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**MILITARY COMMITTEE AIR STANDARDIZATION BOARD (MCASB)**

19 February 2010

NSA(AIR)0188(2010)AT/3548

MCASB

**STANAG 3548 AT (EDITION 3) – TIE-DOWN FITTINGS ON AIR TRANSPORTED AND AIR-DROPPED EQUIPMENT AND CARGO CARRIED INTERNALLY BY FIXED WING AIRCRAFT**

Reference:

MAS(AIR)(78)83 dated 3 April 1978 (Edition 2)

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 black 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 3548 AT (Edition 3)

NATO Standardization Agency – Agence OTAN de normalisation  
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E-mail: [air@nsa.nato.int](mailto:air@nsa.nato.int) – Tel 32.2.707.5587 – Fax 32.2.707.5718

**NORTH ATLANTIC TREATY ORGANIZATION  
(NATO)**



**NATO STANDARDIZATION AGENCY  
(NSA)**

**STANDARDIZATION AGREEMENT  
(STANAG)**

**SUBJECT: TIE-DOWN FITTINGS ON AIR TRANSPORTED AND AIR-DROPPED  
EQUIPMENT AND CARGO CARRIED INTERNALLY BY FIXED WING  
AIRCRAFT**

Promulgated on 19 February 2010

A handwritten signature in black ink, appearing to read 'Juan A. Moreno', is written over a horizontal line. The signature is fluid and cursive.

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

NATO/PfP UNCLASSIFIED

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)

TIE-DOWN FITTINGS ON AIR TRANSPORTED AND AIR-DROPPED EQUIPMENT AND CARGO CARRIED INTERNALLY BY FIXED WING AIRCRAFT

Annex: A. Lashing Configurations

Related Documents: STANAG 3400 AT RESTRAINT OF CARGO IN FIXED WING AIRCRAFT

STANAG 4101 TOWING ATTACHMENTS  
CNAD, AC 225, LCG 2

AIM

1. The aim of this agreement is to provide design criteria for the standardization of tie-down fittings on air transported and air-dropped equipment and cargo which weigh over 2,200 lb (1.000 kg).

AGREEMENT

2. Participating nations agree that all tie-down fittings to be used on air transported or air-dropped cargo and equipment shall conform to the specifications of this STANAG.

VEHICLES, MISSILES AND HEAVY WEAPONS OF MORE THAN ONE METRIC TON

3. Any item weighing over one metric ton (2,200 lb) which is likely to be transported by air must incorporate tie-down fittings, and/or some other suitable means of restraints.

4. The number and strength of such fittings or lashing attachments should be such as to allow satisfactory lashing in accordance with the rules laid down by paragraph 2 of STANAG 3400.

5. For air transported items which may be placed in an aircraft in the forward or reverse direction, the strength of the tie-down fittings providing longitudinal restraints must be equal in the forward and aft directions.

6. Part of these fittings may consist of:

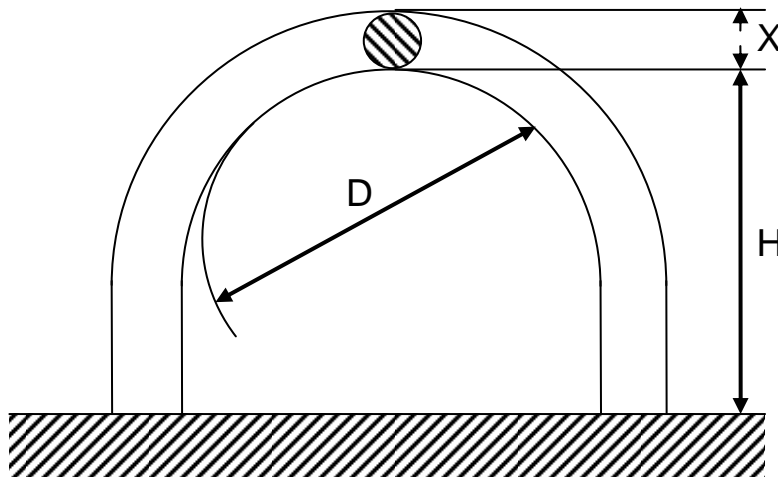
a. The towing hooks with which vehicles must normally be provided.

b. The lifting and general purpose rings provided on vehicles and missiles, subject however to compliance by these fittings with the provision of paragraph 8 below.

7. The special additional tie-down fittings necessary for air transported and air-dropped cargo will take the form of lugs or shackles, the characteristics of which are given in paragraph 8 below. Lugs are defined as fixed or rigid fittings; shackles as movable or hinged fittings.

8. Characteristics of tie-down fittings

SERIAL	CAPACITY	MINIMUM DIAMETER "D"	MINIMUM DIMENSION "H"	MINIMUM DIAMETER OF CROSS SECTION "X"	MAXIMUM DIAMETER OF CROSS SECTION "X"	CARGO WEIGHT
	(a)	(b)	(c)	(d)	(e)	(f)
1	22.24 kN (5000 lbs)	60 mm (2.36 in)	60 mm (2.36 in)	11 mm (0.43 in)	20 mm (0.79 in)	-
2	44.48 kN (10000 lbs)	60 mm (2.36 in)	64 mm (2.50 in)	19 mm (0.75 in)	22 mm (0.87 in)	-
3	111.2 kN (25000 lbs)	76 mm (3.00 in)	76 mm (3.00 in)	22 mm (0.87 in)	25 mm (1.00 in)	above 6810 kg (15000 lbs)
4	222.4 kN (50000 lbs)	89 mm (3.50 in)	89 mm (3.50 in)	22 mm (0.87 in)	25 mm (1.00 in)	



9. Fittings complying with the characteristics specified in paragraph 8 should permit the use of lashings defined in STANAG 3400 in the configuration shown in Annex A.

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10. The tie-down fittings should be so positioned that:
  - a. The whole and each of the principal parts of vehicles (chassis and body) are lashed in accordance with STANAG 3400.
  - b. Combat wheeled equipment can be placed in the aircraft with equal ease in either the forward or reverse direction (except for airdrop).
  - c. Lashing devices are placed symmetrically in relation to the longitudinal axis of the item.
  - d. Lashing devices shall be as easy as possible to attach to the item, and adjust for proper tension.

### GENERAL CARGO, CRATES AND CONTAINERS

11. Restraints complying with the standards of STANAG 3400 can be provided by:
  - a. A lashing harness or net placed over these items so that they become an integral part of the aircraft.
  - b. Lashing devices (chains, ropes or straps) used as a lashing harness.

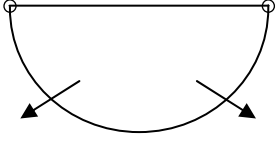
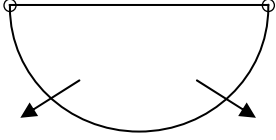
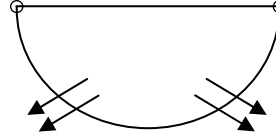
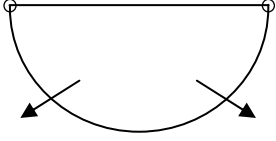
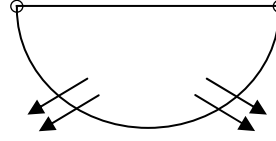
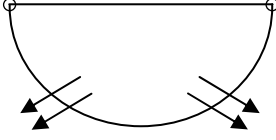
### ITEMS BACKED ON AIRDROP PLATFORMS OR AIR TRANSPORT PALLETS

12. The packing materials and techniques used should be such that the item and its support platform or pallet constitutes a single piece, in accordance with the standards laid down in paragraphs 3 to 11. The support itself (platform or pallet) is so arranged as to be lashed to the aircraft in accordance with these same standards either by means of a special locking device or by the use of conventional lashing devices (chains, webbing, etc.).

### IMPLEMENTATION OF THE AGREEMENT

13. 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.

**LASHING CONFIGURATIONS**  
**CONFIGURATIONS D'ARRIMAGE**

<p>LUG/SHACKLE PONTET/ MANILLE</p> <p>5,000 lbs (22.3 kN)</p>	 <p>5,000 lbs (22.3 kN)      5,000 lbs (22.3 kN)</p>	
<p>LUG/SHACKLE PONTET/ MANILLE</p> <p>10,000 lbs (44.5 kN)</p>	 <p>10,000 lbs (44.5 kN)      10,000 lbs (44.5 kN)</p>	 <p>5,000 lbs (22.3 kN)      5,000 lbs (22.3 kN)</p>
<p>LUG/SHACKLE PONTET/ MANILLE</p> <p>25,000 lbs (111.2 kN)</p>	 <p>25,000 lbs (111.2 kN)      25,000 lbs (111.2 kN)</p>	 <p>10,000 lbs (44.5 kN)      10,000 lbs (44.5 kN)</p>
<p>LUG/SHACKLE PONTET/ MANILLE</p> <p>50,000 lbs (222.4 kN)</p>		 <p>25,000 lbs (111.2 kN)      25,000 lbs (111.2 kN)</p>

**Note:** The strengths shown in column 1 are the maximum that can be applied in any one direction. Fittings should be located on the equipment to give maximum omnidirectional restraint. Multiple lashings may be used as shown in the table.

**Note:** Les valeurs de résistance mentionnées dans la colonne 1 sont les maxima qui puissent être appliqués dans une direction donnée. Les points d'arrimage seront placés sur des matériels de façon à permettre, dans la mesure du possible, des arrimages omnidirectionnels. Plusieurs agrès d'arrimage peuvent être utilisés à partir d'un même point d'arrimage, comme indiqué dans le tableau.