AIRBUS

WIRE-MESH CRES WIRE

Issue : G
Date : June 07
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SUMMARY

1 - SCOPE AND FIELD OF APPLICATION

This product standard defines requirements to be met for acceptance, qualification and quality assurance of corrosion-resistant steel metal fabrics used for the acoustic treatment.

2 - REFERENCES

ASN001-05: Qualification of standardized products in General Engineering standards.
NOTES: in annex 2, line 98.
I.Q. DA 12-01: Identification and marking.

The latest issue of these documents is to be used.

3 - DESCRIPTION OF MATERIAL

3.1 - The material is a wire-mesh fabric made of corrosion-resistant steel wire and selected for its acoustic characteristics.

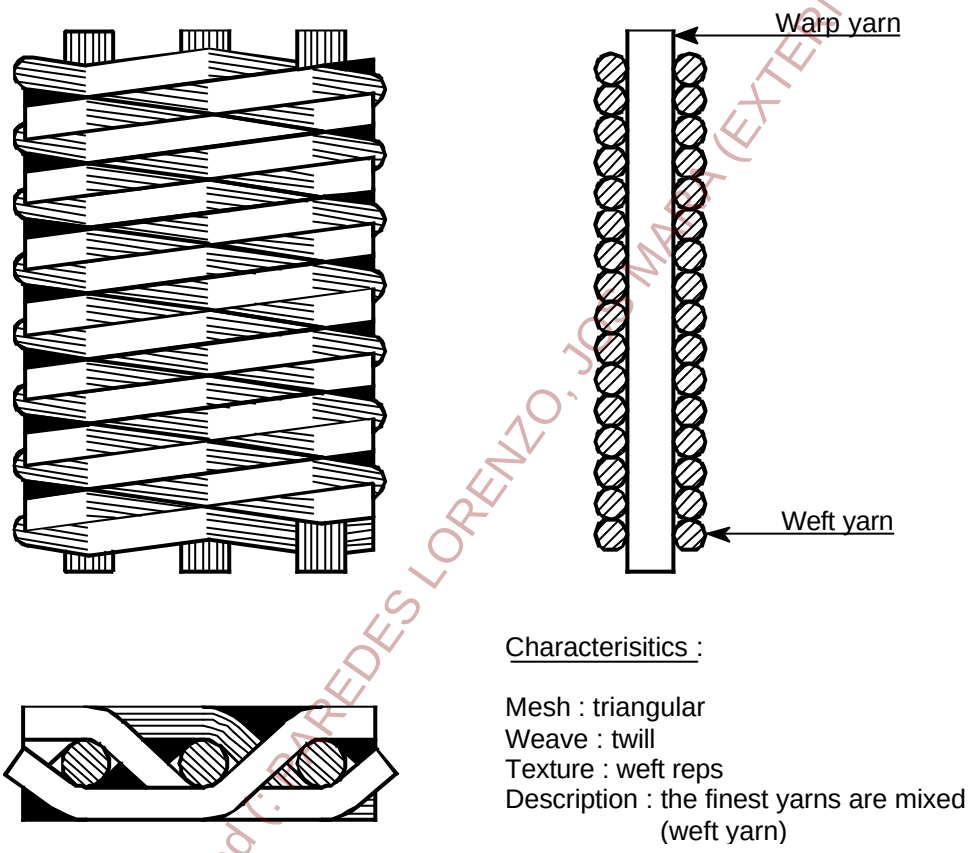


Figure - Fabric section

3.2 - Visual appearance, cleanliness

The stainless steel yarn cloth, uniform in appearance, should have no homogeneity defects, such as foreign bodies, defects in yarn alignment mesh, etc... and should have no stains, degreasing circling or traces of matting. The cloth's cleanliness must be inspected by wiping it with a clean white non-fleecy cotton rag. This should leave no marks on the rag.

3.3 - Allotment

1 batch of wire cloth is composed of 1 batch of warp yarn and at most 2 batches of weft yarn. The cloth must come from single-pass manufacturing, with no interruptions or significant change in parameters (drawing, weaving and final degreasing).

4 - QUALIFICATION, ACCEPTANCE

Acceptance and qualification tests are indicated in annex 2.

4.1 - General provisions

General principles applicable to qualification of AIRBUS products are defined in ASN001-05.

Wire-mesh panels shall be delivered as specified on the order form (manufacturer reference, ± 0,2 % tolerance on panel length, etc.).

The length of the flat-cable diagonals will be checked. The difference between measurements must be lower than or equal to 5 mm.

4.2 - Fabric characteristics

Table 1 : Fabric characteristics

CRES TYPE	316L
(*) R0 (in RAYLS CGS)	33 ± 2
(*) NON-LINEARITY FACTOR (NLF)	1,33 ± 0,03
THICKNESS (mm)	205 ± 5
AREA MASS (g/m^2)	960 ± 20
POROSITY %	41 ± 2
WARP YARN DIAMETER (µm) BEFORE WEAVING	90 ± 3 or 80 ± 3
WEFT YARN DIAMETER (µm) BEFORE WEAVING	60 ± 1
WIRE-MESH CHARACTERISTICS	Annex 1
WEAVING	Twil 2/2 REPS
DESIGNATION	H 5-30

(*) Acoustic units :

- R0 (in rayls CGS) is the extrapolated resistance to air flow at 0 cm/s. The acoustic resistance in rayls CGS is the drop in sound pressure (expressed in dyne/cm^2) through the test specimen divided by the air flow velocity (expressed in cm/s.)
- The non-linearity factor (NLF) is the ratio of the air flow resistance at 200 cm/s to the air flow resistance at 20 cm/s.
- Tolerances for acoustic data relate to mean values per panel, which should be close to medium values and within the tolerances.
  Tolerance for measurement distortion with regard to the mean values measured will be defined at a later date as typical deviations for the R0 and NLF parameters.

4.3 - Appearance

The wire mesh shall have no homogeneity defects such as:

- wire fractures, perforation
- mesh and wire alignment defects
- all pollution (fatty substances, foreign bodies…)
- fraying and perforations near the edges

All these defects are described in accordance with the Gantois specification Ref. HERM 006.

The product shall fulfill the requirement of Appendix 1.

5 - DOCUMENTS TO BE PROVIDED

5.1 - Test report

The test report shall record :

- full identification of product batches,

- all test results.

5.2 - Manufacturing and inspection process

A document shall be provided briefly describing the manufacturing and inspection process (and identifying the main manufacturing and inspection reference documents).
This document shall be the baseline if modifications are required at a later stage.

6 - PACKAGING, TRANSPORT, STORAGE

All necessary precautions shall be taken to avoid damage or corrosion during transport.
Each panel shall be delivered with a protective film covering each face, and rolled onto a cardboard tube 100 mm in diameter.

The following information shall be marked on packaging:
- Customer name,
- Weight,
- Order number and all other information required to check the contents against relevant documents.

Marking

Each panel will be identified at the start by marking (a single part number) with indelible ink on face A (face A of the panel is the face which is not in contact with the metal parts of the weaving machine, and has the most presentable appearance) (I.Q. DA12-01).

Unless otherwise specified in the order, all products shall have the following markings :
- number of the weaving batch and control number of the panel,
- manufacturer and factory identification, and order number,
- all other information required to ensure full identification.

Each panel will be accompanied by the following documents :
- the traceability sheet,
- the cartographic inspection sheet.

Table 2 : Material description

	Material description		METAL FABRICS CRES WIRE-MESH (AISI 316L or 1.4404 NFEN 10088-3 or 1.4435 NFEN 10088-3)									
1	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Fe
		Min.	-	-	-	-	-	16,0	10,0	2	-	Re-mainder
		Max.	0,030	1,0	2,0	0,045	0,030	19,0	15,0	3,0	-	
2	1		2									
3	Production process		WEAVING									
4	Shapes Forming process Limit dimensions											
5	5.1 Technical specifications		-									
	5.2 Dimensional standards		-									
	5.3 Dimensional standard code		-									
6	6.1 Delivery condition and heat treatment		RAPID QUENCHING BEFORE WEAVING FABRICS DEGREASED									
	6.2 Code letter											
7	Usage condition and heat treatment		FABRICS DEGREASED									

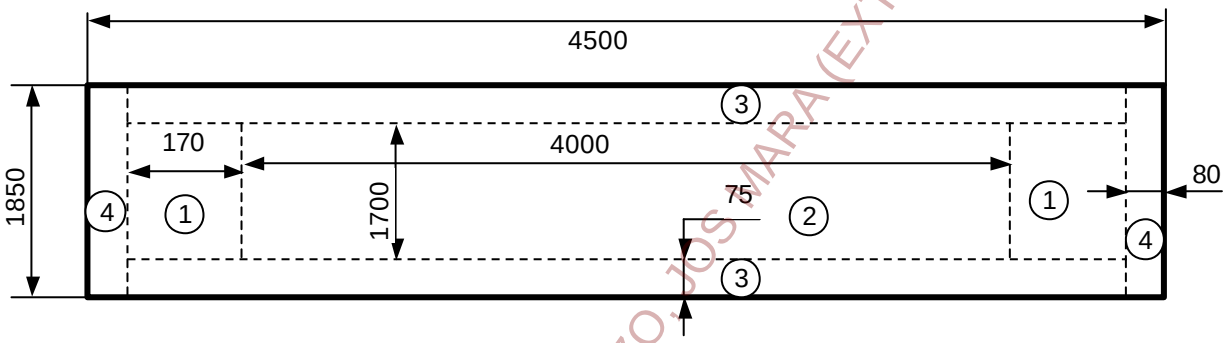
Table 3 : Material characteristics

8	**Test specimen Heat treatment Sample**				-	-	-	-
9	**Dimensions**	**-**	mm		-	-	-	-
10	**Plating thickness on each face**		%		-	-	-	-
11	**Direction of sample**				L (WARP)		LT (WEFT)	
12	**TENSILE**	**Temperature**	θ	°C				
13		**Proof stress**	Fp0,2/b	daN/mm	≥ 1		≥ 4,2	
14		**Strength**	Fm/b		≥ 2,0		≥ 6,9	
15		**Elongation**	A_r	%	≥ 10		-	
16		**Stiffness**	E.e	daN/mm	-		-	
17		**Reduction in area**	Z	%	-		-	
18	**Hardness**		HB	-	-			
19	**Shear strength**		R_c	MPa	-			
20	**Bending**		k	-	-			
21	**Toughness**		-	-	-			
22	**CREEP**	**Temperature**	θ	°C	-			
23		**Time**	t	h	-			
24		**Creep stress**	σ_a	MPa	-			
25		**Creep elongation**	a	%	-			
26		**Breaking stress**	σ_R	MPa	-			
27		**Elongation at break**	A	%	-			
28	**Notes see line 98**				-			
30	**Inspection plane**				-			
	Microradiographic				-			
34	**Grain size index**		G	-	-			
58	**Dimensions**		a	mm	-			
	Stamping		-	mm	x min. > 6,5			
74	**Surface contamination**				No contamination (ASTMA 380)			
75	**External defects**				100 % VISUAL INSPECTION			
97	**Designation**							
98	**Notes**	**Acoustic**	R0 (Rayls CGS)		See table 1			
			NLF					
		I.G.C.04.21.111, ANNEX 7			METAL FABRIC TENSILE TEST METHOD			
		- 510.0381/98			ACOUSTIC TEST METHOD			
		- NAC ER 256/00			UNIT TRACEABILITY SHEET			
		- Draft stage			ACCEPTED DEFECTS BEFORE FORMING			
99	**Typical use**				-			

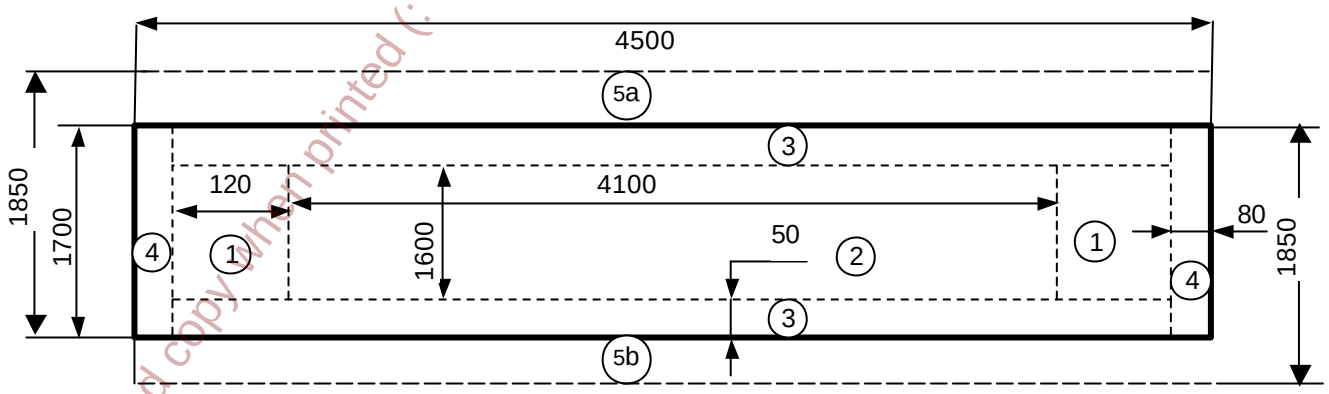
Annex 1

Criterion by area

Upper nacelle part (finale width: 1850 mm)



Lower nacelle part (finale width: 1700 mm) Dropped area = 5a or 5b



Defects	Comments	Zoning				
		①	②	③	④	⑤
Cosmetic defect*	Visible to the naked eyes at 1 m					Acceptable except if present in 5a and 5b
Relaxed warp wire	Acceptable if cosmetic aspect not affected					
Broken warp wire	1 x W > 100 µm or 5 x W ≤ 100 µm					
Wrinkle	Marked					
Clearing						
Weft line irregular aperture	1 x W > 100 µm or 5 x W ≤ 100 µm					
Double wire	3 x L > 25 mm per panel L_{Max} between 2 defects = 1m					
Broken wire back	3 x L > 25 mm per panel L_{Max} between 2 defects = 1m					
Released weft; released warp						
Kink	Acceptable if cosmetic aspect not affected					
Edge tearing	L > 1 mm					
Weaving in of impurity	1 x > 1 mm or 5 x 1 ≤ 1mm					
Weft change	Acceptable if cosmetic aspect not affected					
Lamination mark						

: **Acceptable defect**

: **Defect area not sent to the the customer**

* **Cosmetic defects:** degreasing halo, stain, non-uniform colour, tinted wire, lamination marks, fold, visible defects of weaving

ANNEX 2

FACTORY TEST SYNOPTIC

TESTS		ACCEPTANCE	QUALIFICATION
Chemical composition	1 analysis per cast	X	X
Area mass	1 per batch	X	X
Thickness	6 per batch	X	X
Traction see Table 3 chapter 6	L (warp) 6 per batch 1)	X	X
	LT (weft) 6 per batch 1)	X	X
External defects Contamination Visual appearance	100%	X	X
Stamping	-		X
Acoustic see Table 1 chapter 4.2	R0 2) (Rayls CGS)	X	X
	NLF 2)	X	X
Fatigue			X

1) After the first 5 batches, change to 3 tensions at the beginning and 3 tensions at the end of a batch.

2) 4 tests every 25 m.

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AMENDMENT RECORD SHEET

Issue	Modified paragraph	Modification summary	Justification
A.01.99		New standard.	
B.10.99		New acoustic values.	Following mail BTE/EG/AC of 12/10/99
		New mechanical characteristics.	Definition BTE/CC/NAC of 29/09/99
C.01.00		Numbering of chapter 3 modified and drawing added.	Following meeting Gantois of 01/12/99
	Annex 1	Line 1 - Chemical composition: precision added on % of C/Cr/Ni. Line 13 - LT (weft) : 4,5 changed to 4,2.	
D.06.00		Table 1 modified: R0 28.5 ± 1 changed to 30 ± 1 and NLF 1.29 ± 0.03 changed to 1.25 ± 0.03.	Following note BTE/EG/AC of 13/06/00
	Annex 1	Line 14 - LT (weft) ≥ 6,6 changed to ≥ 6,9. Line 15 - L (warp) ≥ 15 changed to ≥ 12.	In accordance with BTE/CC/NAC
E.03.01		Standard amended.	Following minutes of 20/12/00 NT
F.02.05		New acoustic values (REC benches corrective actions).	Following note EEA of 17/01/05
G.06.07		Table 1 modified: NLF 1.27 ± 0.03 changed to 1.33 ± 0.03.	Following mail ESWCT of 30/06/06
		New mechanical characteristics for Tensile Proof stress.	
		Annex 1 Adding: Criteria by areas	
		§ 6, Characteristic table : Suppression of Elongation and Stiffness in the weft direction	Following note 4794 of Gantois of 12/010/07 and note 1928 of Gantois of 3/04/03
		Annexe 2: modification of analysis's number for tensile tests	