SCOPE

This Design Standard outlines the engineering requirements for the aerodynamic smoothness of the DHC-7 wetted surfaced area.

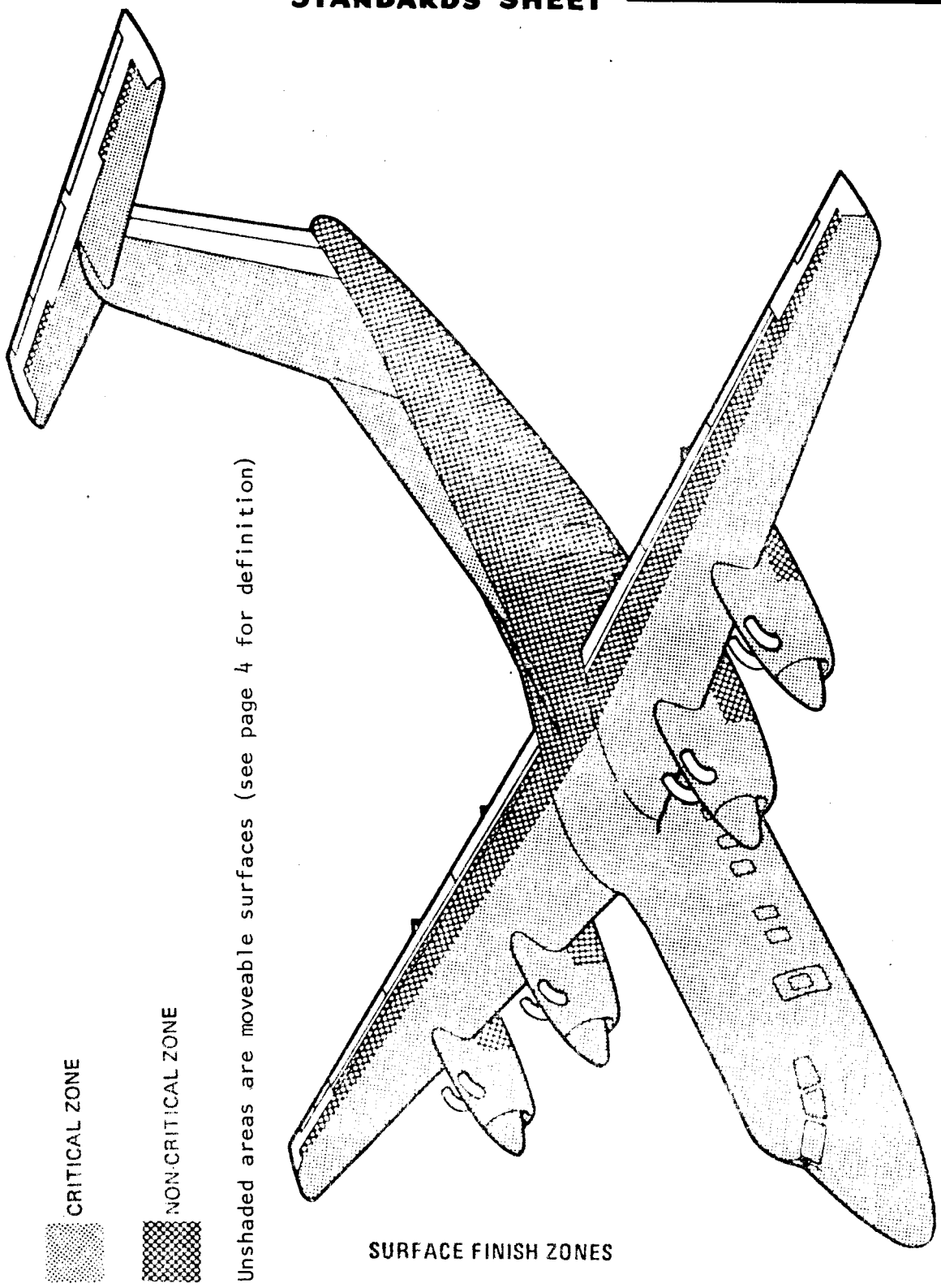
For the definition of aerodynamic smoothness requirements, the wetted surface area of the aircraft is divided into two zones. This Design Standard details the allowable tolerances for the surface imperfections and protuberances for each of the surface zones.

CRITICAL ZONES

The critical zones of the DHC-7 are defined in Table 1 and illustrated on Pages 2,3 & 4 (Ref. AEROC 0.2.AC.0).

AIRCRAFT REGION	CRITICAL ZONE
Fuselage	The fuselage surface, including fairings, forward of the wing rear spar.
Wing (excluding Flaps and Ailerons)	The wing upper and lower surface forward of the rear spar, and on the lower surface only, within 12.0 inches of any nacelle.
Stabilizers and Dorsal Fin (excluding rudders and elevators)	All surfaces of the horizontal and vertical stabilizers forward of the rear spar. All surfaces of the dorsal fin.
Ailerons, Rudders and Elevators	All surfaces forward of the hinge line.
Fore Flaps	The entire upper surface and the lower surface forward of 67% chord
Trailing Flaps	The entire upper surface, and the lower surface forward of 10% chord. Within 12.0 inches of a nacelle, the entire upper and lower surfaces of the flaps.
Nacelles	All surfaces forward of the firewall and all surfaces within 8.0 inches of the wing surface

TABLE 1



SURFACE FINISH ZONES

FIGURE 1

DRAWN	P. LAM	CLASSIFICATION	STANDARD
CHECKED	[signature]	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	[signature]		

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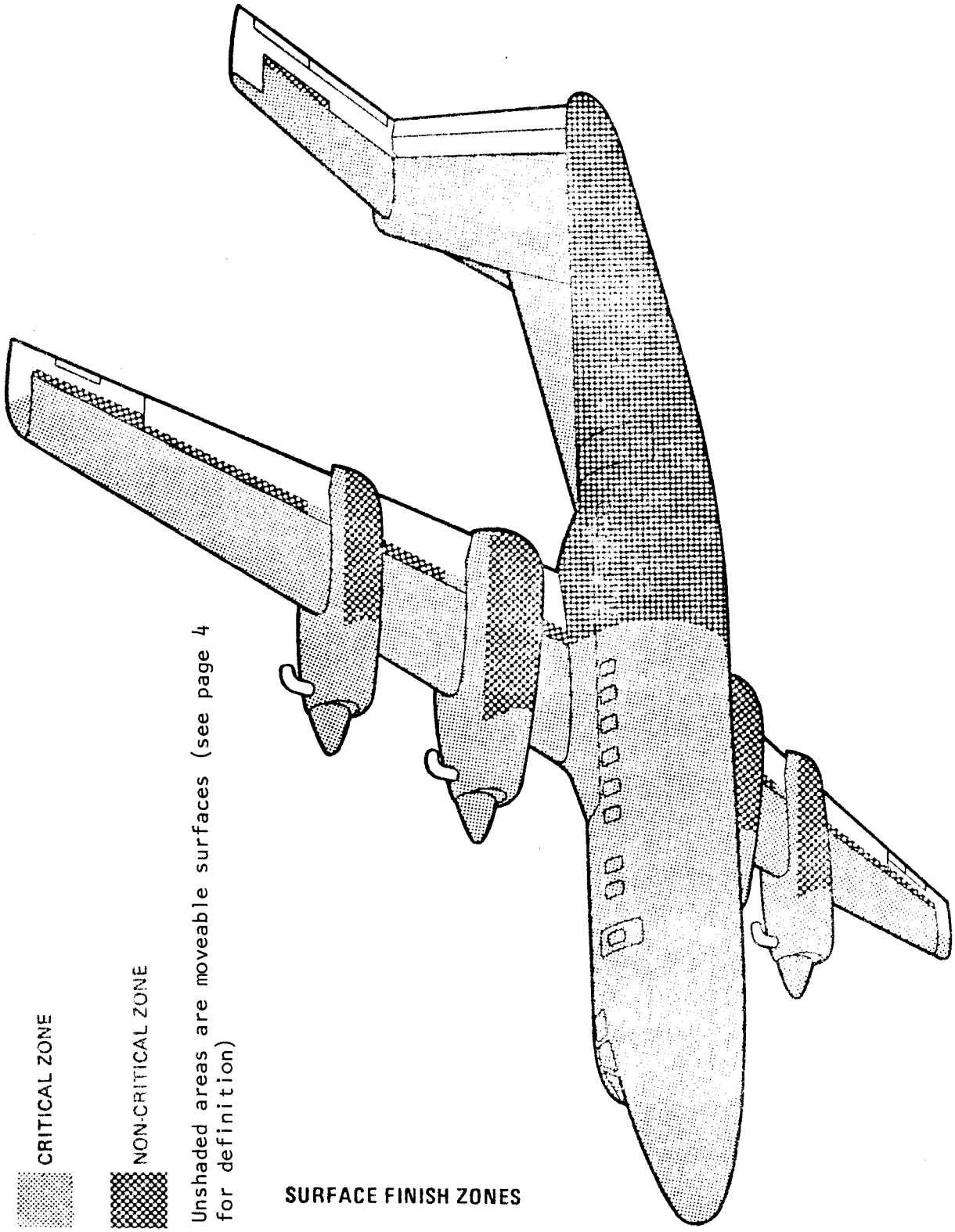

SURFACE FINISH ZONES

FIGURE 2

DRAWN	P. LAM	CLASSIFICATION	STANDARD
CHECKED	SCHERTINCK	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	J.V. Goulter		
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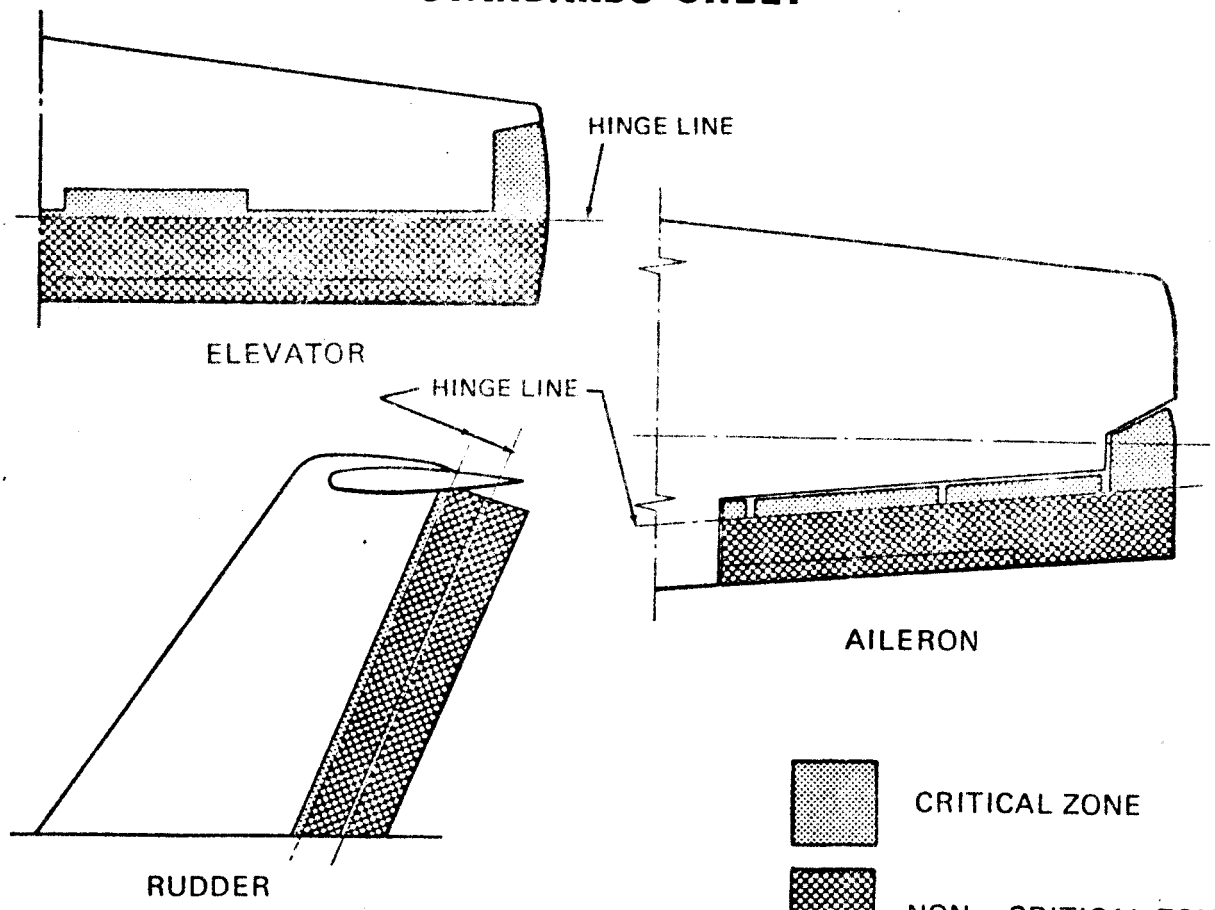
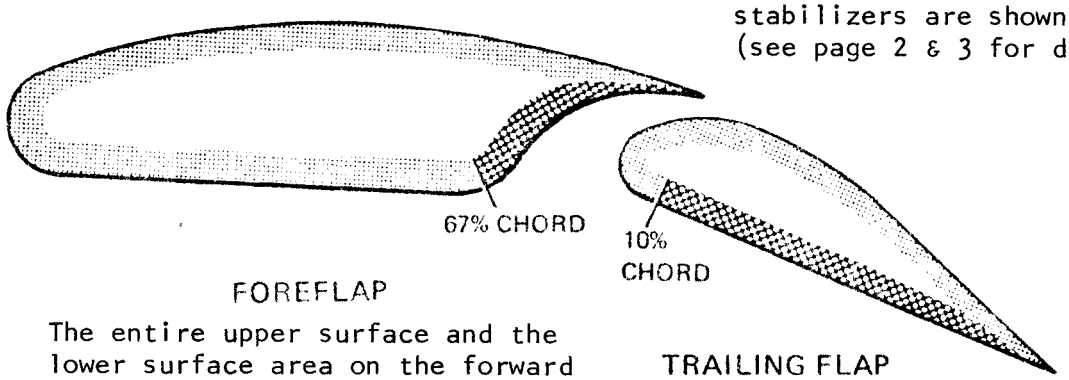


The fixed vertical and horizontal stabilizers are shown unshaded (see page 2 & 3 for definition)



FOREFLAP

The entire upper surface and the lower surface area on the forward 67% of the foreflap chord is in the critical zone.

TRAILING FLAP

The entire upper surfaces, the lower surface area on the forward 10% of the trailing flap chord or within 12 inches of a nacelle is in the critical zone

SURFACE FINISH ZONES

FIGURE 3

DRAWN	P. LAM	CLASSIFICATION	STANDARD
CHECKED	SCHRATTNER	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	C.V. Boulter		

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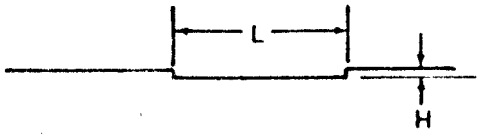
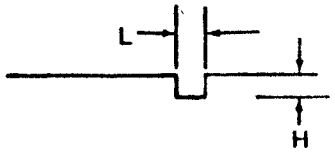
A Allowable Gap Tolerances

The allowable tolerances for gaps in the Critical and Non-critical zones are given in Figure 2, and illustrate the maximum allowable depth of each gap relative to a specified percentage of gap width.

1. CRITICAL AREAS - AT LEAST 80% OF GAP LENGTH

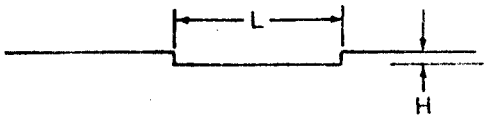


WHEN H IS LESS THAN OR EQUAL TO 0.010 INCH, THERE IS NO LIMIT TO L.

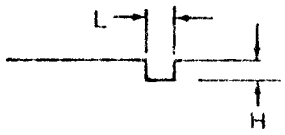


WHEN H IS GREATER THAN 0.010 INCH, THE LIMIT TO L IS 0.0625 INCH.

2. CRITICAL AREAS - NOT MORE THAN 20% OF GAP LENGTH
NON - CRITICAL AREAS - AT LEAST 80% OF GAP LENGTH.

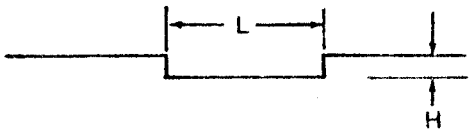


WHEN H IS LESS THAN OR EQUAL TO 0.020 INCH, THERE IS NO LIMIT TO L.

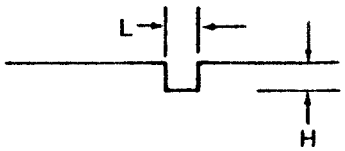


WHEN H IS GREATER THAN 0.020 INCH, THE LIMIT TO L IS 0.125 INCH.

3. NON-CRITICAL AREAS - NOT MORE THAN 20% OF GAP LENGTH



WHEN H IS LESS THAN OR EQUAL TO 0.040 INCH, THERE IS NO LIMIT TO L.



WHEN H IS GREATER THAN 0.040 INCH, THE LIMIT TO L IS 0.250 INCH.

ALLOWABLE GAP TOLERANCES

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CHECKED	SCHRATTER	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	J.V. Bowles		

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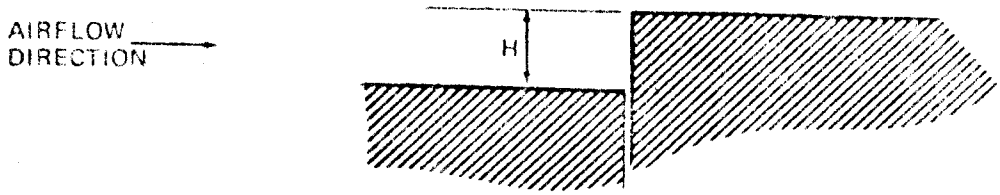
B. Step Mismatch Tolerances

The allowable step mismatch tolerances in the Critical and Non-critical zones are given in Figure 3. Data is given for forward and rearward facing steps and for longitudinal steps.

(1) FORWARD FACING STEP

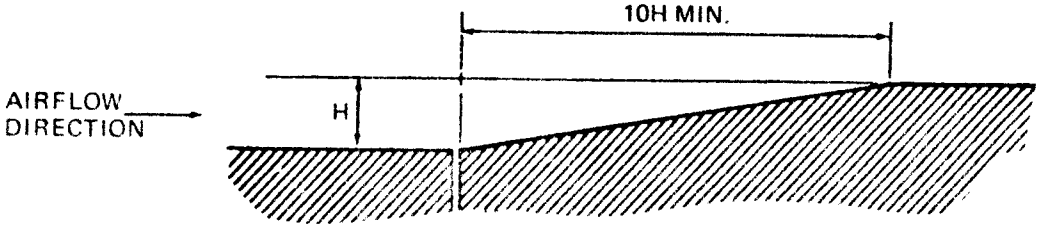


CRITICAL AREAS - H/MAX (TOLERANCE) = 0.015 INCH OVER 80% OF LENGTH AND 0.030 INCH OVER REMAINING 20%

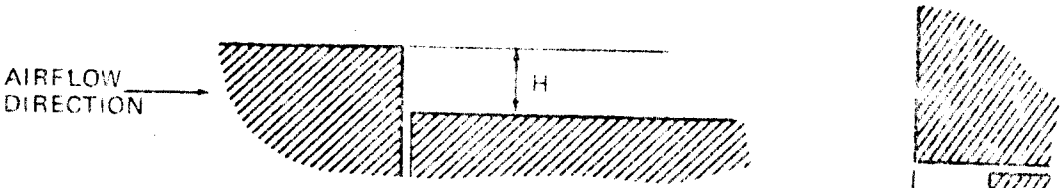
NON CRITICAL AREAS - H/MAX (TOLERANCE) = 0.030 INCH OVER 80% OF LENGTH AND 0.060 INCH OVER REMAINING 20%

(A) * *If mismatch greater than allowable tolerance, consult LIAISON ENGINEERING for proper procedure of chamfering and protective re-finishing.*

NOTE: REJECT IF H EXCEEDS 0.060 INCH IN CRITICAL AREAS OR EXCEEDS 0.120 INCH IN NON CRITICAL AREAS



(2) REARWARD FACING STEP AND LONGITUDINAL STEP



NO CHAMFER EASEMENT - REJECT IF TOLERANCE EXCEEDS LIMIT

CRITICAL AREAS - H/MAX (TOLERANCE) = 0.030 INCH OVER 80% OF LENGTH AND 0.060 INCH OVER REMAINING 20%

NON CRITICAL AREAS - H/MAX (TOLERANCE) = 0.060 INCH OVER 80% OF LENGTH AND 0.120 INCH OVER REMAINING 20%

(A) NOTE * ADDED P.LAM 30.10.80 & 8V8. F

STEP MISMATCH TOLERANCES

DRAWN	P. LAM	CLASSIFICATION	STANDARD
CHECKED	SCHRATTNER	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	L.V. Smith		

8 SEPT 80

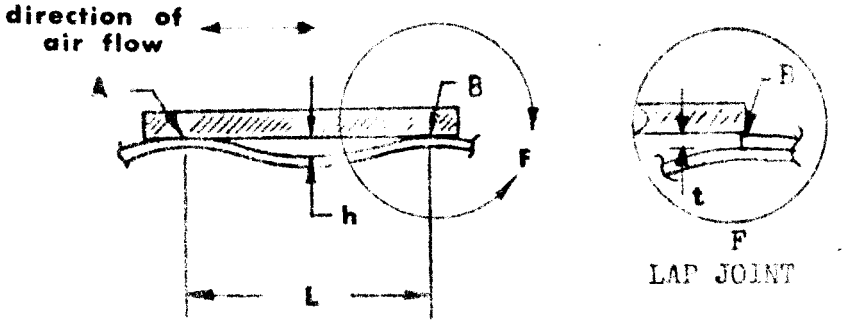
C. SURFACE WAVINESS QUALITY STANDARDS

1. General

Unless otherwise stated, a contour change of wavelength 'L' (inches)* shall have a crest to valley depth 'h' not exceeding 0.020 inches if wavelength is less than 4 inches or 0.005 x L inches if the wavelength is above 4 inches in both critical and non-critical zones.

* *L = wavelength (distance between adjacent high or low points in inches)*

2. Method of Determining Waviness of Specific Cases



Example I
Measured Wavelength = 20"
Measured Depth of Wave = .050"

(maximum allowable depth = .005x20" = .100"; therefore, .050" is within quality standard)

Example II
Measured Wavelength = 5"
Measured Depth of Wave = .050"

(maximum allowable depth = .005x5" = .025"; therefore, .050 is not within quality standard)

3. Waviness at Skin Laps

When waviness measurements are taken across skin laps, the thickness of the outer lapped skin 't' is added to 'h'. Refer to figure above.

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CHECKED	SCHRATTNER	AERODYNAMIC SMOOTHNESS REQUIREMENTS DHC-7	DS 93
STRESSED	—		
APPROVED	L.V. Smith 8 SEPT 80		

D. FLUSH RIVET HEADS

Countersunk rivet heads shall protrude .002 to .005 inch above the surface of skin on installation. Rivet heads protruding more than .005 inch shall be shaved to .000 to .005 inch, provided that the countersink or dimple diameter is within the specified tolerance.

NOTE: Under no circumstances shall NAS1097 rivet heads be shaved.

E. FLUSH BOLT HEADS

All areas to be flush to low, except when specified otherwise on Engineering Drawing or Production Process Standard. (A)

(A) APS ADDED TO 'E' P LAM 30.10.80 SVB 8/11. F

DRAWN	P. LAM	CLASSIFICATION	STANDARD
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STRESSED	—		
APPROVED	S.V. Smith		
	8 SEPT 80		