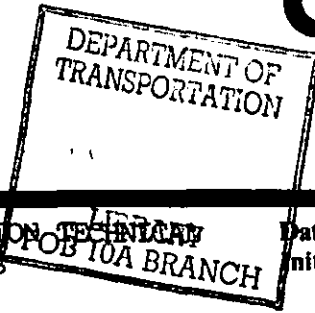




U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular



Subject: INDEX OF AVIATION TECHNICAL STANDARD ORDERS Date: 8/29/88 AC No: 20-110E  
Initiated by: AIR-120 Change:

1. PURPOSE. This advisory circular (AC) describes the public procedure the Federal Aviation Administration (FAA) will use to develop and issue Technical Standard Orders (TSO's) for aeronautical products to be used on civil aircraft. The AC presents an index of the FAA TSO's which contain minimum performance standards for specified materials, parts, processes, and appliances used on civil aircraft. In addition to the current listing of TSO's in Appendices 1 and 2, Appendix 3 of the AC contains a listing of TSO's being proposed and for which a notice of availability has been published in the Federal Register.
2. CANCELLATION. Advisory Circular 20-110D, Index of Aviation Technical Standard Orders, dated June 12, 1987, is canceled.
3. RELATED FAR SECTIONS. Federal Aviation Regulations (FAR), Part 21, Subpart O.
4. BACKGROUND. On June 2, 1980, by Amendment 21-50 to FAR 21, the FAA adopted a new public procedure for issuing TSO's for specified materials, parts, processes, and appliances used on civil aircraft, relocated the substance of Subpart A of FAR 37 to Subpart O of FAR 21, and revoked the remainder of FAR 37. Amendment 21-50 became effective on September 9, 1980.
5. PUBLIC PROCEDURE. The following is the public procedure the FAA will use to develop and issue final TSO's for specified articles used on civil aircraft:
  - a. The FAA will continue to develop proposed TSO's and will use, by reference in the TSO, documents prepared and issued by organizations such as the Radio Technical Commission for Aeronautics (RTCA) and the Society of Automotive Engineers (SAE). Notices of RTCA meetings and invitations will continue to be published in the Federal Register to allow public participation at the early stages of document development.
  - b. Documents prepared and issued by an organization that are incorporated by reference in proposed or final TSO's will be available to any interested person only from that organization.

c. Any person may request the Administrator to revise or issue a new TSO by submitting a description of the revision sought or a description of the new article for which a TSO is requested.

d. The FAA will use several methods to ensure that the public is afforded early opportunities to take part in the TSO decisionmaking process. Proposed TSO's are normally distributed to the public for comment through the use of mailing lists. Any individual or organization can request to be placed on the TSO mailing list. A notice of availability for comment of all proposed TSO's is published in the Federal Register, and a copy of the final TSO is mailed to all persons on the mailing list.

e. Any person wishing to submit comments on a proposed TSO may do so. All comments received on or before the closing date for comments will be considered by the Administrator before issuing a final TSO. Late comments may also be considered as long as no additional expense or delay in processing the TSO is incurred.

f. All comments submitted will be available, both before and after the closing date for comments, for examination by interested persons. Comments are located in the FAA Headquarters Building (FGB-10A), Room 335, 800 Independence Avenue, SW., Washington, D.C. 20591, between 8:30 a.m. and 4:30 p.m., Monday thru Friday.

g. Copies of all proposed and final TSO's will also be available at FAA Headquarters in the Office of Airworthiness, Aircraft Engineering Division (AIR-100), and at all FAA Regional Aircraft Certification Offices (ACO's). Final TSO's will not be published in the Federal Register.

6. INDEX OF TSO's. For the reader's convenience, the index of TSO's is presented both in numerical sequence (Appendix 1) and by subject matter (Appendix 2). The proposed TSO's for which a notice of availability has been published are contained in Appendix 3. All TSO standards contained in FAR 37 Subpart B as of September 9, 1980, are current under the TSO revision program, unless Appendix 1 of this AC shows a later revision date.

7. HOW TO OBTAIN TSO's. To obtain a copy of any of the TSO's listed in Appendices 1, 2, and 3, write to: Federal Aviation Administration, Office of Airworthiness, Aircraft Engineering Division (AIR-100), 800 Independence Avenue, SW., Washington, D.C. 20591. Indicate in your request whether you desire to have your name placed on our mailing list to receive future issuances of the TSO's, notices for public comment on proposed TSO's, or copies of proposed TSO's.



M.C. Beard  
Director, Aircraft Certification Service

APPENDIX 1  
Index of TSO's in Numerical Sequence

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C1c - 7/10/87	Cargo and Baggage Compartment Smoke Detection Instruments
TSO-C2c - 10/19/83	Airspeed Instruments
TSO-C3c - 10/19/83	Turn and Slip Instrument
TSO-C4c	Bank and Pitch Instruments (Indicating Gyro-Stabilized Type) (Gyroscopic Horizon, Attitude Gyro)
TSO-C5d - 10/19/83	Direction Instrument, Non-magnetic (Gyroscopically Stabilized)
TSO-C6c	Direction Instrument, Magnetic (Gyro-Stabilized Type)
TSO-C7c	Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)
TSO-C8c - 10/19/83	Vertical Velocity Instrument (Rate-of-Climb)
TSO-C9c	Automatic Pilots
TSO-C10b	Aircraft Altimeter, Pressure Actuated Sensitive Type
TSO-C11d	Fire Detectors (Thermal Sensing and Ionization Sensing Types)
TSO-C13e - 4/23/86	Life Preservers
TSO-C14a	Aircraft Fabric, Intermediate Grade; External Covering Material
TSO-C15c	Aircraft Fabric, Grade A; External Covering Material
TSO-C16	Air-Speed Tubes (Electrically Heated)

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C17a	Fire Resistant Aircraft Sheet and Structural Material
TSO-C19b	Portable Water-Solution Type Fire Extinguishers
TSO-C20	Combustion Heaters
TSO-C21a	Special Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices
TSO-C22f	Safety Belts
TSO-C23c - 4/25/84	Personnel Parachute Assemblies
TSO-C25a	Aircraft Seats and Berths (Type I Transport, 6 <sub>g</sub> Forward Load)
TSO-C26c - 5/18/84	Aircraft Wheels and Wheel-Brakes Assemblies, with Addendum I
TSO-C27	Twin Seaplane Floats
TSO-C28	Aircraft Skis
TSO-C30b	Aircraft Position Lights
TSO-C31d - 4/30/84	High Frequency (HF) Radio Communication Transmitting Equipment Operating Within the Radio Frequency Range of 1.5 to 30 Megahertz
TSO-C32d - 4/30/84	High Frequency (HF) Radio Communication Receiving Equipment Operating Within the Radio Frequency Range of 1.5 to 30 Megahertz
TSO-C34e - 1/15/88	ILS Glide Slope Receiving Equipment Operating within 328.6 to 335.4 Megahertz
TSO-C35d	Airborne Radio Marker Receiving Equipment
TSO-C36e - 1/25/88	ILS Localizer Receiving Equipment

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C37c - 8/3/81	VHF Radio Communications Transmitting Equipment Operating Within 117.975 to 136.000 Megahertz
TSO-C38c - 8/3/81	VHF Radio Communications Receiving Equipment Operating Within 117.975 to 136.000 Megahertz
TSO-C39b - 4/17/87	Aircraft Seats and Berths
TSO-C40c - 1/25/88	VOR Radio Receiving Equipment Operating Within the Radio Frequency Range of 108-118 Megahertz
TSO-C41d - 5/6/85	Airborne Automatic Direction Finding (ADF) Equipment
TSO-C42	Propeller Feathering Hose Assemblies (Rubber and Wire Braid Construction)
TSO-C43a - 8/18/83	Temperature Instruments
TSO-C44a	Fuel Flowmeters
TSO-C45	Manifold Pressure Indicating Instruments
TSO-C46a	Maximum Allowable Airspeed Indicator Systems
TSO-C47	Pressure Instruments - Fuel, Oil, and Hydraulic
TSO-C48	Carbon Monoxide Detector Instruments
TSO-C49a	Electric Tachometer: Magnetic Drag (For Air Carrier Aircraft)
TSO-C50c - 1/31/83	Audio Selector Panels and Amplifiers
TSO-C51a	Aircraft Flight Recorder
TSO-C52a	Flight Directors

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C53a	Fuel and Engine Oil System Hose Assemblies (Rubber or Tetrafluoroethylene Tube and Wire Braid Construction)
TSO-C54	Stall Warning Instruments
TSO-C55	Fuel and Oil Quantity Instruments (For Reciprocating Engine Aircraft)
TSO-C56a - 4/12/84	Engine-Driven Direct Current Generators/Starter-Generators
TSO-C57a - 1/31/83	Aircraft Headsets and Speakers
TSO-C58a - 1/31/83	Aircraft Microphones (For Air Carrier Aircraft)
TSO-C59	Airborne Selective Calling Equipment (For Air Carrier Aircraft)
TSO-C60b - 5/11/88	Airborne Loran-A and Loran-C Receiving Equipment Operating within the Radio Frequency Ranges of 1800-2000 Kilohertz and 90-110 Kilohertz Respectively
TSO-C62c - 9/12/84	Aircraft Tires, with Addendum I
TSO-C63c - 8/18/83	Airborne Weather and Ground Mapping Pulsed Radars
TSO-C64	Oxygen Mask Assembly Continuous Flow, Passenger (For Air Carrier Aircraft)
TSO-C65a - 8/18/83	Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)
TSO-C66b - 8/3/81	Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 Megahertz
TSO-C67	Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C68a - 8/18/83	Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)
TSO-C69b - 8/17/88	Emergency Evacuation Slides, Ramps, and Slide/Raft Combinations
TSO-C70a - 4/13/84	Liferafts (Reversible and Nonreversible)
TSO-C71	Airborne Static ("DC to DC") Electrical Power Converter (For Air Carrier Aircraft)
TSO-C72c - 2/19/87	Individual Flotation Devices
TSO-C73	Static Electrical Power Inverter
TSO-C74c	Airborne ATC Transponder Equipment
TSO-C75	Hydraulic Hose Assemblies
TSO-C76	Fuel Drain Valves
TSO-C77a - 7/20/81	Gas Turbine Auxiliary Power Units
TSO-C78	Crewmember Demand Oxygen Masks
TSO-C79	Fire Detectors (Radiation Sensing Type)
TSO-C80	Flexible Fuel and Oil Cell Material
TSO-C84	Cockpit Voice Recorder
TSO-C85	Survivor Locator Lights
TSO-C87	Airborne Low-Range Radio Altimeter
TSO-C88a - 8/18/83	Automatic Pressure Altitude Reporting Code Generating Equipment
TSO-C89	Oxygen Regulators, Demand
TSO-C90b - 1/20/88	Cargo Pallets, Nets, and Containers

## Appendix 1

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C91a - 4/29/85	Emergency Locator Transmitters (ELT) Equipment
TSO-C92b	Ground Proximity Warning-Glide Slope Deviation Alerting Equipment
TSO-C93	Airborne Interim Standard Microwave Landing System Converter Equipment
TSO-C94a - 8/12/81	Omega Receiving Equipment Operating within the Radio Frequency Range of 10.2 to 13.6 Kilohertz
TSO-C95 - 8/18/83	Mach Meters
TSO-C96 - 6/22/82	Anticollision Lights System
TSO-C97	Lithium Sulfur Dioxide Batteries
TSO-C99 - 6/27/83	Protective Breathing Equipment
TSO-C100a - 3/15/85	Child Restraint Systems
TSO-C101 - 2/19/87	Over Speed Warning Instruments
TSO-C102 - 4/2/84	Airborne Radar Approach and Beacon Systems for Helicopters
TSO-C103 - 4/12/84	Continuous Flow Oxygen Mask Assembly (For Non-Transport Category Aircraft)
TSO-C104 - 6/22/82	Microwave Landing Systems (MLS) Airborne Receiving Equipment
TSO-C105 - 6/13/84	Optional Display Equipment for Weather and Ground Mapping Radar Indicators
TSO-C106 - 1/15/88	Air Data Computer
TSO-C109 - 12/9/85	Airborne Navigation Data Storage System
TSO-C110 - 12/2/86	Airborne Passive Thunderstorm Detection Systems
TSO-C112 - 2/5/86	Air Traffic Control Radar Beacon System/ Mode Select (ATCRBS/Mode S) Airborne Equipment



<u>TSO Number</u>	<u>Subject Title</u>
TSO-C113 - 10/27/86	Airborne Multipurpose Electronic Display
TSO-C114 - 3/27/87	Torso Restraint Systems
TSO-C115 - 6/12/86	Airborne Area Navigation Equipment Using Multi-Sensor Inputs
TSO-C118 - 8/5/88	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I

Subject TitleTSO NumberSeats, Berths, and Safety Belts

Aircraft Seats and Berths (Type I Transport, 6g Forward Load)	TSO-C25a
Aircraft Seats and Berths	TSO-C39b
Safety Belts	TSO-C22f
Torso Restraint Systems	TSO-C114

Fire ProtectionFire Detection

Fire Detectors (Thermal Sensing and Ionization Sensing Types)	TSO-C11d
Fire Detectors (Radiation Sensing Type)	TSO-C79

Fire Extinguishers

Portable Water-Solution Type Fire Extinguishers	TSO-C19b
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Fire Resistant Material

Fire Resistant Aircraft Sheet and Structural Material	TSO-C17a
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FuelFlowmeters

Fuel Flowmeters	TSO-C44a
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Fuel and Oil Cell Material

Flexible Fuel and Oil Cell Material	TSO-C80
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Fuel Hose Assemblies

Fuel and Engine Oil System Hose Assemblies (Rubber or Tetrafluoroethylene Tube and Wire Braid Construction)	TSO-C53a
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Fuel Valves

Fuel Drain Valves	TSO-C76
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Subject Title

TSO Number

Hydraulic

Hose Assemblies

Hydraulic Hose Assemblies

TSO-C75

Environmental Protection Equipment

Air-Speed Tubes

Air-Speed Tubes (Electrically  
Heated)

TSO-C16

Weather and Radar Equipment

Airborne Passive Thunderstorm Detection  
Systems

TSO-C110

Airborne Radar Approach and Beacon  
Systems for Helicopters

TSO-C102

Airborne Weather and Ground Mapping  
Pulsed Radars

TSO-C63c

Instruments

Detectors

Cargo and Baggage Compartment Smoke  
Detection Instruments

TSO-C1c

Carbon Monoxide Detector Instruments

TSO-C48

Flight Instruments

Air Computer

TSO-C106

Airborne Low-Range Radio Altimeter

TSO-C87

Airborne Radar Altimeter Equipment  
(For Air Carrier Aircraft)

TSO-C67

Aircraft Altimeter, Pressure Actuated  
Sensitive Type

TSO-C10b

Aircraft Flight Recorder

TSO-C51a

Airspeed Instruments

TSO-C2c

Over Speed Warning Instrument

TSO-C101

<u>Subject Title</u>	<u>TSO Number</u>
Automatic Pressure Altitude Reporting Code Generating Equipment	TSO-C88a
Bank and Pitch Instruments (Indicating Gyro-Stabilized Type) (Gyroscopic Horizon, Attitude Gyro)	TSO-C4c
Direction Instrument, Magnetic (Gyro-Stabilized Type)	TSO-C6c
Direction Instrument, Magnetic Non- stabilized Type (Magnetic Compass)	TSO-C7c
Direction Instrument, Non-Magnetic (Gyrosocopically Stabilized)	TSO-C5d
Electric Tachometer, Magnetic Drag (for Air Carrier Aircraft)	TSO-C49a
Flight Directors	TSO-C52a
Maximum Allowable Airspeed Indicator Systems	TSO-C46a
Vertical Velocity Instrument (Rate-of-Climb)	TSO-C8c
Stall Warning Instruments	TSO-C54
Temperature Instruments	TSO-C43a
Turn and Slip Instruments	TSO-C3c
<u>Engine Instruments</u>	
Fuel and Oil Quantity Instruments (For Reciprocating Engine Aircraft)	TSO-C55
Manifold Pressure Indicating Instruments	TSO-C45
Pressure Instruments - Fuel, Oil, and Hydraulic	TSO-C47
<u>Landing Gear</u>	
Aircraft Skis	TSO-C28

<u>Subject Title</u>	<u>TSO Number</u>
Aircraft Tires, with Addendum I	TSO-C62c
Aircraft Wheels and Brakes, with Addendum I	TSO-C26c
Twin Seaplane Floats	TSO-C27
<u>Lights</u>	
Aircraft Position Lights	TSO-C30b
Anticollision Light System	TSO-C96
<u>Navigation Equipment</u>	
Airborne ATC Transponder Equipment	TSO-C74c
Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)	TSO-C68a
Airborne Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 Megahertz	TSO-C66b
Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment	TSO-C112
Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)	TSO-C65a
Airborne ILS Glide Slope Receiving Equipment Operating within 328.6 to 335.4 Megahertz	TSO-C34e
Airborne ILS Localizer Receiving Equipment	TSO-C36e
Airborne Interim Standard Microwave Landing System Converter Equipment	TSO-C93

<u>Subject Title</u>	<u>TSO Number</u>
Airborne Multipurpose Electronic Display	TSO-C113
Airborne Area Navigation Equipment Using Multi-Sensor Inputs	TSO-C115
Airborne Loran-A Receiving Equipment Operating Within the Radio Frequency Range of 1800-2000 Kilocycles (For Air Carrier Aircraft)	TSO-C60a
Airborne Omega Receiving Equipment	TSO-C94a
Airborne Radio Receiving and Direction Finding Equipment	TSO-C35d
Airborne Automatic Direction Finding (ADF) Equipment	TSO-C41d
Airborne Navigation Data Storage System	TSO-C109
Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
Optional Display Equipment for Weather and Ground Mapping Radar Indicators	TSO-C105
Microwave Landing Systems (MLS) Airborne Receiving Equipment	TSO-C104
Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I	TSO-C118
VOR Radio Receiving Equipment Operating Within the Radio Frequency Range of 108-118 Megahertz	TSO-C40c

OxygenCrewmembers

Crewmember Demand Oxygen Masks	TSO-C78
Protective Breathing Equipment	TSO-C99

Passenger

Oxygen Mask Assembly Continuous Flow, Passenger (For Air Carrier Aircraft)	TSO-C64
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<u>Subject Title</u>	<u>TSO Number</u>
Continuous Flow Oxygen Mask Assembly (For Non-Transport Category Aircraft)	TSO-C103
<u>Regulators</u>	
Oxygen Regulators, Demand	TSO-C89
<u>Propellers</u>	
Hose Assemblies	
Propeller Feathering Hose Assemblies (Rubber and Wire Braid Construction)	TSO-C42
<u>Structure</u>	
<u>Containers, Pallets, Nets</u>	
Cargo Pallets, Nets, and Containers	TSO-C90b
<u>Survival Equipment</u>	
<u>Ground Proximity Warning</u>	
Ground Proximity Warning-Glide Slope Deviation Alerting Equipment	TSO-C92b
<u>Locator Transmitter</u>	
Survivor Locator Lights	TSO-C85
Emergency Locator Transmitters (ELT) Equipment	TSO-C91a
<u>Rafts/Slides/Life Preservers/Parachutes</u>	
Emergency Evacuation Slides	TSO-C69
Individual Flotation Devices	TSO-C72c
Life Preservers	TSO-C13e
Liferafts (Reversible and Nonreversible)	TSO-C70a
Parachutes	TSO-C23c

APPENDIX 3  
Index of Proposed TSO's by Subject Matter

Notice of availability of the following proposed TSO's has been published in the Federal Register for public comment:

<u>Revised TSO's</u>	<u>TSO Number</u>
Airspeed Instruments	TSO-C2d
Turn and Slip Instruments	TSO-C3d
Direction Instrument, Magnetic (Gyroscopically Stabilized)	TSO-C5e
Bank and Pitch Instruments (Indicating Gyro-Stabilized Type, Gyroscopic Horizon, Attitude Gyro)	TSO-C4d
Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)	TSO-C6d
Direction Instrument, Magnetic Non- Stabilized (Magnetic Compass)	TSO-C7d
Vertical Velocity Instrument (Rate of Climb)	TSO-C8d
Powerplant Fire Detection Instruments (Thermal and Flame Contact Types)	TSO-C11e
Aircraft Altimeter, Pressure Actuated Sensitive Type	TSO-C10c
Aircraft Turnbuckle Assemblies and/or Turnbuckle Safelying Devices	TSO-C21b
Aircraft Position Lights	TSO-C30c
VHF Radio Communication Transmitting Equipment Operating within the Radio Frequency Range 117.975 to 136.000 Megahertz	TSO-C37d



## Appendix 3

Revised TSO'sTSO Number

VHF Radio Communication Receiving Equipment Operating within the Radio Frequency Range 117.975 to 136.000 Megahertz	TSO-C38d
Temperature Instruments	TSO-C43a
Fuel Flowmeter	TSO-C44b
Manifold Pressure Instruments	TSO-C45a
Pressure Instruments - Fuel, Oil and Hydraulic (Reciprocating Engine Powered Aircraft)	TSO-C47a
Carbon Monoxide Detector Instruments	TSO-C48a
Electric Tachometer: Magnetic Drag	TSO-C49b
Flight Director Equipment	TSO-C52b
Oxygen Mask Assembly, Continuous Flow, Passenger	TSO-C64a
Anticollision Lights Systems	TSO-C96a

NEW TSO's

A-C Generators	TSO-C98
Nickel Cadmium Vented Rechargeable Aircraft Batteries (Non-Sealed, Maintainable Type)	TSO-C107
General Aviation Flight Recorder	TSO-C111