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Aircraft — Self-propelled lavatory-servicing vehicle — Functional requirements

Aéronefs — Véhicules automoteurs de vidange des sanitaires — Exigences fonctionnelles

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9666 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Sub-Committee SC 9, *Air cargo and ground equipment*.

Annex A of this International Standard is for information only.

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Aircraft — Self-propelled lavatory-servicing vehicle — Functional requirements

1 Scope

This International Standard specifies functional requirements for a self-propelled lavatory-servicing vehicle suitable for all aircraft types commonly in service in civil air transport.

It does not specify equipment design but highlights certain criteria that are known to be essential for efficient operation in the airline environment.

In all cases, this International Standard shall be applied with due reference to national regulations on sanitation that are applicable in the area in which it is proposed that the vehicle is to be used.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1950:1974, *Aircraft — Identification of servicing, maintenance, ground handling and safety/hazard points.*

ISO 6966:1982, *Aircraft — Basic requirements for aircraft loading equipment.*

World Health Organization, *Guidelines for Drinking-Water Quality. Volume 1. Recommendations.* Geneva. 1984. ISBN 92 4 154 1687.

World Health Organization, *Guidelines for Drinking-Water Quality. Volume 2. Criteria and Other Supporting Information.* Geneva. 1986. ISBN 92 4 154 1695.

3 General requirements

3.1 The vehicle shall be capable of accepting, transporting and disposing of waste products that can be removed from the aircraft.

3.2 The vehicle shall be used only for servicing aircraft lavatory systems and any connections to the aircraft systems shall be so designed as to prevent their inadvertent use on any other aircraft system. See ISO 1950 for identification marking of service points.

3.3 The unit shall be capable of servicing aircraft lavatory systems from points located at heights ranging from 1,6 m (63 in) to 4,5 m (177 in) above ground level.

3.4 Whenever justified, the unit should be mounted upon a standard, commercially available chassis in order to ensure maximum economies in purchase and running costs.

3.5 The overall weight, dimension and stability of the unit shall satisfy all regulations applicable to road vehicles in the intended country of use, in accordance with the requirements of ISO 6966.

3.6 The overall dimensions of the vehicle shall be kept to a minimum.

3.7 The lowest point of the loaded unit shall be not less than 200 mm (8 in) above level ground.

3.8 The unit shall be capable of turning within a swept radius of 12,2 m (40 ft).

3.9 When negotiating two intersecting ramps with a 5° difference in angle, no part of the structure of the unit shall be less than 130 mm (5 in) from the ground.

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3.10 Except for the driver's cab, no structural part of the unit shall be more than 1,63 m (64 in) above the ground when the working platform is in the fully lowered position.

3.11 Except for the driver's cab, all parts of the unit shall be made from noncorrosive material or material which has been treated against corrosion.

3.12 The unit shall be fitted with a working platform which, if required, shall elevate so as to allow efficient operation of all appropriate controls on the unit and the aircraft.

3.13 The unit shall be fitted with lighting so as to allow safe operation in darkness.

3.14 The electrical system shall be of such capacity as to allow servicing of at least one aircraft with the engine running at idle speed.

3.15 Each electrical circuit shall be protected from overload by an independent circuit breaker.

3.16 Visibility from the driver's position shall be such as to facilitate easy and safe manoeuvring and positioning of the unit near and onto the aircraft.

4 Tank design

4.1 The unit shall have waste-collection and rinsing-water tanks that are separate and independent.

4.2 In order to be easily cleanable, the tanks shall have the following features:

a) all inside fittings, welds, joints and rivets shall have a smooth finish;

b) cylindrical ends shall be dished and any corners rounded to a radius of at least 75 mm (3 in);

c) the bottom of the tank shall have a slope of 5°, preferably with the lowest point at the rear of the vehicle.

4.3 Baffles shall be installed inside the tank so as to prevent any surge of load when the vehicle is driven.

4.4 Both tanks shall have a leakproof manhole in the top so as to facilitate cleaning and inspection.

4.5 The tanks shall be fitted with suitable gas/air vents.

4.6 The tanks shall be fitted with easily visible and suitably protected liquid level-gauges.

4.7 The chassis mountings of the tanks shall be constructed so as to absorb impacts and vibrations in the most adverse loading conditions during service.

4.8 A walkway, at least 300 mm (12 in) wide, shall be fitted on each side at the top of the vehicle's structure.

5 Waste tank features

5.1 The capacity of the waste tank shall be between 1 800 l [396 gal (UK)] and 3 500 l [770 gal (UK)].

5.2 A dump valve of at least 100 mm (4 in) diameter shall be fitted to the lowest point of the tank.

5.3 The operating handle of the dump-valve shall be so located as to protect the operator from being splashed with effluent when emptying the tank.

5.4 The tank shall be equipped for internal cleaning and flushing.

6 Rinsing tank features

6.1 The rinsing tank shall have a capacity of between 1 100 l [224 gal (UK)] and 1 800 l [396 gal (UK)].

6.2 The tank shall be equipped with a drain plug and filler cap.

6.3 The tank shall be equipped for internal cleaning and flushing.

7 Main pump

7.1 The main pump shall be directly connected to the rinsing tank outlet and shall be driven by a power-take-off from the main engine or by an auxiliary power source.

7.2 The outlet of the main pump shall be fitted with a two-way valve. One position shall be to feed the water delivery hose and the other shall be to feed the waste-tank flushing system.

7.3 Where the pump is driven by a power-take-off, it shall not be possible to operate the pump unless the vehicle's road gears are in a neutral position.

7.4 The capacity of the pump shall be equivalent to:

— flow: 120 l/min [26 gal (UK)/min];

— pressure: 350 kPa (50 lbf/in^2).

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7.5 There shall be a relief valve located close to the working platform to allow the pressure to be regulated according to the requirements of different aircraft types. The valve shall be easily adjustable between 150 kPa (21 lbf/in^2) and 350 kPa (50 lbf/in^2) and should be fitted with an easily readable pressure gauge.

7.6 Controls shall be provided so as to allow the unit to be operated from the ground as well as from the working platform.

7.7 A meter, equipped with a zero reset, shall be provided to indicate the amount of rinsing water delivered to the aircraft.

8 Hoses

8.1 The rinsing water hose shall

— be flexible and noncollapsible;

— be at least 5 m (16 ft) long;

— have an inside diameter of 25 mm (1 in);

— have a coupling at the delivery end compatible with the aircraft types to be serviced[1];

— be stowed on a hose reel at the rear of the vehicle.

8.2 The waste hose shall

— be flexible and noncollapsible;

— have an inside diameter of 100 mm (4 in);

— be at least 5 m (16 ft) long;

— have a coupling compatible with the aircraft types to be serviced and which will allow the waste to flow by gravity into the waste tank[1];

— have provision to be stowed, together with the coupling at a suitable location on the vehicle.

9 Working platform

9.1 An elevating working platform of dimensions 800 mm × 800 mm (31,5 in × 31,5 in) shall be provided at the rear of the vehicle.

9.2 The height range of the working platform shall be from 0,4 m (16 in) to 3 m (118 in) from the ground.

9.3 The platform shall have a lifting speed between 80 mm/s (3,1 in/s) and 150 mm/s (5,9 in/s).

9.4 The minimum lifting capacity of the platform shall be 160 kg (350 lb) or more if so required by national safety regulations for one-operator platforms.

9.5 The floor of the working platform shall be constructed of open-work material so as to allow self-draining and cleaning.

9.6 The fastening connectors for the hoses shall be installed in the basket of the working platform.

9.7 The controls in the working platform shall be duplicated so that the unit can be operated from ground level.

9.8 Control panels and working areas shall be equipped with adequate lighting for night operation.

9.9 All working platforms and access ways shall be equipped with adequate hand/safety rails.

9.10 The location of the hoses shall be such that there is no risk of hose damage caused by movement of the working platform.

9.11 A transmission interlock shall be fitted so that vehicle movement is not possible with the working platform raised.

10 Options

The following optional equipment may also be added to the basic vehicle specified above:

a) additional tank to contain and dispense disinfecting fluid;

b) system insulation incorporating insulation and/or a heating system to protect fluids from freezing;

c) manual water pump;

d) manual pump to raise and lower the working platform;

e) powered hosereel for the rinsing water hose;

f) dump-valve designed for direct connection to the ground drainage system;

g) retractable handrail around the top of the tank structure;

h) adjustable steps instead of an elevating working platform.

1) An International Standard covering this subject is in preparation.

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Annex A
(informative)

Vacuum-assisted extraction

A.1 Many lavatory-servicing vehicles operate on a gravity drainage system. Since the 1970's, however, lavatory-servicing vehicles equipped for vacuum-assisted extraction have been in use in some areas.

A.2 In principle, these vehicles have an additional pump installed which creates a negative pressure within the vehicle's waste tank(s).

A.3 The purpose of the system is to speed the flow of fluids and to assist with the clearance of "soft" blockages, although the systems are, generally, not effective in clearing "hard" blockages.

A.4 Views within the industry on the use of vacuum-assisted units are polarised to a considerable extent due partly to the possibility of damage to aircraft systems as a result of the collapse of pipes and ducting caused by the vacuum and partly due to concern on issues of personnel safety.

A.5 There are records of damage to aircraft systems during lavatory servicing by vacuum althrough, in almost all cases, there have been contributory factors other than the use of vacuum-assisted extraction.

A.6 The use of vacuum-assisted extraction is accepted by the major airframe manufacturers, recommended by some airlines and used as normal procedure by some handling agencies. Vacuum assistance, however, cannot be used for all aircraft types or configurations and is prohibited by some airlines and not generally used in some countries.

A.7 Due to the reservations held in some areas, the system should therefore only be used with the operator's express approval and then only if the vacuum can be accurately adjusted and after reference to the aircraft operator for the negative pressure to be used.

A.8 If vacuum-assisted extraction is used, suction shall not be applied until the aircraft waste drain valves have been opened nor while any lavatory is occupied.

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