Designation: F2155 – 01 (Reapproved 2017)

Standard Specification for Performance of Hasps and Other Attachment Devices for Padlocks or Seals[1]

This standard is issued under the fixed designation F2155; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification describes and grades various levels of performance to provide users of the standard with criteria upon which to select suitable hasps and other attachment devices. No effort has been made to include criteria for specially made hasps used by the Department of Defense or other highly sensitive applications.

1.2 The tests described are laboratory tests, and although they simulate field conditions as to attacks, they do not duplicate these conditions. Tests described are repeatable in the laboratory.

1.3 Some users of this standard may wish to use hasps that have special attributes not related to security.

1.4 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are provided for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F883 Performance Specification for Padlocks

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *attachment device, n*—an item consisting of any number of members that act in combination with a padlock or seal to provide a locking security system.

3.1.2 *fixed hasp, n*—a combination of elements that, when aligned, provide holes though which a padlock shackle or seal may pass to secure the elements.

3.1.3 *hasp, n*—an attachment device having a hinged or fixed strap that engages a hasp staple to provide for the attachment of a padlock or seal.

3.1.4 *hasp staple, n*—an eye- or U-shaped element that is engaged by the slotted strap of a hasp and provides for the attachment of a padlock or seal.

3.1.5 *hasp staple pad, n*—a component of a hasp staple that provides a fastening medium for attachment of the hasp staple to the mounting surface.

3.1.6 *hasp strap, n*—a component of a hasp that engages a hasp staple.

3.1.7 *hasp strap pad, n*—a component of a hasp strap that provides a fastening medium for attachment of the hasp to the mounting surface.

3.1.8 *hinged hasp, n*—a hasp that includes a hasp strap, a hasp strap pad, a hasp staple, and a hasp staple pad in combination such that the hasp strap, when closed, engages the hasp staple, providing for the attachment of a padlock or seal to cause the assembly to be latched and locked or sealed into a secure system.

3.1.9 *latch, n*—an item consisting of any number of members that act in combination to fasten separate elements into a connected whole, and provides for the unfastening of this whole.

3.1.10 *latching attachment device, n*—an attachment device that includes a latching feature that permits the assembly to remain engaged without the use of a padlock or seal.

3.1.11 *latching hasp, n*—a hasp that includes a latching feature that permits the strap to remain engaged with the hasp staple without the use of a padlock or seal.

3.1.12 *rotating hasp staple, n*—a hasp staple that is free to turn in its pad, generally to provide a latching function by engaging the hasp strap, or to resist a torsional attack.

4. General Requirements

4.1 *Tolerances:*

[1] This specification is under the jurisdiction of ASTM Committee F12 on Security Systems and Equipment and is the direct responsibility of Subcommittee F12.50 on Locking Devices.

Current edition approved March 1, 2017. Published March 2017. Originally approved in 2001. Last previous edition approved in 2009 as F2155 – 01 (2009). DOI: 10.1520/F2155-01R17.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.1.1 *Fixture Tolerances*—All tolerances shall follow standard machining practices unless otherwise specified.

4.1.2 *Test Setup Tolerances:*

4.1.2.1 *Force*—±1 % of working range.

4.1.2.2 *Height*—±3 mm (0.12 in.).

4.1.2.3 *Torque*—4 % of reading.

4.1.2.4 *Weight*—±10 g (0.02 lb).

4.2 *Temperature*—All tests shall be conducted between 16°C and 27°C (61°F and 81°F).

4.3 *Test Reports*—All test reports shall be dated.

5. Test Specimens

5.1 Select specimens at random from the manufacturer's finished stock of each size and model being certified by the manufacturer.

5.2 Select four hasps for the forcing tests.

6. Preparation of Apparatus

6.1 *Tensile Loading Device:*

6.1.1 Provide a tensile loading device appropriate for the test to be performed.

6.2 *Shock Impactor:*

6.2.1 Provide a fixture, as illustrated in Figs. 1-6, that allows the weights described in 6.2.2 to be properly guided to strike the anvil rod that will be placed in direct contact with the top surface of a hasp staple using the mounting block described in 6.2.3.

6.2.2 Provide a set of weights, as shown in Figs. 1-6, with a central hole in each that allows the weight selected to free-fall and strike the top surface of the anvil rod.

6.2.3 Provide a mounting block, as shown in Figs. 1-6, that will support the specimen when being subjected to the required shock load.

6.3 *Torque Test:*

6.3.1 Provide a fixture, as illustrated in Figs. 7-13, that allows the hasp to be mounted central to the torque arm; apply torque to the hasp.

7. Forcing Tests

7.1 Refer to Table 1.

7.2 *Staple Axial Load Test*—(Does not apply if test cannot be performed.) (see 6.1) Mount base pad of hasp staple to test fixture using the fasteners as described in Fig. 14. Insert the pulling device through hasp staple hole and connect to the tensile loading device. Apply the required force slowly along the vertical centerline of the hasp staple.

7.2.1 *Test Value*—The test value is achieved when a failure occurs that is sufficient to allow circumvention of the hasp.

7.3 *Hasp Staple Impact Test*—Using the impactor (see 6.2), drop the weight the required number of times onto the staple of a complete hasp, which has been mounted to the test sample plate. Test the hasp in both the vertical and horizontal mounting configurations.

7.3.1 Test value occurs if the hasp staple breaks or becomes separated from the hasp.

7.4 *Hasp Staple Cutting Test*—(Does not apply if test cannot be performed.) Two shearing blades (made of a steel hardened to a minimum hardness of Rc 50) are used in conjunction with the blade positioning holder. The fixture with a staple is placed in a tensile loading device (see 6.1) having the required compression load capability and is compressed with the required force. See Fig. 15 for blade and fixture details and 7.3.1 for proper positioning of test sample.

7.4.1 Hasp staples that are round must be cut perpendicular to the axis of the diameter of the hasp staple. When other shapes are tested, cutting must occur through the point that represents the smallest cross section of the hasp staple that would be exposed in actual use.

7.4.2 Test value occurs at the force reading reached when the staple is cut through.

7.5 *Hasp Staple Torque Test*—(Does not apply if test cannot be performed.) Mount the hasp to the fixture (see 6.3) so that the hasp staple is centered to the torque arm. Verify that the hasp strap is engaged with the hasp staple, if applicable. Mount the hasp strap to the fixture, if applicable. Insert dowel pin into the hasp staple hole (dowel pin to fill 75 % minimum of the staple hole). The hasp staple should be held by the torque arm so that the hasp staple will not rotate when torque rotation is applied. Shim if necessary.

7.5.1 The test value is achieved when a failure occurs that is sufficient to allow circumvention of the hasp.

8. Acceptance Criteria

8.1 Hasps must meet all of the requirements of a grade to be so rated.

8.2 A hasp complying with one of the grades may exceed the requirements for that grade in another portion of this standard.

8.3 Breaking of the mounting fasteners does not constitute acceptance or failure. Fasteners used to mount the hasp or hasp staple to the test fixture shall be the largest diameter that may be inserted in the holes provided. Alteration of the product, as supplied from the manufacturer, is not permitted. (It is suggested that the test fixture be designed to accommodate through bolt and nut fastening.)

9. Precision and Bias

9.1 Where dimensions and weights are described for various test apparatus and no maximums or minimums are given, a combined bias of ±2 % is permitted.

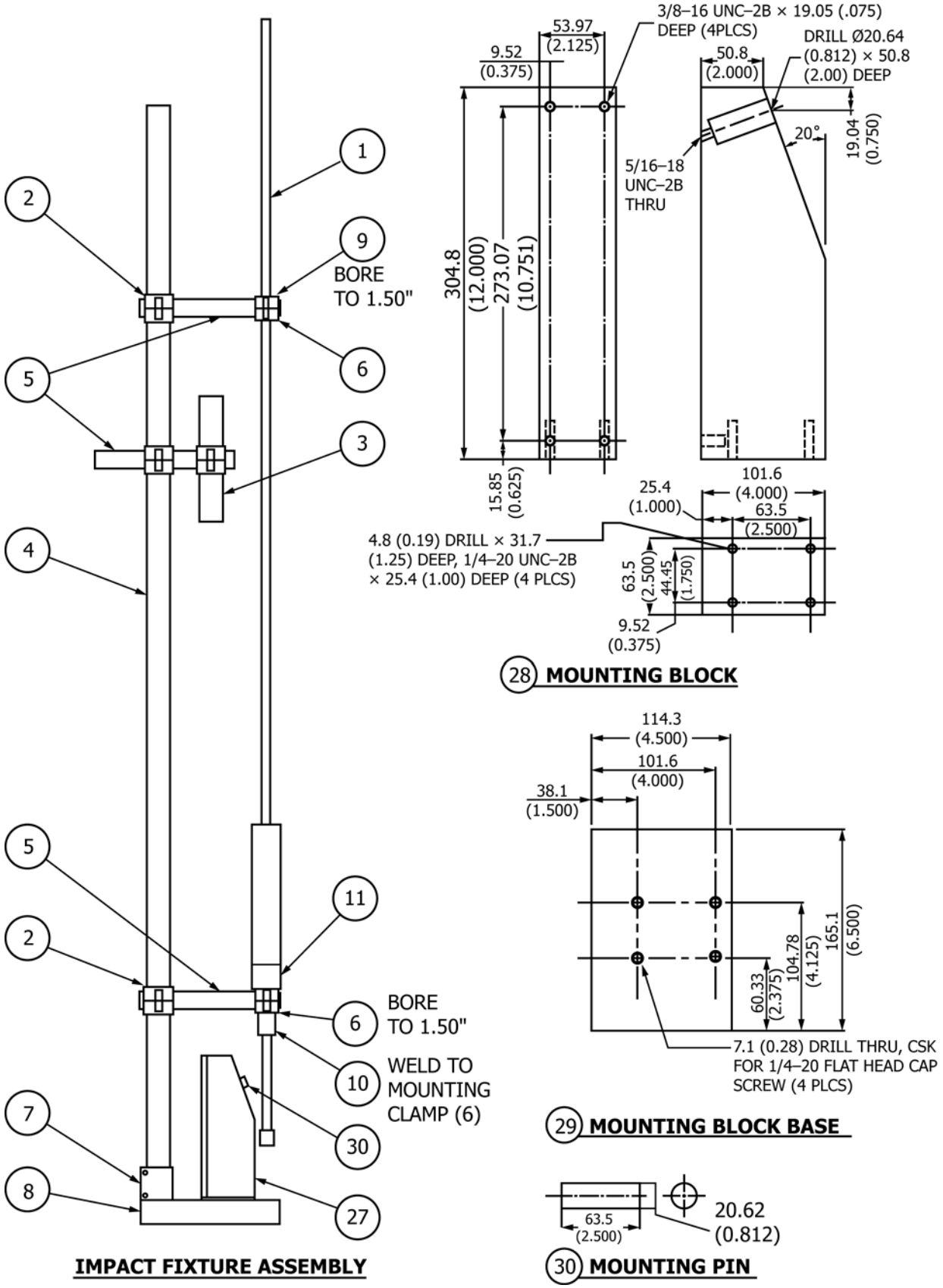
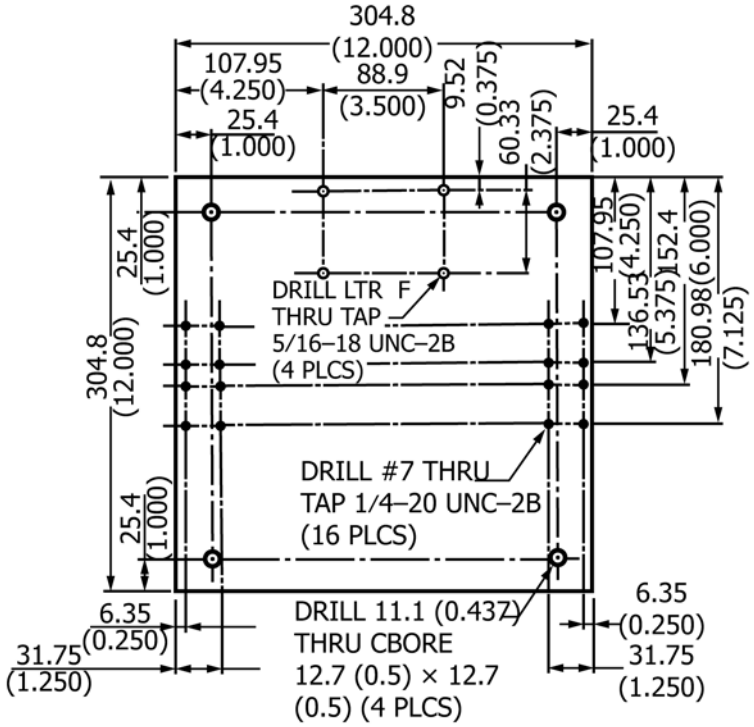
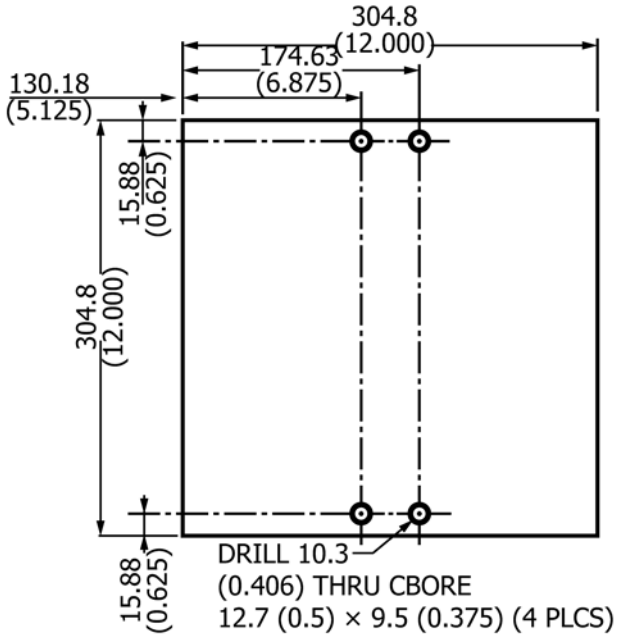

1
2
9
BORE
TO 1.50"
6
5
3
4
5
11
2
6
BORE
TO 1.50"
10
WELD TO
MOUNTING
CLAMP (6)
30
7
8
27
IMPACT FIXTURE ASSEMBLY
3/8–16 UNC–2B × 19.05 (.075)
DEEP (4PLCS)
53.97
(2.125)
9.52
(0.375)
DRILL Ø20.64
(0.812) × 50.8
(2.00) DEEP
50.8
(2.000)
20°
19.04
(0.750)
5/16–18
UNC–2B
THRU
304.8
(12.000)
273.07
(10.751)
15.85
(0.625)
101.6
(4.000)
25.4
(1.000)
63.5
(2.500)
4.8 (0.19) DRILL × 31.7
(1.25) DEEP, 1/4–20 UNC–2B
× 25.4 (1.00) DEEP (4 PLCS)
63.5
(2.500)
44.45
(1.750)
9.52
(0.375)
28 MOUNTING BLOCK
114.3
(4.500)
101.6
(4.000)
38.1
(1.500)
165.1
(6.500)
104.78
(4.125)
60.33
(2.375)
7.1 (0.28) DRILL THRU, CSK
FOR 1/4–20 FLAT HEAD CAP
SCREW (4 PLCS)
29 MOUNTING BLOCK BASE
63.5
(2.500)
20.62
(0.812)
30 MOUNTING PIN

FIG. 1 Sheet 1

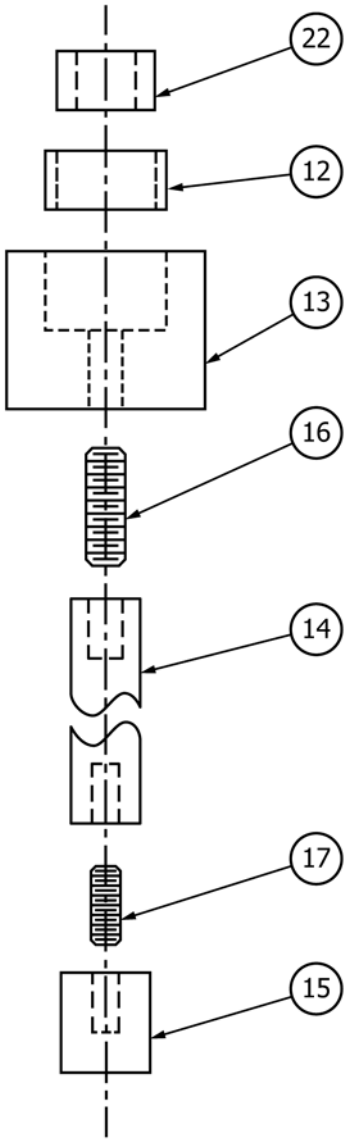


8 **MOUNTING BASE PLATE**



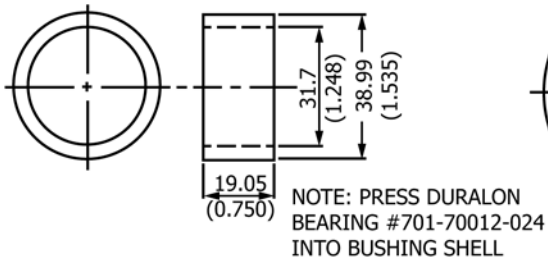
31 **MOUNTING BLOCK FIXTURE PLATE**

FIG. 2 Sheet 2

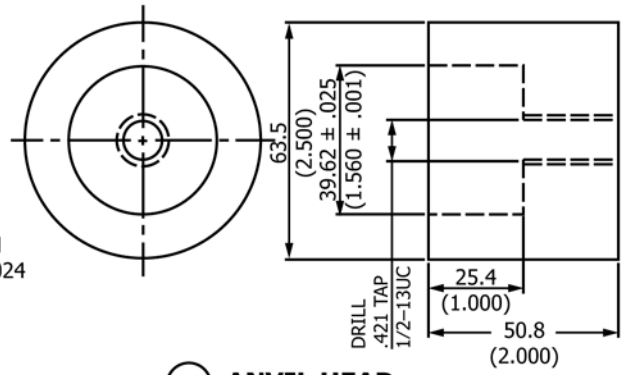


(11) ANVIL ASSEMBLY – EXPLODED VIEW

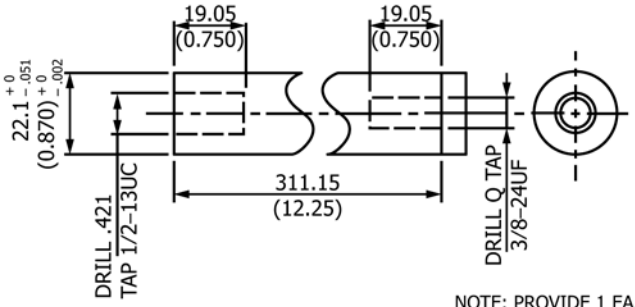
FIG. 3 Sheet 3



12 LOWER GUIDE SHAFT BUSHING SHELL

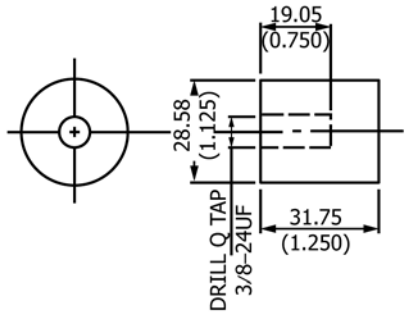


13 ANVIL HEAD



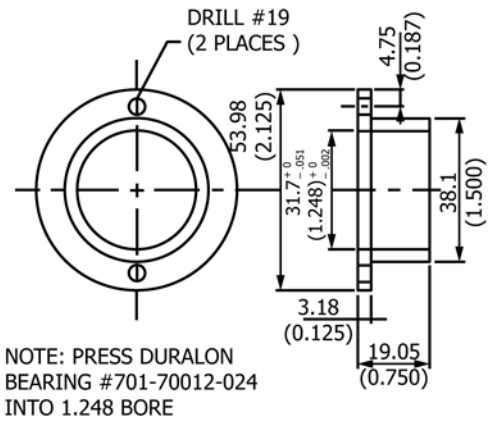
14 ANVIL SHAFT

NOTE: PROVIDE 1 EA.
1/2–13UC × 1.50 GRADE
8 STUD AND 1 EA.
3/8–24UF × 1.00 STUD

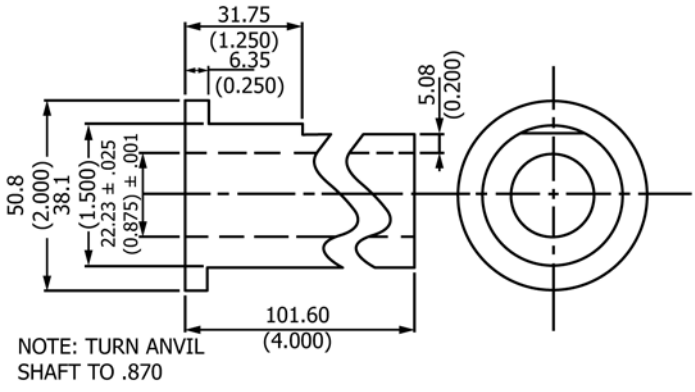


15 EXPANDABLE ANVIL FACE

11 ANVIL ASSEMBLY PARTS

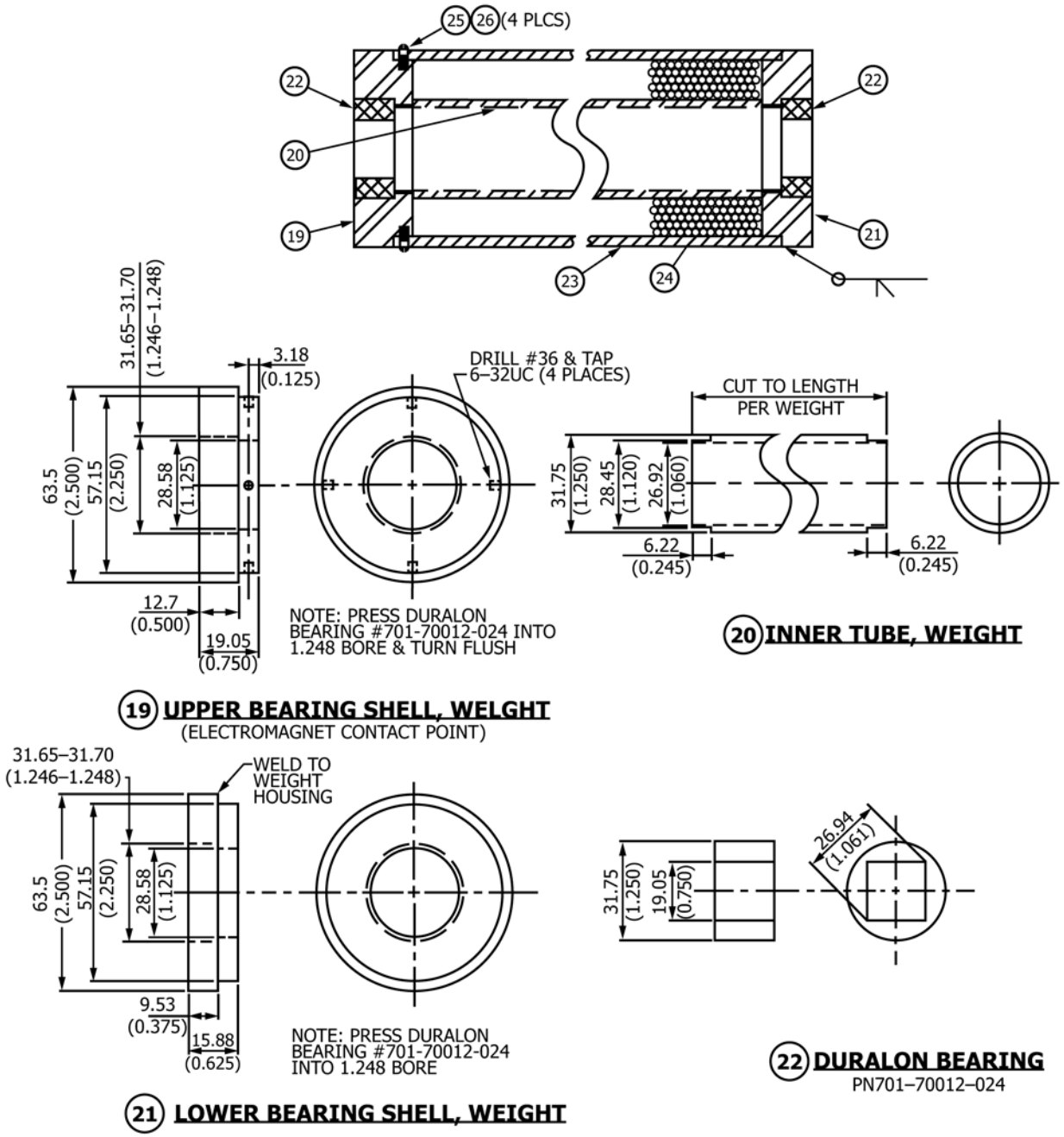


9 UPPER GUIDE SHAFT BUSHING



10 ANVIL SHAFT GUIDE

FIG. 4 Sheet 4



18 WEIGHT ASSEMBLY

FIG. 5 Sheet 5

Detail No.	No. Required	Description	Material
1	1	Tubing, .75″ x .75″ x .125″ wall x 94″ long	Steel
2	2	Cross Clamp, ″Rose+Krieger″, P/N RXA 2015 Source: ROSE+KRIEGER, 7730 Executive Way Frederick, MD 21704-8377 301-696-9400	
3	1	Electromagnet, 2″ O.D.	
4	1	Tubing, 2.0″ O.D. x .125″ wall x 94″ long	Aluminum
5	3	Tubing, 1.5″ O.D. x .125″ wall x 12″ long	Aluminum
6	2	Mounting Clamp, ″Rose+Krieger″, P/N RMA 1500 (See Source, Item 2)	
7	1	Base Clamp, ″Rose+Krieger″, P/N RBF 2000 (See Source, Item 2)	
8	1	Base Plate, 12″ x 12″ x 2″	Aluminum
9	1	Upper Guide Shaft Bushing	Aluminum
10	1	Anvil Shaft Guide - Weld to Mounting Clamp(6)	Aluminum
11	1	Anvil Assembly (consists of parts with Detail Nos. 12-17)	
12	1	Lower Guide Shaft Bushing Shell	Aluminum
13	1	Anvil Head	Steel
14	1	Anvil Shaft	Steel
15	1	Expendable Anvil Face	Steel
16	1	Stud, 1/2-13 x 1.5″ long (attach Anvil Head(13) to Anvil Shaft(14)	Steel
17	1	Stud, 3/8-24 x 1″ long (attach Anvil Shaft(14) to Expendable Anvil Face(15))	Steel
18	6	Weight Assembly (consists of parts with Detail Nos. 19-26)	
19	6	Upper Bearing Shell, Weight	Steel
20	1	Inner Tube, Weight, pipe, 1″ sch. 40 x 10 ft. long (length sufficient to Make six Weight Assemblies)	Steel
21	6	Lower Bearing Shell, Weight	Aluminum
22	14	Bearing, ″Duralon″, P/N 701-70012-024 Source: Rexnord Corporation, 2324 Curtiss Street Downers Grove, IL 60515 708-969-1770	
23	1	Outer Tube, Weight, Tubing, 2.50″ O.D. x 0.124 Wall x 10 ft. long (length sufficient to make six Weight Assemblies)	Aluminum
24	50 lbs.	Lead shot, #7 1/2	
25	24	Screw, Pan Head, #6-32 x 3/8″ long (attach Upper Bearing Shell, Weight(19) to Outer Tube, Weight(23))	Steel
26	24	Washer, Star, #6 (for screw(25)	Steel
27	1	Mounting Fixture Assembly (consists of parts with Detail Nos. 28-35)	
28	1	Mounting Block, Bar, 1.75″ x 4.0″ x 12″ long	Steel
29	1	Mounting Block Base, Plate, 4.5″ x 6.5″ x 1/4″	Steel
30	1	Mounting Pin, Bar, 0.812″ Dia. X 2.5″ long	Steel
31	1	Mounting Block Fixture Plate, 12″ x 12″ x 1/2″	Steel
32	4	Screw, Flat Head, 1/4-20 x 3/4″ long (attach Mounting Block Base(29) to Mounting Block(28))	Steel
33	4	Clamp, ″De-STA-CO″, P/N 227-U, (not shown on drawings) Source: Wayco Sales, Inc., 6446 Clara Street Bell Gardens, CA 90201-5606 562-927-3469 or www.bandsawblade.com (attach Mounting Block Base(29) to Base Plate(8))	
34	16	Screw, Socket Head, 1/4-20 x 1″ long (attach ″De-STA-CO″ clamps(33) to Base Plate(8))	Steel
35	4	Screw, Socket Head, 3/8-16 x 1″ long (attach Mounting Block Fixture Plate(31) to Mounting Block(28))	Steel
36	4	Screw, Socket Head, 5/16-18 x 1.25″ long (attach Base Clamp(7) to Base Plate(8))	Steel

NOTE 1—All sources shown are the sole sources of supply for the referenced products. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

FIG. 6 Sheet 6—Impact Fixture Bill of Material

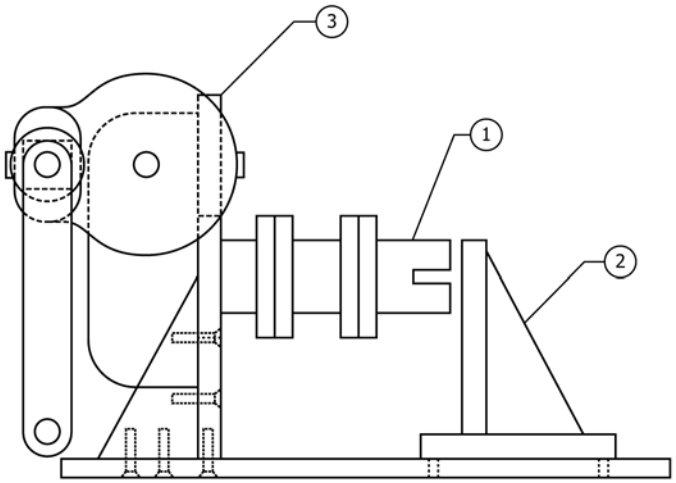


FIG. 7 Sheet 1A—Assembled Torque Fixture

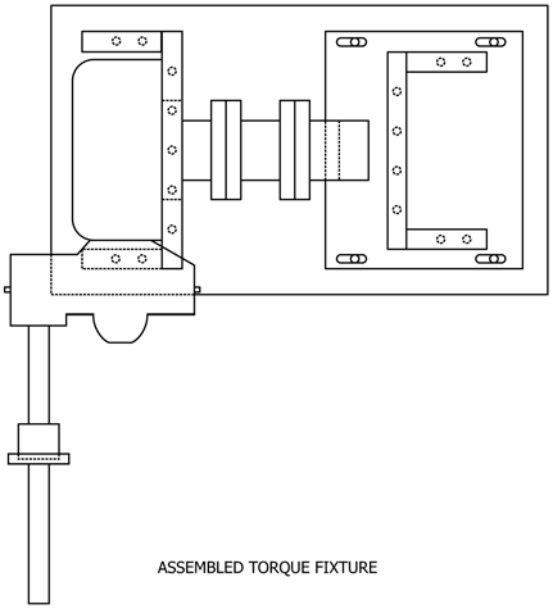


FIG. 8 Sheet 1B—Assembled Torque Fixture

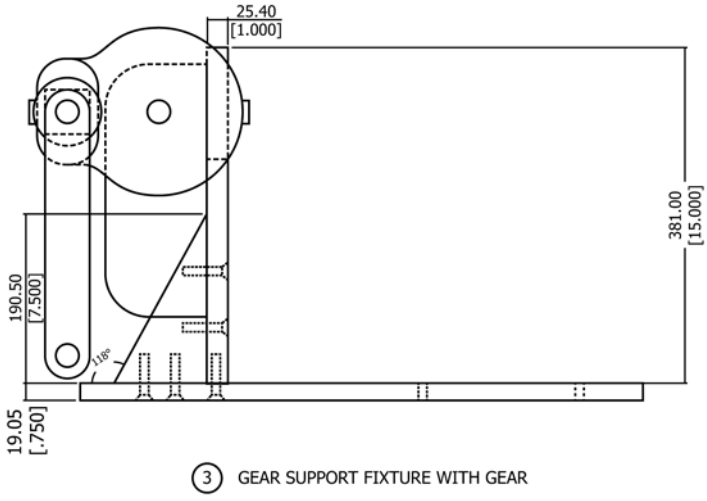


FIG. 9 Sheet 2A—Gear Support Fixture With Gear

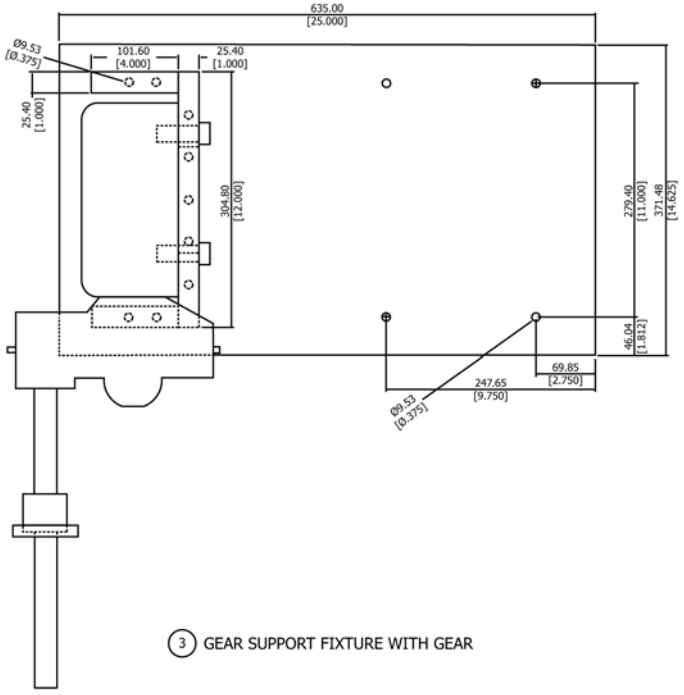
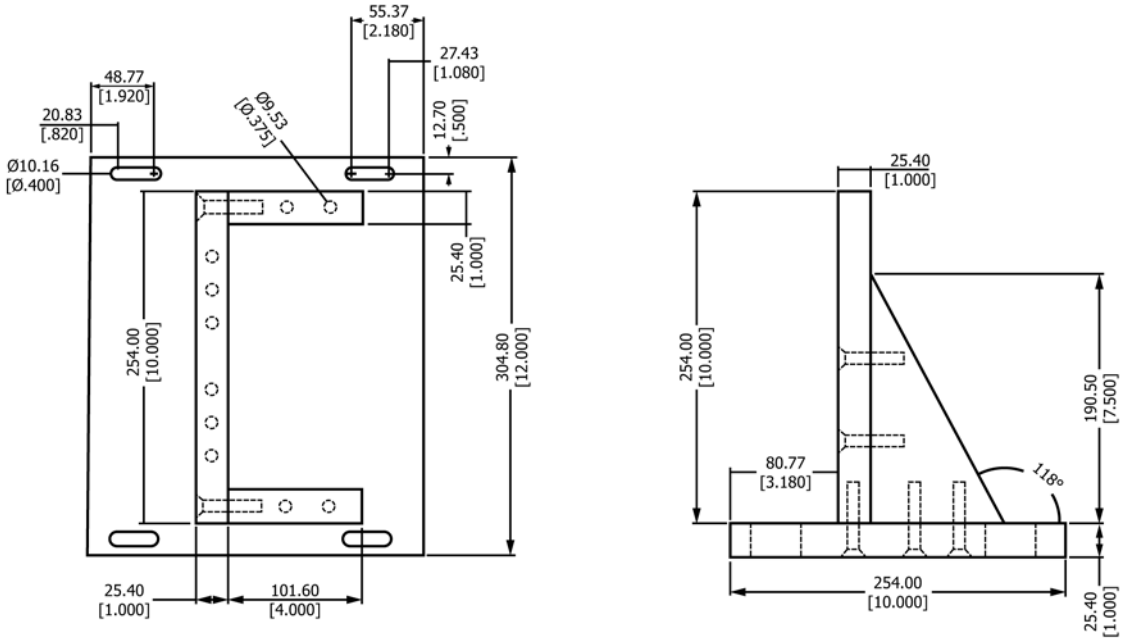
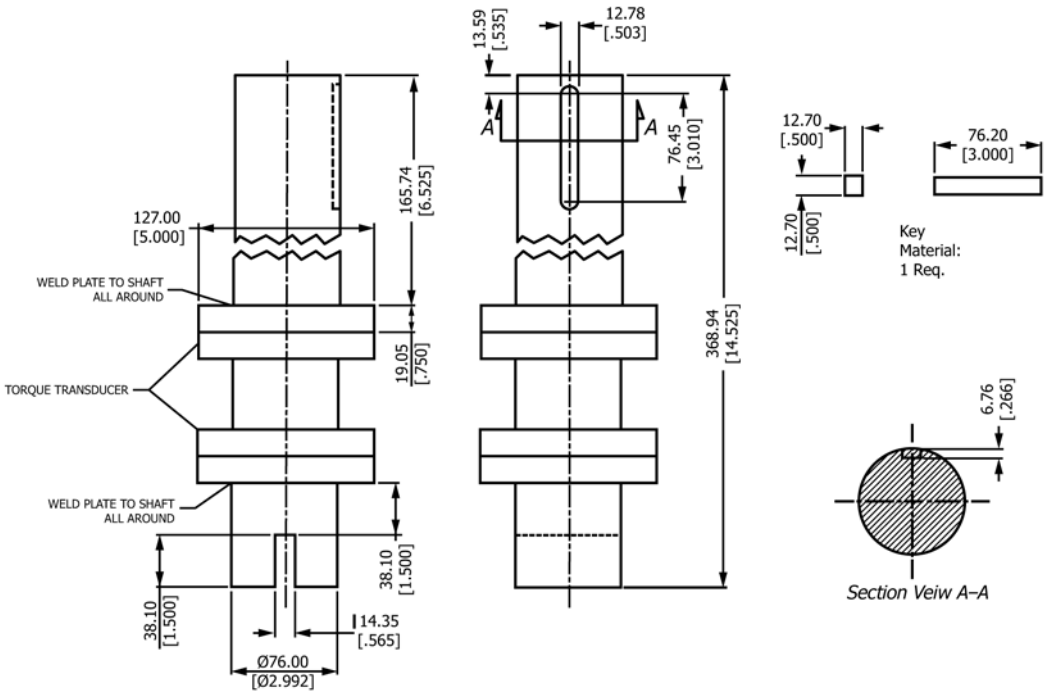


FIG. 10 Sheet 2B—Gear Support Fixture With Gear



2 HASP SUPPORT FIXTURE

FIG. 11 Sheet 3—Hasp Support Fixture



1 TORQUE ARM WITH TRANSDUCER

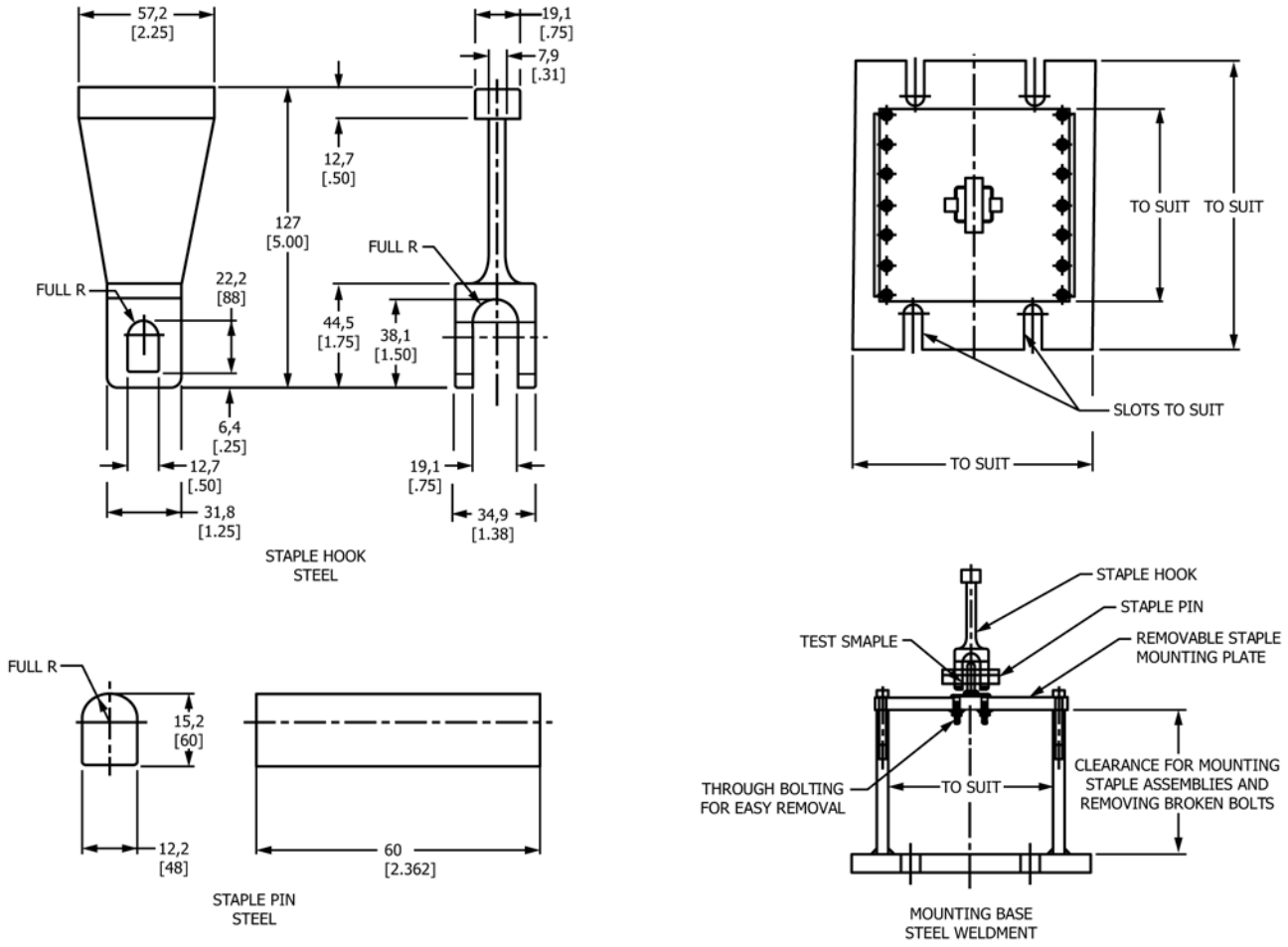
FIG. 12 Sheet 4—Torque Arm With Transducer

Detail No.	Quantity	Description	Material
1	1	Torque Arm	Steel
1	2	Mounting Plates	Steel
1	1	Key	Steel
1	1	Torque Transducer	Sensotec Torque Transducer QFFH-9 Or Equivalent Source: SENSOTEC 2080 Arlingate Lane Columbus, OH 43228 800 848-6564
2	1	Hasp Support Base Plate	Steel
2	1	Hasp Support Mounting Plate	Steel
2	2	Hasp Support Side Plate	Steel
3	2	Gear Support Side Plate	Steel
3	1	Gear Support Mounting Plate	Steel
3	1	Gear Support Base Plate	Steel
3	1	360° Gear With Spur Gear	Dynatorque Gear-DT30 Or Equivalent Source: DYNATORQUE 1934 E. Sherman Blvd. Muskegon, MI 49444 616 739-1377

FIG. 13 Sheet 5—Torque Test Fixture Bill of Material

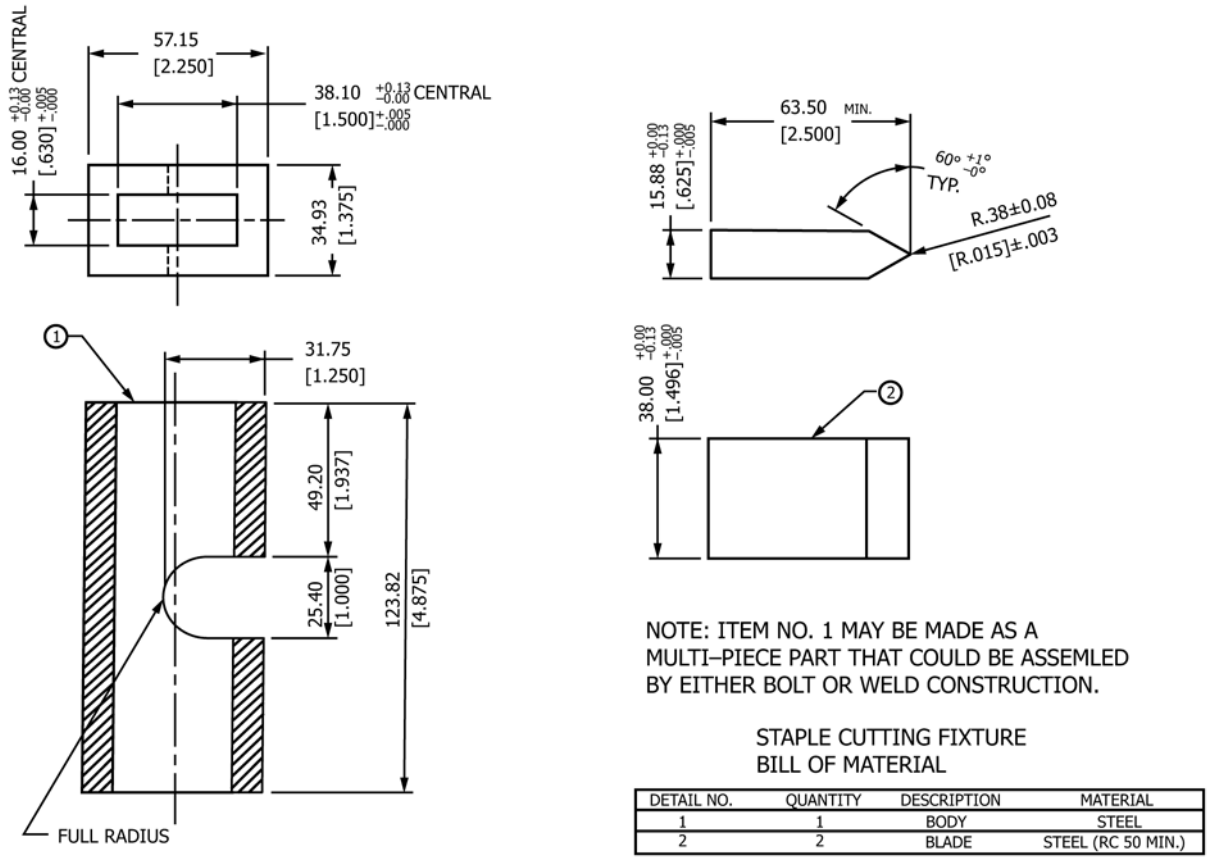
TABLE 1 Forcing Tests Required Values

		Grades					
	Units	1	2	3	4	5	6
Staple axial load test	newtons	4450	8900	13500	18000	31000	45000
	(lbf)	(1000)	(2001)	(3035)	(4046)	(6969)	(10116)
Staple impact test blows		5	5	5	5	5	5
Weight	kilograms	1	2	3	4	5	6
	(lb)	(2.2)	(4.4)	(6.6)	(8.8)	(11.0)	(13.2)
Height	meters	1	1	1	1	1	1
	(in.)	(39.4)	(39.4)	(39.4)	(39.4)	(39.4)	(39.4)
Staple cutting test	newtons	4450	8900	13500	18000	31000	45000
	(lbf)	(1000)	(2001)	(3035)	(4046)	(6969)	(10116)
Staple torque test	newton-meters	113	226	339	452	678	904
	(lbf-in.)	(1000)	(2000)	(3000)	(4000)	(6000)	(8000)



STAPLE AXIAL LOAD TEST FIXTURE

FIG. 14 Staple Axial Load Test Fixture



DETAIL NO.	QUANTITY	DESCRIPTION	MATERIAL
1	1	BODY	STEEL
2	2	BLADE	STEEL (RC 50 MIN.)

STAPLE CUTTING FIXTURE

FIG. 15 Staple Cutting Fixture

APPENDIX

(Nonmandatory Information)

X1. USERS GUIDE

X1.1 Taking into account the manner of hasp class rating through use of this standard and the grades achieved in the force testing, a product may be specified that does not exist. Where such issues occur, it is recommended that consultation with individual manufacturers be instigated.

X1.2 Environmental issues are not addressed in this standard. Where such concerns are an issue, it is recommended that consultation with individual manufacturers be instigated.

X1.3 Padlocks are not addressed in this standard. The strength, durability, and environmental concerns associated with padlocks are separate but important considerations when designing a locking system. It is recommended that the padlock chosen for use with a particular hasp have a shackle cross section approximating that of the hasp staple.

X1.4 Fasteners may or may not be supplied with each hasp. It is recommended that each installation be separately evaluated and that consideration be given to upgrading the structure upon which the hasp will be attached. It is the responsibility of the end user for ensuring that all fasteners and methods of installation are consistent with the grade of hasp specified.

X1.4.1 To achieve the maximum performance of any hasp mounted on wood or foam-core doors, it is advisable to use a backing plate and through bolting as shown in Fig. X1.1.

X1.4.2 Weaker structures may benefit from through bolts and may also benefit from the use of a backing plate and support tubes as shown in Fig. 5.

X1.4.3 If requirements appear to be complex, or beyond the skill level of the end user, individual specialists or manufacturers should be consulted.

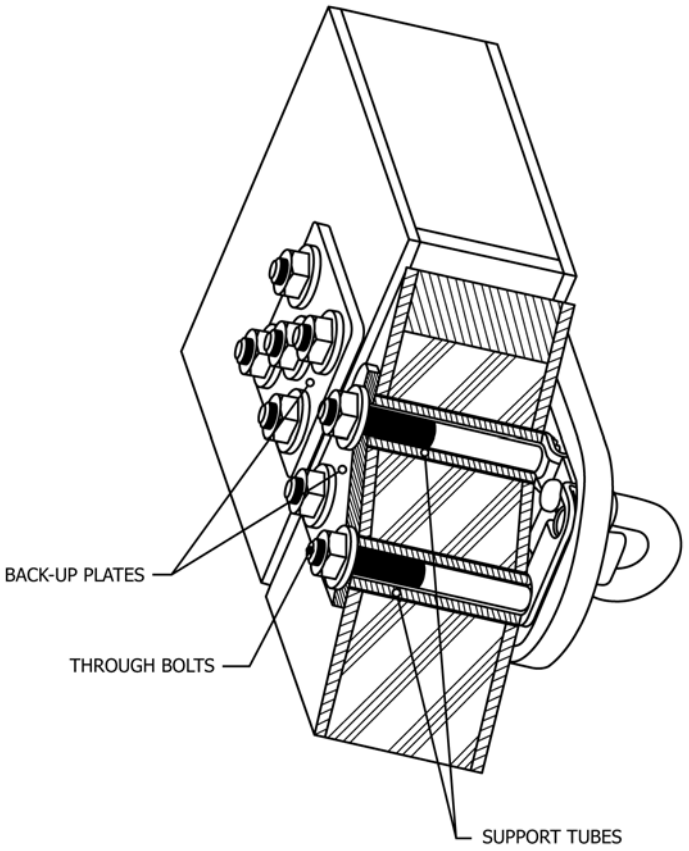


FIG. X1.1 Example of Back-Up Plate and Through Bolt Installation