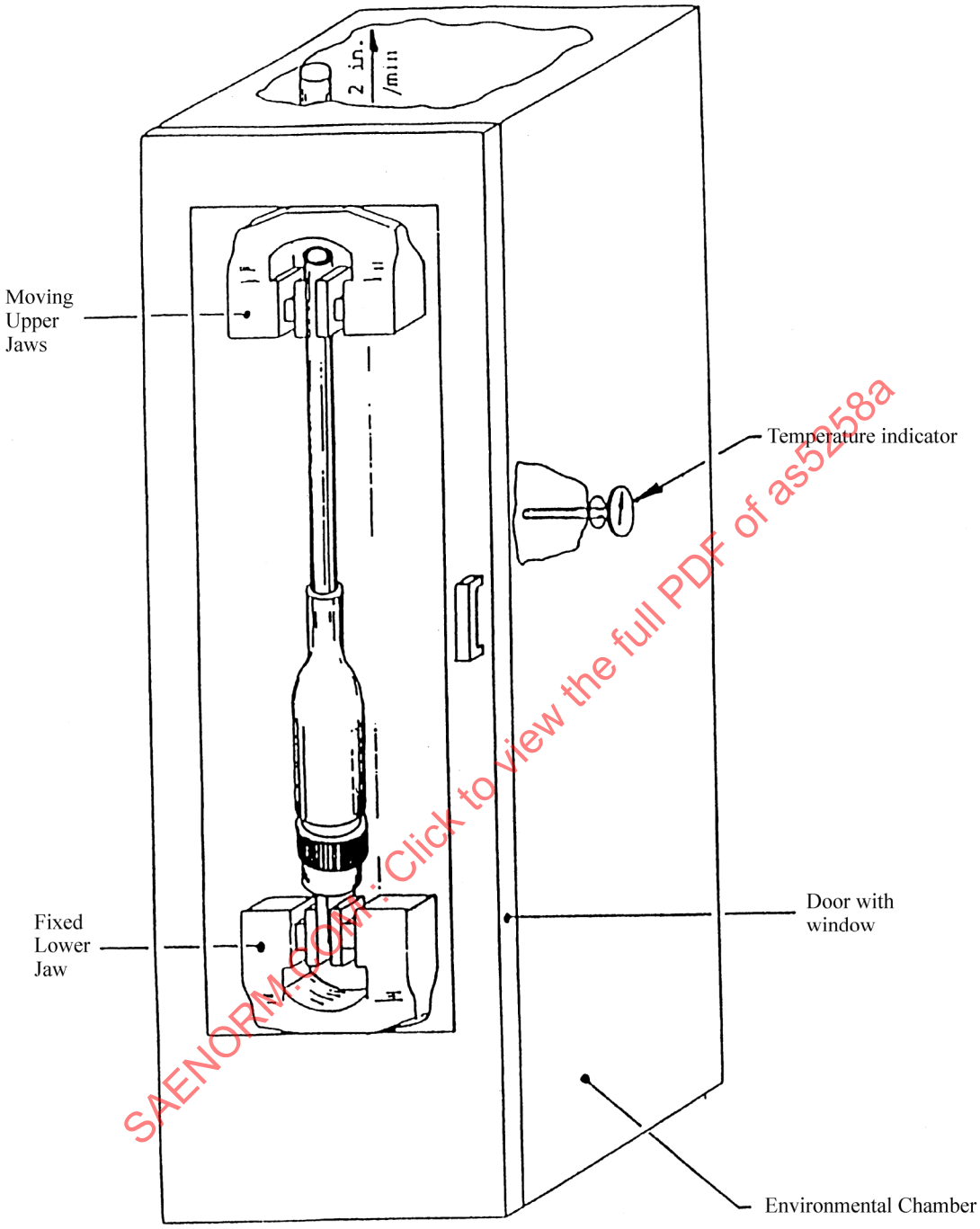


FIGURE 3 – DYNAMIC SHEAR TEST

4.5.4 Static Load: For each test temperature specified in Table 2, prepare three size-18 assemblies as described in Figure 1. Perform the test in a static tensile test fixture installed in an oven of sufficient temperature range to permit selection of the specified test temperatures (see Figure 4). Condition the specimen at the test temperature for at least 1 h before application of the test load. Maintain the applied load for a period of 4 ± .025 h. The free cable length shall be 6 in (150 mm). At the completion of the test, examine the cable-to-boot junction for evidence of pullout and record the length of pullout. After cooling to room temperature, subject the specimens to the dynamic shear test of 4.5.3 at 25 ± 2 °C (77 ± 4 °F) (see 3.6.2).

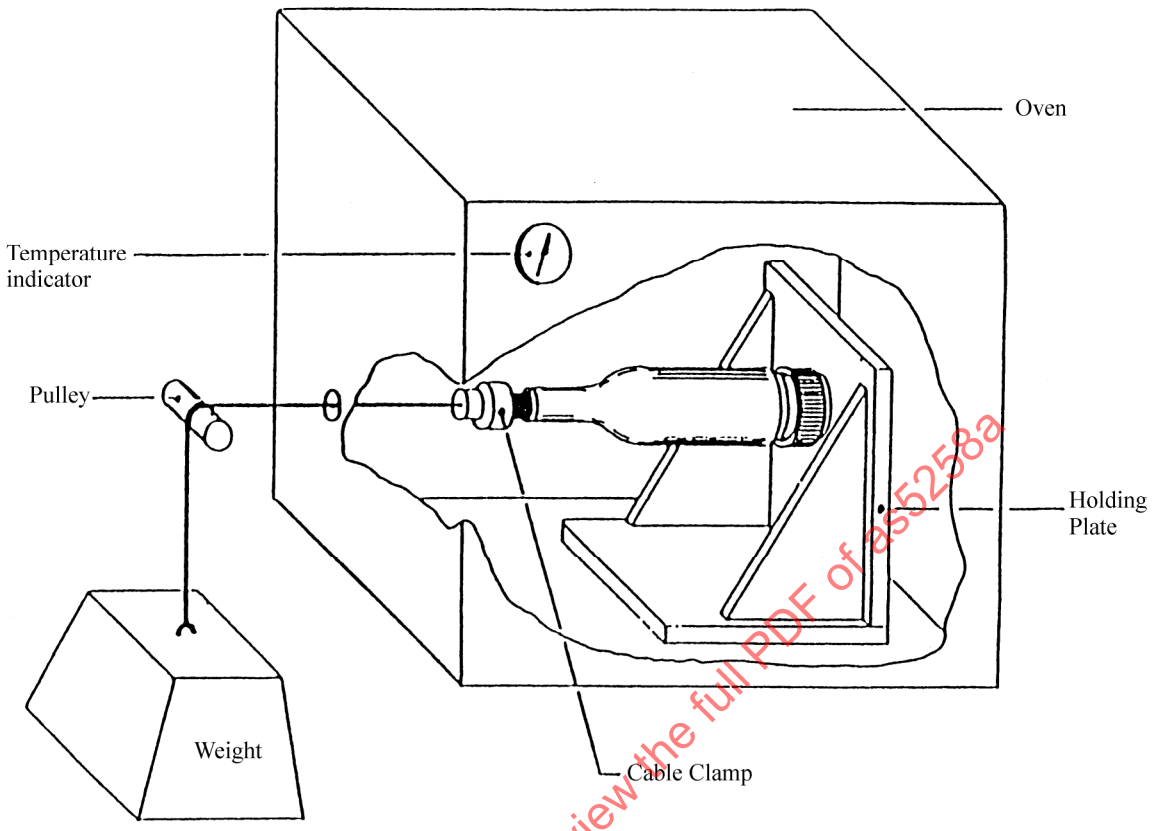


FIGURE 4 – STATIC LOAD TEST

4.5.5 Fluid Immersion: For each fluid to be tested, prepare six size-18 specimen assemblies, three regular and three peel adhesion, as described in Figure 1. Immerse the six specimens in each fluid for 24 ± 0.5 h at the specified temperature leaving the cable ends out of the fluid. Fluid temperatures shall be as specified in Table 1 for each material type (see 3.5.3).

Immersion fluids are as follows:

a. Hydraulic fluid: MIL-PRF-87257 or MIL-PRF-83282

b. JP-5 fuel: MIL-DTL-5624, Grade JP-5

c. Lube oil: MIL-PRF-23699

d. Salt water: 5% solution

e. Deicing fluid: AMS 1424

f. Automotive gasoline; ASTM D 4814 (type “H” only)

g. Diesel fuel: A-A-52557 (type “H” only)

h. Hydraulic fluid: MIL-PRF-6083 (type “H” only)

i. Mineral insulating oil: ASTM D 3487 (type “G” only)

j. Cleaning compound A-A-59133 (type “H” only)