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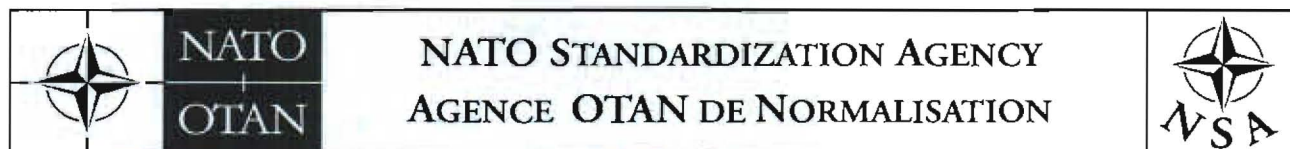
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MILITARY COMMITTEE AIR STANDARDIZATION BOARD (MCASB)

8 April 2010

NSA(AIR)0406(2010)AT/3400

MCASB

STANAG 3400 AT (EDITION 4) – RESTRAINT OF CARGO IN FIXED WING AIRCRAFT

Reference:

MAS(AIR)238-TN/3400 dated 17 June 1983 (Edition 3)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization Document Database (NSDD), is promulgated herewith.
2. The reference listed above is to be destroyed in accordance with local document destruction procedures.
3. The MCASB, NSA considers this an editorial edition of the STANAG; previous ratifying references and implementation details are deemed to be valid.

A handwritten signature in purple ink, appearing to read 'Juan A. Moreno', is written over a horizontal line.

Juan A. MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

Enclosure:

STANAG 3400 AT (Edition 4)

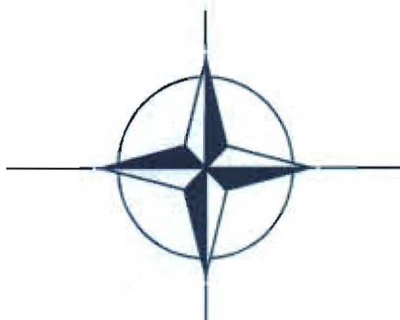
NATO Standardization Agency – Agence OTAN de normalisation
B-1110 Brussels, Belgium Internet site: <http://nsa.nato.int>
E-mail: air@nsa.nato.int – Tel 32.2.707.5587 – Fax 32.2.707.5718

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STANAG 3400
(Edition 4)

**NORTH ATLANTIC TREATY ORGANIZATION
(NATO)**



**NATO STANDARDIZATION AGENCY
(NSA)**

**STANDARDIZATION AGREEMENT
(STANAG)**

SUBJECT: RESTRAINT OF CARGO IN FIXED WING AIRCRAFT

Promulgated on 8 April 2010

A handwritten signature in purple ink, which appears to read 'Juan A. Moreno'. The signature is written in a cursive style and is positioned above a horizontal line.

Juan A MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

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RECORD OF AMENDMENTS

| N° | Reference/date of Amendment | Date Entered | Signature |
|----|-----------------------------|--------------|-----------|
| | | | |

EXPLANATORY NOTES

AGREEMENT

1. This STANAG is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.
2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet <http://nsa.nato.int>; NATO Secure WAN <http://nsa.hq.nato.int>).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BE.

NATO STANDARDIZATION AGREEMENT
(STANAG)

RESTRAINT OF CARGO IN FIXED WING AIRCRAFT

Related Document: STANAG 3548 AT TIE-DOWN FITTINGS ON AIR
TRANSPORTED AND AIR-DROPPED
EQUIPMENT AND CARGO CARRIED
INTERNALLY BY FIXED WING
AIRCRAFT

AIM

1. The aim of this agreement is to establish minimum ultimate aircraft restraint factors, strength of cargo lashing devices, and strength, locations and sizes of cargo aircraft floor tie-down fittings. These criteria and devices apply to fixed wing aircraft specifically employed on operation and exercises.

AGREEMENT

2. Participating nations agree to the following:

- a. Aircraft Restraint Factors. All cargo, whether or not on pallets or platforms, when carried in aircraft, shall be restrained to the following minimum ultimate factors:

| | |
|---------------|-------|
| Forward | 3.0 g |
| Side | 1.5 g |
| Aft | 1.5 g |
| Vertical (up) | 2.0 g |

Note 1: Where the passengers or crew are seated forward of and on the same level as the cargo, the nation supplying the aircraft may provide additional restraint in accordance with national requirements.

Note 2: Where the National Air Transport Regulations of the country providing the aircraft require higher factors than those above, it is the responsibility of that country to provide the additional restraint required, unless there are structural or other limitations which prevent this, in which case, cargo weights must be reduced as necessary.

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- b. Lashings. All cargo aircraft will be equipped with lashings of one or more of the following three categories:

5,000 lbs (22.3 kN)
10,000 lbs (44.5 kN)
25,000 lbs (111.2 kN)

Note: The above figures represent the minimum ultimate strengths of these lashings and afford the best compromise between the metric and avoirdupois systems. Should the metric system be adopted universally, an appropriate revision will be issued.

- c. Floor (Excluding Ramps and Doors) Tie-Down Fittings. The following design criteria shall apply to all future cargo aircraft.

(1) Strengths. Floor tie-down fittings shall have minimum ultimate capacities of 5,000 lbs (22.3 kN), 10,000 lbs (44.5 kN) and 25,000 lbs (111.2 kN).

(2) Locations.

(a) The 20 inch (508 mm) grid pattern for tie-down fittings shall be standard for all future transport aircraft with cargo compartment floor widths equal to or less than 126 inches (3.20 m). The floor shall be divided into a grid 20 inches (508 mm) between lines starting with a row of fittings along the centreline of the aircraft cargo compartment. At each intersection of grid lines a tie-down fitting will be installed. On regions of diminishing fuselage cross section of floor width, deviation is permitted for efficient utilization of available space. This does not preclude the provision of additional tie-down points. The 5,000 lbs (22.3 kN) or 10,000 lbs (44.5 kN) fitting shall be located on the 20 inch (508 mm) grid intersection points. Tie-down fittings of 25,000 lbs (111.2 kN) capacity (or higher strength) may be installed to supplement the lower strength fittings and may be installed at optimum locations compatible with the aircraft structural designs.

(b) For all future transport aircraft with cargo compartment floor widths greater than 126 inches (3.20 m) the 20 inch (508 mm) grid pattern, per paragraph 2.b.(2).a., shall be standard whenever possible. When cost and aircraft design factors prevent the use of 20 inch (508 mm) grid pattern for a particular type of wider body transport aircraft, a standard grid pattern shall be established for that particular type of aircraft. The nation(s) developing the aircraft shall establish the dimensions of the grid pattern such that member nations' air transportable loads, that are physically compatible with aircraft's cargo compartment, can be secured to the restraint factors in

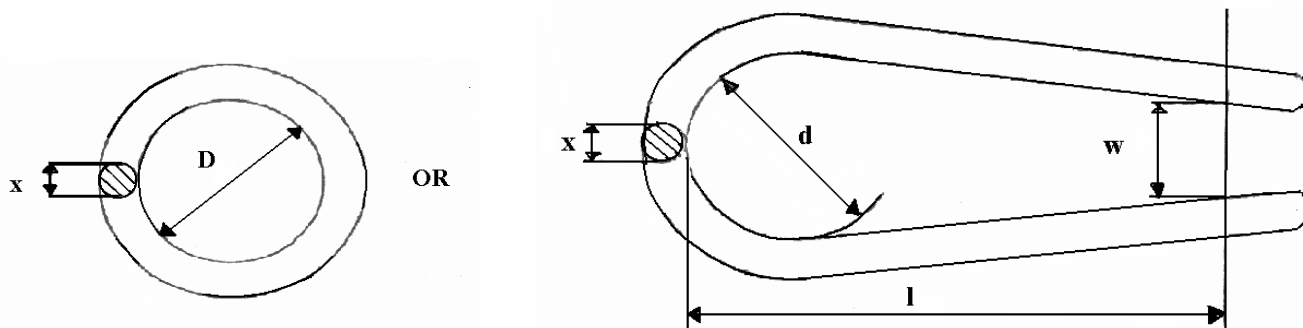
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STANAG 3400 without using excessive cargo floor area or restricting the load location within the aircraft¹, thereby providing maximum utilization of the cargo compartment. At each intersection of grid lines, a tie-down fitting will be installed. The 5,000 lbs (22.3 kN), 10,000 lbs (44.5 kN) or 25,000 lbs (111.2 kN) fitting shall be located on the grid intersection points. On regions of diminishing fuselage cross-section of floor width, deviation from the established grid pattern is permitted for efficient utilization of tie-down points.

Note: In the case of military versions of civilian aircraft, it may not always be possible to implement the provision of paragraph 2.c.(2) above.

(3) Dimensions of floor Tie-Down Fittings

| CAPACITY | MINIMUM DIAMETER (D) | DIAMETER OF CROSS SECTION X | | MINIMUM DIAMETER (d) | MINIMUM DIMENSION (l) | MINIMUM DIMENSION (w) |
|-------------------------|----------------------|-----------------------------|---------------------|----------------------|-----------------------|-----------------------|
| | | MINIMUM | MAXIMUM | | | |
| 22.3 kN (5000 lbs) | 60 mm (2.36 in) | 9.5 mm (0.38 in) | 12.7 mm (0.5 in) | 38 mm (1.50 in) | 60 mm (2.36 in) | 15 mm (0.59 in) |
| 44.5 kN (10000 lbs) | 60 mm (2.36 in) | 9.5 mm (0.38 in) | 16 mm (0.63in) | 38 mm (1.50 in) | 60 mm (2.36 in) | 15 mm (0.59 in) |
| 111.2 kN (25000 lbs) | | | | | | |



Note: The C 160 TRANSALL 25,000 lbs (111.2 kN) tie-down minimum clear opening is 1.828 inches (46.5 mm). Furthermore the cross section "x" is oval shaped with the longer diameter in the direction of pull 0.55 inch x 0.24 inch (14 mm x 6 mm) for 10,000 lbs (44.5 kN) and 0.67 inch x 0.47 inch (17 mm x 12 mm) for 25,000 lbs (111.2 kN) tie-down fittings.

¹ Load may be restricted for other reasons such as aircraft centre of gravity limits or aircraft cargo floor limits.

IMPLEMENTATION OF THE AGREEMENT

3. This STANAG is implemented when a nation has issued instructions that all future equipment procured for its forces will be manufactured in accordance with the specifications detailed in this agreement. No retrofit action is necessary.