

TÜV NORD Nederland B.V. Ekkersrijt 4401 5692 DL Son en Breugel

AAS INTERNATIONAL BV

To Mr. R. Meulenkamp
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TÜV®

Your reference

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Direct contact details

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Datum

22-08-2023

Subject: results of test according ICAO Doc 9157 Aerodrome Design Manual part 6 – Frangibility 483km/h”

Dear Mr. Meulenkamp,

On the 22nd of May 2023 AAS INTERNATIONAL BV (hereafter AASI) requested TÜV Nederland QA BV (hereafter TÜV) as third party to witness load test according to ICAO Doc. 9157 Aerodrome Design Manual part 6- Frangibility.

By this writing TÜV reports the witnessed results of the executed tests:

Test protocol: ICAO Doc 9157 part 6 §5.2.3.
Location: Achtseweg Zuid 153-C, Eindhoven, The Netherlands
Test date: 8th of August 2023

The sample provided was a runway guidance sign with the following characteristics:

Designation: Standard Mode 3
Width: 2100 mm
Height: 600 mm

The foresaid test was performed on a setup with the following parts:

Break coupling: Type 5

During the test the break coupling was mounted horizontally in a test rig and loaded with a force equal to the specified wind loads from ICAO Doc 9157 part 6 §5.2.3.

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Figure 1 - Test rig with means to apply forces

From calculations the following loads were simulated by applying test masses:

Sample	Objective	Requirement	Realized	PASS/FAIL
1	Load for 10 minutes	$\geq 602 \text{ kgf}$ (5,9 kN)	602 kgf (5.903 kN)	PASS
	No permanent deformation or no breakage	0 mm	0 mm	PASS
	Breakage	$< 836 \text{ kgf} \pm 20 \text{ kgf}^*$ (8,2 kN \pm 0,2 kN)	846 kgf (8,3 kN)	PASS
2	Load for 10 minutes	$\geq 602 \text{ kgf}$ (5,9 kN)	602 kgf (5.903 kN)	PASS
	No permanent deformation or no breakage	0 mm	0 mm	PASS
	Breakage	$< 836 \text{ kgf} \pm 20 \text{ kgf}^*$ (8,2 kN \pm 0,2 kN)	839 kgf (8,2 kN)	PASS
3**	Load for 10 minutes	$\geq 602 \text{ kgf}$ (5,9 kN)		Not witnessed
	No permanent deformation or no breakage	0 mm		Not witnessed
	Breakage	$< 836 \text{ kgf} \pm 20 \text{ kgf}^*$ (8,2 kN \pm 0,2 kN)	850 kgf (8,3 kN)	PASS

*) Tolerance based on quality statement of manufacturer related to the maximum reasonable accuracy of the set of test equipment.

***) Sample 3 was pre-loaded without witnessing and pulled up to breakage without the 10 load test.

With kind regards,

Martijn Otten

Sr. Inspector CE/Projects

TÜV Nederland, OBS Manufacturing Technologies

Attachment: AASI manufacturer report "20230810 Frangibility test.pdf"

Test sample 1

Sign dimension 600 x 2100 mm (face), mode 3 (wind load 493km/h), coupler type 5

Standard	Objective	Requirement	Result	Result
ICAO Doc 9157 part 6, §5.2.3 a	Load for 10 minutes	≥ 602 kgf (5,902 kN)	602 kgf 5,902 (kN)	PASS
	No permanent deformation.	0 mm	0 mm	PASS
	No breakage of frangible coupler.		No breakage	PASS
ICAO Doc 9157 part 6, §5.2.3 c	Breakage of frangible coupler.	836 kgf +/- 20 (8,196kN)	846 kgf 8,294 (kN)	PASS
	Failure mechanisme	On breakage point	On breakage point	PASS



Test sample 2

Sign dimension 600 x 2100 mm (face), mode 3 (wind load 493km/h), coupler type 5

Standard	Objective	Requirement	Result	Result
ICAO Doc 9157 part 6, §5.2.3 a	Load for 10 minutes	≥ 602 kgf (5,902 kN)	602 kgf 5,902 (kN)	PASS
	No permanent deformation.	0 mm	0 mm	PASS
	No breakage of frangible coupler.		No breakage	PASS
ICAO Doc 9157 part 6, §5.2.3 c	Breakage of frangible coupler.	836 kgf +/- 20 (8,196kN)	839 kgf 8,225 (kN)	PASS
	Failure mechanisme	On breakage point	On breakage point	PASS



Test sample 3

Sign dimension 600 x 2100 mm (face), mode 3 (wind load 493km/h), coupler type 5

Standard	Objective	Requirement	Result	Result
ICAO Doc 9157 part 6, §5.2.3 a	Load for 10 minutes	≥ 602 kgf (5,902 kN)	602 kgf 5,902 (kN)	PASS
	No permanent deformation.	0 mm	0 mm	PASS
	No breakage of frangible coupler.		No breakage	PASS
ICAO Doc 9157 part 6, §5.2.3 c	Breakage of frangible coupler.	836 kgf +/- 20 (8,196kN)	850 kgf 8,333 (kN)	PASS
	Failure mechanisme	On breakage point	On breakage point	PASS

