

Grip Range

To determine the bolt grip range required for any application, measure the thickness of the material with a hook scale inserted through the hole. Once this measurement is determined, select the correct grip range by referring to the charts provided by the rivet manufacturer. Examples of grip range charts are shown in *Figures 7-22 and 7-23*.

When installed, the lockbolt collar should be swaged substantially throughout the complete length of the collar. The tolerance of the broken end of the pin relative to the top of the collar must be within the dimensions given in *Figure 7-24*.

When removal of a lockbolt becomes necessary, remove the collar by splitting it axially with a sharp, cold chisel. Be careful not to break out or deform the hole. The use of a backup bar on the opposite side of the collar being split is recommended. The pin may then be driven out with a drift punch.

Aircraft Nuts

Aircraft nuts are made in a variety of shapes and sizes. They are made of cadmium-plated carbon steel, stainless steel, or anodized 2024T aluminum alloy and may be obtained with either right- or left-hand threads. No identifying marking or lettering appears on nuts. Only the characteristic metallic

Grip Number	Grip Range		Grip Number	Grip Range	
	Minimum	Maximum		Minimum	Maximum
1	0.031	0.094	18	1.094	1.156
2	0.094	0.156	19	1.156	1.219
3	0.156	0.219	20	1.219	1.281
4	0.219	0.281	21	1.281	1.344
5	0.281	0.344	22	1.344	1.406
6	0.344	0.406	23	1.406	1.469
7	0.406	0.469	24	1.469	1.531
8	0.469	0.531	25	1.531	1.594
9	0.531	0.594	26	1.594	1.656
10	0.594	0.656	27	1.656	1.718
11	0.656	0.718	28	1.718	1.781
12	0.718	0.781	29	1.781	1.843
13	0.781	0.843	30	1.843	1.906
14	0.843	0.906	31	1.906	1.968
15	0.906	0.968	32	1.968	2.031
16	0.968	1.031	33	2.031	2.094
17	1.031	1.094			

Figure 7-22. Pull-and stump-type lockbolt grip ranges.

¼" Diameter			⅝" Diameter		
Grip Number	Grip Range		Grip Number	Grip Range	
	Minimum	Maximum		Minimum	Maximum
1	0.031	0.094	2	0.094	0.156
2	0.094	0.156	3	0.156	0.219
3	0.156	0.219	4	0.219	0.281
4	0.219	0.281	5	0.281	0.344
5	0.281	0.344	6	0.344	0.406
6	0.344	0.406	7	0.406	0.469
7	0.406	0.469	8	0.469	0.531
8	0.469	0.531	9	0.531	0.594
9	0.531	0.594	10	0.594	0.656
10	0.594	0.656	11	0.656	0.718
11	0.656	0.718	12	0.718	0.781
12	0.718	0.781	13	0.781	0.843
13	0.781	0.843	14	0.843	0.906
14	0.843	0.906	15	0.906	0.968
15	0.906	0.968	16	0.968	1.031
16	0.968	1.031	17	1.031	1.094
17	1.031	1.094	18	1.094	1.156
18	1.094	1.156	19	1.156	1.219
19	1.156	1.219	20	1.219	1.281
20	1.219	1.281	21	1.281	1.343
21	1.281	1.343	22	1.343	1.406
22	1.344	1.406	23	1.406	1.469
23	1.406	1.469	24	1.460	1.531
24	1.469	1.531			
25	1.531	1.594			

Figure 7-23. Blind-type lockbolt grip ranges.

luster or color of the aluminum, brass, or the insert can identify them when the nut is of the self-locking type. They can be further identified by their construction.

Aircraft nuts can be divided into two general groups: non-self-locking and self-locking nuts. Non-self-locking nuts are those that must be safe tied by external locking devices, such as cotter pins, safety wire, or locknuts. Self-locking nuts contain the locking feature as an integral part.

Pin diameter	Tolerance	
	Below	Above
⅜	0.079	to 0.032
¼	0.079	to 0.050
⅝	0.079	to 0.050
⅜	0.079	to 0.060

Figure 7-24. Pin tolerance ranges.