



U.S. Department  
of Transportation  
Federal Aviation  
Administration

# Advisory Circular

Subject:

INDEX OF AVIATION TECHNICAL  
STANDARD ORDERS

Date: 5/6/93  
Initiated by: AIR-120

AC No: 20-110H  
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 articles 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 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 20-110G, Index of Aviation Technical Standard Orders, dated June 19, 1991, 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 Part 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 Part 37 to Subpart O of FAR Part 21, and revoked the remainder of FAR Part 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 RTCA Inc. (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. Copies of 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.

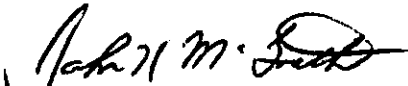
f. All comments submitted will be available, both before and after the closing date for comments, for examination by interested persons. Comments are located at the FAA Headquarters in the Aircraft Certification Service, Aircraft Engineering Division (AIR-100), Room 806, 800 Independence Avenue, SW., 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 the FAA Headquarters in the Aircraft Certification Service, 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 Part 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 or 2, write to the: Department of Transportation, Personal Property Operations Branch, General Services Section, M-443.2, Washington, DC 20590. To obtain a copy of any of the proposed TSO's listed in appendix 3, write to the: Federal Aviation

Administration, Aircraft Certification Service, 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.



John K. McGrath  
Manager, Aircraft Engineering  
Division, AIR-100

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-C2d - 6/14/89	Airspeed Instruments
TSO-C3d - 6/14/89	Turn and Slip Instrument
TSO-C4c	Bank and Pitch Instruments (Indicating Gyro-Stabilized Type) (Gyroscopic Horizon, Attitude Gyro)
TSO-C5e - 6/14/89	Direction Instrument, Non-magnetic (Gyroscopically Stabilized)
TSO-C6d - 6/14/89	Direction Instrument, Magnetic (Gyro-Stabilized Type)
TSO-C7d - 6/14/89	Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)
TSO-C8d - 8/8/91	Vertical Velocity Instrument (Rate-of-Climb)
TSO-C9c	Automatic Pilots
TSO-C10b	Aircraft Altimeter, Pressure Actuated Sensitive Type
TSO-C11e - 10/17/91	Fire Detectors (Thermal Sensing and and Flame Contact)
TSO-C13f - 9/24/92	Life Preservers
TSO-C14b - 2/15/90	Aircraft Fabric, Intermediate Grade; External Covering Material
TSO-C15d - 2/26/90	Aircraft Fabric, Grade A; External Covering Material
TSO-C16	Air-Speed Tubes (Electrically Heated)

<u>TSO Number</u>	<u>Subject Title</u>
TSO-C19b	Portable Water-Solution Type Fire Extinguishers
TSO-C20	Combustion Heaters
TSO-C21b - 3/16/89	Special Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices
TSO-C22g - 3/5/93	Safety Belts
TSO-C23c - 4/25/84	Personnel Parachute Assemblies
TSO-C25a	Aircraft Seats and Berths (Type I Transport, 6g 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-C30c - 5/12/89	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 Transmitting 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-C37d - 9/23/92	VHF Radio Communications Transmitting Equipment Operating Within 117.975 to 136.000 Megahertz
TSO-C38d - 9/23/92	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-C43b - 8/8/91	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 Tetrafluorethylene 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-C62d - 9/7/90	Aircraft Tires
TSO-C63c - 8/18/83	Airborne Weather and Ground Mapping Pulsed Radars
TSO-C64a - 8/25/89	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-C66c - 1/18/91	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 Invertor
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-C90c - 4/3/92	Cargo Pallets, Nets, and Containers



<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 Kiloherzt
TSO-C95 - 8/18/83	Mach Meters
TSO-C96a - 4/7/89	Anticollision Lights System
TSO-C97	Lithium Sulfur Dioxide Batteries
TSO-C99 - 6/27/83	Protective Breathing Equipment
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-C110a - 10/26/88	Airborne Passive Thunderstorm Detection Systems

APPENDIX 2. Index of TSO's by Subject Matter

<u>Subject Title</u>	<u>TSO Number</u>
<u>Air Conditioning</u>	
Combustion Heaters	TSO-C20
<u>Auto Flight</u>	
Automatic Pilots	TSO-C9c
<u>Airborne Auxiliary Power</u>	
Gas Turbine Auxiliary Power Units	TSO-C77a
<u>Communications</u>	
<u>Amplifiers</u>	
Audio Selector Panels and Amplifiers	TSO-C50c
<u>Microphones</u>	
Aircraft Headsets and Speakers	TSO-C57a
Aircraft Microphones (For Air Carrier Aircraft)	TSO-C58a
<u>Selective Calling Equipment</u>	
Airborne Selective Calling Equipment (For Air Carrier Aircraft)	TSO-C59
<u>VHF</u>	
VHF Radio Communications Transmitting Equipment Operating Within 117.975 to 136.000 Megahertz	TSO-C37d
VHF Radio Communications Receiving Equipment Operating Within 117.975 to 136.000 Megahertz	TSO-C38d

<u>Subject Title</u>	<u>TSO Number</u>
<u>HF</u>	
High Frequency (HF) Radio Communication Transmitting Equipment Operating within the Radio Frequency Range of 1.5 to 30 Megahertz	TSO-C31d
High Frequency (HF) Radio Communication Receiving Equipment Operating within the Radio Frequency Range of 1.5 to 30 Megahertz	TSO-C32d
<u>Voice Recorders</u>	
Cockpit Voice Recorder	TSO-C84
Underwater Locating Devices (Acoustic) (Self-Powered)	TSO-C121
<u>Electrical Power</u>	
Airborne Static ("DC to DC") Electrical Power Converter (For Air Carrier Aircraft)	TSO-C71
Engine-Driven Direct Current Generators/Starter-Generators	TSO-C56a
Lithium Sulfur Dioxide Batteries	TSO-C97
Static Electrical Power Inverter	TSO-C73
<u>Equipment/Furnishings</u>	
<u>Aircraft Fabrics</u>	
Aircraft Fabric Intermediate Grade; External Covering Material	TSO-C14b
Aircraft Fabric, Grade A; External Covering Material	TSO-C15d
Special Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices	TSO-C21b

<u>Subject Title</u>	<u>TSO Number</u>
<u>Seats, Berths, and Safety Belts</u>	
Aircraft Seats and Berths (Type I Transport, 6g Forward Load)	TSO-C25a
Aircraft Seats and Berths	TSO-C39b
Safety Belts	TSO-C22g
Torso Restraint Systems	TSO-C114
<u>Fire Protection</u>	
<u>Fire Detection</u>	
Fire Detectors (Thermal Sensing and Ionization Sensing Types)	TSO-C11e
Fire Detectors (Radiation Sensing Type)	TSO-C79
<u>Fire Extinguishers</u>	
Portable Water-Solution Type Fire Extinguishers	TSO-C19b
<u>Fuel</u>	
<u>Flowmeters</u>	
Fuel Flowmeters	TSO-C44a
<u>Fuel and Oil Cell Material</u>	
Flexible Fuel and Oil Cell Material	TSO-C80
<u>Fuel Hose Assemblies</u>	
Fuel and Engine Oil System Hose Assemblies (Rubber or Tetrafluoroethylene Tube and Wire Braid Construction)	TSO-C53a

<u>Subject Title</u>	<u>TSO Number</u>
<u>Fuel Valves</u>	
Fuel Drain Valves	TSO-C76
<u>Hydraulic</u>	
<u>Hose Assemblies</u>	
Hydraulic Hose Assemblies	TSO-C75
<u>Environmental Protection Equipment</u>	
<u>Air-Speed Tubes</u>	
Air-Speed Tubes (Electrically Heated)	TSO-C16
<u>Weather and Radar Equipment</u>	
Airborne Passive Thunderstorm Detection Systems	TSO-C110a
Airborne Radar Approach and Beacon Systems for Helicopters	TSO-C102
Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
<u>Instruments</u>	
<u>Detectors</u>	
Cargo and Baggage Compartment Smoke Detection Instruments	TSO-C1c
Carbon Monoxide Detector Instruments	TSO-C48
<u>Flight Instruments</u>	
Air Computer	TSO-C106
Airborne Low-Range Radio Altimeter	TSO-C87
Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)	TSO-C67

<u>Subject Title</u>	<u>TSO Number</u>
Aircraft Altimeter, Pressure Actuated Sensitive Type	TSO-C10b
Aircraft Flight Recorder	TSO-C51a
Airspeed Instruments	TSO-C2d
Cockpit Voice Recorder System	TSO-C123
Over Speed Warning Instruments	TSO-C101
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-C6d
Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)	TSO-C7d
Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)	TSO-C5e
Electric Tachometer, Magnetic Drag (for Air Carrier Aircraft)	TSO-C49a
Flight Data Recorder Systems	TSO-C124
Flight Directors	TSO-C52a
Maximum Allowable Airspeed Indicator Systems	TSO-C46a
Mach Meter	TSO-C95
Vertical Velocity Instrument (Rate-of-Climb)	TSO-C8d
Stall Warning Instruments	TSO-C54
Temperature Instruments	TSO-C43b
Turn and Slip Instruments	TSO-C3c

## Appendix 2

<u>Subject Title</u>	<u>TSO Number</u>
<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
Aircraft Tires	TSO-C62d
Aircraft Wheels and Brakes, with Addendum I	TSO-C26c
Twin Seaplane Floats	TSO-C27
<u>Lights</u>	
Aircraft Position Lights	TSO-C30c
Anticollision Light System	TSO-C96a
<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-C66c
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

<u>Subject Title</u>	<u>TSO Number</u>
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
Airborne Multipurpose Electronic Display	TSO-C113
Airborne Area Navigation Equipment Using Multi-Sensor Inputs	TSO-C115a
Airborne Area Navigation Equipment Using Omega/VLF Inputs	TSO-C120
Airborne Loran-A and Loran-C Receiving Equipment Operating Within the Radio Frequency Range of 1800-2000 Kilohertz and 90-110 Kilohertz Respectively	TSO-C60b
Airborne Omega Receiving Equipment	TSO-C94a
Airborne Radio Marker Receiving Equipment	TSO-C35d
Airborne Automatic Direction Finding (ADF) Equipment	TSO-C41d
Airborne Navigation Data Storage System	TSO-C109
Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS)	TSO-C129
Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
Airborne Windshear Warning and Escape Guidance Systems for Transport Airplanes	TSO-C117
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



<u>Subject Title</u>	<u>TSO Number</u>
Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II	TSO-C119a
VOR Radio Receiving Equipment Operating Within the Radio Frequency Range of 108-118 Megahertz	TSO-C40c
<u>Oxygen</u>	
<u>Crewmembers</u>	
Crewmember Demand Oxygen Masks	TSO-C78
Protective Breathing Equipment	TSO-C99
Crewmember Protective Breathing Equipment	TSO-C116
<u>Passenger</u>	
Oxygen Mask Assembly Continuous Flow, Passenger (For Air Carrier Aircraft)	TSO-C64a
Continuous Flow Oxygen Mask Assembly (For Non-Transport Category Aircraft)	TSO-C103
<u>Regulators</u>	
Oxygen Regulators, Demand	TSO-C89
<u>Propellers</u>	
<u>Hose Assemblies</u>	
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-C90c
<u>Survival Equipment</u>	
<u>Ground Proximity Warning</u>	
Ground Proximity Warning-Glide Slope Deviation Alerting Equipment	TSO-C92b

<u>Subject Title</u>	<u>TSO Number</u>
<u>Locator Transmitter</u>	
Survivor Locator Lights	TSO-C85
406 MHz Emergency Locator Transmitters (ELT)	TSO-C126
Emergency Locator Transmitters (ELT) Equipment	TSO-C91a
<u>Rafts/Slides/Life Preservers/Parachutes</u>	
Emergency Evacuation Slides	TSO-C69b
Individual Flotation Devices	TSO-C72c
Life Preservers	TSO-C13f
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>
Aircraft Altimeter, Pressure Actuated Sensitive Type	TSO-C10c
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
 <u>NEW TSO's</u>	
A-C Generators	TSO-C98
Nickel Cadmium Vented Rechargeable Aircraft Batteries (Non-Sealed, Maintainable Type)	TSO-C107
General Aviation Flight Recorder	TSO-C111