FASTENER SPACING AND MARGIN DATA

1. General

A. This topic supplies spacing and margin data for the installation of fasteners in metallic and composite structures. All primary data are shown in the tables and illustrations.

NOTE: The data given in the tables of this topic are only applicable to new holes. For existing holes that must be enlarged to an oversize diameter, maximum 2nd oversize (1/32 in. (0.8 mm)), check the edge distances and hole pitches to ensure that they are within the tolerances given in the tables for the nominal fastener diameters. Also check that the hole has not been previously oversized.

If the pitch or edge distance values are not within the allowable limits, or the hole has previously been oversized to its maximum of 2nd oversize, then contact AIRBUS INDUSTRIE.

B. The fastener spacing and margin data applicable to metallic structure are given in Paragraph 2..

C. The fastener spacing and margin data applicable to composite structure are given in Paragraph 3..

2. Fastener Hole Pitch and Edge Distance - Metallic Structure

A. Bolt and Pin Hole Pitch and Edge Distance

(1) The bolt and pin hole pitch values are from the centre of one fastener hole to the centre of the next fastener hole and are quoted in terms of the fastener nominal shank diameter 'D'. For example, factor 4.0 x 'D' = pitch (Refer to Table 1 and Figure 1).

(2) The bolt and pin hole edge distance values are from the centre of one fastener hole to the nearest edge of the component.

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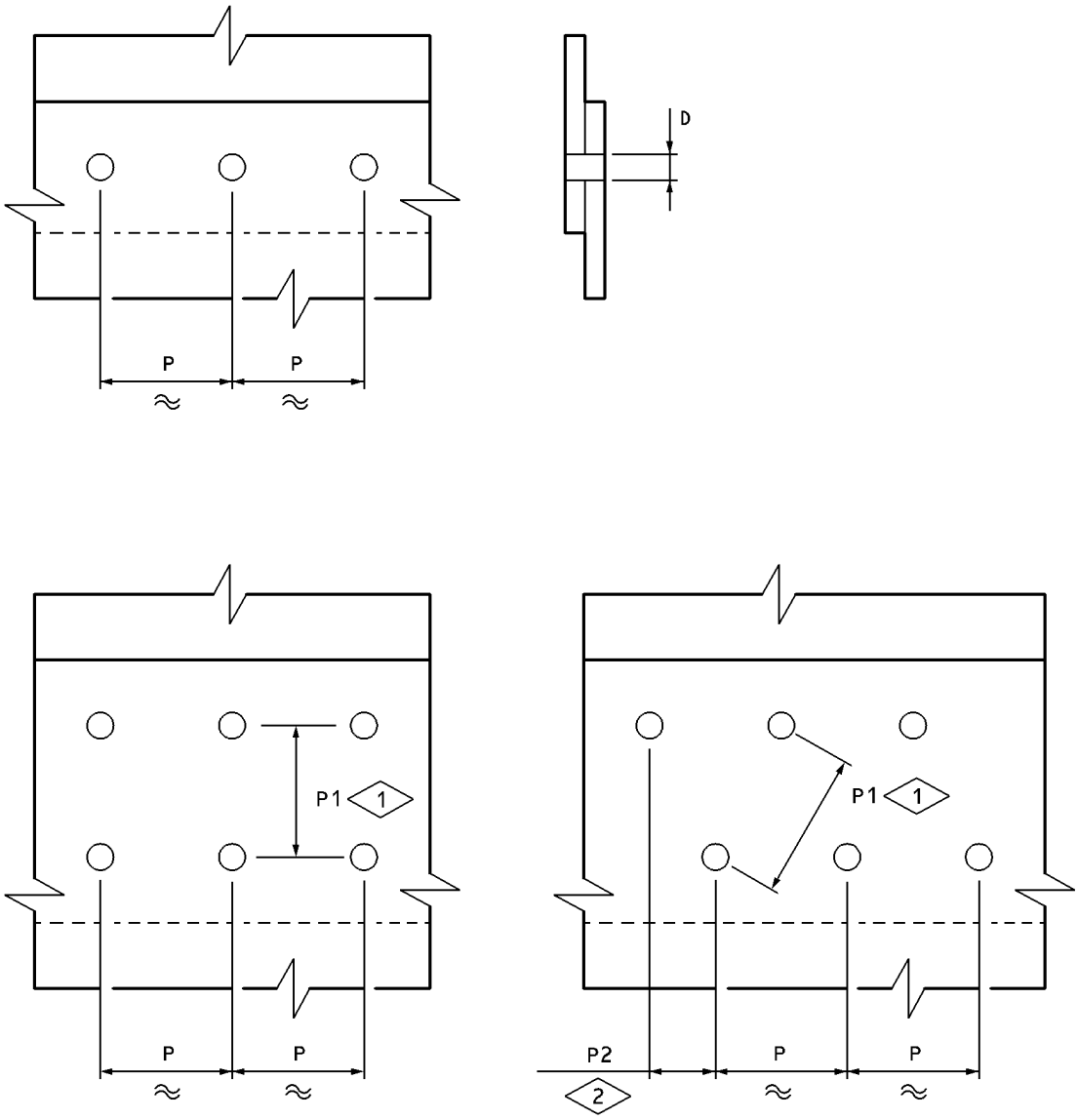

NOTE:

1 'P1'MUST BE EQUAL OR GREATER THAN 'P'MINIMUM.

2 'P2'MUST BE EQUAL 0.5P.

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Fastener Hole Pitch Examples
Figure 1

(3) Refer to Figure 4 for the edge distance for repair fasteners in milled skin pockets and steps in the fuselage and door skins - Chapters 52-XX-XX and 53-XX-XX.

NOMINAL FASTENER DIAMETER		PITCH VALUES					
		FACTOR	MINIMUM PITCH		FACTOR	MAXIMUM PITCH	
mm	in.		mm	in.		mm	in.
4.0	0.1560	4.0 D	16.000	0.630	5.0 D	20.000	0.787
4.8	0.1900	4.0 D	19.200	0.756	5.0 D	24.000	0.945
6.4	0.2500	4.0 D	25.600	1.008	5.0 D	32.000	1.260
7.9	0.3125	3.875 D	30.613	1.205	5.0 D	39.500	1.555
9.5	0.3750	3.750 D	35.625	1.403	5.0 D	47.500	1.870

Example of Pitch Data for Bolt and Pin Holes

Table 1

NOTE: Pitching for Taper-Loks will follow the above guide lines unless specified otherwise by specific repair instructions.

(4) The edge distance values applicable to the protruding head fasteners for the wing structure are quoted in terms of the fastener nominal shank diameter 'D'. For example, factor 2.0 x 'D' = edge distance (Refer to Table 2 and Figure 2).

(5) The edge distance values applicable to the countersunk head fasteners for the wing structure only are given in Table 2.

(6) The edge distance values applicable to protruding and countersunk head fasteners are given in Table 3.

(7) Figure 3 shows an example of edge distance and chamfer for the installation of fasteners in external doublers.

NOMINAL FASTENER DIAMETER		EDGE DISTANCE VALUES						
		ONLY APPLICABLE TO PROTRUDING HEAD FASTENERS			VALUES APPLICABLE TO COUNTERSUNK HEAD FASTENERS			
		FACTOR	MIN. EDGE DISTANCE		SHALLOW		FULL	
					MIN. EDGE DISTANCE		MIN. EDGE DISTANCE	
mm	in.		mm	in.	mm	in.	mm	in.
4.0	0.1560	2.0 D	8.0	0.3149	-	-	-	-
4.8	0.1900	2.0 D	9.7	0.3819	13.0	0.5118	14.6	0.5748

Table 2

NOMINAL FASTENER DIAMETER		EDGE DISTANCE VALUES						
		ONLY APPLICABLE TO PROTRUDING HEAD FASTENERS			VALUES APPLICABLE TO COUNTERSUNK HEAD FASTENERS			
		FACTOR	MIN. EDGE DISTANCE		SHALLOW		FULL	
					MIN. EDGE DISTANCE		MIN. EDGE DISTANCE	
mm	in.		mm	in.	mm	in.	mm	in.
6.4	0.2500	2.0 D	12.7	0.5000	17.2	0.6772	19.2	0.7559
7.9	0.3125	1.9 D	15.1	0.5945	20.5	0.8071	22.9	0.9016
9.5	0.3750	1.8 D	17.1	0.6732	23.2	0.9134	26.0	1.0236

Example of Edge Distance Data for Bolt and Pin Holes for the Wing Structure

Table 2

NOTE: The edge distance for Taper-Loks will follow the above guide lines unless specified otherwise by specific repair instructions.

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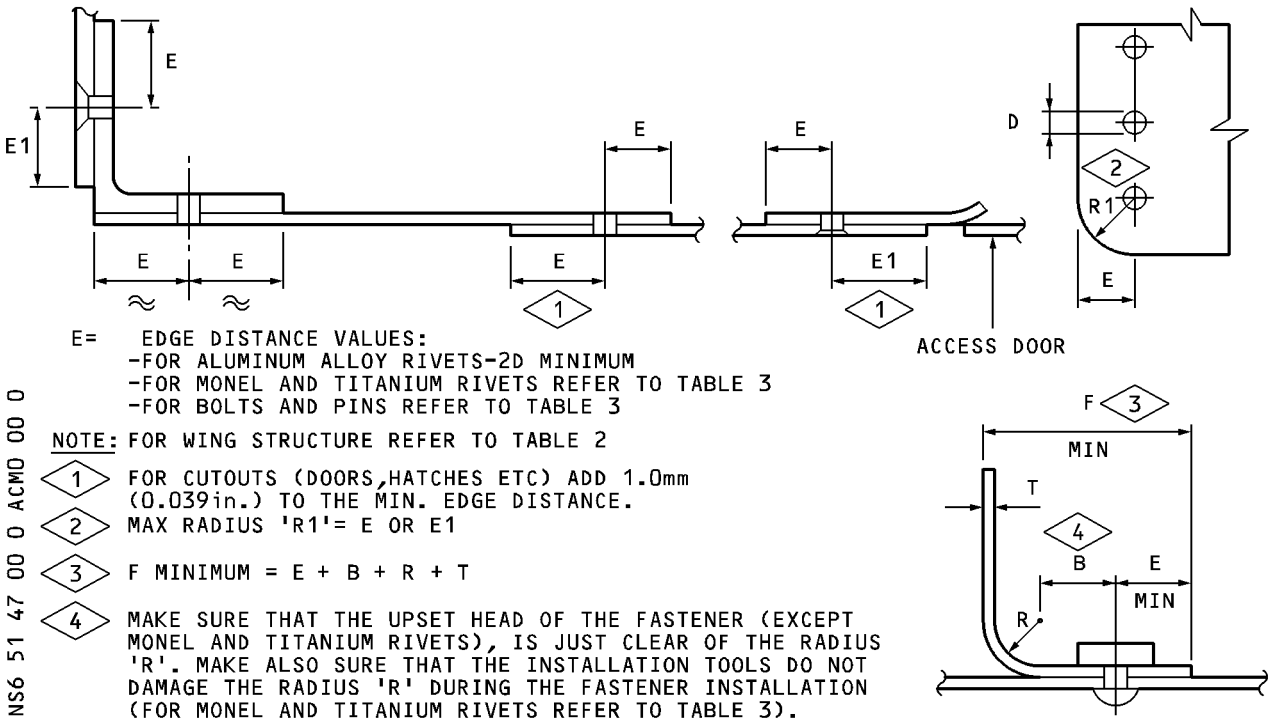

Examples of Fastener Edge Distance
Figure 2

NOMINAL FASTENER DIAMETER		RIVETS (MONEL AND TITANIUM)				PIN (THREADED), PIN (SWAGED),BOLT-BLIND			
NOMINAL FASTENER DIAMETER		E, E1 (+1.0 mm (+0.039 in.))		B MIN.		E (+1.0 mm (+0.039 in.))		E1 (+1.0 mm (+0.039 in.))	
mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
2.4	3/32	7.0	0.276	4.0	0.157				
3.2	1/8	8.0	0.315	5.0	0.197				
3.6	9/64	8.5	0.335	5.5	0.217				
4.0	5/32	9.0	0.354	6.0	0.236	7.0	0.276	8.0	0.315
4.8	3/16	11.0	0.433	7.0	0.276	9.0	0.354	10.0	0.394
5.6	7/32	12.0	0.472	8.0	0.315	-	-	-	
6.4	1/4			9.0	0.354	10.0	0.394	11.0	0.433
7.9	5/16					12.0	0.472	13.0	0.512

Examples of Fastener Edge Distance

Table 3

9.5	3/8					14.5	0.571	16.0	0.630
11.1	7/16					16.5	0.650	17.0	0.669

Examples of Fastener Edge Distance

Table 3

B. Rivet Hole Pitch and Edge Distance

(1) The rivet hole pitch values are from the centre of one rivet hole to the centre of the next rivet hole. The pitch values are quoted in terms of the rivet nominal shank diameter 'D'. For example, factor 4.0 x 'D' =pitch (Refer to Figure 1).

(2) The recommended hole pitch values are:

- Pressure tight joint - 4D to 5D
- Nonpressure tight joints - 4D minimum

NOTE: When otherwise specified by specific repair instructions then the repair instructions take precedence.

(3) The edge distance values are from the centre of the rivet hole to the nearest edge of the component. The edge distance values are quoted interms of the rivet nominal shank diameter 'D' (Refer to Figure 2).

(4) The recommended edge values for metallic joints are 2D minimum.

NOTE: In general cases for the installation in skin, sheet metaldetails, members, shear webs etc. with a thickness of 1.2 mm (0.0472 in.) and thicker, edge distance 'E' = 2D. When the thick-ness is less than 1.2 mm (0.0472 in.), edge distance 'E' = 2.5D (Refer to Figure 2).

(5) Figure 3 shows an example of edge distance and chamfer for the installation of fastener in external doublers.

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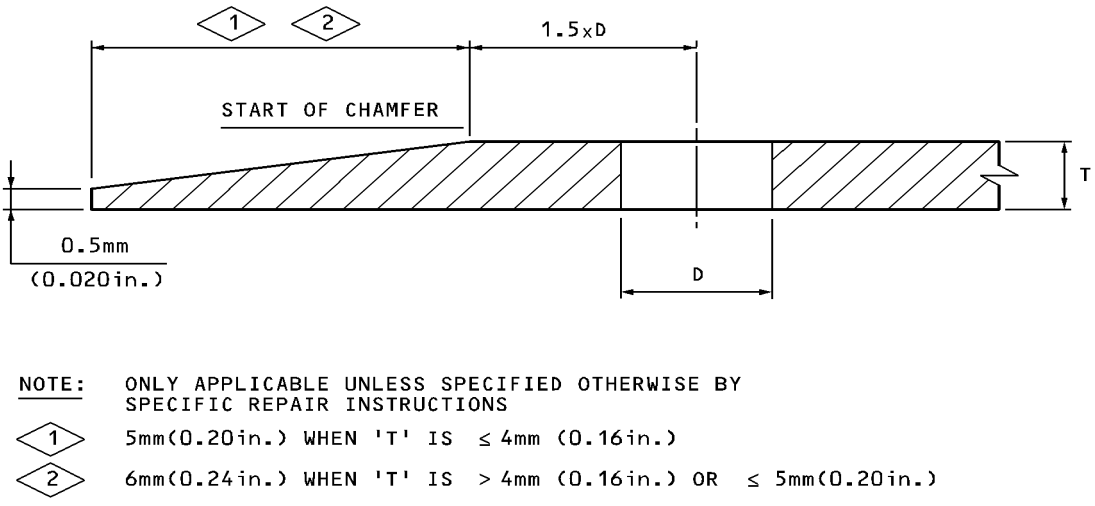

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Example of Edge Distance and Chamfer for Installation of Fasteners in External Doublers.
Figure 3

3. Fastener Hole Pitch and Edge Distance - Composite Structure

A. Bolt, Pin and Rivet Hole Pitch and Edge Distance

(1) The bolt and pin hole pitch values are from the centre of one fastener hole to the centre of the next fastener hole. These pitch values are quoted in terms of the fastener nominal shank diameter 'D'.

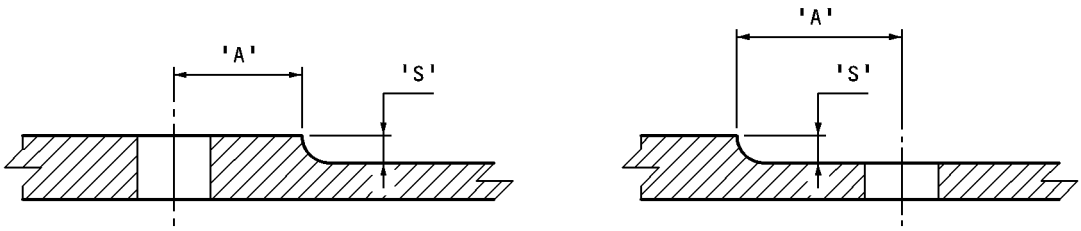
(2) In nonmetallic joints the recommended minimum hole pitch is 5 'D' unless otherwise specified by specific repair instructions.

Example: 5 x 'D' = Pitch

(3) The edge distance values are from the centre of the hole to the nearest edge of the component. These values are quoted in terms of the fastener nominal shank diameter 'D'.

(4) The recommended minimum edge distance in nonmetallic joints is 2.5 'D'unless otherwise specified by specific repair instructions.

Example: 2.5 x 'D' = Edge Distance.



FASTENER DIAMETER	DISTANCE 'A'
UPTO 4.8mm (0.19in.)	5.0mm (0.20in.) <1>
6.35mm (0.25in.)	8.0mm (0.31in.) <1>

NOTE: <1> THESE VALUES ARE BASED ON A STEP 'S' OF UP TO 1.0mm (0.039in.).
IF 'S' IS MORE THAN 1.0mm (0.039in.),ADD 'S'-1.0mm (0.039in.) TO 'A'.

EXAMPLE: FASTENER DIAMETER OF 4.8mm (0.189in.)
STEP 'S' IS 2.0mm (0.079in.)
'A' = 5.0mm + (2.0 - 1.0mm) = 6.0mm
(0.196in.) + ((0.079 - 0.039in.)) = (0.236in.)

Example of Edge Distance for Milled Step
Figure 4

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