Conf-820306--8

Temperature standards, what and where -- resources
for effective temperature measurements^a

MASTER

Wiley W. Johnston, Jr.

Oak Ridge National Laboratory^b, P.O. Box X, Oak
Ridge, Tennessee 37830

CONF-820306--8

DE82 009619

ABSTRACT

Many standards have been published to describe devices, methods, and other topics. How they are developed and by whom are briefly described, and an attempt is made to extract most of those relating to temperature measurements. A directory of temperature standards and their sources is provided.

Subject Index: Standard documents, specifications, test methods

INTRODUCTION

There is no single source in the open literature to which an engineer or scientist can turn to find a listing of temperature standards. This means that this individual may have to search through many documents to see if there is a standard applicable to his or her particular need. This paper has been prepared to provide a quick reference to temperature standards for the engineer or scientist involved in thermometry. Not all standards can be covered; therefore, we will restrict this presentation to some of those standards most common in the field of temperature measurements. This paper presents a brief discussion of the development of standards, a description of the two types of temperature standards most commonly used in industrial applications, and a tabulation of U.S. temperature standards and their sources.

BACKGROUND

The standards addressed here are formal documents which define a material, device, or a method of test for some specific purpose. Physical standards, such as fixed points, gas thermometers, resistance thermometers, thermocouples, and pyrometers will not be considered in this paper. The field of standards covers a long list of diverse subjects and purposes. The title of "Standard" applied to any document usually implies wide usage or acceptance. Temperature standards include methods of test, specifications, recommended practices, definitions, tables, and other subjects. In a field of over 70 000 standards, more than 200 deal with some aspect of temperature

DISCLAIMER

measurement. Through the years, standards have been prepared to help promote uniformity and reliability of research output and commercial industrial product. With greater sophistication of industrial processes and the growing emphasis on quality assurance, standards have been generated in ever-increasing numbers. A standard is conceived with the need for a specification or guideline describing a particular material, device, or test procedure. The Standard Specification is a precise statement of mechanical and behavioral characteristics of a device or thing, usually including a recommendation of the method for determining and documenting conformance. The development and writing of the standard must be done by people who are knowledgeable in the field. In the United States, most of the work is done by voluntary contributors supported by their companies, the government and its agencies, or private research and educational institutions. The actual development of a draft of a standard is usually performed by a committee of experts under the auspices of one of the national professional societies or other organizations such as ANSI, ASTM, ISA, and SAMA (see Table I). The proposed standard is reviewed by the sponsoring organization; and, if approved, it is then formally issued as a standard. Standards have been developed by most of the industrial nations of the world, and several international organizations have been established to develop standards on all topics. Only U.S. Standards are considered here.

DESCRIPTION

In the field of thermometry, two types of standards are most common: Standard Specifications and Standard Testing Methods. Standard Specifications discuss and define materials, devices, and characteristics of temperature measurement sensors, systems, and components; Standard Test Methods provide a uniform procedure for verifying or testing the conformance of materials and characteristics to the criteria defined in the Specifications.

The Standard Specification has several functions. First, it provides technical information useful to the designer in his selection of appropriate devices for use in his application. Second, it provides both the buyer and the seller of a product with a common language and a uniform description of a device clearly defining physical dimensions and performance characteristics and delineating responsibility for testing and certification. Finally, the specification provides standardization of design, so that similar devices will be interchangeable.

Standard Test Methods are complementary to the Specifications. A typical testing method describes an

orderly and uniform procedure for testing a specified item for conformance to the specification. It should contain detailed directions for performing a test, including description of the apparatus to be used, the method of sample preparation, and calculations to be performed. Sufficient theoretical and technical discussion should be presented to enable the user to understand and properly conduct the test and interpret the results.

Both types of standards should be subjected to periodic review and updating in order to maintain credibility and prevent technical obsolescence. The review process is essentially the same as that followed in the development of the original standard.

The development of a standard frequently points out the need for supporting documents with detailed discussions much too long and complex to be treated in the body of the standard. To fill these needs, manuals, recommended practices, monographs, etc., are written to cover in detail subjects not appropriate for inclusion in Standards.

GUIDE TO STANDARDS

Finding the precise standard needed in any one particular situation is something like the proverbial search for the needle in a haystack, but there is hope. Large data-base systems and computer searches are extremely useful. This catalog was partially prepared in this manner using keywords of Temperature, Temperature Measurement(s), Thermister, Thermocouple, Resistance Thermometer, Liquid (Hg)-in-Glass Thermometers, Thermometer, Pyrometer, etc.

Table I lists the various sponsoring organizations, giving the addresses from which copies and information on the standards may be obtained for a reasonable fee. Table II presents a list of standards, indicating the title, a reference number, and the identification of the sponsoring organization. In the case of the American National Standards Institute (ANSI), most standards have dual reference, because they are both written by an independent sponsoring group and adopted by ANSI.

ACKNOWLEDGMENTS

The author would like to express his appreciation to the National Standards Association, Washington, D.C., the Information Handling Service, Englewood, CO, and to the Oak Ridge National Laboratory Library System for their invaluable assistance in the preparation of this catalog.

REFERENCES

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^bOak Ridge National Laboratory is operated by Union Carbide Corporation under Contract No. W-7405-eng-26 with the U.S. Department of Energy.

TABLE I. Organizations sponsoring the development of standards

ALCA	American Leather Chemists Association University of Cincinnati - Loc 14 Cincinnati, OH 45221 (513) 475-2643
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018 (212) 354-3300
AOCS	American Oil Chemists Society 5085 Sixth St. Champaign, Il 61820 (172) 359-2344
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASM	American Society of Metals Metals Park, OH 44073 (216) 338-5151
ASME	American Society of Mechanical Engineers 345 E. 47th St. New York, NY 10017 (212) 644-7722
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103 (215) 299-5400
DOD	Department of Defense
EIA	Electronic Industries Association 2001 Eye St., NW Washington, DC 20006 (202) 547-4900
GSA	General Services Administration
ISA	Instrument Society of America 67 Alexander Drive, P.O. Box 12277 Triangle Park, NC 27709 (919) 594-8411
RDT	Nuclear Standards Program Information Center Oak Ridge National Laboratory P.O. Box Y Oak Ridge, TN 37830 (615) 574-7886

SAE Society of Automotive Engineers
 400 Commonwealth Drive
 Warrendale, PA 15096
 (412) 775-4841

SAMA Scientific Apparatus Makers Association
 1101 16th St., NW
 Washington, DC 20036
 (202) 223-1360

TABLE II. List of standards for thermocouples, including title, identification of sponsoring organization, and reference number.

Thermocouple

Standard Exposed Junction Thermocouple for Controlled Conduction Errors in Measurement of Air or Exhaust Gas Temperature	SAE	ARP690
The Preparation and Use of Chromel-Alumel Thermocouples for Turbojet Engines	SAE	AIR46
Temperature Measurement Thermocouples	ISA	MC96.1
Standard Specifications for Clinical Thermometers (Maximum Self-Registering, Mercury in Glass)	ASTM	E667
Standard Specifications for Metal Sheathed Base Metal Thermocouples	ANSI	ASTM E608
Standard Test Methods for Comparing EMF Stability of Single Element Base Metal Thermocouple Materials in Air	ANSI	ASTM E601
Sheathed Base Metal Thermocouple Material, Specifications for	ANSI	ASTM E585
Standard Specifications for Duplex, Base Metal Thermocouple Wire with Glass Fiber or Silica Fiber Insulation	ANSI	ASTM E574
Standard Meth. for Calibration of Refractory Metal Thermocouples using an Optical Pyrometer	ANSI	ASTM E452
Standard Specifications for Thermocouples, Sheathed, Type K, for Nuclear or for Other High Reliability Applications	ANSI	ASTM E235
Standard Temperature Electromotive Force (EMF) Tables for Thermocouples	ANSI	ASTM E230
Standard Method for Calibration of Thermocouples by Comparison Techniques	ASTM	E220
Standards for Temperature Measurement Thermocouples	ANSI	MC96.1
Standard for Temperature Measurement Thermocouples	ANSI	C96.1
Thermocouple - Aircraft Engine Gasket Type	DOD	AN5540
Thermocouples and Resistance Temperature Elements (Naval Shipboard Use)	DOD	QPL-24388

Thermocouples, Aircraft Engine Spark Plug Gasket Type
Drawing AN5494

DOD QPL-5494-5

Thermocouple, Engine Cylinder, Bayonet Type

DOD MS-90324A

Wire, Thermocouple, Identification Marking and Color
Coding of

DOD MIL-STD-687A

Thermocouple, Engine, Cylinder, Bayonet Type, MS90324

DOD MIL-T-81272

Thermocouple and Resistance Temperature Element
Assemblies, Type RTE (EM Installation)

DOD MIL-T-24388/8

Thermocouple and Resistance Temperature Element
Assemblies, Type TCE (EM Installation)

DOD MIL-T-24388/7

Thermocouple and Resistance Temperature Element
Assemblies, Type RTE (by Installation)

DOD MIL-T-24388/6

Thermocouple and Resistance Temperature Element
Assemblies, Type TCE (by Installation)

DOD MIL-T-24388/5

Thermocouple and Resistance Temperature Element
Assemblies, Type RTE (BB Installation)

DOD MIL-T-24388/4

Thermocouple and Resistance Temperature Element
Assemblies, Type TCE (BB Installation)

DOD MIL-T-24388/3

Thermocouple and Resistance Temperature Element
Assemblies, Type RTE (TW Installation)

DOD MIL-T-24388/2

Thermocouple and Resistance Temperature Element
Assemblies, Type TCE (TW Installation)

DOD MIL-T-24388/1

Thermocouple and Resistance Temperature Element
Assemblies, General Specification for (Naval Shipboard)

DOD MIL-T-24388B

Wire, Electrical, Copper and Constantan, Thermocouple

DOD MIL-W-5908D

Wire, Electrical, Iron and Constantan, Thermocouple

DOD MIL-W-5845C

Thermocouple Leads, Iron and Constantan, Chromel and
Alumel, and Copper and Constantan, Installation of
(ASG)

DOD MIL-T-5679A

Thermocouple Material, Copper and Constantan, Solid
Conductor (Bare, Fiberglass Insulated, and Sheathed
Over Fiberglass Insulation)

RDT C 7-3T

Thermocouple Material, Copper-Constantan, Mineral-Oxide
Insulated, Sheathed

RDT C 7-4T

Thermocouple Material, Chromel P and Alumel, Solid Conductor (Bare, Fiberglass Insulated, and Sheathed Over Fiberglass Insulation)

RDT C 7-5T

Thermocouple Material and Thermocouple Assembly, Chromel-P versus Alumel, Stainless Steel Sheathed, Magnesium Oxide Insulated

RDT C 7-6T

Thermocouple Materials, Platinum and Platinum 10 Percent Rhodium Wires, Noninsulated, Standard Grade

RDT C 7-7T

Thermocouple Assemblies, Magnesium Oxide Insulated, Stainless Steel Sheathed

RDT C 7-16T

Thermistors

General Specification for Glass Coated Thermistor Beads and Thermistor Beads in Glass Probes and Glass Rods (Negative Temperature Coefficient)

ANSI EIA RS337

General Specification for Thermistors, Insulated and Non-Insulated

ANSI EIA RS309

Thermistor Definitions and Test Meth.

ANSI EIA RS275-A

Thermistor, (Thermally Sensitive, Resistor) Insulated General Specification for

DOD QPL-23648-10

Electronic Equipment Parts Selected Standards for Resistors, (Including Thermistors) Crystals, Semiconductor Devices and Tubes

DOD MIL-STD-242F

Thermistor, (Thermally Sensitive Resistor), Hermetically Sealed, Positive Temperature Coefficient Style RTH42

DOD MIL-T-23648/19

Thermistor, (Thermally Sensitive Resistor), Insulated Negative Temperaturecoefficient Style RTH40

DOD MIL-T-23648/18

Thermistor, (Thermally Sensitive Resistor), Insulated Negative Temperaturecoefficient Style RTH38

DOD MIL-T-23648/17

Thermistor, (Thermally Sensitive Resistor), Insulated Negative Temperaturecoefficient Style RTH36

DOD MIL-T-23648/16

Thermistor, (Thermally Sensitive Resistor), Insulated Negative Temperaturecoefficient Style RTH34

DOD MIL-T-23648/15

Thermistor, (Thermally Sensitive Resistor), Insulated Negative Temperaturecoefficient Style RTH32

DOD MIL-T-23648/14

Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperature Coefficient Style RTH30
 DOD MIL-T-23648/13(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperature Coefficient Style RTH28
 DOD MIL-T-23648/12(1)
 Thermistor, (Thermally Sensitive Resistor), Insulator
 Negative Temperature Coefficient Style RTH26
 DOD MIL-T-23648/11(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperature Coefficient Style RTH24
 DOD MIL-T-23648/10(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Positive Temperature Coefficient Style RTH22
 DOD MIL-T-23648/9
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Positive Temperature Coefficient Style RTH20
 DOD MIL-T-23648/8(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Sytel RTH18
 DOD MIL-T-23648/7(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Style RTH16
 DOD MIL-T-23648/6(1)
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Style RTH14
 DOD MIL-T-23648/5
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Style RTH12
 DOD MIL-T-23648/4
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Style RTH10
 DOD MIL-T-23648/3
 Thermistor, #Thermally Sensitive Resistor, Insulated
 Negative Temperature Coefficient Style RTH06
 DOD MIL-T-23648/2
 Thermistor, (Thermally Sensitive Resistor), Insulated
 Negative Temperaturecoefficient Style RTH06
 DOD MIL-T-23648/1
 Thermistor (Thermally Sensitive Resistor), Insulated
 General Specification for
 DOD MIL-T-23648A(4)

Resistance Thermometers

Standard Temperature Resistance Values for Resistance
 Thermometer Elements of Platinum, Nickel and Copper

SAMA PMC21-4

Standard Methods for Testing Industrial Resistance
 Thermometers

E644

Thermocouples and Resistance Temperature Elements
(Naval Shipboard Use)

	DOD	QPL-24388/9
Bulb, Electrical Resistance, Thermometer, Free Air		
	DOD	QPL-8598-5
Bulb, Electrical Resistance, Thermometer, Free Air, Type B-4		
	DOD	QPL-7258-4
Bulb, Electrical Resistance, Thermometer, Free Air		
	DOD	MS-28038
Thermocouple and Resistance Temperature Element Assemblies, Type RTE EM Installation		
	DOD	MIL-T-24388/8
Thermocouple and Resistance Temperature Element Assemblies, Type TCE EM Installation)		
	DOD	MIL-T-24388/7
Thermocouple and Resistance Temperature element Assemblies, Type RTE by Installation)		
	DOD	MIL-T-24388/6
Thermocouple and Resistance Temperature Element Assemblies, Type TCE by Installation)		
	DOD	MIL-T-24388/5
Thermocouple and Resistance Temperature Element Assemblies, Type RTE BB Installation)		
	DOD	MIL-T-24388/4
Thermocouple and Resistance Temperature Element Assemblies Type TCE BB Installation)		
	DOD	MIL-T-24388/3
Thermocouple and Resistance Temperature Element Assemblies, Type RTE (TW Installation)		
	DOD	MIL-T-24388/2
Thermocouple and Resistance Temperature Element Assemblies, Type TCE (TW Installation)		
	DOD	MIL-T-24388/1
Thermocouple and Resistance Temperature Element Assemblies, General Specification for (Naval Shipboard)		
	DOD	MIL-T-24388B
Thermometer, Recording, Capillary Tube and Bulb, and Resistance		
	DOD	MIL-T-17585B
Bulb, Electrical Resistance, Thermometer, Free Air		
	DOD	MIL-B-8598A(1)
Platinum Resistance Thermometer		
	RDT	C 7-17T

Pyrometer

Standard Methods of Measuring Total Radiance
Temperature of Heated Surfaces Using a Radiation
Pyrometer

	ANSI	ASTM	E639
Pyrometer, Portable, Handheld			
	DOD		MIL-P-18722

Pyrometer, Optical

DOD MIL-P-11879D

Pyrometer, Indicating, Immersion

DOD MIL-P-11570B

Liquid (Hg)-In-Glass Thermometers

Rec. Specifications for General Purpose Glass
Laboratory Thermometers

SAMA LA1

Standard Methods for Verification and Calibration of
Liquid in Glass Thermometers

ANSI ASTM E77

Standard Specifications for Clinical Thermometers
(Maximum Self Registering, Mercury in Glass)

ASTM E667

Standard Specifications for ASTM Thermometers

ASTM E1

Thermometer, Self-Indicating, Liquid in Glass, Minimum,
(Meteorological)

GSA GG-T-356A

Thermometer, Self-Indicating, Liquid in Glass, Maximum,
(Meteorological)

GSA GG-T-355B

Thermometer, Self-Indicating, Liquid in Glass,
(Laboratory)

GSA GG-T-336B

Thermometers, Self-Indicating, Liquid in Glass, for
Machinery and Piping Systems

GSA GG-T-321D(2)

Thermometer, Self-Indicating, Liquid in Glass (Testing
Pocket with Case)

GSA GG-T-318

Thermometers, Self-Indicating, Liquid in Glass

GSA GG-T-315C

Thermometers, Self-Indicating, Mercury in Glass,
(Fever)

GSA GG-T-311A

Thermometers, Self-Indicating, Mercury in Glass,
(Fever)

GSA GG-T-311A

Thermometer, Self-Indicating, Liquid in Glass,
Incubator, 0 Degrees to 70 Degrees C

DOD MIL-T-37594

Thermometer, Self-Indicating, Liquid in Glass, Film
Processing

DOD MIL-T-0036527

Thermometer, Self-Indicating, 5-Inch Scale Size,
Liquid-in-Glass, Mercury

DOD MIL-T-24103(1)

Thermometers, Self-Indicating, Liquid-In-Glass,
ML-438()/PMQ-1, ML-439()/PMQ-1, ML-440()/PMQ-1, and
ML-488()/PM and Case, Thermometer CY-953()/PMQ-1

DOD MIL-T-13133B

Thermometer, Self-Indicating, Liquid-In-Glass (for Precision Level Rod)

DOD MIL-T-13057B

Thermometers, Self-Indicating, Liquid in Glass, Base Line Tape; with Case

DOD MIL-T-12839C

Thermometer, Self-Indicating, Liquid in Glass, Pocket Type

DOD MIL-T-12625C

Thermometer, Self-Indicating, Liquid in Glass (Thermometer ML-352()/UM)

DOD MIL-T-11753B

Thermometer, Self-Indicating, Liquid-in-Glass

DOD MIL-T-1160C

Other Thermometers

Standards for Bimetallic Thermometers

SAMA PMC4-1

Standard Specifications for Hydrometer Thermometer Field Tester for Engine Coolants

ANSI ASTM D1124

Temperature Measurement Instruments and Apparatus (Radiation Thermometers)

ANSI ASME PTC19.3

Cloud and Pour Thermometer Specifications

AOCS H8

Low Softening Point Thermometer Specification

AOCS H7

Titer Test Low Softening Point Thermometer Specifications

AOCS H6

Open Flash Thermometer Specifications

AOCS H5

Thermometer Specifications

AOCS H11

Vegetable Oil Flash Thermometer Specifications

AOCS H10

Specifications for Desiccants, Petroleum Ether and Thermometers Used in Analysis of Oils, Greases and Their Products (Leather Tanning)

ALCA H10

Thermometers, Remote Readign, Self-Indicating, Dial, 1 Gas Actuated

DOD QPL-19646/13

Indicators, Hermo Couple Thermometer

DOD QPL-7884-4

Thermometer, Self Indicating, Bimettalic

GSA GG-T-353D

Hydrometer, Graduated Scale API Gravity (with Thermometer)

DOD MS-36539

Thermometer, Indicating, Capillary Tube and Bulb 2/2
Inch Dial Side

DOD MS-27211B

Standard Parts List for Flight and Mission Essential
Ground Support Equipment

DOD MIL-STD-975B

Thermometer, Self Indicating, Bimetallic, M2

DOD MIL-T-55221(1)

Thermometer, Clinical, Human, Disposable

DOD MIL-T-37832

Thermometer, Self-Indicating, Bimetallic, Dial, 8-1/2
Inch

DOD MIL-T-35349A

Hydrometers, Graduated Scale with Thermometer, API
Gravity

DOD MIL-H-36343B

Thermometers, Remote Reading, Self-Indicating Dial, Gas
Actuated

DOD MIL-T-19646(7)

Thermometer, Recording, Capillary Tube and Bulb, and
Resistance

DOD MIL-T-17585B

Thermometer ML-7

DOD MIL-T-11401A

Thermometer, Indicating, Capillary Tube and Bulb, Flush
Mounting

DOD MIL-T-9955A

Thermometer, Self-Indicating, Bimetallic

DOD MIL-T-3617C(2)

Thermometer, Self-Indicating, Bimetallic, 5-1/2 Inch

DOD MIL-T-3462D

Thermometer, Clinical, Veterinary

DOD MIL-T-3332A

Accessory Devices

Flange (Thermocouple for Mounting Temperature Sensing
Probes in Gas Turbine Engines)

SAE ARP465

Mount - Thermocouple

SAE ARP464

Thermoelectric Circuits and the Performance of Several
Aircraft Engine Thermocouples

SAE AIR65

Terminal, Lug Thermocouple, Chromel and Alumel

DOD AN5548

Terminal - Thermocouple

DOD AN5542

Terminal, Thermocouple, Brass

DOD AN5539

Terminal & Thermocouple Lead Soldering

DOD AN5538

Connector Assembly & Thermocouple Lead

DOD AN5537

Resistor & Thermocouple Lead Spool	DOD	AN5534
Indicator, Temperature, Thermocouple, Type EHU-31A/A	DOD	QPL-83262/1-1
Indicator, Temperature, Thermocouple EHU-15A/A, Potentiometer Type, White Lighted	DOD	QPL-27552-16
Tester, Electric Thermometer, Field TTU-104/E	DOD	QPL-27463-4
Indicator, Temperature, Thermocouple Self-Balancing Potentiometer Type	DOD	QPL-27209-12
Indicator, Temperature, Thermocouple EHU-4/A	DOD	QPL-25952-5
Indicator, Temperature, Thermocouple, Engine Exhaust, Type MJ-4	DOD	QPL-25026-2
Indicator, Temperature, Thermocouple, Engine Exhaust, Type MJ-2	DOD	QPL-9443-6
Indicator, Temperature, Thermocouple, Engine Exhaust, Type MJ-1	DOD	QPL-9343-5
Resistor, Thermocouple Lead Spool	DOD	QPL-7790-5
Indicator, Temperature, Thermocouple, Multifunction, Minus 50 Deg. to Plus 300 Deg. C, 2-Inch Size	DOD	QPL-7074-6
Indicators, Temperature, Thermocouple	DOD	MS-90410
Lead Assembly, Thermocouple	DOD	MS-75050C
Clamp, Thermometer, Apparatus Swivel Jaw	DOD	MS-36010B
Gage, Unit, Engine, With Electric Thermometer (ASG)	DOD	MS-28043A
Indicator - Temperature, Multi-Function, Thermocouple, Single, Clamp Mounted, 50 to 300 Deg., 2-Inch Side	DOD	MS-28007A
Indicator Temperature, Thermocouple, Self Balancing Potentiometer Type (ASG)	DOD	MS-24569D
Three Eights Inch Thermometer Well, 4-Inch Insertion Length, 3/4 Inch NPT Thread Connection	DOD	MS-18140
Test Methods and Test Equipment for Thermometers Used in Machinery and Piping Systems	DOD	MIL-STD-735A
Electronic Equipment Parts Selected Standards for R.F. and Acoustical Parts	DOD	MIL-STD-242F
Automated Engineering Document Preparation System, Thermocouples	DOD	MIL-STD-35/105

Automated Engineering Document Preparation System,
Thermistors

	DOD	DOD-STD-35/76
Indicator, Temperature, Thermocouple Self-Balancing, Potentiometer Type, White Lighted		
	DOD	MIL-I-83487
Indicator, Temperature, Thermocouple, EHU-39/A		
	DOD	MIL-I-83262/4
Indicator, Temperature, Thermocouple, EHU-43/A		
	DOD	MIL-I-83262/3(1)
Indicator, Temperature, Thermocouple, EHU-38/A		
	DOD	MIL-I-83252/2(1)
Indicator, Temperature, Thermocouple EHU-31A/A		
	DOD	MIL-I-83262/1(1)
Indicator, Temperature, Thermocouple, Hermetically Sealed, General Specification for		
	DOD	MIL-I-83262B(1)
Tester, Pyrometer and Thermocouple, Field, Type N-3A		
	DOD	MIL-T-58082A
Calibrator, Thermometer		
	DOD	MIL-C-45543
Contact, Electrical Connector, Socket, Crimp Removable, (Thermocouple for MIL-C-38999 Series II Connectors)		
	DOD	MIL-C-29029/89
Contact, Electrical Connector Pin, Crimp Removable, Thermocouple (for MIL-C-28999 Series I, II, III, and IV Connectors)		
	DOD	MIL-C-39029/87
Contact, Electrical Connector, Socket, Crimp Removable, Thermocouple (for MIL-C-5015 MS3450 Series and MIL-C-83723 Series II Connectors)		
	DOD	MIL-C-39029/86
Contact, Electrical Connector, Pin, Crimp Removable, Thermocouple (for MIL-C-5015 MS3450 Series and MIL-C-83723 Series 2 Connectors)		
	DOD	MIL-C-39029/85
Contact, Electrical Connector, Socket, Crimp Removable, Thermocouple, (for MIL-C-26482 Series 2, MIL-C-81703 Series 3, MIL-C-83723 Series 3, and MIL-C-83733 Connectors)		
	DOD	MIL-C-39029/10
Contacts, Electrical Connector, Pin, Crimp Removable, Thermocouple, (for MIL-C-26482 Series 2, MIL-C-81703 Series 3, MIL-C-83723 Series 3, and MIL-C-83733 Connectors)		
	DOD	MIL-C-39029/9
Indicator, Temperature, Thermocouple EHU-15A/A, Potentiometer Type, White Lighted		
	DOD	MIL-I-27552B(2)
Tester, Pyrometer and Thermocouple TTU-104/E		
	DOD	MIL-T-27463A

Indicator, Temperature, Thermocouple, Self-Balancing,
Potentiometer Type (ASG)

DOD MIL-I-27209C(2)

Control-Transmitter, Liquid Level, Thermistor Type,
Aircraft

DOD MIL-C-25855

Indicator, Temperature, Thermocouple EHU-4-A

DOD MIL-I-25852A(2)

Indicator, Temperature, Thermocouple, Engine Exhaust,
Type MJ-4

DOD MIL-I-25026A(1)

Indicator, Temperature, Thermocouple, Engine Exhaust,
Type MJ-2A

DOD MIL-I-9443/1

Indicator, Temperature, Thermocouple, Engine Exhaust,
Type MJ-2

DOD MIL-I-9443D(3)

Indicator, Temperature, Thermocouple, Engine Exhaust,
Type MJ-1

DOD MIL-I-9343B(4)

Indicators, Temperature, Thermocouple

DOD MIL-I-7884A(3)

Resistor, Thermocouple Lead Spool

DOD MIL-R-7790(1)

Gage Unit; Engine (with Electric Thermometer)

DOD MIL-G-7090(1)

Indicator, Temperature, Thermocouple, Multifunction, 50
Deg. to + 300 Deg., C, 2-Inch Side

DOD MIL-I-7074

Indicator, Temperature, Thermocouple Hermetically
Sealed, General Specification for

DOD MIL-I-7071B(1)

Thermocouple, Contact, Aircraft Engine Spark Plug
Gasket Type

DOD MIL-T-5494A

Thermocouple Connectors and Thermocouple Connector
Panels

RDT C 7-15T

Thermowell Systems for Liquid Metal Service

RDT C 7-18T