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Airbus

ATA 51 Standard Practices and Structure Rev.-ID: 1

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EASA Part-66 B1/B2

Training Manual



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ATA 51 STD PRACTICES & STRUCTURE

STANDARD PRACTICES AND STRUCTURE

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A320/A330/A340

INTRODUCTION

Aircraft manufacturers publish Structural Repair Manual (SRM) to give general airplane data, usual procedures, descriptive information as well as specific instruction around structural maintenance of aircraft.

Damage limits and repairs are approved by the relevant regulatory authority, for example:

EASA European Aviation Safety Agency

for Airbus-Aircrafts and therefore are approved data.

PAGE BLOCK ALLOCATION

In chapters 52 thru 57 each subject represents a structural element. All of the data concerning that element are covered within that subject. To provide topic separation page blocks are used:

IDENTIFICATION
 ALLOWABLE DAMAGE
 REPAIRS
 Page 101 to 199
 Page 201 to 999

NOTE:

The Chapter 51 in Airbus SRM has no identifying page number block. In this case the description page block could extend up to 999. In order to avoid extension of the identification page block 1–99 in chapters 52–57, each page can be assigned of a number and an additional letter (e.g.: A1–A99, B1–B99,...)

Figure Numbering

Figure numbers are to be allocated sequentially within page blocks.

It means figure numbers:

- in page block 1 to 99 start at figure 1,
- in page block 101 to 199 at figure 101 and
- in page block 201 at figure 201.

HOW TO USE THE STRUCTURAL REPAIR MANUAL

- 1. Find out the damaged location on the aircraft.
 - Do this with the help of a station diagram for the concerning ATA-chapter. Find out the type of damage (dent, scratch,...). Measure the sizes of the damage (length, width, depth and distance). Do this as exact as possible.
- 2. Check the effectivity, this means use the correct manual. Check the revision date of the manual and it has to be sure that this manual is the latest revision. Check the effectivity for the damaged aircraft. This can be found in the "Introduction" of the manual in the "Airplane Allocation List". In these lists the registration and the "MSN" will be found. If the aircraft is listed in here this manual is effective. Check the temporary revisions for the related chapter.
- 3. Identify the material of the damaged part.

Refer to the applicable material identification data in the manual. This will be found in the chapter-section-subject page block 1–99 of the damaged part and gives information about the material and the thickness in the damaged area.

4. Find the allowable damage data for the damaged structure.

This can be found in the chapter-section-subject of the damaged part but in page block 101–199. If there is no special allowable damage for this section a reference is given to the general section for this subject. In the

allowable damage part, the limitations for different damages are given.

5. Find the repair data for the damaged structure.

This can be found in the chapter-section-subject of the damaged part, but in page block 201–999. If there are no special repairs for this aircraft section, a reference is given to the general section for this subject. There are different repair options (repair at stringer, between stringer..., external or flush repairs). Depending on the situation the maintenance staff can choose one of these repairs.

NOTE:

IT IS NECESSARY TO READ ALL INFORMATION INCLUDING ALL NOTES, WARNINGS AND CAUTIONS BEFORE STARTING ANY ACTION. FOR EXAMPLE SOME TIMES A RESTRICTION IS GIVEN AT THE END OF THE INSTRUCTIONS OR AS AN INSIGNIFICANT NOTE.



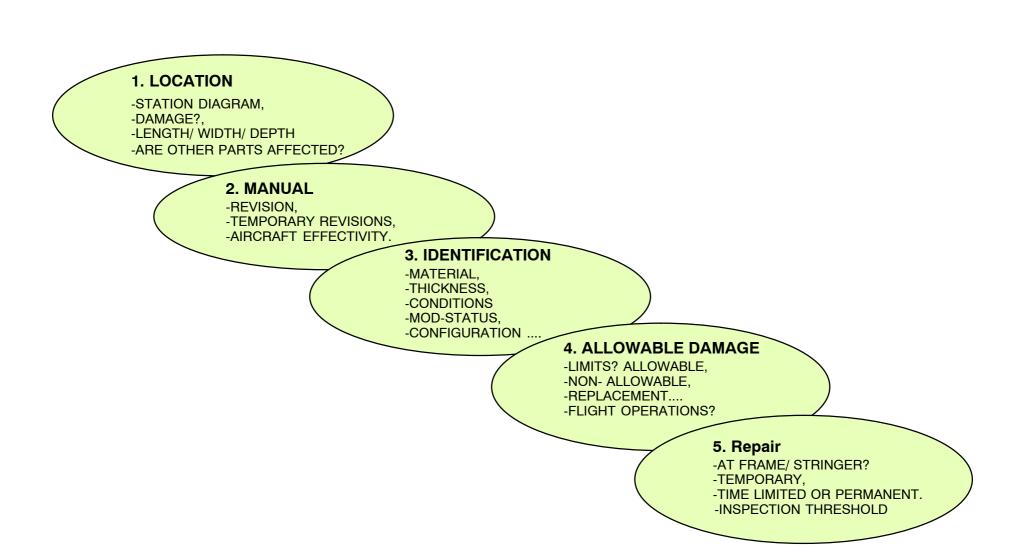


Figure 1 How to use the SRM

A320/A330/A340



A320/A330/A340

STRUCTURE IDENTIFICATION

General

After checking of revision and effectivity the next steps can be done to localize, assess and/or repair a damage to the aircraft.

NOTE: The following pages about "Airbus SRM usage" are extracts from

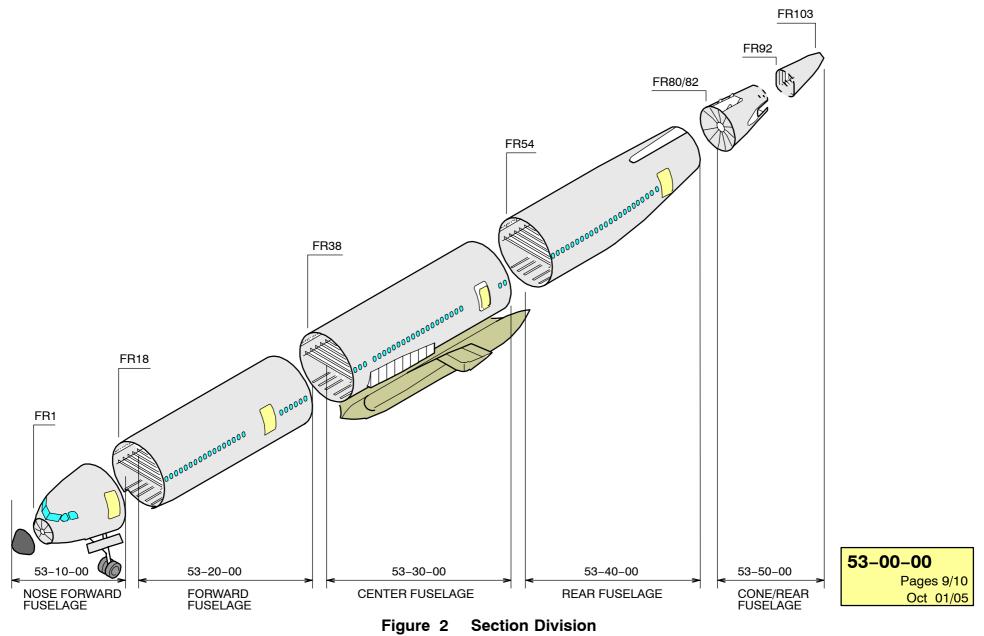
the SRM A330-200/300 and the affected aircraft in the example

on next pages has following attributes:

Registration: D-AIKA MSN: 0570 WV: 052 STD: 8

SECTION DIVISION

A "Section Division" will be found in the "General Part" (53–00–00) of SRM-Chapter 53 and provides the needed SRM-Section for identification of damaged part.





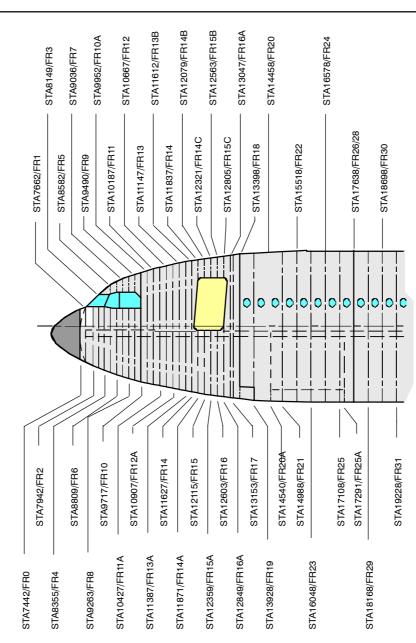
A320/A330/A340

STATION DIAGRAM

For a more detailed localization of affected area, a station diagram is helpful to use.



A320/A330/A340



Station Diagram Figure 3

Pages 11/12 Nov 01/10

53-00-00



A320/A330/A340

IDENTIFICATION

To ensure a correct treatment of the damage a identification of the damaged part is required. In identification pages the structure parts of the major components are illustrated and listed in tabular form.

KEY TO FIGURE LIST

General

Each illustration in identification block has a "Key to Figure List" where parts/items are listed in tabular form with all necessary informations. The item number is the key between the illustration and the identification table.

Detailed Information

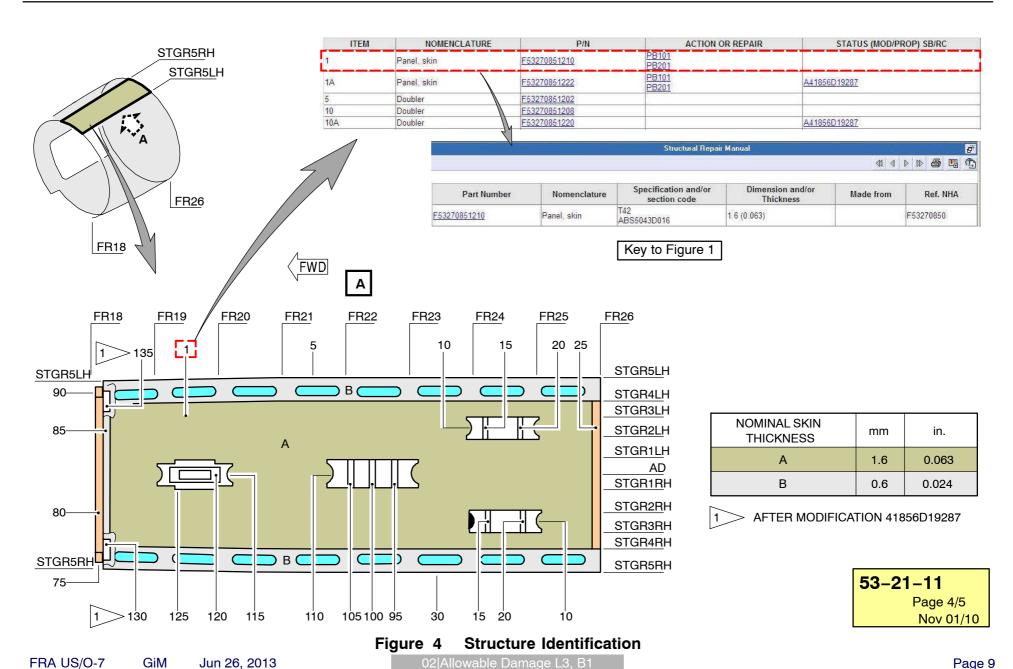
- Column "Item"
 - The item number is the link with the associated illustrations. This column also indicates the different evolutions of the same item (with a suffix letter: 1A, 1B, ...) compared to the basic version (without suffix). Each evolution is linked to a production modification given in the column "status (MOD/PROP)".
- Column "Nomenclature"
 - Name/Title of structural part
- Column "Specification/Section code"
 - This column provides information related to the type of material used (material specification), and when possible/available, the appropriate standards.
- Column "Thickness/Part Number"
 - The Part Number (PN) corresponding to the structural componen! is shown in this column. Within the PN, the first nine characters give the detailed drawing number of the cornponent, which is an entry key to the airbus drawing set.

In general the "as drawn" parts are Left Hand (LH) and are provided with an even part number (e.g.: ... 202). In the SRM, the identification table always states the LH part number on the first line and the RH part number (when indicated) on the second line.

- Column "IC" (Interchangeability of the part)
 - 01—One way interchangeable (post–mod part to be used to replace pre–mod part)
 - 02—Two ways interchangeable (post–mod or pre–mod part can be used)
 - 03—No interchangeability
- · Column "Action or Repair"
 - This column gives indication concerning the action or repair to be performed. For existing, general or specific repairs, the chapter/section/sub-section is inserted. For a recommendation to replace the part, the word "REPLACE" is inserted. Where left blank, a case-by-case assessment has to be performed to determine the relevant corrective action (part replacement, repair as per SRM or specific repair as per Airbus definition).
- Column "Status MOD/PROP SB/RC"
 - Linked with the "Item" column, the "STATUS MOD/PRP, SB/RC" column gives the modification or SB driving the different evolutions of a structural component (listed in column "ITEM"). A prefix leiter is used to identify the status BEFORE ("B" letter) or AFTER ("A" letter) SB or Modification. The suffix letter (A, B, C, D...) indicated at the end of the "MOD/PROP" (and column "s" of the MOD/SB list) shows the different effectivity within the same "MOD/PROP" number.



A320/A330/A340





A320/A330/A340

ALLOWABLE DAMAGE

General

The information to be found within allowable damage page block enables the operator to define whether a damaged airplane may be returned into service without repair.

An permitted allowable damage has no significant effect on the strength or fatigue life of the structure, which must still be capable of fulfilling its function.

Allowable damage may require minimal rework such as cleanup of small scratches or minor corrosion damages.

EXAMPLE:

53-21-11 PB 101 Allowable Damage - SKIN PLATES

• 1. General

This topic contains allowable damage data for the skin plates between FR18 thru FR38. Allowable damage is damage for which an immediate structural repair is not necessary. You must blend out the allowable damage and protect the surface on the component.

CAUTION:

HIDDEN DAMAGE CAN LEAD TO A FAILURE OF THE REPAIR OR SURROUNDING STRUCTURE.

CAUTION:

OBEY THE ALLOWABLE DAMAGE EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN THE RELEVANT PARAGRAPH.

CAUTION:

THE REWORKED AREA MUST BE CHECKED TO ENSURE THAT THE ALLOWABLE DAMAGE LIMITS HAVE NOT BEEN EXCEEDED. WHEN THE LIMITS ARE EXCEEDED A REPAIR IS NECESSARY.

CAUTION: OBEY THE GIVEN INSPECTION INSTRUCTION REFERENCE WHICH LEADS TO THE APPLICABLE INSPECTION PROGRAM DEFINED IN THE STRUCTURAL REPAIR INSPECTIONS. IF NECESSARY.

NOTE: For definition of allowable damage, refer to Chapter 51–11–11.

NOTE: For Damage/Repair Data Recording, refer to Chapter 51–11–15.

NOTE: For repair of Minor Damage, refer to Chapter 51-73-00.

NOTE: For repair of Corroded Areas, refer to Chapter 51-74-00 .

NOTE: For detailed definition of of Repair Categories refer to Chapter 51–11–14.

The appropriate allowable damage data is listed in Table 101 and is described in more detail in the following text or in the relevant chapter.

- 2. Allowable Damage
 - Refer to Paragraph 3. Damage Criteria to find the limits of allowable damage. These include data for the skin plates.
 - The column 'Action or Repair' in the identification page block gives references for the available repairs. These are necessary if the allowable damage limits are exceeded.



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3. Damage Criteria

NOMENCLATURE	TYPE OF DAMAGE / DESCRIPTION	REFERENCE	REPAIR CATEGORY	INSPECTION INSTRUCTION REFERENCE
Skin Plates	Allowable Rework	Chapter 53-00-11<1>		-
	Allowable Rework in riveted/stiffened and unriveted/unstiffened areas except panels specified under paragraph 3 C and 3 D.		В	53-21-11-1-001-00
Skin Plates	Allowable Dent Limits	Chapter 53-00-11	=	2
	Dent Dress-out	Chapter 53-00-11	-	
	Temporary Allowable Damage Limits caused by Lightning Strikes	Paragraph <u>3 A.</u>	C	8
Dana Communication Office Develo	Allowable Rework for surrounding skin panels of the FWD Cargo Door	Paragraph 3.C <2>	В	53-21-11-1-002-00
Door Surrounding Skin Panels	Allowable Rework for surrounding skin panels of the MID Passenger/Crew Door	Paragraph 3 D <2>	В	53-21-11-1-003-00

Table 101

<1> Only valid before MODIFICATION 48827D42881.

<2> Only valid for A330–200 Weight Variant 050, 051, 052, 053, 054, 055, 056, 059, 060 and A330–300 Weight Variant 050, 051, 052, 053.



A320/A330/A340

ALLOWABLE REWORK LIMITS (DIAGRAM 101/102)

Diagram 101 and Diagram 102 are valid for rework only. The rework dimensions are given in a depth-to-width ratio. The minimum distance between two defects (including any existing rework) must be more than the maximum length of one defect. Additionally for rework with a depth of more than 50%, the minimum distance between two defects must be:

- · More than one frame bay
- More than two stringer bays.

If any of these conditions is not fulfilled, contact AIRBUS.

After rework the dimension of the reworked area has to be compared with the allowable damage limits.

In case of exceeding the limits given in the diagrams, a repair is necessary or a repair proposal needs to be requested.

Allowable Rework in riveted/stiffened and unriveted/unstiffened areas

All damages with a change in cross-sectional area (e.g. scratch, gouge, corrosion...) have to be fully removed to make a smooth contour and to bring the surface back in an acceptable condition.

To determine, if reworked area is within allowable damage limits, a few points have to be noted, for example:

- Minimum distance between two or more defects,
- If rework runs through riveted/unriveted or stiffened/unstiffened area. CAUTION:

OBEY THE ALLOWABLE DAMAGE EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN THE RELAVANT TABLE.

- THESE ALLOWABLE DAMAGE MUST BE INSPECTED AT DEFINED INTERVALS. THE INSPECTION INSTRUCTION REFERENCE IS 53-21-11-1-001-00 AND IS DESCRIBED IN THE STRUCTURAL REPAIR INSPECTIONS (SRI) SECTION OF THE SRM. INFORM YOUR PLANNING DEPARTMENT AND PROVIDE THEM WITH THE NECESSARY INFORMATION.
- THE ALLOWABLE DAMAGE LIMITS GIVEN IN THIS PARAGRAPH ARE ONLY APPLICABLE TO THE TYPE OF DAMAGE SPECIFIED. IF YOU HAVE THIS TYPE OF DAMAGE TOGETHER WITH A DIFFERENT TYPE OF DAMAGE, FOR EXAMPLE DENT PLUS SCRATCH, CONTACT AIRBUS. IF ANY OF THE DAMAGES ARE WITHIN THE CHAPTER

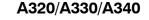
- 51-73-11 LIMITS THEY DO NOT NEED TO BE TAKEN INTO ACCOUNT IN THE ASSESSMENT.
- DAMAGE IN AREAS AROUND STATIC PORTS, PITOT PROBES, TOTAL AIR TEMPERATURE PROBES AND ANGLE OF ATTACK SENSORS, HAVE TO COMPLY WITH THE STRUCTURAL ALLOWABLE LIMITS GIVEN IN THIS CHAPTER AND THE AERODYNAMIC SMOOTHNESS REQUIREMENTS GIVEN IN CHAPTER 53-00-11 PAGE BLOCK 101 PARAGRAPH 4.

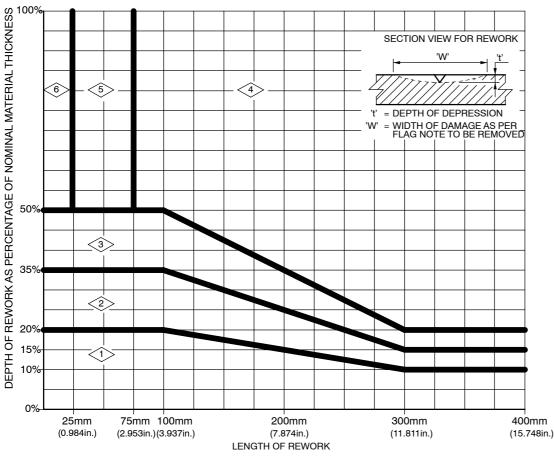
NOTE:

This allowable damage information is not applicable for rework to the door surrounding skin panels.

- <1> Applicable in the following areas only: FR18 thru FR38.
- <2> Applicable in the following areas only:
- FR18 thru FR26, except for excluded areas listed below:
 - FR19 thru FR21, STGR25 LH thru STGR28 LH,
 - FR22 thru FR25, STGR35 LH thru STGR37 LH,
 - FR21 thru FR26, STGR36 LH thru STGR41 LH,







CAUTION: OBEY THE ALLOWABLE DAMAGE EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN TABLE 103.

CAUTION: THE DIAGRAM IS VALID FOR ISOLATED CRACKS AND REWORKS ONLY. CONTACT AIRBUS:

-IF THE MINIMUM DISTANCE BETWEEN TWO DEFECTS, INCLUDING ANY EXISTING REWORKS, IS LESS THAN THE MAXIMUM LENGTH OF ONE DEFECT.

-IF MORE THAN ONE REWORK WITH A DEPTH OF MORE THAN 50% OF THE SKIN IS WITHIN TWO ADJACENT STRINGER BAYS OR ONE FRAME BAY.

CAUTION: THESE ALLOWABLE DAMAGE MUST BE INSPECTED AT DEFINED INTERVALS. THE INSPECTION INSTRUCTION REFERENCE IS 53-21-11-1-001-00 AND IS DESCRIBED.

INSPECTION INSTRUCTION REFERENCE IS 53-21-11-1-001-00 AND IS DESCRIBED IN THE STRUCTURAL REPAIR INSPECTION (SRI) SECTION OF THE SRM. INFORM YOUR PLANNING DEPARTMENT AND PROVIDE THEM WITH THE NECESSARY INFORMATION.

ITEM	REPAIR CATEGORY	DESCRIPTION	NOTE
⟨ 6⟩	С	ONE FLIGHT ONLY	2
⟨ 5⟩	С	ONE UNPRESSURIZED FLIGHT ONLY	2
4>	С	FLIGHT ONLY WITH MANUFACTURERS PERMISSION	-
3>	С	REPAIR AFTER 50FC AT THE LATEST	1, 7, 8
2 >	С	REPAIR AFTER 3000FC AT THE LATEST	1, 3, 6, 8
1>	В	PERMANENTALLOWABLE REWORK	3, 4, 5
\bigcirc	С	TEMPORARY ALLOWABLE REWORK FOR MAX 1500 FC	1, 5, 8

NOTE	DESCRIPTION
1	CHECK DAMAGE FOR CRACKS WITH AT LEAST A DETAILED VISUAL INSPECTION. IF CRACKED, PERFORM REPAIR BEFORE NEXT FLIGHT. IF NOT, REMOVE DAMAGE UP TO DEPRESSION DEPTH ACCORDING TO NOTE 6, 7 OR 8. RENEW SURFACE PROTECTION. (FOR PERMANENT ALLOWABLE REWORK REFER TO NOTE 4).
2	CHECK DAMAGE FOR CRACKS WITH AT LEAST A DETAILED VISUAL INSPECTION. IF THE SKIN IS PERFORATED APPLY SELF-ADHESIVE ALUMINUM TAPE (MATERIAL NO. 08-052) ON THE DAMAGE.
3	FOR REWORKED AREAS UP TO 10000mm2 (15.500in.2)IT IS RECOMMENDED TO PERFORM FLAP-PEENING, INTENSITY 0.15mmN (0.006in.N), AS PER CHAPTER 51-29-11. IF THE REWORKED AREA EXCEEDS 10000mm2 (15.500in.2) YOU MUST FOLLOW THE METHODS FOR PRESTRESSING GIVEN IN CHAPTER 51-29-11.
4	PERFORM EXTERNAL AND INTERNAL INSPECTION AS PER NTM, CHAPTER 51–10–08, PAGE BLOCK 601 TO CONFIRM NO CRACK. IF NO CRACK DETECTED, REMOVE DAMAGE UP TO DEPRESSION DEPTH ACCORDING TO NOTE 5, NO LIFE LIMITATION. IF CRACK DETECTED, PERFORM REPAIR BEFORE NEXT FLIGHT.
5	SMOOTH BLEND OUT WITH 'W' ≥ 40 x t.
6	SMOOTH BLEND OUT WITH 'W' ≥ 20 x t.
7	SMOOTH BLEND OUT WITH 'W' ≥ 10 x t.
8	IF NO BLEND OUT CAN BE PERFORMED, ACCEPTABLE FOR ONE REVENUE FLIGHT ONLY AFTERWARDS CONTINUATION OF THE HERE GIVEN INSTRUCTIONS.

Diagram 101 and Diagram 102



A320/A330/A340

ALLOWABLE DENT LIMITS

A dent is a damaged area which is pushed in with respect to its usual contour. There is no cross–sectional area change in the material and the area edges are smooth.

Nevertheless dents change the contour or roughens of the surface. This increases the drag on airframe and has negative effect to the aerodynamic efficiency.

Allowable Damage

- Refer to Paragraph 3. Damage Criteria to find the limits of allowable damage. These include data for the skin plates.
- The column 'Action or Repair' in the relevant identification page block gives references for the available repairs. These are necessary if the allowable damage limits are exceeded.

NOTE:

- For the definition of allowable damage, refer to Chapter 51–11–11.
- For the definition of repair categories, refer to Chapter 51–11–14.
- For damage/repair data recording, refer to Chapter 51–11–15.
- For the repair of minor damage, refer to Chapter 51-73-00.
- For the repair of corroded areas, refer to Chapter 51-74-00.

53-00-11 PB 101 Allowable Damage - SKIN PLATES

This topic contains the allowable damage limits data for the skin plates.

CAUTION:

- Hidden damage can lead to a failure of the repair or surrounding structure.
- Damage in areas around static ports, pitot probes, total air temperature probes and angle of attack sensors, have to comply with the structural allowable limits given in this chapter and the aerodynamic smoothness requirements given in paragraph 4.
- The reworked area must be checked to ensure that the allowable damage limits have not been exceeded. When the limits are exceeded a repair is necessary.
- Obey the allowable damage effectivity per weight variant and aircraft type given in the relevant paragraph.

 Obey the given inspection instruction reference which leads to the applicable inspection program defined in the structural repair inspections (SRI) of the SRM, if necessary.

SKIN PLATES - ALLOWABLE DENT LIMITS

 This allowable damage information is applicable for dents to the skin plates in the areas between FR18 thru FR38 and FR53.3 thru FR80/82 and is valid as shown in Table 103.



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3. Damage Criteria

NOMENCLATURE	TYPE OF DAMAGE / DESCRIPTION	REFERENCE	REPAIR CATEGORY	INSPECTION INSTRUCTION REFERENCE	
	Pdi-	Descript 2.A	C	×2	
	Rework	Paragraph 3.A.	В	53-00-11-1-002-00	
Skin Plates			A <3>	14	
	Dents	Paragraph 3.C.	В	53-00-11-1-003-00	
			C	85	
Skin Plates	Dent Dress-Out	Paragraph 3.D.	A <1> B <2>	53-00-11-1-001-00	
Upper Skin Plates	Rework of Longitudinal Lap Joint Runout	Paragraph <u>3.B.</u>	A	/5	
Skin Plates	Aerodynamic Requirements for Allowable damage and repairs	Paragraph <u>4</u>	Å	\$ -	

Table 101

- <1> Only valid for A330–300 Weight Variant 050 thru 053.
- <2> Only valid for A330–200 Weight Variant 020 thru 027, 050 thru 056, 059, 060, A330–300 Weight Variant 000 thru 004, 010 thru 014, 020, 022, 024 and 025.
- <3> Repair Category is applicable for Door Surrounding Skin of AFT Cargo Frame Panel and Door 4 Frame Panel. This data is valid for aircraft weight variants given below: A330–300 WV000, 001, 002, 003, 004, 010, 011, 012, 013, 014, 020, 022, 024, 025.

AIRCRAFT	WEIGHT VARIANT
A330-200	020, 021, 022, 023, 024, 025, 026, 027 <1>
A330-200	050, 051, 052, 053, 054, 055, 056 <u><3></u>
A330-300	000, 001, 002, 003, 004, 010, 011, 012, 013, 014 <2>
	020, 022, 024, 025 <2>
A330-300	050, 051, 052, 053 <u><3></u>

Table 103 Effectivity per Weight Variant and Aircraft Type

<1> Refer to Figure 102 sheet 3 for allowable damage information on undisturbed skin with skin thickness T = 1.6 mm. For measurement of dents in skin panel refer to Figure 102 sheet 1.

Refer to Figure 102 sheet 2 for allowable damage information on undisturbed skin with skin thickness T > 1.6 mm and for the remaining areas (door surrounding panels). For measurement of dents in skin panel refer to Figure 102 sheet 1.

<2> Refer to Figure 102 sheet 3 for allowable damage information on undisturbed skin with skin thickness T = 1.6 mm and Door surrounding panels between FR31 thru FR37.1 and STGR9 thru STGR31 LH/RH. For measurement of dents in skin panel refer to Figure 102 sheet 1.

Refer to Figure 102 sheet 2 for allowable damage information on undisturbed skin with skin thickness T > 1.6 mm and for the remaining areas (other door surrounding panels). For measurement of dents in skin panel refer to Figure 102 sheet 1.

- <3> Refer to Figure 102 sheet 3 for allowable damage information. For measurement of dents in skin panel refer to Figure 102 sheet 1. This allowable damage information is not applicable in the following areas:
- FR1 thru FR18. Refer to Chapter 53-11-11 Page Block 101 to find the allowable dent limits applicable in this area.
- FR38 thru FR53.3. Refer to Chapter 53-31-11 Page Block 101 to find the allowable dent limits applicable in this area.



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Allowable Dent Limits for Skin Plates cont'd

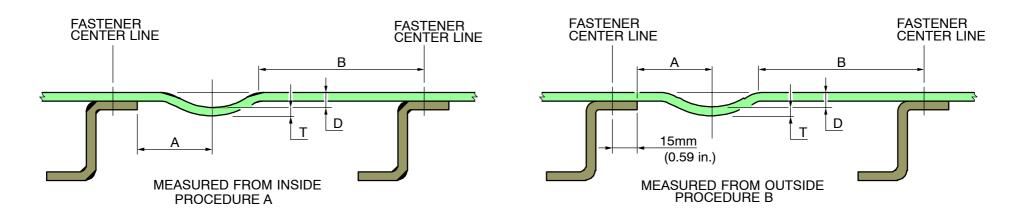
The allowable damage investigation depends upon the geometrical data and location of the dent to the nearest adjacent structure (Frame, Stringers, etc.).

Before using the diagram "Allowable Dent Limits", dimensions "A" & "B" have to be determined with given measurements of existing dent in fuselage skin.

This is necessary to check if the requirement for using the diagram is fulfilled.







CAUTION: OBEY THE ALLOWABLE DAMAGE EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN TABLE 103.

NOTE: T: IS THE SKIN THICKNESS IN DENTED AREA. IF DENT AFFECTS SEVERAL THICKNESSES, EACH OF THEM HAS TO BE CONSIDERED AND THE WORST LIMITATION HAS TO BE APPLIED.

D: IS THE MAXIMUM DEPTH OF THE SKIN DENT.

- A: IS THE DISTANCE FROM THE LOCATION OF THE MAXIMUM DEPTH OF THE DENT TO THE EDGE OF ADJACENT STIFFENING MEMBER, SEE PROCEDURE A. WHEN THE DISTANCE 'A' CANNOT BE MEASURED FROM INSIDE, USE THE METHODE AS FOLLOWS, SEE PROCEDURE B.
 - USE DISTANCE OF 15mm (0.59 in.) BACK FROM THE FASTENER ROW AS A REFERENCE POINT (15mm (0.59 in.) IS AN AVERAGE EDGE MARGIN).
 - MEASURE THE DISTANCE FROM THE CENTER OF THE DENT TO THE REFERENCE POINT TO GET THE DISTANCE 'A'.

B: IS THE DISTANCE BETWEEN THE OUTER CONTOUR OF THE DENT AND ANY CUTOUT IN THE SKIN OR ANY FASTENER ROW.

NOTE: IN CASE OF DENTS AROUND STATIC PORTS, PITOT PROBES, TOTAL AIR TEMPERATURE PROBES, ANGLE OF ATTACK SENSORS, CHECK THAT THE DENTS ARE WITHIN AREODYNAMIC REQUIREMENTS, REFER TO PARAGRAPH 4.



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A320/A330/A340

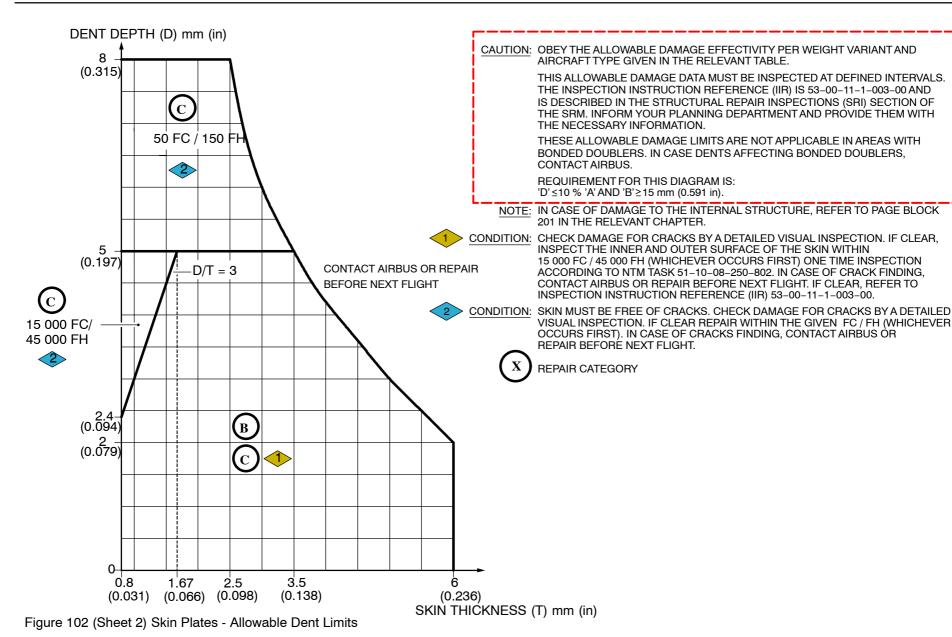


Figure 9 SRM Figure 102 (Sheet 2) Skin Plates - Allowable Dent Limits

Jun 26, 2013



A320/A330/A340

REPAIR

General

The section "Repairs" contains sufficient information to enable the operator to carry out permissible repairs.

Each of the repair examples is described with the aid of a diagram, which in turn is supplemented by material lists and procedural instructions given in the subsequent pages.

Standard practices, general procedures, typical repairs and rework procedures within allowable damage applicable to more than one chapter are included in Chapter 51.

53-21-11 PB 201 Repairs - SKIN PLATES

These repairs are applicable for damage to the skin between FR18 thru FR38, For STA (FR) designations refer to Chapter 53–00–00 Page Block 001 – FUSELAGE.

The appropriate repairs are listed in Table 201 and are described in more detail in the relevant Chapter.

NOTE:

• For Damage/Repair Data recording, refer to Chapter 51-11-15.

CAUTION:

- OBEY THE INSPECTION INSTRUCTIONS GIVEN IN THE RELEVANT REPAIR.
- HIDDEN DAMAGE CAN LEAD TO A FAILURE OF THE REPAIR OR SURROUNDING STRUCTURE.



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53-21-11 PB 201 Repairs - SKIN PLATES

2. Repair Scheme for General Repairs

Repair Procedure	Chapter
Skin between Stringer - External Repair	53-00-11
Skin at Stringer - External Repair	53-00-11
Skin at Frame - External Repair	53-00-11
Small Skin between Stringer - External Repair	53-00-11
Skin between Stringer - Flush Repair	53-00-11
Skin at Stringer - Flush Repair	53-00-11
Skin at Frame - Flush Repair	53-00-11
Small Skin between Stringer - Internal Repair	53-00-11
Skin Repair - Cutout larger than 265 mm (10.433 in.)/170 mm (6.693 in.)	53-00-11
Small Skin - Temporary Repair	53-00-11
Skin - Temporary Repair	53-00-11
Skin - Conversion of Temporary into Final - External Repair	53-00-11
Skin - Conversion of Temporary into Final - Flush Repair	53-00-11
Longitudinal Lap Joint Repair - Large Cutout in upper Skin Panel	<u>53-00-11</u>
Longitudinal Lap Joint Repair - Lap Joint Cutout	53-00-11
Lightning Strike - Permanent Repair	53-00-11
Skin Repair by Bushes	53-00-11
Lightning Strike - Temporary Repair	53-00-11
Lightning Strike - Conversion of Temporary Repair into Permanent	53-00-11
Skin - Local Rework of milled Skin Pocket Steps	53-00-11

Table 201



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53-00-11 PB 201 REPAIRS - SKIN PLATES

REPAIR SELECTION

Selecting a repair to fuselage skin depends on existing skin thickness, aerodynamic requirements and location of damage which has to be cutted out. In this particular case, an external repair was chosen. The existing skin thickness is between 1,6 - 4,0 mm, the cut out will be between two stringers.

In addition the selected repair is a "Category B" repair with supplemental inspections. The appropriate reference to Structural Repair Inspection (SRI) can be find in fourth column.

1. General

These repairs are applicable for damage to the skin plates. The appropriate repairs are listed in Table 201 thru Table 204 and are described in more detail in the following text.

NOTE:

- For Damage/Repair Data recording, refer to Chapter 51-11-15.
- For detailed definition of Repair Categories refer to Chapter 51–11–14.

2. Safety Precautions

CAUTION:

- THERE MUST BE A MINIMUM DISTANCE OF FOUR FASTENER SPACINGS BETWEEN THE OUTER ROWS OF ADJACENT REPAIR.
- THERE MUST BE A MINIMUM DISTANCE OF FOUR FASTENER SPACINGS BETWEEN THE OUTER FASTENER ROW OF THE DOUBLER AND ANY EXISTING CUTOUT (E.G. DOOR/WINDOW).
- THERE MUST BE A MINIMUM DISTANCE OF THREE FASTENER SPACINGS BETWEEN THE OUTER FASTENER ROW OF THE DOUBLER TO THE FIRST FASTENER ROW OF A LONGITUDINAL OR CIRCUMFERENTIAL JOINT. IN CASE THIS DISTANCE CANNOT BE MAINTAINED, REFER TO THE INSTRUCTIONS FOR THE RELEVANT SRM JOINT REPAIR SCHEME.
- USE ONLY SPECIFIED CLEANING MATERIALS AND SOLUTIONS OR THEIR EQUIVALENTS. THE SURFACE PROTECTION COULD BE DAMAGED IF UNSPECIFIED MATERIALS ARE USED. IT IS IMPORTANT THAT THE MANUFACTURER'S MIXING, APPLICATION AND TREATMENT INSTRUCTIONS ARE FOLLOWED.

- TO PREVENT DAMAGE TO THE SURFACE PROTECTION, MECHANICAL AND ELECTRICAL SYSTEMS, THE AREA SURROUNDING THE REPAIR MUST BE COVERED WITH PLASTIC FOIL AND MASKING TAPE.
- FOR REPAIR EFFECTIVITY RELATED TO AIRCRAFT TYPE REFER TO PARAGRAPH 3, GIVEN IN THE INTRODUCTION OF THE SRM.
- OBEY THE REPAIR APPLICABILITY PER AIRCRAFT TYPE, WEIGHT VARIANT AND REPAIR AREA GIVEN IN THE RELEVANT REPAIR.
- FOR DOUBLER THICKNESS RULE REFER TO FIGURE 201. THIS RULE IS VALID FOR STANDARD SKIN REPAIRS ONLY. FOR OTHER REPAIRS, SPECIFIC INSTRUCTION GIVEN ON RELEVANT FIGURES MUST BE OBSERVED.
- OBEY THE GIVEN INSPECTION INSTRUCTION REFERENCE WHICH LEADS TO THE APPLICABLE INSPECTION PROGRAM DEFINED IN CHAPTER STRUCTURAL REPAIR INSPECTIONS (SRI) OF THE SRM, IF NECESSARY.
- REPAIRS APPLICABLE IN AREAS AROUND STATIC PORTS, PITOT PROBES, TOTAL AIR TEMPERATURE PROBES AND ANGLE OF ATTACK SENSORS, HAVE TO COMPLY WITH AERODYNAMIC SMOOTHNESS REQUIREMENTS GIVEN IN CHAPTER 53-00-11 PAGE BLOCK 101 PARAGRAPH 4.
- OBEY THE REPAIR APPLICABILITY PER MODIFICATION GIVEN IN THE RELEVANT REPAIR.
- HIDDEN DAMAGE CAN LEAD TO A FAILURE OF THE REPAIR OR SURROUNDING STRUCTURE.

3. Repair Scheme

A. For different types of repair refer to:

- Table 201 for Skin Repairs Permanent Solution,
- Table 202 for Skin Repairs Temporary Solution,
- Table 203 for Skin Repairs Conversion of Temporary into Permanent,
- Table 204 for Skin Repairs at Lap Joints.



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SA330

STRUCTURAL REPAIR MANUAL

NOTE: Information on Determination of Doubler Thickness can be found in Figure 201.

REPAIR PROCEDURE	PARAGRAPH	FIGURE	REPAIR CATEGORY	INSPECTION INSTRUCTION REFERENCE (IIR)
Skin between Stringer – External Repair for skin thickness between 1.6 mm (0.063 in.) and 3.2 mm	4.A.	202	В	53-00-11-2-001-00
(0.126 in.). NO FURTHER APPLICATION, REFER TO PARAGRAPH 4.O., FIGURE 223	INACTIVE	INACTIVE		
Skin between Stringer – External Repair for skin thickness between 1.6 mm (0.063 in.) and 4.0 mm (0.157 in.)	4.O.	223	В	53-00-11-2-020-00

Skin Repairs - Permanent Solution Table 201



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REPAIR INSTRUCTION

Each repair has its own "Recipe" with step-by-step instructions and all necessary informations about consumable and repair materials needed.

Before start repairing, it has to be checked if selected paragraph is applicable by reading all "Notes" and checking "Weight Variant Effectivity".

O. Skin between Stringer - External Repair, refer to Figure 223.

CAUTION:

- THIS REPAIR IS EITHER PERMANENT WITH ASSOCIATED REPETITIVE INSPECTIONS OR TEMPORARY WITH OR WITHOUT REPETITIVE INSPECTIONS.
- FOR THE APPLICABLE LIFE LIMITATIONS AND / OR INSPECTION INSTRUCTION REFERENCE (IIR), REFER TO IIR 53-00-11-2-020-00. THE INSPECTION INSTRUCTION IS DESCRIBED IN THE STRUCTURAL REPAIR INSPECTIONS (SRI) SECTION OF THE SRM.
- REPAIRS APPLICABLE IN AREAS AROUND STATIC PORTS, PITOT PROBES, TOTAL AIR TEMPERATURE PROBES AND ANGLE OF ATTACK SENSORS, HAVE TO COMPLY WITH AERODYNAMIC SMOOTHNESS REQUIREMENTS GIVEN IN CHAPTER 53-00-11 PAGE BLOCK 101 PARAGRAPH 4.
- OBEY THE REPAIR EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN TABLE 218.
- CAUTION: FOR POSSIBLE ADDITIONAL WEIGHT VARIANT COVERAGE APART FROM THOSE MENTIONED IN TABLE 218, REFER TO SRM INTRODUCTION, PARAGRAPH 22.

Skin at Stringer - External Repair, refer to Figure 224.

Skin at Frame - External Repair, refer to Figure 225.

NOTE:

These repairs are applicable for damage to the skin where the skin thickness is between 1.6 mm (0.063 in.) and 4.0 mm (0.157 in.) and are effective as follows:

- From FR18 thru FR38
- From FR53.3 thru FR54, STGR27RH STGR27LH (upper panel only)
- From FR54 thru FR91 for all aircraft weight variants except for A330–200 WV057 and 058

For A330-200 WV057 and 058 only:

- From FR54 thru FR68
- From FR68 thru FR72, only below STGR7RH and STGR7LH
- From FR72 thru FR75, except between STGR7RH and STGR7LH (upper shell), and except between STGR28RH and STGR31RH
- From FR75 thru FR87, only between STGR8 and STGR43 (RH or LH), but except between FR84–85, STGR28–29 (RH or LH)
- From FR87 thru FR91, between STGR8 and STGR16 (RH or LH).

NOTE:

- For specific repair information to the area between FR38 thru FR53.3 refer to Chapter 53–31–11 Page Block 201.
- The repair is applicable only in the areas indicated on the relevant Figure. The repair effectivity of this repair is shown in Table 218.
- For general requirements applicable to these repairs, refer to Chapter 51–70–20.



AIRCRAFT	WEIGHT VARIANT
A330-200	020, 021, 022, 023, 024, 025, 026, 027, 050, 051 052, 053, 054, 055, 056, 057, 058, 059, 060, 061
A330-300	000, 001, 002, 003, 004, 010, 011, 012, 013, 014 020, 022, 024, 025, 050, 051, 052, 053, 056

Table 218 - Effectivity per Weight Variant and Aircraft Type

NOTE:

Refer to Paragraph 22. 'Weight Variant Information' in the INTRODUCTION of the SRM.

Tables in the subparagraphs give necessary data about all weight variants and their required information for allowable damage and repair applicability.

(1) Repair Materials

ITEM	NOMENCLATURE	QTY	MATERIAL/REMARKS
1	Doubler		Refer to Figure 223
1	Doubler	19	Refer to Figure 224
2	Filler		Refer to Figure 224
1	Doubler	12	Refer to Figure 225
2	Filler	-	Refer to Figure 225
-	Sealant	AR	Material No. 09-013 refer to Chapter 51-35-00
	Cleaning Agent	AR	Material No. 11-003, refer to Chapter 51-35-00
	Cleaning Agent	AR	Material No. 11-004, refer to Chapter 51-35-00
=	Storage Preservation	AR	Material No. 15-005A , refer to Chapter 51-35-00
5	Structure Paint	AR	Material No. 16-001, refer to Chapter 51-35-00
ġn.	Structure Paint	AR	Material No. 16-002 , refer to Chapter 51-35-00
-	Structure Paint	AR	Material No. 16-018, refer to Chapter 51-35-00
	Structure Paint	AR	Material No. 16-020 , refer to Chapter 51-35-00
-	Structure Paint	AR	Material No. 16-021A , refer to Chapter 51-35-00

(2) Repair Instruction, refer to the relevant Figure.

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REPAIR LAYOUT

The repair figure provides all informations for defining of fastener layout, required repair materials, fasteners and references to SRM-Chapter 51 as well (e.g. oversize and alternative fasteners).

CAUTION:

OBEY THE REPAIR EFFECTIVITY PER WEIGHT VARIANT AND AIRCRAFT TYPE GIVEN IN THE RELEVANT TABLE.

THIS REPAIR IS EITHER PERMANENT WITH ASSOCIATED REPETITIVE INSPECTIONS OR TEMPORARY WITH OR WITHOUT REPETITIVE INSPECTIONS. FOR THE APPLICABLE LIFE LIMITATIONS AND / OR INSPECTION INSTRUCTION REFERENCE (IIR), REFER TO IIR 53–00–11–2–020–00. THE INSPECTION INSTRUCTION IS DESCRIBED IN THE STRUCTURAL REPAIR INSPECTIONS (SRI) SECTION OF THE SRM. INFORM YOUR PLANNING DEPARTMENT AND PROVIDE THEM WITH THE NECESSARY INFORMATION.

NOTE:

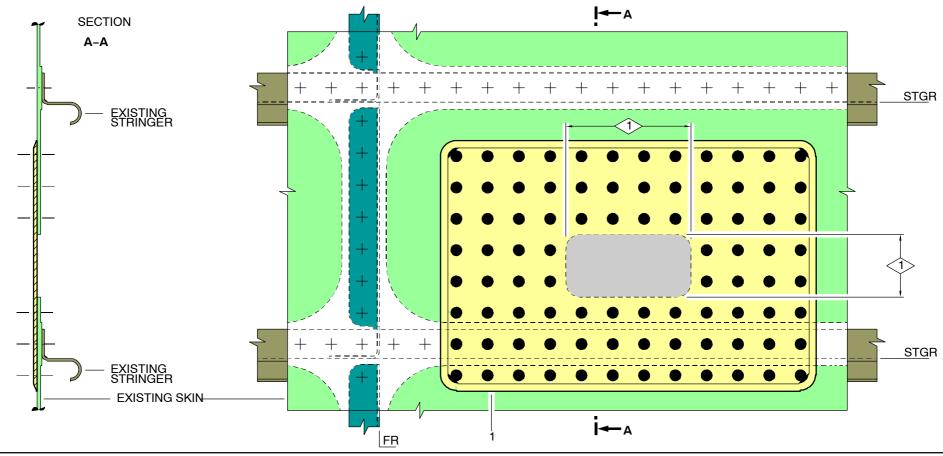
FOR BONDED SKIN PANELS:
REFERENCE FOR THE RIVET
PITCH OF BONDED STRINGER IS
THE PITCH OF THE CLOSEST
LONGITUDINAL LAP JOINT.

FOR GENERAL REQUIREMENTS APPLICABLE TO THIS REPAIR REFER TO CHAPTER 51-70-20.

- 1 CUT OUT IN SKIN IS LIMITED TO A LENGTH OF HALF A FRAME BAY AND A WIDTH OF ONE STRINGER BAY.
- 2 THE mm (in.) CONVERSION FOR THE DOUBLER THICKNESS CORRESPONDS TO THE US STANDARD ALUMINUM SHEET METAL GAGE AND IS NOT NECESSARILY THE EXACT CONVERSION.
- 3 IF ORIGINAL FASTENER WAS NOT A SOLID ALUMINUM RIVET, REFER TO CHAPTER 51–43–00 FOR OVERSIZE AND ALTERNATIVE.







	REPAIR MATERIAL									
		EXISTING SKIN								
ITEM	NOMEN- CLATURE	MATERIAL	1.6–1.8mm (0.063–0.071 in.)	1.9–2.1mm (0.075–0.083 in.)	2.2–2.4mnm (0.087–0.094 in.)	2.5–2.7mm (0.098–0.106 in.)	2.8–3.0mm (0.110–0.118 in.)	3.1–3.2mm (0.122–0.126 in.)	3.3–3.4mm (0.130–0.134 in.)	3.5–4.0mm (0.138–0.157 in.)
1	DOUBLER 2	CLAD 2024T3	1.8mm (0.071 in.)	2.2mm (0.090 in.)	2.5mm (0.100 in.)	2.8mm (0.112 in.)	3.2mm (0.125 in.)	3.2mm (0.125 in.)	3.5mm (0.140 in.)	4.0mm (0.160 in.)
FAOT	ENED	REFERENCE ONLY								
SYME	ENER BOLS	•	NAS1097DD6 3	HL11VF6 HL411VF6						

53-00-11 Figure 223 Skin between Stringer - External Repair



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