
ASTM International: Aviation Fuel Standards

Ensuring the Safety of Synthetic Aviation Turbine Fuels

Alyson Fick | October 7, 2024 | ICAO LTAG Stocktaking Event 2024

About ASTM International



ASTM International Utilizes an Industry Led Consensus-Based Process to:

- Develop and Issue Technical Standards that Define and Control Products, Processes and Procedures
- That Support Industry Commercial Operations and Regulatory Oversight Activities



Established in 1898



150 Committees & 13,000+ Standards (Covering 90 industry sectors from aviation to construction to advanced manufacturing)



A leading global standards organization with more than 34,000+ members:

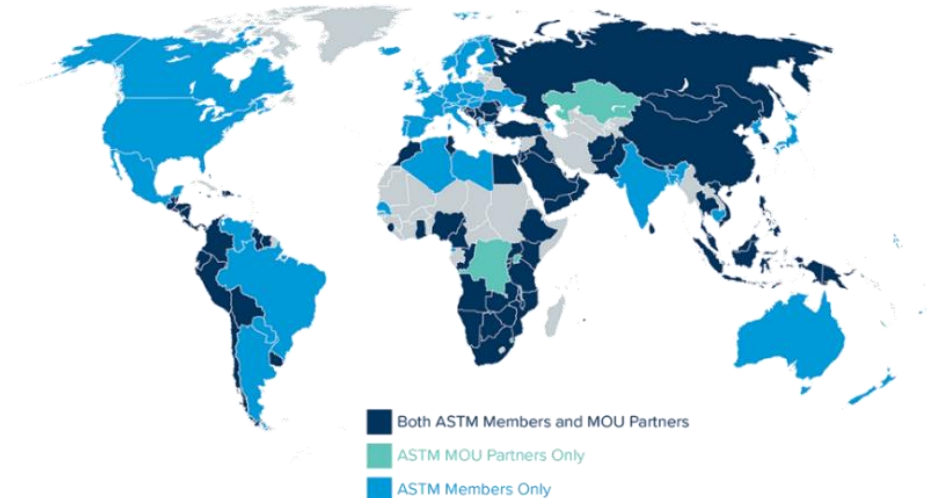
- 8,000+ International Members from 135 countries
- 8,400+ ASTM standards used in 83 countries



A highly agile, independent, non-governmental, non-profit, [member-led standards body](#)

- uniquely positioned to help society solve challenges and seize opportunities

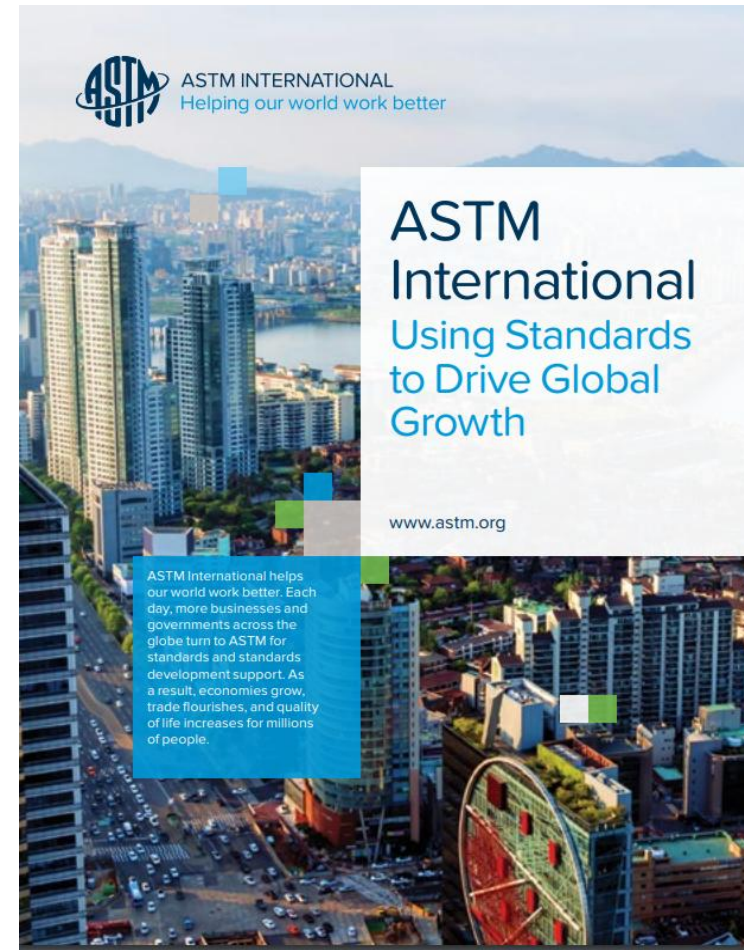
Globally recognized for quality and relevance



What Is a Standard?



- Much more than technical documents...
- An integrated system of limits, properties, test methods, and other information, which, when applied in accordance with the specified procedures will produce results which can be measured against industry's requirements for accuracy and relevance.
- Documents established by consensus, and approved by a recognized body, that provide for common and repeated use, offer rules, guidelines or characteristics
- Standards fuel global trade, promote health and general welfare, advance innovation



ASTM International and Aviation Fuels



- **ASTM Subcommittee D02.J on Aviation Fuels.**
- 800+ Members, representing a wide-variety of stakeholders:
 - All major engine, aircraft manufacturers, fuel producers and Regulators represented – including EASA.
 - A formalized process for the industry to evaluate the technical requirements of fuels and test methods.
 - High level of technical expertise and peer review.
 - Open and transparent process – anyone can join
 - Membership represents 55 different countries, including 22 European nations

***The Aviation Industry aspires to reduce environmental impact
ASTM offers a platform to progress this aspiration through
technical rigor and oversight of fuel specifications.***

Technical Committee Organization



Main Committee:

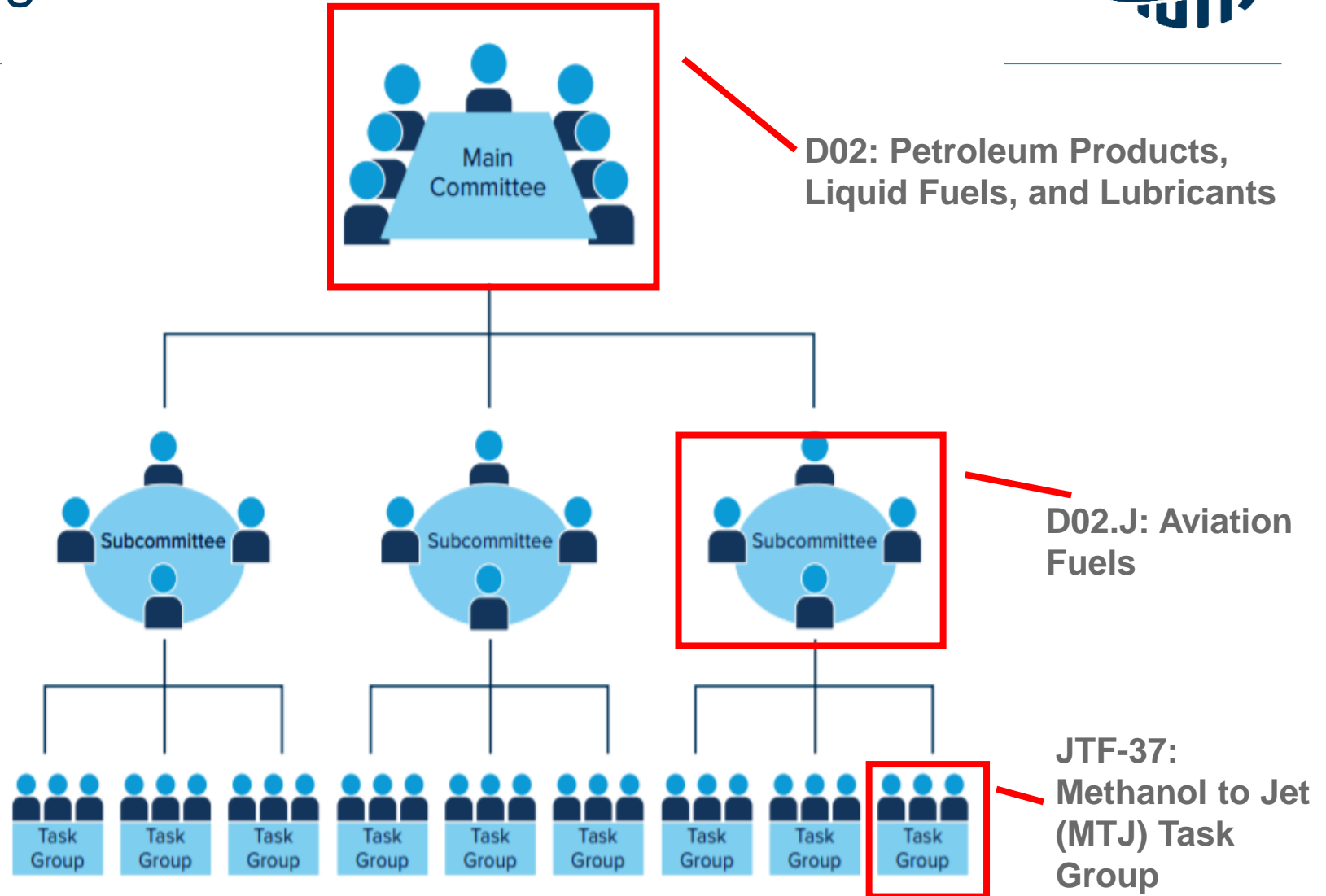
Each main committee is a semi-autonomous group approved by the ASTM Board of Directors and is responsible for developing standards in a given subject area.

Subcommittees:

Are formed as needed to address specific subjects or areas within the scope of the main committee. These areas include technical as well as administrative and strategic planning functions.

Task Groups:

Task groups are small working groups responsible for a specific assignment (development of a draft standard or implementation of an interlaboratory study) within a given time period. Task group members need not be members of ASTM.



Key Open Projects on SATF



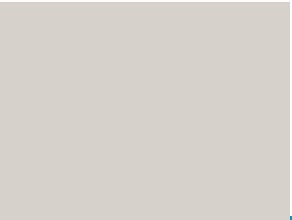
Synthetic Aviation Turbine Fuel: Section D02.J.06

| Subject | Standard | Lead | Under Development in Task Force | In Balloting | Completed (in ASTM Standard) |
|--|----------|-------------------------------|---------------------------------|--------------|------------------------------|
| Alcohol to Jet with Aromatics (New Annex A8) | D7566 | Swedish Biofuels | | | X |
| Isobutene to Jet (add to Annex A5) | D7566 | SkyNRG | | | X |
| Synthesized Aromatic Kerosene | D7566 | Virent | | X | |
| 100% Drop-in SATF | D7566 | GE Aviation | X | | |
| 100% Non-Drop-in SATF | TBD | Airbus & Rolls Royce | X | | |
| Plastics to Jet SATF | D7566 | OMV | X | | |
| HEFA with Aromatics | D7566 | Indian Institute of Petroleum | X | | |
| Methanol to Jet | D7566 | ExxonMobil | X | | |



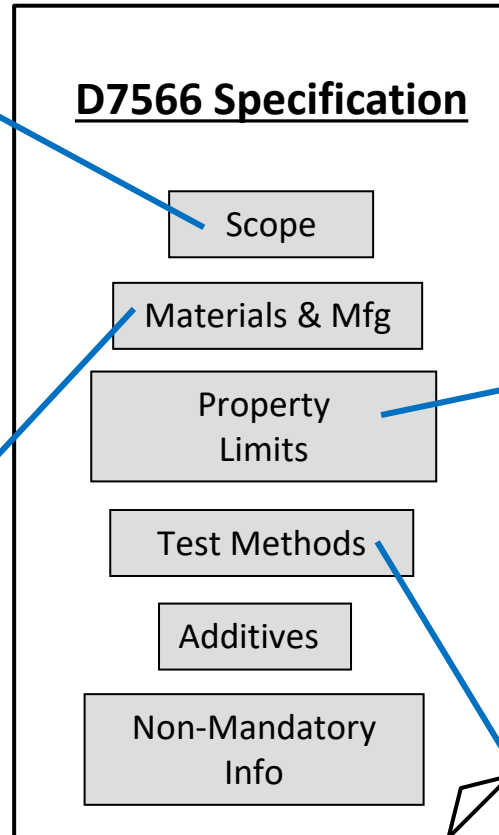
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Back up slides



ASTM International Standard Example

Defines the Applications or Products for which the Specification Results are Relevant and Accurate



Properties Selected to Bound Fuel Composition and Performance Based on Understanding of Fuel Raw Mat'ls and Manufacturing Processes

Compositional & Physical Property Limits that Fuel Must Meet

Examples:

- Aromatics: 8 to 25% vol
- Freezing Point < -47°C
- Density: 775 to 840 Kg/m³ at 15°C
- Viscosity: 12 mm²/s max at -47°C
- Lubricity: 0.85 mm max

Defines the Materials Manufacturing Methods for Which the Limits and Test Methods will Produce Accurate Results

ASTM Test Methods are Scientifically Developed and Statistically Validated FOR SPECIFIC FUEL COMPOSITIONS, Their Accuracy is Unknown for Compositions not Evaluated

Test Procedures Used to Measure the Performance Properties

Examples:

- Aromatics: D8305
- Freezing Point: D5791
- Density: D4052
- Viscosity: D445
- Lubricity: D5001

Attributes of ASTM Standards Process



Ensure an open and transparent process

- Direct and equal participation for everyone

Provide impartial, consensus-based model of engagement

- Balanced system where producers' votes are equal to those of users
- Impartial, inclusive, and fair to all, with appeals and protections to avoid abuses

Produce effective and relevant standards

- Respond to needs and changing conditions, new hazards, or emerging technologies
- Relevant to the global marketplace and performance-based in application

Driven by research, data, and science-based decisions

- Focus on science and technical quality, and specifically addressing risks and needs

Collaborate with other standards bodies to avoid duplications

- Agreements with ISO/IEC
- Regional agreements with CEN/CENELEC
- National agreements with 115 NSBs

D02.J - Aviation Fuel Accomplishments



Aviation Gasoline Standards Issued:

- 1998: D6227, Grade 82UL Unleaded Aviation Gasoline Containing a Non-hydrocarbon Component
- 2009: D7547, UL91 Unleaded Aviation Gasoline
- 2011: D7719, High Aromatic Content Unleaded Hydrocarbon Aviation Gasoline Test Fuel
- 2013: D7826, Aviation Gasoline Test and Evaluation Guideline
- 2014: D7960, Unleaded Aviation Gasoline Test Fuel

Synthetic Aviation Turbine Fuel Specifications Issued:

- 2009: D7566, Synthetic Aviation Turbine Fuels
- 2009: D7566 Annex A1, Fischer-Tropsch
- 2009: D4054: New Fuel and Additive Evaluation Guideline
- 2011: D7566 Annex A2, Hydroprocess Esters and Fatty Acids
- 2014: D7566 Annex A3, Synthesized Isoparaffins
- 2015: D7566 Annex A4, Fisher-Tropsch with Aromatics
- 2016: D7566 Annex A5, Alcohol to Jet
- 2018: D7566 Annex A5, Ethanol to Jet
- 2019: D7566 Annex A6, Catalytic Hydrothermolysis
- 2020: D7566 Annex A7, Hydrocarbons and Hydroprocessed Esters and Fatty Acids
- 2023: D7566 Annex A8: Alcohol to Jet with Aromatics
- 2023: D7566 Annex A5: Isobutene to Jet

- **The industry meet twice each year (June / December) to review the specifications.**
- **Specifications are updated / published throughout the year to meet industry requirements.**
- **Task Forces are also active throughout the year to progress various technical activities.**

• With up to 12 million passengers flying each day this is a major responsibility



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Questions?

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