BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 2.18

PRODUCTION PROCESS STANDARD

Installation of Roll Pins

Issue 5
- This standard supersedes PPS 2.18, Issue 4.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

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	Production Process Standards (PPS)	
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	Quality	

Signed original on file. Validation of paper prints is the responsibility of the user.

Table of Contents

Sections **Page**

Tables

Figures

1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the installation of roll pins. Use roll pins only if specified on the engineering drawings or engineering orders.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction and the procedure specified must be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 Hazardous Materials

2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto (de Havilland) Environment, Health and Safety Department.

3 References

3.1 PPS 1.09 - Drilling and Reaming.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 27.05 - Manual Edge Finishing.

4 Materials and Equipment

4.1 Materials

4.1.1 Roll pins as specified on the engineering drawing. Refer to Figure 1 for NAS designations, Figure 2 for ESNA (manufacturer's) designations, and Figure 3 for MS designations. NAS 561 and ESNA roll pin numbers have been replaced by MS16562 numbers. MS16562 roll pins are interchangeable with NAS561 and ESNA roll pins. Refer to Table 1 for detailed listings of MS16562 dash numbers and corresponding nominal diameter and length.

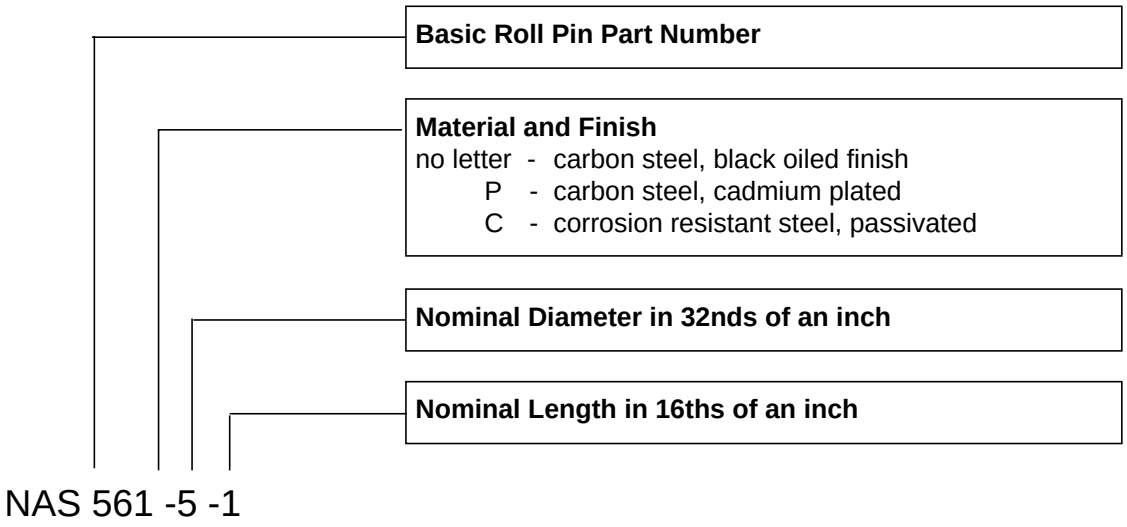

Figure 1 - NAS Designation

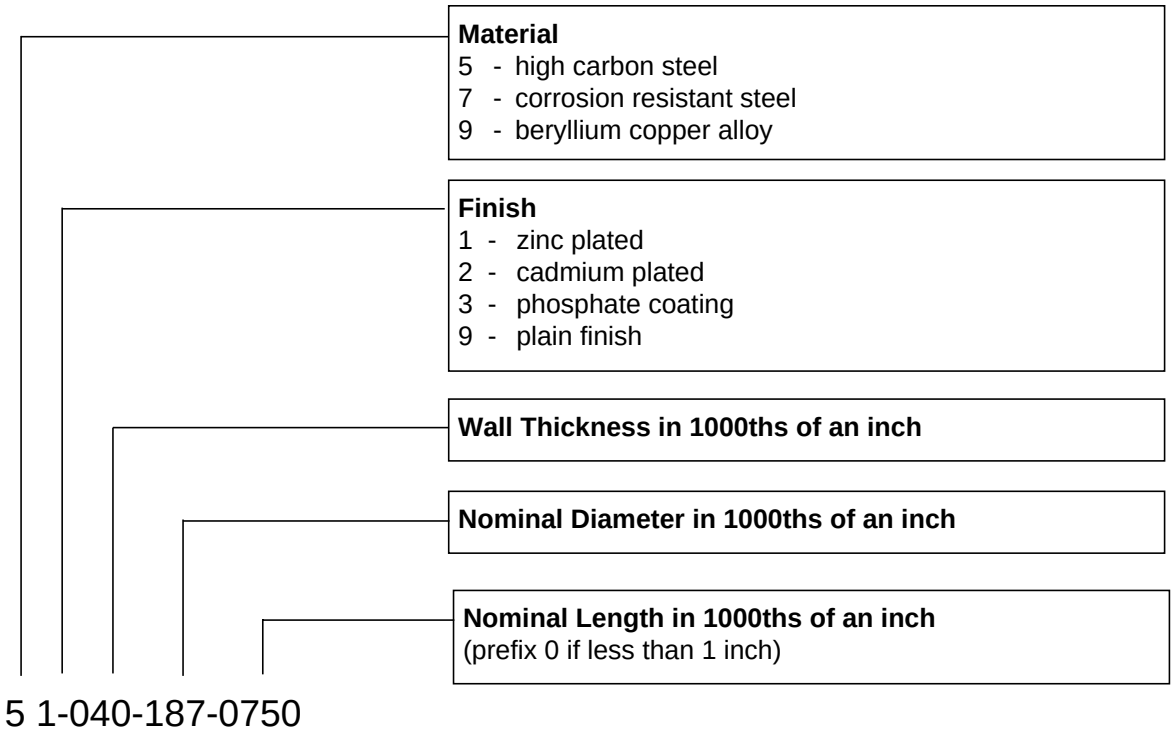

Figure 2 - ESNA Designation

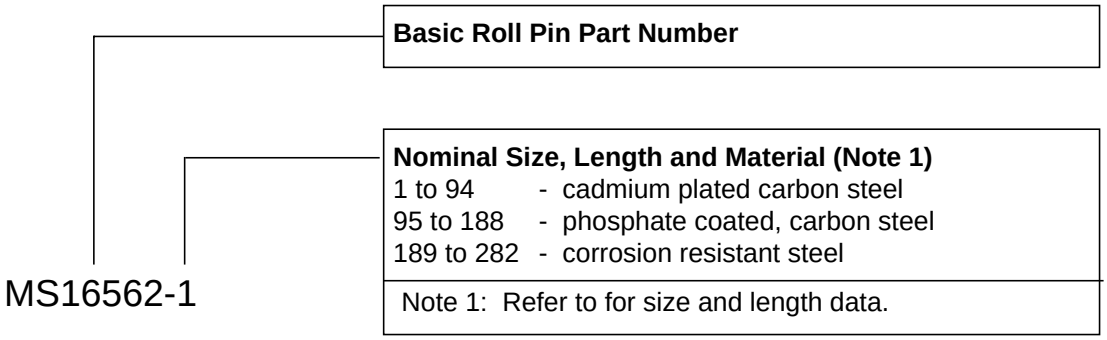

Figure 3 - MS Designation

Table 1 - MS16562 Dash Numbers

DASH NUMBER	NOMINAL LENGTH	NOMINAL DIAMETER
1/95/189	0.188"	1/16" (0.062")
2/96/190	0.250"	
3/97/191	0.312"	
4/98/192	0.375"	
5/99/193	0.438"	
6/100/194	0.500"	
7/101/195	0.562"	
8/102/196	0.625"	
9/103/197	0.688"	
10/104/198	0.750"	
11/105/199	0.250"	0.078"
12/106/200	0.312"	
13/107/201	0.375"	
14/108//202	0.438"	
15/109/203	0.500"	
16/110/204	0.562"	
17/111/205	0.625"	
18/112/206	0.750"	
19/113/207	0.875"	
20/114/208	1.000"	
21/115/209	0.250"	3/32" (0.094")
22/116/210	0.312"	
23/117/211	0.375"	
24/118/212	0.438"	
25/119/213	0.500"	
26/120/214	0.562"	
27/121/215	0.625"	
28/122/216	0.750"	
29/123/217	0.875"	
30/124/218	1.000"	
31/125/219	0.250"	1/8" (0.125")
32/126/220	0.312"	
33/127/221	0.500"	1/8" (0.125")
34/128/222	0.562"	
35/129/223	0.625"	
36/130/224	0.750"	
37/131/225	0.875"	
38/132/226	1.000"	
39/133/227	1.250"	
40/134/228	0.500"	5/32" (0.156")
41/135/229	0.625"	
42/136/230	0.750"	
43/137/231	0.875"	
44/138/232	1.000"	
45/139/233	1.250"	
46/140/234	0.500"	3/16" (0.188")
47/141/235	0.625"	
48/142/236	0.750"	
49/143/237	0.875"	
50/144/238	1.000"	
51/145/239	1.250"	
52/146/240	1.500"	
53/147/241	1.750"	
54/148/242	0.750"	7/32" (0.219")
55/149/243	0.875"	
56/150/244	1.000"	
57/151/245	1.250"	
58/152/246	1.500"	
59/153/247	1.750"	
60/154/248	2.000"	
61/155/249	2.500"	
62/156/250	0.750"	1/4" (0.250")
63/157/251	0.875"	
64/158/252	1.000"	
65/159/253	1.250"	1/4" (0.250")
66/160/254	1.500"	
67/161/255	1.750"	
68/162/256	2.000"	
69/163/257	2.500"	
70/164/258	1.000"	5/16" (0.312")
71/165/259	1.250"	
72/166/260	1.500"	
73/167/261	1.750"	
74/168/262	2.000"	
75/169/263	2.500"	
76/170/264	3.000"	
77/171/265	1.000"	3/8" (0.375")
78/172/266	1.250"	
79/173/267	1.500"	
80/174/268	1.750"	
81/175/269	2.000"	
82/176/270	2.500"	
83/177/271	3.000"	
84/178/272	1.250"	7/16" (0.438")
85/179/273	1.500"	
86/180/274	1.750"	
87/181/275	2.000"	
88/182/276	2.500"	
89/183/277	3.000"	
90/184/278	1.500"	1/2" (0.500")
91/185/279	1.750"	
92/186/280	2.000"	
93/187/281	2.500"	
94/188/282	3.000"	

4.2 Equipment

4.2.1 Suitable mallet, air hammer or arbour press.

5 Procedure

5.1 General

5.1.1 The spring of the roll pin, installed in an undersize hole, provides a self-locking effect. The pin can only be removed when an axial load is applied to it greater than that required to insert it.

5.2 Hole Preparation

5.2.1 Prepare holes as follows:

Step 1. Pre-drill holes according to Table 2, or align existing holes, as applicable.

Step 2. Except as noted in paragraph 5.2.2, drill the hole to final size as listed in Table 2. Reaming is not required. Perform drilling operations according to PPS 1.09. If difficulty is experienced in obtaining holes of correct size using the drills listed in Table 2, the use of no-land drills having the same nominal size as the minimum hole size is permitted.

Step 3. Deburr the hole according to PPS 27.05.

Table 2 - Hole Preparation Data for Roll Pins

ROLL PIN NOMINAL DIAMETER	RECOMMENDED PRE-DRILL SIZE	RECOMMENDED FINAL DRILL SIZE	FINAL HOLE SIZE
1/16" (0.062")	---	1/16"	0.062" - 0.065"
5/64" (0.078")	1/16"	5/64"	0.078" - 0.081"
3/32" (0.094")	1/16"	3/32"	0.094" - 0.097"
1/8" (0.125")	3/32"	1/8"	0.125" - 0.129"
0.140"	3/32"	9/64"	0.140" - 0.144"
5/32" (0.156")	3/32"	5/32"	0.156" - 0.160"
3/16" (0.188")	3/32"	3/16"	0.187" - 0.192"
7/32" (0.219")	1/8"	7/32"	0.219" - 0.224"
1/4" (0.250")	1/8"	1/4"	0.250" - 0.256"
5/16" (0.312")	1/8"	5/16"	0.312" - 0.318"
3/8" (0.375")	1/8"	3/8"	0.375" - 0.382"
7/16" (0.438")	3/16"	7/16"	0.437" - 0.445"
1/2" (0.500")	3/16"	1/2"	0.500" - 0.510"

5.2.2 If the engineering drawing specifies use of roll pins pivots, prepare the hole in one of the members of the assembly so that it will be seated tightly; in the other member of the assembly prepare a clearance hole according to the engineering drawing.

5.3 Installation of Roll Pins

5.3.1 Install roll pins as follows:

Step 1. Align the axes of the hole and the roll pin.

Step 2. Hammer or press the roll pin into position using a mallet, air hammer or arbor press.

5.4 Removal of Roll Pins

5.4.1 If necessary, remove roll pins with a punch and mallet or an arbor press incorporating a punch with a slightly smaller diameter than the hole. Roll pins may be re-installed in the same hole or otherwise re-used, provided they are not deformed or damaged, and that the hole is not enlarged or untrue.

6 Requirements

6.1 Size, material and finish of roll pins used must conform to the engineering drawing or Engineering order.

6.2 Roll pins must not be used if misalignment of the holes requires excessive force to insert the pin or if it causes the gap of the pin to close entirely.

6.3 Unless otherwise specified, the ends of the roll pin must be flush with the surfaces of the assembly or slightly below the surfaces, an equal distance from each end. In applications where the engaged pin length is minimum the pin ends may be allowed to protrude the length of the chamfer on each end to achieve maximum locking effect over the engaged length.

7 Safety Precautions

7.1 Observe general shop safety precautions when performing the procedure specified herein.

8 Personnel Requirements

8.1 Personnel responsible for installation of roll pins must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their familiarity to their supervisor.