



Number: CTSO-2C702a
Date of approval: May 27, 2022
Approval by: Yang Zhenmei

China Civil Aviation Technical Standard Order

This China Civil Aviation Technical Standard Order (CTSO) is issued according to Part 37 of the China Civil Aviation Regulations (CCAR-37). Each CTSO is a criterion which the concerned aeronautical materials, parts or appliances used on civil aircraft must comply with when it is presented for airworthiness certification.

Civil Aviation Jet Fuel

1. Purpose

This China Civil Aviation Technical Standard Order (CTSO) is for manufacturers applying for aviation jet fuel CTSO authorization (CTSOA). This CTSO prescribes the minimum performance standards that aviation jet fuel must first meet for approval and identification with the applicable CTSO marking.

2. Applicability

This CTSO is applicable for new applications since CTSO goes into effect. Major design changes to aviation jet fuel approved under this CTSO shall require a new authorization in accordance with CCAR-21.

3. Requirements

- a. Feedstock and process requirements

Jet fuel marked by this CTSO shall consist predominantly of refined hydrocarbons derived from conventional sources including crude oil,

natural gas liquid condensates, heavy oil, shale oil, and oil sands. The process of jet fuel is fractionation or hydroprocessing.

b. Performance requirements

Jet fuel shall meet requirements of current product specifications which include GB 6537, ASTM D1655 or DEF-STAN 91-091 etc. Components or performance requirements of additives in GB 6537 shall be according to CTSO-2C707.

c. Other requirements

Civil aviation jet fuel shall test some of fit for purpose properties and materials compatibility in accordance with ASTM D4054. Fit for purpose properties include chemistry, bulk physical and performance properties, electrical properties, ground handling properties and safety. Materials compatibility includes metallic materials and non-metallic materials.

d. Testing laboratory

All tests shall be conducted in laboratories approved by CAAC or under the supervision of CAAC.

e. Deviation

For using alternate or equivalent means of compliance to the criteria in this CTSO, the applicant must show that the product maintains an equivalent level of safety. The applicant must apply for a deviation under the provision of section 21.368(一) in CCAR-21.

4. Marking

a. The quality certificate and other applicable documents of jet fuel shall be marked at least the following information:

- (1) Grade and CTSOA number;
- (2) Crude oil category and place of origin;
- (3) Volume fraction of fractionation, hydrotreating and hydrocracking;
- (4) Manufacturer designation and address;
- (5) Manufacture date, quantity and batch number;

b. Annex 1 is an example of the refinery certificate quality of jet fuel.

5. Documents Requirements

The applicant shall submit the responsible documents as follows.

- a. Documents for CTSOA application according to CCAR-21;
- b. Standards or specifications;
- c. Description of feedstock;
- d. Description of manufacturing process;
- e. Safety data sheet for chemical products(SDS);
- f. Other documents required by CAAC.

6. Application Note

After CTSOA authorization, the applicant shall obtain aircraft installation approval. If product standards have already listed in the type

certificate data sheets (TCDS), supplemental type certificate (STC) or other design approval documents, civil aviation jet fuel is not essential for installation approval.

7. Referenced Documents

a. GB standards are available from:

Standard Press of China, No.16, North Sanlihe Street, Fuxingmenwai, Beijing. Tel: 010-68523946.

b. SH standards are available from:

China Petrochemical Press Co., Ltd., No. 58, Andingmenwai Street, Dongcheng District, Beijing. Tel: 010-57512507.

c. ASTM standards are available from:

ASTM, 100 Barr Harbor Drive, West Conshohocken PA 19428-2959.

Appendix 1

Civil Aviation Jet Fuel

Refinery Certificate Quality (Example)

Grade number:		Product standard:		
CTSOA number:		CTSO: CTSO-2C702		
Manufacturer designation		Manufacturer address:		
Product quantity and batch number:		Manufacture date:		
Property		Limits	Results	Test Method
Appearance		Clear, bright and visually free from solid matter and undissolved water at ambient fuel temperature		Visual
Color		Report		GB/T 3555
Composition				
Acidity, total mg KOH/g	Max	0.015		GB/T 12574
Aromatics, percent by volume	Max	25.0		GB/T 11132
Olefins, vol %	Max	5.0		GB/T 11132
Sulfur, total percent by mass	Max	0.20		SH/T 0689 NB/SH/T 0842
Sulfur, mercaptan, percent by mass	Max	0.0020		GB/T 1792
Doctor Test		Pass		NB/SH/T 0174
fractionation components, vol %		Report		—
hydrotreating components, vol %		Report		—
Hydrocracked components, vol %		Report		—
Volatility				
Distillation				
Initial boiling point		Report		GB/T 6536
10% recovered, (T10) / °C	Max	205		
20% recovered, (T20) / °C		Report		
50% recovered, (T50) / °C	Max	232		
90% recovered, (T90) / °C		Report		
Final boiling point / °C	Max	300		
Residue, vol %	Max	1.5		
Loss, vol %	Max	1.5		
Flash point/ °C	Min	38		GB/T 21789
Density at 20 °C / (kg/m³)		775~830		GB/T 1884 GB/T 1885 SH/T 0604
Fluidity				
Freezing point / °C	Max	-47		GB/T 2430 SH/T 0770
Viscosity at -20 °C / (mm ² /s)	Max	8.0		GB/T 265

Combustion				
Neat heat of combustion / (MJ/kg)	Min	42.8		GB/T 384
Smoke point / mm	Min	25.0		GB/T 382
Smoke point / mm and naphthalenes, vol %	Min	20.0		
	Max	3.0		SH/T 0181
Corrosion				
Copper strip, 2 h at 100 °C / Grade	Max	1		GB/T 5096
Stability				
Thermal stability, 2.5h at 260 °C				GB/T 9169
Filter pressure drop / kPa	Max	3.3		
Tube rating	Less than	3 no peacock or abnormal color deposits		
Cleanliness				
Existent gum / (mg/100 mL)	Max	7		GB/T 8019 GB/T 509
Particulate contamination / (mg/L)	Max	1.0		SH/T 0093
Conductivity				
Electrical conductivity at 20 °C / (pS/m)		50~600		GB/T 6539
Water separation index				
Without electrical conductivity additive	Min	85		SH/T 0616
With electrical conductivity additive	Min	70		
Lubricity				
Wear scar diameter / mm	Max	0.85		SH/T 0687
Static dissipater additive				
First dose, mg/L	Max	3.0		-
Anti-wear additive, mg/L	Max	20.0		-
Antioxidant, mg/L	-	17.0~24.0		-
Conclusion:	Tested by:		Approved by:	
	Reviewed by:			

(The English version is for reference only. In case of any discrepancy or ambiguity of meaning between this English translation and the Chinese version, the latter shall prevail.)