



**LE RÉSEAU DE CRÉATION
ET D'ACCOMPAGNEMENT PÉDAGOGIQUES**

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BACCALAURÉAT PROFESSIONNEL
TECHNICIEN AÉROSTRUCTURE

Session 2015

DOSSIER TECHNIQUE

Durée : 4 heures

Coefficient : 4

ÉPREUVE E2 – ÉPREUVE DE TECHNOLOGIE

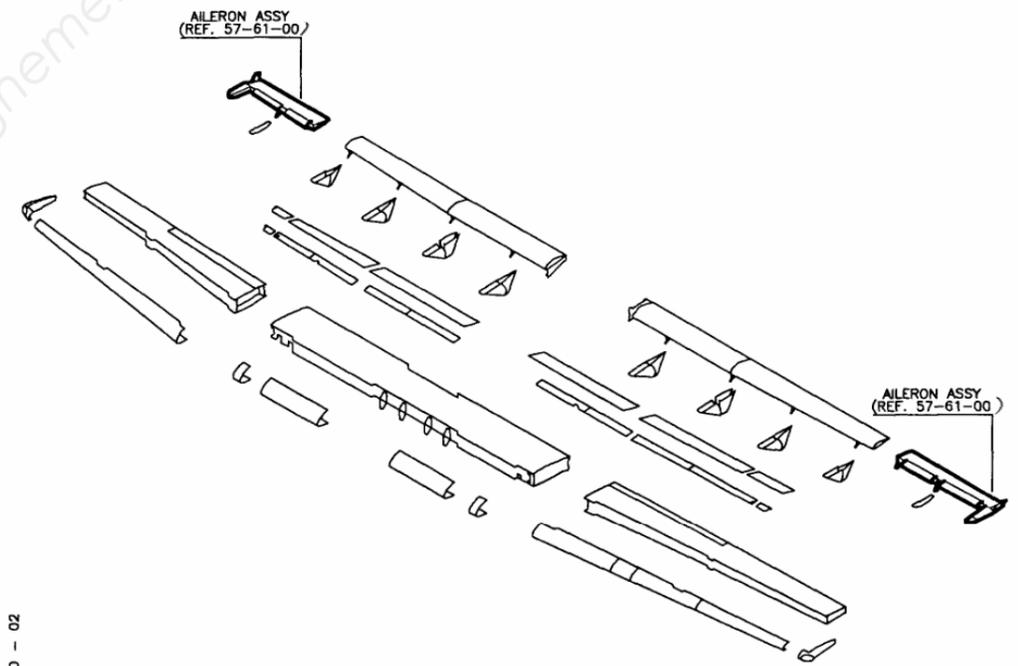
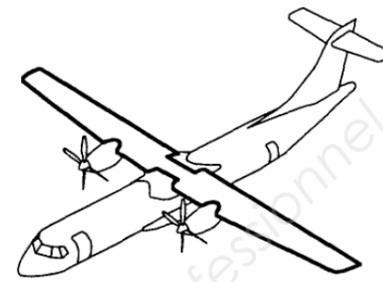
(U2) - ANALYSE ET COMMUNICATION TECHNIQUES

Ce dossier technique comporte 11 pages, numérotées de 1 / 11 à 11 / 11
Assurez-vous que cet exemplaire est complet.
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Défaut constaté lors de la visite au centre de maintenance



Défaut constaté

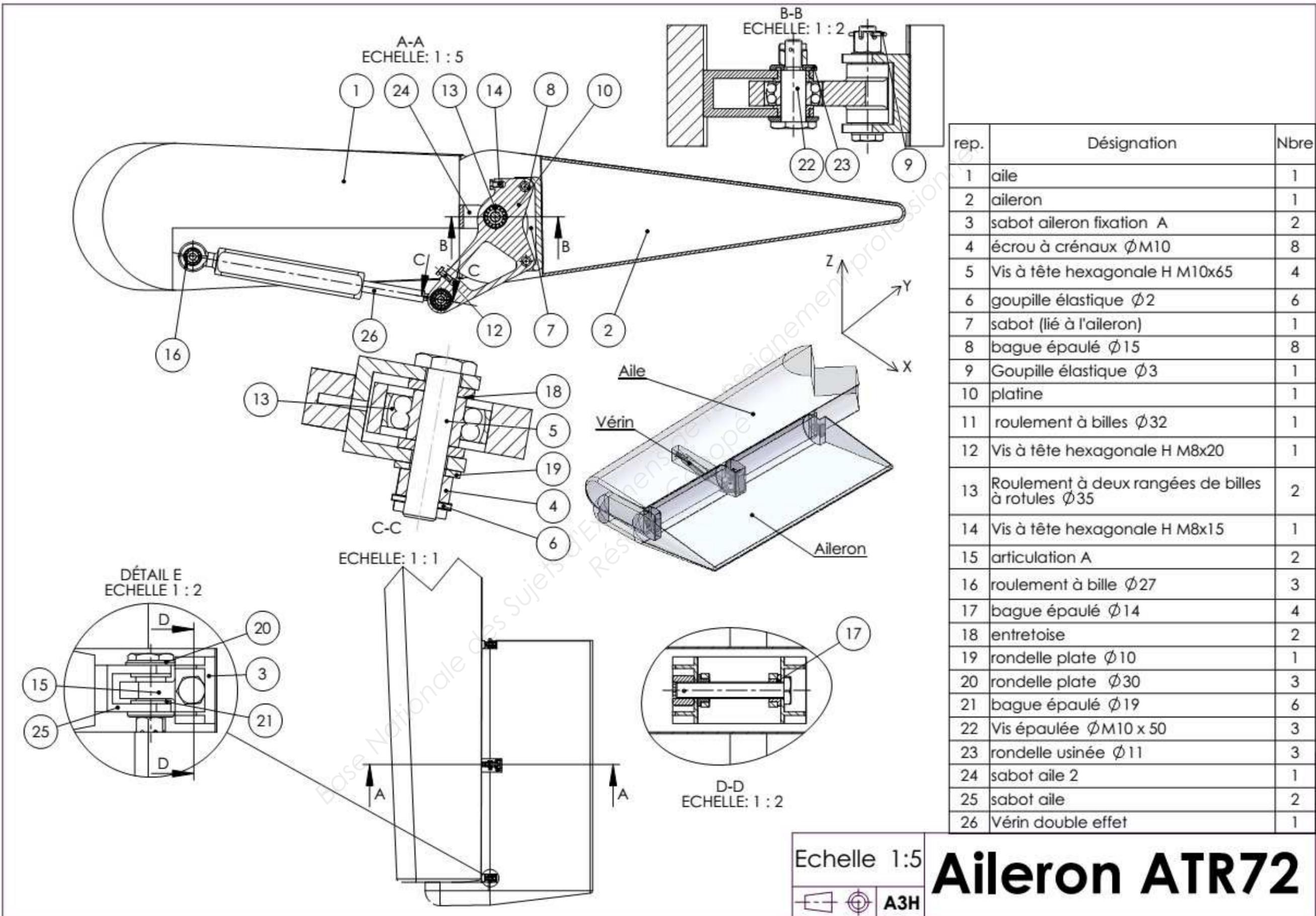


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Ailerons - General
Figure 001

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rep.	Désignation	Nbre
1	aile	1
2	aileron	1
3	sabot aileron fixation A	2
4	écrou à crénaux ϕ M10	8
5	Vis à tête hexagonale H M10x65	4
6	goupille élastique ϕ 2	6
7	sabot (lié à l'aileron)	1
8	bague épaulé ϕ 15	8
9	Goupille élastique ϕ 3	1
10	platine	1
11	roulement à billes ϕ 32	1
12	Vis à tête hexagonale H M8x20	1
13	Roulement à deux rangées de billes à rotules ϕ 35	2
14	Vis à tête hexagonale H M8x15	1
15	articulation A	2
16	roulement à bille ϕ 27	3
17	bague épaulé ϕ 14	4
18	entretoise	2
19	rondelle plate ϕ 10	1
20	rondelle plate ϕ 30	3
21	bague épaulé ϕ 19	6
22	Vis épaulée ϕ M10 x 50	3
23	rondelle usinée ϕ 11	3
24	sabot aile 2	1
25	sabot aile	2
26	Vérin double effet	1

Echelle 1:5

A3H

Aileron ATR72

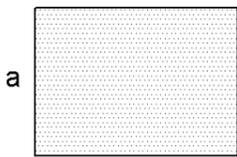
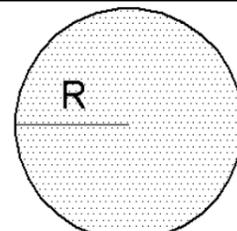
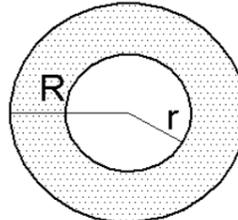
FORMULAIRE :

Relation force / pression :
$$P = \frac{\|\vec{F}\|}{S}$$

1 bar = 0,1 MPa

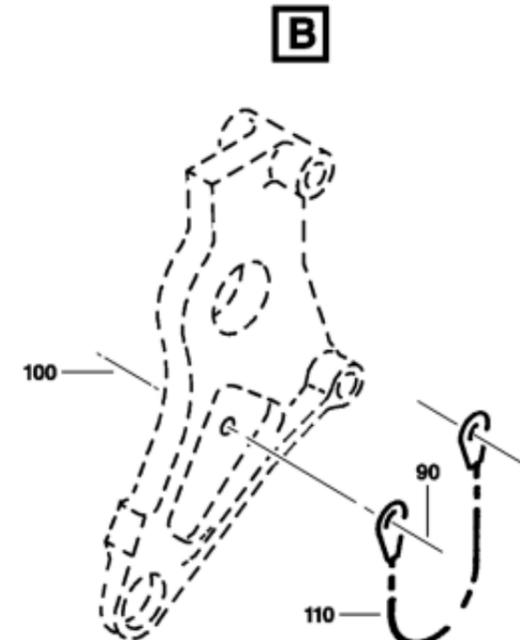
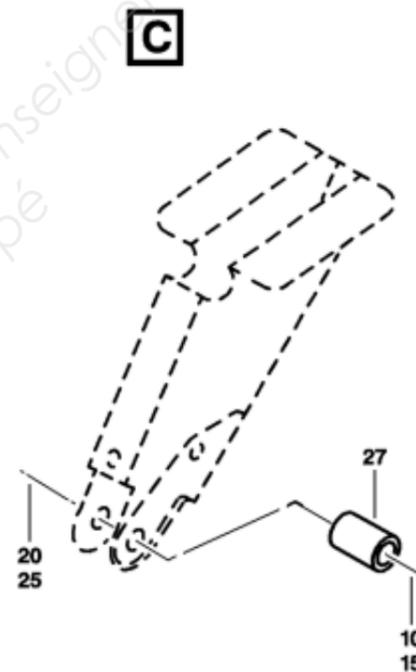
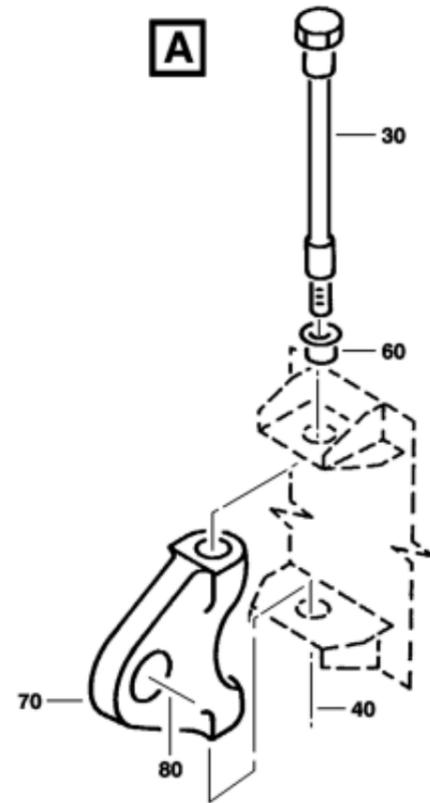
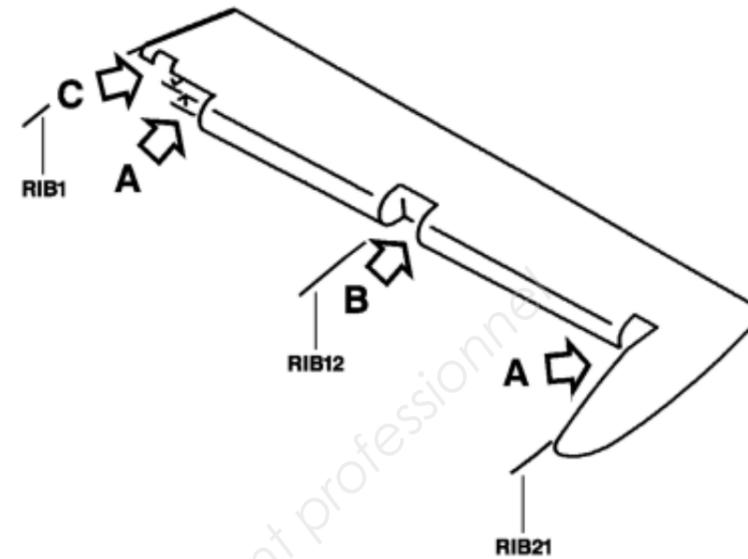
1MPa = 1 N/mm²

Calcul de surface :

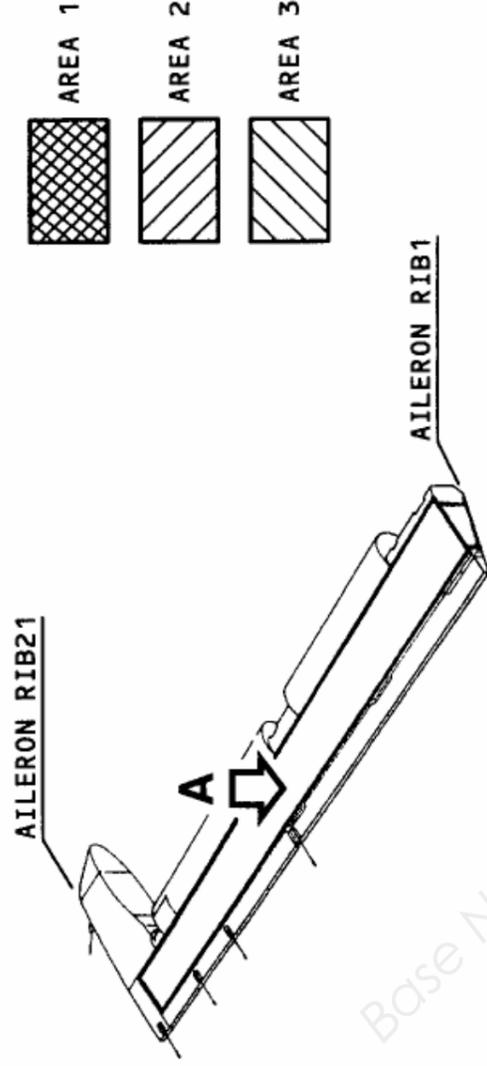
Rectangle	Disque	Couronne
$S = a.b$	$S = \pi.r^2$	$S = \pi(R^2 - r^2)$
		

Résistance des matériaux :

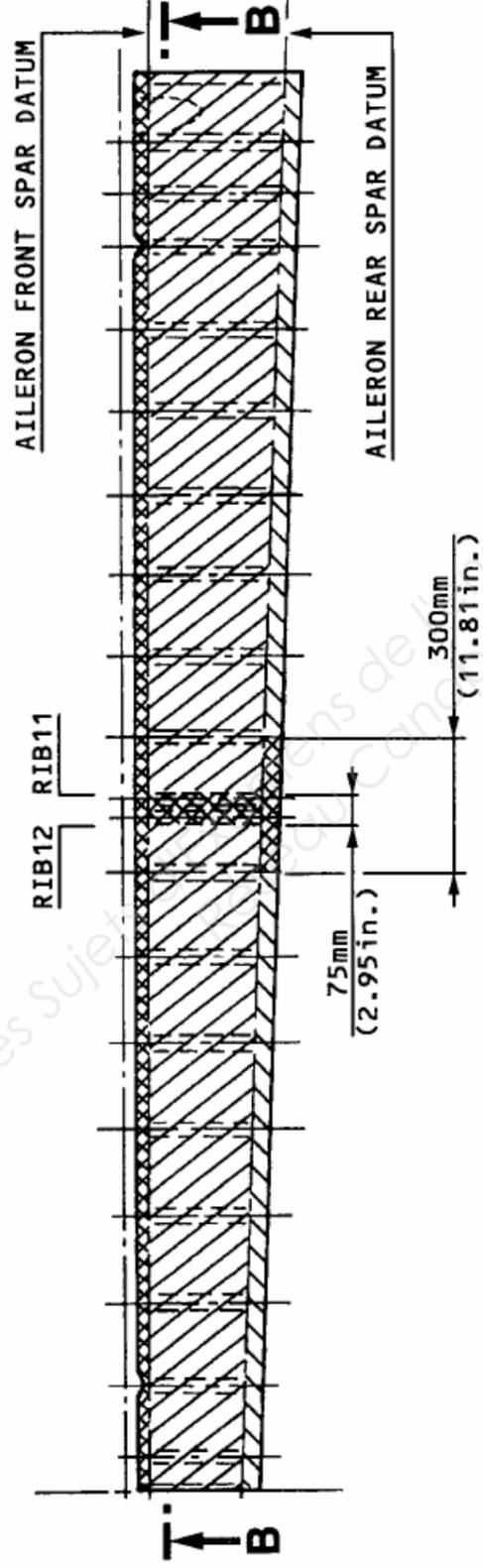
Formulaire
τ : contrainte de cisaillement ou tangentielle. $\rightarrow : \tau = T / S$
T : effort tranchant.
S : aire de la section.
k : coefficient de sécurité
<u>Condition de résistance :</u>
$\tau \leq R_{pg}$, Résistance pratique au glissement : $R_{pg} = R_{eg}/k$



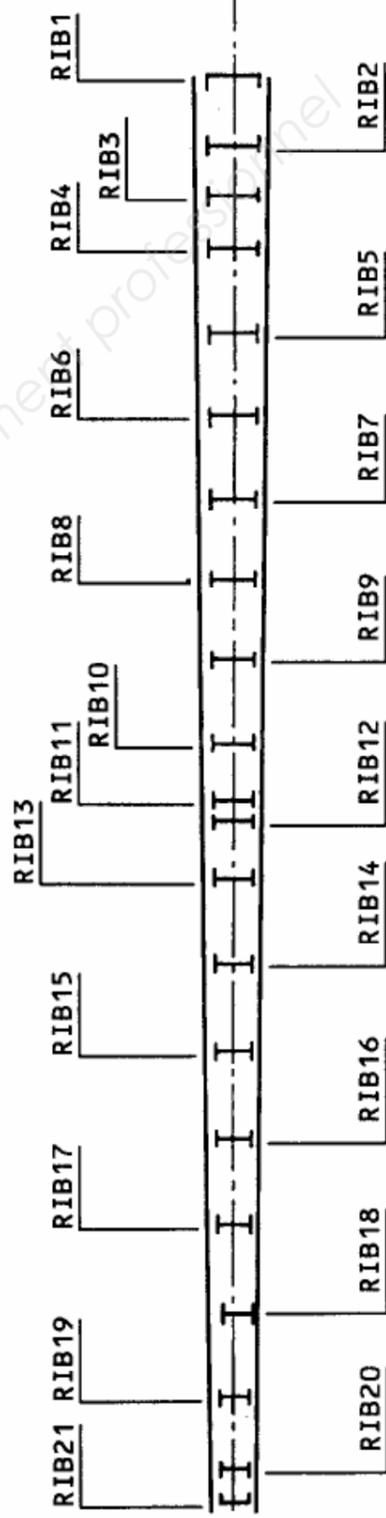
RP5 57 61 11 01 -E



A RH SIDE SHOWN
RH SIDE SYMMETRICAL



SECTION
B - B



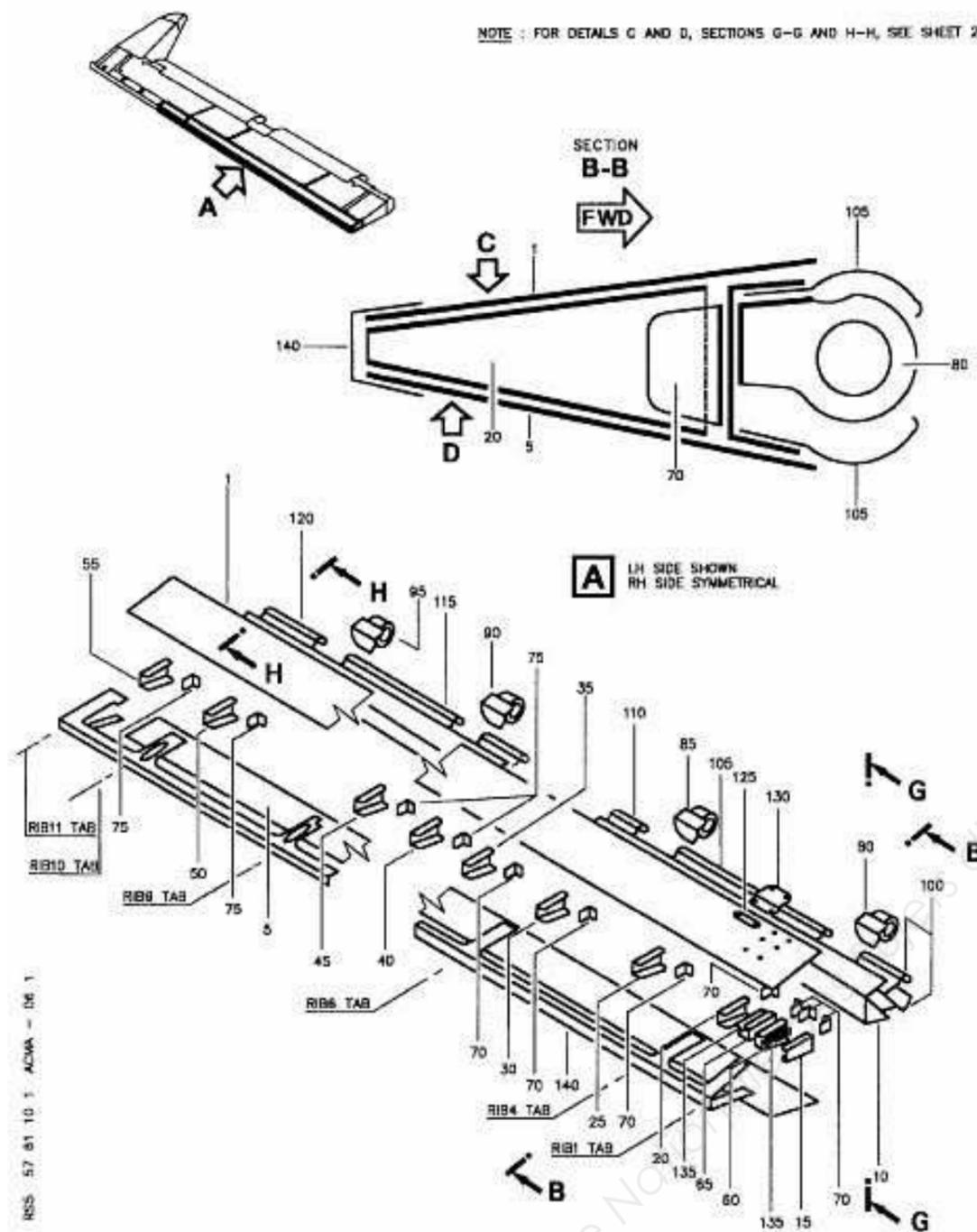
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Complete Structure - Aileron Damage
Aileron Box-Definition of Zones
Figure 301

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NOTE : FOR DETAILS C AND D, SECTIONS G-G AND H-H, SEE SHEET 2

SECTION B-B

A LH SIDE SHOWN RH SIDE SYMMETRICAL

Complete Structure Tab (Rib1 to Rib11) Figure 102 (Sheet 1)

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ITEM	DESCRIPTION	PART NUMBER LH / RH	MAT SPEC TREATMENT	THK MM (in)	OBSERVATIONS MOD/SB/REPAIR
1	Tab Skin	S57612183000/001	See Fig. 102		Be. 2348T2473 For repair, see P.B.400
1A	Tab Skin	S57612183008/009	See Fig. 102		Af. 2348T2473 For repair, see P.B.400
5	Tab Skin	S57612183002/003	See Fig. 102		Be. 2348T2473 For repair, see P.B.400
5A	Tab Skin	S57612183010/011	See Fig. 102		Af. 2348T2473 For repair, see P.B.400
R 10	Spar Rib	S57612184000/001	See Fig. 102		
R 15	Rib	S57612186200 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 20	Rib	S57612186202 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 25	Rib	S57612186204 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 30	Rib	S57612186206 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 35	Rib	S57612186208 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 40	Rib	S57612186210 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 45	Rib	S57612186212 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 50	Rib	S57612186214 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 55	Rib	S57612186216 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	
R 60	Rib	S57612185200/201 made from ASN-A30128565	clad 2024-T3	0.8 (0.031)	

Assy Dwg : S57612180, S57612156

R

Key to Figure 102 (Sheet 1 thru 3)

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REPAIR SCHEME ON AILERON BOX
(SCHEME B1)

NOTE: These instructions are to be applied as soon as damage is evidenced. If temporary repair using metal sheet has already been applied, use metal plate as drilling template.

REPAIR MATERIAL

ITEM	NOMENCLATURE	QTY	MATERIAL/REMARK
5	Cured flat carbon	1	T300-6K 5208 or T300-6K 914 (180°C (356°F); 7 bars) drapping 12 plies
-	Adhesive	AR	REDUX 408 or HYSOL 9321 (Mat. No. 08-001C or 08-046A) (Ref. 51-35-00)
-	Sealant	AR	Sealant (Mat. No. 09-031) (Ref. 51-35-00)
-	Sealant	AR	PR1422A (Mat. No. 09-001A) (Ref. 51-35-00)
-	Rivets	AR	NAS 1921M04SXXW or ASN-A0077D4X (Ref. 51-40-10)

REPAIR INSTRUCTIONS (Ref. Fig. 404, 405, 406 and 407)

1. Instructions before repair

(See chapter 3. A. Repair procedures)

2. Repair procedure

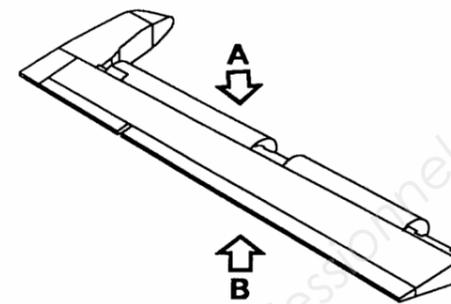
A. Preparation

(Ref. 51-29-08)

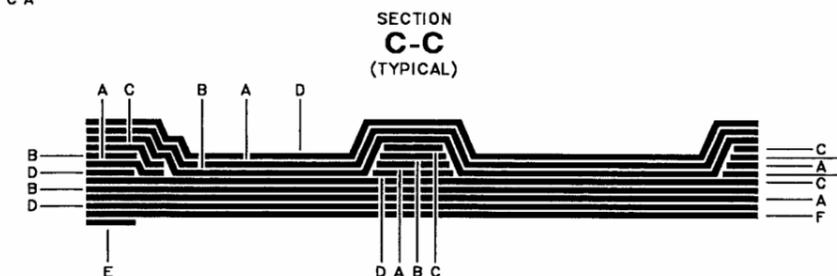
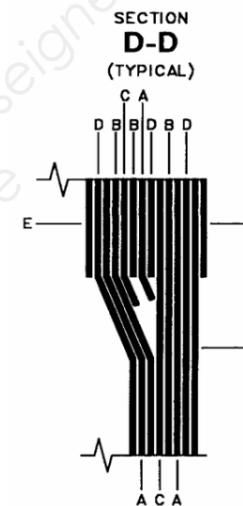
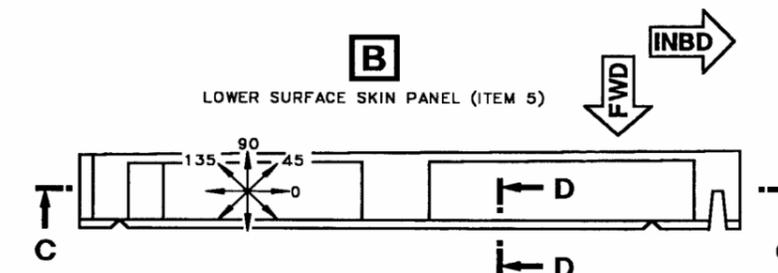
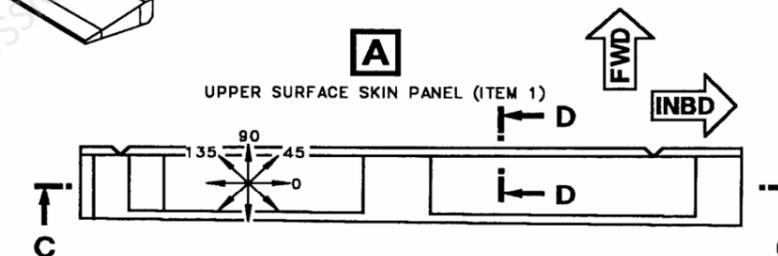
B. Repair

(Ref. 51-21-44, 51-22-02, 51-25-01)

- (1) Cut plate (1) to dimensions given on figure.
- (2) If temporary repair scheme has already been applied, use metal plate as drilling template for carbon reinforcement plate. Counterdrill to same diameters.
- (3) Drill dia. 2.5 mm (3/32 in.) attachment pilot holes as per instructions given in figure.



SKIN				
ITEM	THICKNESS		ORIENT.	MATERIAL
	mm	in.		
A	0.13	0.005	0	PQ10139-261-00
B	0.13	0.005	45	PQ10139-261-00
C	0.13	0.005	90	PQ10139-261-00
D	0.13	0.005	135	PQ10139-261-00
E	0.13	0.005	-	PQ10056-026-00
F	-	-	-	PQ10059-147-00



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Complete Structure
Skin Panels
Figure 104

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2024 (A-U4G 1)
cl ad 2024 (A-U4G 1/A5)

INITIAL CONDITION	FINAL CONDITION	TREATMENT TO BE PERFORMED
F	T 42	Quenching + ageing
O	T 42	Quenching + ageing
H	T 42	Quenching + ageing
T3	T 42	Quenching + ageing
T42	T 62	Tempering
T3	T 8	Tempering
T4	O	Annealing

Solution heat treatment temperature: 495°C ± 5°C (923°F ± 9°F)

THICKNESS OF MATERIAL (Th.) mm (in.)	SOAK TIME (mn.)		MAXIMUM TRANSFER TIME(S)	COOLING
	MINIMUM PLATED PRODUCTS	MINIMUM NON-PLATED PRODUCTS		
Th. ≤ 0.6 (0.0236)	20	15	≤ 5	Water ≤ 30°C (86°F)
0.6 < Th. ≤ 0.8 (0.0236) (0.031)	25	20	≤ 7	
0.8 < Th. ≤ 1.6 (0.031) (0.063)	30	25	≤ 10	
1.6 < Th. ≤ 2.5 (0.063) (0.098)	35	30	≤ 10	
2.5 < Th. ≤ 6 (0.098) (0.236)	50	40	≤ 10	
6 < Th. ≤ 10 (0.236) (0.394)	60	50	≤ 10	

Heat Treatment Table
(2024, cl ad 2024)
Table 3 (continued)

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THICKNESS OF MATERIAL (Th.) mm (in.)	SOAK TIME (mn.)		MAXIMUM TRANSFER TIME(S)	COOLING
	MINIMUM PLATED PRODUCTS	MINIMUM NON-PLATED PRODUCTS		
10 < Th. ≤ 25 (0.394) (0.984)		80	≤ 15	Water ≤ 30°C (86°F)
25 < Th. ≤ 40 (0.984) (1.575)		120	≤ 15	
40 < Th. ≤ 70 (1.575) (2.756)		180	≤ 30	
70 < Th. ≤ 100 (2.756) (3.94)		240	≤ 30	

AGEING - Temperature: ambient. Minimum time: 4 days

TEMPERING - Temperature: 190 ± 3°C (374 ± 5.4°F), time: 10 hours.
Cooling: in free air.

RECRYSTALLIZATION ANNEALING - Temperature: 385 ± 5°C (725 ± 9°F),
time: 1 hour.
Cooling: in oven (< 35°C/h) (95°F/h) until
250°C (482°F), then in still air.

RECOVERY ANNEALING - Temperature: 300 ± 10°C (572 ± 18°F), time: 30 to 60 mn.
Cooling: in free air.

Heat Treatment Table
(2024, cl ad 2024)
Table 3 (continued)

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