



International Civil Aviation Organization

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## ICAO FACT SHEET

### AIRCRAFT CO<sub>2</sub> EMISSIONS STANDARD METRIC SYSTEM

The International Civil Aviation Organization (ICAO) promotes the safe and orderly development of international civil aviation throughout the world. Among others, ICAO sets global Standards for aviation safety, security, and environmental protection. The ICAO Council's Committee on Aviation Environmental Protection (CAEP) conducts the majority of ICAO's environmental technical work and has developed a range of Standards to address aircraft noise and local air quality. The CAEP is currently focussed on developing an Aircraft Carbon Dioxide (CO<sub>2</sub>) Emissions Standard which was a recommendation from the ICAO Programme of Action on International Aviation and Climate Change, as part of a set of measures to reduce greenhouse gas emissions from the air transport system. Subsequently in October 2010 the 37th Assembly (Resolution A37-19) requested the development of an ICAO CO<sub>2</sub> Emissions Standard.

#### **A robust, objective and effective CO<sub>2</sub> metric system**

On 11 July 2012, global aviation moved an important step closer to establishing the worldwide Aircraft CO<sub>2</sub> Emissions Standard when the CAEP reached a unanimous agreement on a CO<sub>2</sub> metric system to underpin the CO<sub>2</sub> Standard. The CO<sub>2</sub> metric system is a measure of aircraft fuel burn performance and therefore represents the CO<sub>2</sub> emissions produced by an aircraft. The intent of the CO<sub>2</sub> metric system is to equitably reward advances in aircraft technologies (i.e. structural, propulsion and aerodynamic) which contribute to reductions in aircraft CO<sub>2</sub> emissions, and differentiate between aircraft with different generations of these technologies. As well as accommodating the full range of technologies and designs which manufacturers can employ to reduce CO<sub>2</sub> emissions, the CO<sub>2</sub> metric system has been designed to be common across different aircraft categories, irrespective of aircraft purpose or capability. As a result, the CO<sub>2</sub> metric system is based on three elements associated with aircraft technology and design:

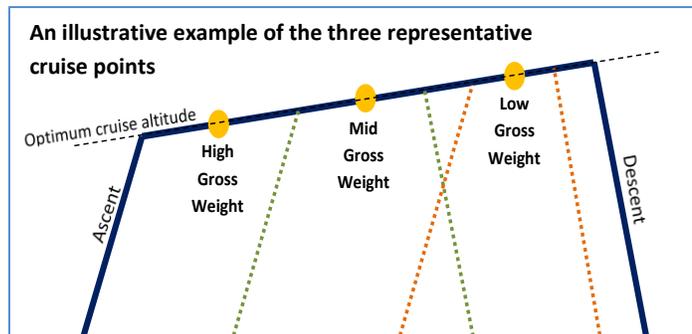
- Cruise point fuel burn performance;
- Aircraft size; and
- Aircraft weight.

Based on the CO<sub>2</sub> metric system, the CO<sub>2</sub> Standard will aim to reduce aircraft CO<sub>2</sub> emissions by encouraging the integration of fuel efficient technologies into aircraft design and development. It has been developed such that effective improvements observed through the CO<sub>2</sub> Standard will correlate with reductions of CO<sub>2</sub> emissions by aircraft during day-to-day operations.

The development of the CO<sub>2</sub> metric system is a critical step toward the full Aircraft CO<sub>2</sub> Emissions Standard and is based on extensive and consensus-based technical analyses and discussions over the past three years within the CAEP. An overview of the three elements which make up the CO<sub>2</sub> metric system is provided in the following sections.

### Cruise point fuel burn performance

To establish the fuel efficiency of the aircraft, the CO<sub>2</sub> metric system uses multiple test points to represent the fuel burn performance during cruise. There are three equally weighted points represented by aircraft weights at high, middle and low percentages of Maximum Take-Off Weight, and each of these represents an aircraft cruise gross weight seen regularly in service. The objective of using three gross weight cruise points is to make the evaluation of fuel burn performance more relevant to day-to-day aircraft operations.

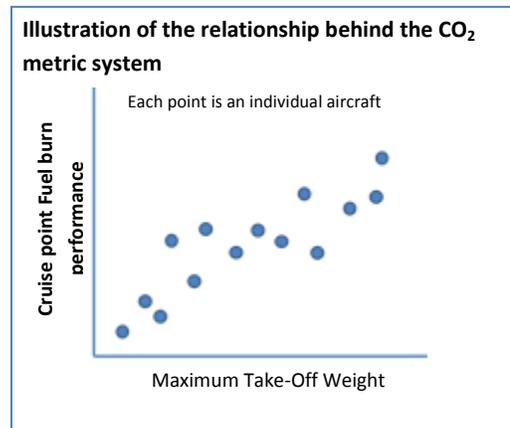


### Aircraft size

In some aircraft designs there are instances where changes in aircraft size may not reflect changes in aircraft weight, for example when an aircraft is a stretched version of an existing aircraft design. To better account for such instances, not to mention the wide variety of aircraft types and the technologies they employ, an adjustment factor based on fuselage width and length was introduced to represent aircraft size. This improved the performance of the CO<sub>2</sub> metric system, making it fairer and better able to account for different aircraft designs.

### Aircraft weight

The overall design of the aircraft is represented in the CO<sub>2</sub> metric system by the certified Maximum Take-Off Weight. This accounts for the majority of aircraft design features which allow an aircraft type to meet market demand.



### Next steps

The decision on the CO<sub>2</sub> metric system allows the CAEP to move onto the next stages in developing an ICAO CO<sub>2</sub> Standard. The next stage includes the definition of certification procedures for each of the parameters in the agreed metric system, as well as the determination of the new Standard's scope of applicability. An appropriate regulatory limit for the CO<sub>2</sub> Standard will then be identified using the ICAO criteria of technical feasibility, environmental benefit, cost effectiveness and the impacts of interdependencies. Once these steps are complete, the new CO<sub>2</sub> Standard will go through a formal review and approval process by relevant ICAO bodies and Member States, ultimately leading to its incorporation into national regulatory frameworks. Official approval of the CO<sub>2</sub> metric system, as part of the Aircraft CO<sub>2</sub> Emissions Standard, is expected from the ICAO Council next year.