



Armstrong C-Clamps

When your requirements call for clamps, specify Armstrong—the most accepted name in the business. When you see Armstrong forged into the frame, feel confident—your clamp has been manufactured from the best materials. Screws and frames are hardened to provide great strength and durability. You can depend on it.

SPECIAL FEATURES:

A—BALL JOINT SWIVEL PAD

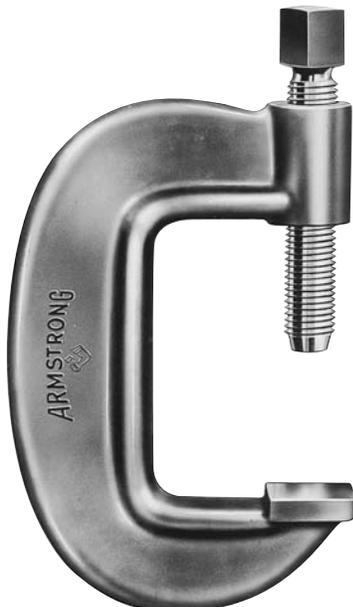
An exclusive with Armstrong, this patented feature assures the most secure system of locking pad to screw. Lip of pad is undercut. When ball of screw is inserted into pad and lip is forced down, a solid steel wall is formed inside the pad cavity. It completely encircles the ball insuring a permanent attachment but retaining plenty of swivel.

B—HEAVY WALLED HUB

Offers greater support for screw. Helps to prevent bending as the hub bears much of the stress. Makes for a longer lasting clamp.

C—ANVIL

Extra large anvil is carefully broached to assure a flat surface and proper alignment with screw. Provides greater gripping area for big work, yet permits pin-point clamping of small or uneven pieces.



Heavy Duty Pattern

The strongest C-Clamp made. Square-head screw has hardened point. Screw does not include a handle—it must be tightened with a wrench. Extra long hub helps prevent springing even under great stress.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-000	13/16	0	5/8	3/8-16	2-1/4	2,800	.38
78-010	1-5/16	0	15/16	7/16-14	2-13/16	5,600	.74
78-015	1-3/4	0	1-7/16	5/8-11	4-3/16	8,750	1.91
78-020	2-3/8	1/2	1-9/16	3/4-10	4-1/4	12,500	3.28
78-030	3-5/16	5/8	2	7/8-9	5-3/4	16,250	5.83
78-040	4-5/8	1	2-7/16	1-8	7-1/16	20,000	10.10
78-050	5-3/8	1-1/4	2-7/8	1-8	7-3/4	23,800	14.08
78-060	6-5/8	2-1/2	3-1/4	1-1/8-7	8-3/16	27,500	18.92
78-080	8-1/4	2-1/4	3	1-1/4-7	10-5/16	31,250	27.50
78-090	10-3/8	4-1/4	3-1/8	1-1/4-7	10-5/16	35,000	30.59
78-092	12-1/2	6-3/8	3-1/2	1-1/4-7	10-5/16	40,000	37.22

Fed'l Spec. GGG-C-406d

Heavy Duty Pattern, with Full-Length Screw*

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-021	2-3/8	0	1-9/16	3/4-10	5	12,500	3.28
78-031	3-5/16	0	2	7/8-9	6-11/16	16,250	5.83
78-041	4-5/8	0	2-7/16	1-8	8-11/16	20,000	10.10
78-051	5-3/8	0	2-7/8	1-8	9-13/16	23,800	14.08
78-061	6-5/8	0	3-1/4	1-1/8-7	11-3/8	27,500	18.92
78-081	8-1/4	0	3	1-1/4-7	13-9/16	31,250	27.50
78-091	10-3/8	0	3-1/8	1-1/4-7	15-9/16	35,000	30.59
78-093	12-1/2	0	3-1/2	1-1/4-7	15-3/8	40,000	37.22

*Product marked with Heavy Duty # Fed'l Spec. GGG-C-406d





C-Clamps

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General Service Pattern

Designed for use in the many applications which don't require the throat depth of our Square or Deep Throat pattern, or the extreme strength of our Heavy Duty Pattern.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-102	2	0	1-3/8	1/2-13	4-7/8	7,500	1.26
78-103	3	0	1-3/4	5/8-11	6-3/8	8,750	2.60
78-104	4	0	2	3/4-10	7-7/8	10,000	4.13
78-106	6	2	2-1/4	3/4-10	7-7/8	11,250	5.90
78-108	8	4	2-1/4	3/4-10	7-7/8	12,500	6.90
78-110	10	6	2-3/8	3/4-10	7-7/8	13,750	8.00
78-112	12	8	2-5/8	7/8-9	10-1/4	15,000	11.61
78-115	15	10	2-3/4	7/8-9	10-1/4	16,250	14.95
78-118	18	13	2-7/8	7/8-9	10-1/4	17,500	18.21

Fed'l Spec. GGG-C-406d

General Service Pattern, with Full-Length Screw*

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-107	6	0	2-1/4	3/4-10	9-5/8	11,250	5.90
78-109	8	0	2-1/4	3/4-10	11-11/16	12,500	6.90
78-111	10	0	2-3/8	3/4-10	13-9/16	13,750	8.00
78-113	12	0	2-5/8	7/8-9	16-1/4	15,000	11.61
78-116	15	0	2-3/4	7/8-9	19-1/4	16,250	14.95
78-119	18	0	2-7/8	7/8-9	22-1/4	17,500	18.21

*Product marked with General Service Pattern # Fed'l Spec. GGG-C-406d

Square Throat Pattern, Black Finish

Designed for those jobs where a super deep throat is required. Square throat clamps offer up to 89% more throat depth than other patterns, but embody all the strength and durability inherent in a drop forged C-clamp.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-303	3	0	3-1/2	1/2-8	4-7/8	3,500	2.52
78-304	4	0	4-1/2	3/4-6	7-5/8	4,100	4.49
78-306	6	0	6-1/2	3/4-6	9-7/8	5,400	8.05
78-308	8	0	8-1/2	3/4-6	12-3/8	5,900	13.11

Fed'l Spec. GGG-C-406d

Square Throat Pattern, Zinc Plated

Designed for those jobs where a super deep throat is required. Square throat clamps offer up to 89% more throat depth than other patterns, but embody all the strength and durability inherent in a drop forged C-clamp. Features spatter resisting zinc plated forcing screws for use in welding.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-333	3	0	3-1/2	1/2-8	4-7/8	3,500	2.52
78-334	4	0	4-1/2	3/4-6	7-5/8	4,100	4.49
78-336	6	0	6-1/2	3/4-6	9-7/8	5,400	8.05
78-338	8	0	8-1/2	3/4-6	12-3/8	5,900	13.11

Fed'l Spec. GGG-C-406d

**C-Clamps and Lifting Eyes (Eye Bolts)**



Deep Throat Pattern

Our most popular and versatile pattern. Provides all the strength of our Square Throat Pattern and greater throat depth than our General Service Pattern. Frame is drop forged Carbon Steel; all other parts are machined from Carbon Steel.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-401	1-1/2	0	1-5/8	3/8-16	3-1/4	1,400	.37
78-402	2	0	2-5/16	1/2-8	4-3/4	3,300	1.25
78-403	3	0	2-3/4	1/2-8	5-3/4	3,500	2.04
78-404	4	0	3-1/16	3/4-6	7-5/8	4,100	2.96
78-406	6	0	4-1/16	3/4-6	9-7/8	5,400	4.82
78-408	8	0	5	3/4-6	12-3/8	5,900	6.81
78-410	10	3	5-15-16	3/4-6	12-3/8	6,200	9.86
78-412	12	4	6-3/8	7/8-6	13-1/2	9,300	12.69

Fed'l Spec. GGG-C-406d

Deep Throat Pattern, with Full-Length Screw*

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-411	10	0	5-15/16	3/4-6	14-1/2	6,200	9.86
78-413	12	0	6-3/8	7/8-6	16-1/2	9,300	12.69

*Product marked with Deep Throat # Fed'l Spec. GGG-C-406d



Deep Throat Pattern, Zinc Plated

Design and materials are exactly the same as Deep Throat Pattern. However, forcing screw are zinc plated to resist the adhesion of welding spatter.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-431	1-1/2	0	1-3/8	3/8-16	3-1/4	1,400	.37
78-432	2	0	2	1/2-8	4-3/4	3,300	1.23
78-433	3	0	2-3/8	1/2-8	5-3/4	3,500	2.11
78-434	4	0	2-3/4	3/4-6	7-5/8	4,100	2.89
78-436	6	0	3-5/8	3/4-6	9-7/8	5,400	4.83
78-438	8	0	4-1/2	3/4-6	12-3/8	5,900	6.98
78-440	10	3	5-3/8	3/4-6	12-3/8	6,200	9.66
78-442	12	4	5-3/4	7/8-6	13-1/2	9,300	12.85

Fed'l Spec. GGG-C-406d

Deep Throat Pattern, Zinc Plated with Full-Length Screw*

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-441	10	0	5-3/8	3/4-6	14-1/2	6,200	9.66
78-443	12	0	5-3/4	7/8-6	16-1/2	9,300	12.85

*Product marked with Deep Throat # Fed'l Spec. GGG-C-406d





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Deep Throat Pattern, High Visibility Finish, Safety Yellow*

Same in all respects-except for finish-as other Deep Throat C-Clamps. However, High Visibility Clamp frames are finished in your choice of "Safety Yellow" or "Safety Orange" high-gloss baked-on enamel. Easy to see; hard to lose or misplace. Screws and handles are black finish. Furnished with standard screws only.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-601	1-1/2	0	1-5/8	3/8-16	3-1/4	1,400	.37
78-602	2	0	2-15/16	1/2-8	4-3/4	3,300	1.25
78-603	3	0	2-3/4	1/2-8	5-3/4	3,500	2.04
78-604	4	0	3-13/16	3/4-6	7-5/8	4,100	2.96
78-606	6	0	4-1/16	3/4-6	9-7/8	5,400	4.82
78-608	8	0	5	3/4-6	12-3/8	5,900	6.81
78-610	10	3	5-15/16	3/4-6	12-3/8	6,200	9.86
78-612	12	4	6-3/8	7/8-6	13-1/2	9,300	12.69

*Product marked with Deep Throat # Fed'l Spec. GGG-C-406d



Deep Throat Pattern, High Visibility Finish, Safety Orange*

Product Number	Capacity Inches		Depth of Throat from Center of Screw, In.	ACME Thread Size	Length of Screw	Min. Proof Test, lbs.	Weight, lbs.
	Max.	Min.					
78-631	1-1/2	0	1-5/8	3/8-16	3-1/4	1,400	.37
78-632	2	0	2-5/16	1/2-8	4-3/4	3,300	1.25
78-633	3	0	2-3/4	1/2-8	5-3/4	3,500	2.04
78-634	4	0	3-13/16	3/4-6	7-5/8	4,100	2.96
78-636	6	0	4-1/16	3/4-6	9-7/8	5,400	4.82
78-638	8	0	5	3/4-6	12-3/8	5,900	6.81
78-640	10	3	5-15/16	3/4-6	12-3/8	6,200	9.86
78-642	12	4	6-3/8	7/8-6	13-1/2	9,300	12.69

*Product marked with Deep Throat # Fed'l Spec. GGG-C-406d



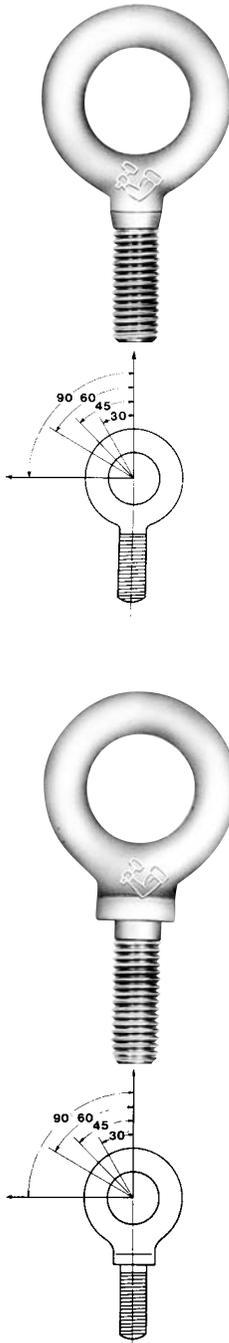
Tool Maker's Pattern

Small, light-weight C-Clamps are ideal for pattern making, woodworking and other light duty applications. Both frame and screw are drop forged from Carbon Steel. Square below thumb screw head allows screw to be set up extra tight with a wrench.

Product Number	Capacity Inches		Depth of Throat from Center of Screw, Inches	Dia., of Screw Inches	Weight, lbs.
	Max.	Min.			
78-671	1	0	11/16	5/16	.25
78-672	2	0	13/16	3/8	.46
78-673	3	1	15/16	3/8	.56
78-674	4	1-1/4	1-1/8	7/16	.92



C-Clamps and Lifting Eyes (Eye Bolts)



Armstrong Lifting Eyes (Eye Bolts)

Armstrong carbon steel Lifting Eyes are manufactured in accordance with the latest revision of ASME/ASME B18.15. To ensure consistent performance, these uniformly designed, drop forged Lifting Eyes are quenched and tempered for optimum strength. Armstrong Lifting Eyes are furnished with Unified National Coarse (U.N.C.) threads. Special threads and lengths shorter than standard are available on special order.

Plain Pattern

Product Number	Shank Dimensions, In.			Eye Diameter, In.			Guide for MAX. Working Load*, lbs.			Weight, lbs.
	Thread Size	Std. Length Under Eye		Inside	Outside	0°	30°	45°		
89-001	1/4-20	1		3/4	1-3/16	500	70	NR	.05	
89-002	5/16-18	1-1/8		7/8	1-7/16	800	200	NR	.08	
89-003	3/8-16	1-1/4		1	1-21/32	1,400	600	300	.13	
89-004	7/16-14	1-3/8		1-3/32	1-27/32	2,000	700	450	.20	
89-005	1/2-13	1-1/2		1-3/16	2-1/16	2,600	850	525	.31	
89-006	9/16-12	1-5/8		1-9/32	2-9/32	3,000	1,125	750	.41	
89-007	5/8-11	1-3/4		1-3/8	2-1/2	4,000	1,400	950	.59	
89-008	3/4-10	2		1-1/2	2-13/16	6,000	2,200	1,600	.83	
89-009	7/8-9	2-1/4		1-11/16	3-1/4	7,200	2,850	2,000	1.36	
89-010	1-8	2-1/2		1-13/16	3-9/16	9,500	3,800	2,800	2.09	
89-011	1-1/8-7	2-3/4		2	4	11,800	4,700	3,400	2.92	
89-012	1-1/4-7	3		2-3/16	4-7/16	15,000	6,000	4,400	3.83	
89-014	1-1/2-6	3-1/2		2-1/2	5-3/16	21,700	8,600	6,200	6.44	
89-015	1-3/4-5	3-3/4		2-7/8	6-1/16	29,500	11,600	8,200	11.92	
89-016	2-4-1/2	4		3-1/4	6-7/8	38,500	15,400	11,200	14.55	

ASME B18.15

Shoulder Pattern

Product Number	Shank Dimensions, In.			Eye Diameter, In.			Guide for MAX. Working Load*, lbs.			Weight, lbs.
	Thread Size	Std. Length Under Eye		Inside	Outside	0°	30°	45°		
89-021	1/4-20	1		3/4	1-3/16	500	75	NR	.05	
89-022	5/16-18	1-1/8		7/8	1-7/16	800	225	NR	.08	
89-023	3/8-16	1-1/4		1	1-21/32	1,400	650	350	.13	
89-024	7/16-14	1-3/8		1-3/32	1-27/32	2,000	1,000	500	.20	
89-025	1/2-13	1-1/2		1-3/16	2-1/16	2,600	1,200	650	.31	
89-026	9/16-12	1-5/8		1-9/32	2-9/32	3,000	1,600	900	.41	
89-027	5/8-11	1-3/4		1-3/8	2-1/2	4,000	2,000	1,200	.59	
89-028	3/4-10	2		1-1/2	2-13/16	6,000	3,200	2,200	.83	
89-029	7/8-9	2-1/4		1-11/16	3-1/4	7,200	3,800	2,500	1.36	
89-030	1-8	2-1/2		1-13/16	3-9/16	9,500	5,000	3,600	2.09	
89-031	1-1/8-7	2-3/4		2	4	11,800	5,500	4,500	2.92	
89-032	1-1/4-7	3		2-3/16	4-7/16	15,000	7,000	5,200	3.83	
89-034	1-1/2-6	3-1/2		2-1/2	5-3/16	21,700	10,500	7,200	6.44	
89-035	1-3/4-5	3-3/4		2-7/8	6-1/16	29,500	14,000	10,500	11.92	
89-036	2-4-1/2	4		3-1/4	6-7/8	38,500	18,000	13,500	14.55	

ASME B18.15

NR: NOT RECOMMENDED

*These loads were determined using a very slow, steady pull. Jerking, sudden pulls and/or drops, and fast pulls impart very high and unpredictable loads to the Lifting Eye(s) which can exceed the MAXIMUM Working Load.

LIFTING EYE SAFETY

The dangers inherent in any lifting operation are obvious. Yet every year, accidents occur which could have been avoided by applying the simplest, most fundamental safety precautions.

1. Read and follow all of the suggestions stated in the "Manual of Proper Uses of Forged Lifting Eyes (Eye Bolts)," BEFORE attempting to use Lifting Eyes in any application. A copy is on page 11-6 and 11-7 of this catalog.
2. ALWAYS stay well clear of the load.

3. DO NOT use Lifting Eyes for angular lifts unless ABSOLUTELY necessary. If angular lifts CANNOT be avoided, then ONLY Shoulder Pattern Lifting Eyes-which are specifically designed for this application-should be used.
4. Armstrong Carbon Steel Lifting Eyes must NEVER be welded.
5. DO NOT use Carbon Steel Lifting Eyes at temperatures below 32°F (0°C).
6. NEVER exceed the MAXIMUM Working Load of a Lifting Eye.





How Recommended Static Working Loads Are Determined

Lifting Eye manufacturers provided recommended static working loads for their standard lifting eyes. These static working loads are shown in the manufacturers' catalogs and have been determined by multiplying the tensile strength of the lifting eye material, after heat treating, by the tensile stress area of the threaded lifting eye shank. The product of this multiplication is the maximum ultimate strength of the lifting eye. Dividing this figure by a factor of five provides the recommended static working load for a straight vertical lift. More complete information may be found in ASTM A 489, Standard Spec. for Carbon Steel Lifting Eyes.

Angular Lifts

An angular lift (see figure 1) places additional stresses on a lifting eye, above that of the load to be hoisted. For this reason, use of angular lifts should be avoided whenever possible. If, however, the situation necessitates an angular lift, *a properly selected and inserted lifting eye must be used*, and a reduction in the rated capacity must be applied.

Shoulder Pattern Lifting Eyes (Eye Bolts) Are Preferable

In theory, plain pattern and shoulder pattern lifting eyes are equally suitable for vertical lifts. But since there is no guarantee that a load will never be subjected to an angular lift, *shoulder pattern lifting eyes are recommended for use wherever possible*.

When a shoulder pattern lifting eye is properly seated in the receiving hole, the shoulder bears against the seat and reduces bending stress on the shank.

Seating Of Lifting Eyes (Eye Bolts)

Shoulder pattern lifting eyes should always be screwed in so as to **firmly seat the shoulder**, with at least 90% of the thread engaged. To facilitate this, the receiving hole should be machine countersunk. (See figure 2.) If countersinking is impossible, a minimum number of washers should be used to build up the surface of the load until the shoulder can be firmly seated by hand. *Be sure at least 90% of the threads are engaged in the receiving hole with a minimum thread engagement of at least 1-1/2 times the thread diameter in steel when this method is used.*

When using a plain pattern lifting eye, be sure the bolt is firmly seated by hand with at least 90% of the thread engaged in the receiving hole with the full threads close to the eye fully engaged.

Loads should always be applied to lifting eyes in the plane of the eye, not at some angle to this plane. Therefore, the direction of the load should be taken into account when seating the lifting eye. Before lifting the load, but with the load lines under tension, check to see if the lifting eyes are properly positioned.

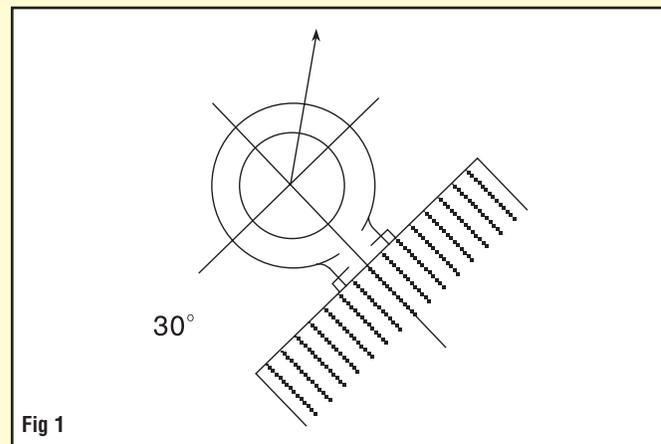


Fig 1

Angular lifts of 30° (Fig.1) apply additional stresses and *necessitate* reduced working loads.

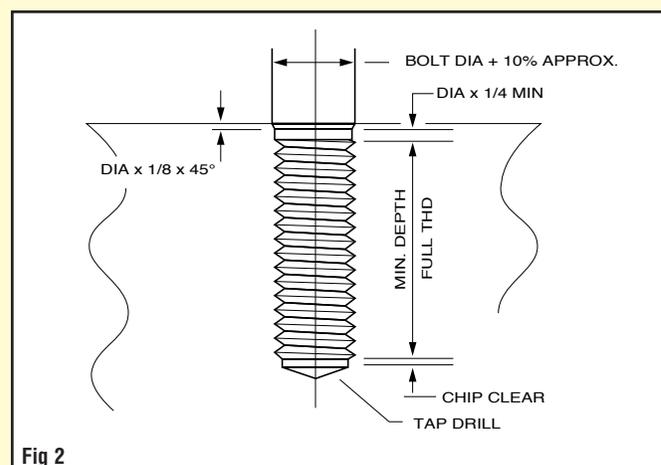


Fig 2

Recommendation for proper drilling, tapping and counterboring of the receiving hole.



Receiving Hole

In order to obtain the maximum strength from an eye bolt, considerable care must be given to the receiving hole into which the bolt will be screwed. (See Figure 3)

Tap the correct class fit thread to accommodate the full length of the lifting eye shank. This is important because recommended capacities apply only when a minimum 90% of the threaded shank is engaged. For shoulder pattern lifting eyes, counterbore the hole to insure proper seating of the shoulder, as described previously.

Check Seating After Applying Angular Lift

Immediately after applying an angular load to a shoulder pattern lifting eye, check to be sure the shoulder is still firmly engaged. This is important, since the initial lift may cause the bolt to back off, away from the load. In such cases, the lifting eye should be unloaded and the lifting eye properly resealed.

Thread Engagement

The minimum thread engagement should be at least 1-1/2 times the thread diameter in steel. Refer to ASME/ASME B18.15, Forged Lifting Eyes (Eye Bolts), for engagements in other materials.

Undercut Lifting Eyes (Eye Bolts)

Undercutting of lifting eyes to provide clearance in a non-counterbore/countersunk hole is not recommended.

Dynamic Loading

Shock or rapid loading is inherently dangerous. All loads should be applied in a gradually increasing manner.

Always Stand Clear

Never stand, work or crawl under the load. If the load could swing, or if the pieces could fly in the event of a drop, allow for this possibility by establishing a safe distance between yourself and the load.

Don't Overload

Follow carefully the working load recommendations of the manufacturer of the lifting eye you are using.

Altering Of Lifting Eyes (Eye Bolts)

Lifting eyes should never be ground, machined, metal stamped or altered in any way, since such operation is likely to weaken the bolt. Lifting eyes showing signs of having been so treated should immediately be destroyed.

Extreme Heat

Lifting eyes should never be welded, used at, or subjected to temperatures above 275°F (135°C). Important physical properties are likely to be changed by such heating, creating an unsafe bolt. Lifting eyes showing signs of such heating should be immediately destroyed.

Low Temperature Service

Low temperature service poses additional problems. It is mandatory that all safety precautions be rigidly adhered to.

At temperatures below 30°F (-1°C), carbon steel, normally used for standard lifting eyes, is subject to a decrease in shock resistance and ductility at the lower temperatures.

- (a) To minus 40°F (-40°C): Heat treated low carbon alloy steel ASTM specification F541, Alloy Steel Lifting Eyes, should be used as a guide.
- (b) Under minus 40°F (-40°C) Use austenitic type steel. A reduction in rated load may occur.

Damaged Threads

Lifting eyes with worn, chipped, or otherwise damaged threads should be immediately destroyed. Such damage weakens the lifting eye and can cause improper seating.

Inspection

Lifting eyes should be routinely inspected for such conditions as:

- A. Elongated or bent eye section.
- B. Elongated or bent shank.
- C. Nicks and gouges.
- D. Obvious wear.
- E. Worn, corroded and/or distorted threads.
- F. Cracks found by non-destructive testing.
- G. Absence of sufficient identifying markings.

If any of these conditions exist, the lifting eye should be removed from service and destroyed.

In addition, the receiving hole should be carefully cleaned and inspected for worn threads or other thread deterioration prior to each insertion of the lifting eye.

Any lifting eye should be removed from service and destroyed when the manufacturer's identifying marks are no longer readily identifiable to guarantee proper reference for continued safe usage.

How To Destroy

Lifting eyes that are being replaced should be rendered unusable. Crushing or cutting across the eye is recommended.



