

<b>State Energy Inspection Services</b>  <b>Standard Operating Procedure</b> Visual Thread Inspection	<b>Instruction #</b>	<b>Manual</b>
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## 1.0 Scope

The requirements of this procedure shall be followed when Visual Thread Inspection is specified on the State Energy's work order. This procedure details requirements, equipment and procedures for visual thread inspection of round and buttress threaded connections. Inspection covered in this procedure are:

- ✓ Internal coupling threads
- ✓ External field end threads

1.1 Thread repair is not part of the procedure and will only be performed when specified by the Customer. Minor dings, burrs, etc. may be repaired in the non Lc length and time spent will be limited.

## 2.0 Personnel Qualification

2.1 Personnel performing this procedure shall be classified as a minimum, Level I Visual Thread.

2.2 Level I thread inspectors shall be under the supervision of an on site Level II or Level III supervisor.

2.3 Personnel performing Visual Thread must be able to distinguish J1 letters at 12 inches on a Jeager eye chart and have no color vision impairment.

## 3.0 Reference Documents

3.1 The following documents are referenced in preparation of this procedure and should be available on the job site location.

- ✓ API Spec 5CT
- ✓ API Spec 5B
- ✓ API RP 5A5
- ✓ API RP 5B1
- ✓ Customer specification, as applicable

## 4.0 Definitions

4.1 Reference RP 5A5 and RP 5B1 for definitions of wording used in this procedure.

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## 5.0 Equipment

- 5.1 Equipment used in this procedure consists of the following.
- a) Steel ruler with graduation of 1/32 inch
  - b) Thread profile gage
  - c) Thread dressing tools, if required

## 6.0 Cleaning and Preparation of Threads

- 6.1 Remove thread protectors and stack for cleaning prior to reapplying to the threads.
- 6.2 Threads must be clean before inspection. All traces of thread compound, dirt, scale and other foreign material must be removed. Clean pins with brush and solvent. Remove any seal rings from modified couplings prior to cleaning. Blow solvent out of the threads with high-pressure air.
- 6.3 Apply a sequential number near the coupling end of each length of pipe to be inspected.
- 6.4 When rolling pipe without thread protectors care should be taken to avoid impact that may cause mechanical damage to the threads.
- 6.5 Lighting intensity shall be 50 foot candles or greater at the inspection surface or under natural lighting conditions.

## 7.0 Visual Inspection of Round and Buttress Threads

### 7.1 Criteria for Round Thread Connections

- a) These inspection requirements apply to round threaded connections, upset and non-upset in sizes 2 3/8" through 20" diameter.
- b) Reference Figure 11-1 of this procedure and Tables 10-1 & 10-3 within State Energy's SOP 10.0 of this manual, and the following explanations when inspecting round threaded connections. Any of the conditions noted should be considered defects.

\*(pin bearing face) Examine for:

1. The presence of a knife-edge.
2. Burrs on either the internal or external surface.

\*(chamfer) Examine for:

1. A featheredge
2. Burrs

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3. Chamfer not present a full 360° around the circumference.
4. First or starting thread running out to the end of the pipe.
5. A false starting thread is often present and is a premature tool cut. It is not reason for rejection unless it engages the continuous thread resulting in two individual starting threads.

\*(L<sub>c</sub> thread length) Examine for:

1. Any imperfection or distortion of the thread form, which will produce a longitudinal or helical leak path.
2. Black crested or flat crested threads.
3. Any imperfection that penetrates through the crests into the mating flanks of the threads.
4. Any imperfection that visibly bulges the flanks or results in a protrusion of metal from one or more threads.
5. Any other imperfection, which might affect the sealing capability of the threads.
6. Corrosion pitting.

\*(non L<sub>c</sub> length) Examine for:

1. Any imperfection extending from the crest to the root of the threads or any imperfection whose depth exceeds 12-½% of nominal wall thickness measured from the projected pipe surface.
2. Any metal protrusion that may prevent proper makeup or peel the protective coating of the coupling threads.

\*(J area) Examine for:

1. Threads not extending to the center of the coupling. These threads are non-engaged threads and need not be perfect.

\*(internal coupling threads) Examine for:

1. All internal coupling threads are considered to be L<sub>c</sub> threads and shall be inspected using the same criteria used for the external threads.

\*(coupling bearing face) Examine for:

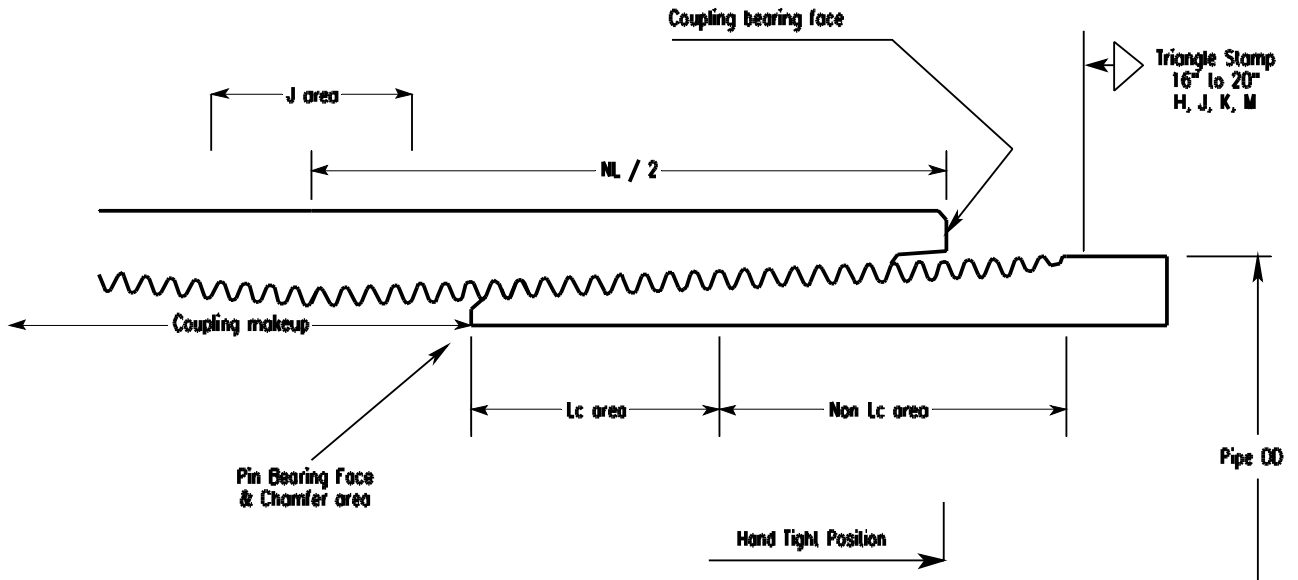
1. Any metal protrusions that would prevent proper makeup.
2. Any feather edges.
3. Any mashes or dings.

\*(coupling makeup) Examine for:

1. Couplings should be checked for proper makeup using a tolerance of (+/-) 2 thread turns (.250") from nominal makeup position. Coupling makeup is measured from the end of the coupling to the face of the pipe inside the coupling. The formula for determining nominal makeup position is ( actual coupling length (NL) divided by 2 plus the j dimension )
2. Coupling makeup on round threaded material is not an API rejectable condition. However, if the measured distance is greater than (+/-) 2 thread turns from nominal makeup the condition should be reported to the customer.

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**Figure 11-1**  
**\* Round Thread \***



## 7.2 Criteria for Buttress Thread connections

- These inspection requirements apply to Buttress threaded connections in sizes 4-1/2" through 20" diameter.
- Reference Figure 11-2 of this procedure, Tables 10-2 & 10-3 within SOP 10.0 of this manual and the following explanations when inspecting buttress threaded connections. Any of the conditions noted should be considered defects.

\*\* (pin bearing face) Examine for:

- The presence of a knife edge.
- Any burrs on either the internal or external surface.

\*\* (chamfer) Examine for:

- A feather edge
- Any burrs
- Chamfer not present a full 360° around the circumference.
- First or starting thread running out to the end of the pipe.
- A false starting thread is often present and is a premature tool cut. It is not reason for rejection unless it engages the continuous thread resulting in two individual starting threads.

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\*\*( $L_c$  thread length) Examine for:

1. Any imperfection or distortion of the thread form, which will produce a longitudinal or helical leak path.
2. Two black crested threads are allowed in the  $L_c$  length providing neither extend more than 25% around the circumference of the connection.
3. Any imperfection that penetrates through the crests into the mating flanks of the threads.
4. Any imperfection that visibly bulges the flanks or results in a protrusion of metal from one or more threads.
5. Any other imperfection, which might affect the sealing capability of the threads.
6. Corrosion pitting on the 3 degree sealing flanks, roots of the pin threads or crest of the coupling threads is rejectable.

\*\* (non  $L_c$  length) Examine for:

1. Any imperfection extending from the crest to the root of the threads. Or any imperfection whose depth exceeds 12-½% of nominal wall thickness measured from the projected pipe surface.
2. Any metal protrusion that may prevent proper makeup or peel the protective coating of the coupling threads.

\*\* (J area) Examine for:

1. Threads not extending to the center of the coupling.
2. These threads are non-engaged threads and need not be perfect.

\*\* (internal coupling threads) Examine for:

1. All internal coupling threads are considered to be  $L_c$  threads and shall be inspected using the same criteria used for the external threads.

\*\* (coupling bearing face) Examine for:

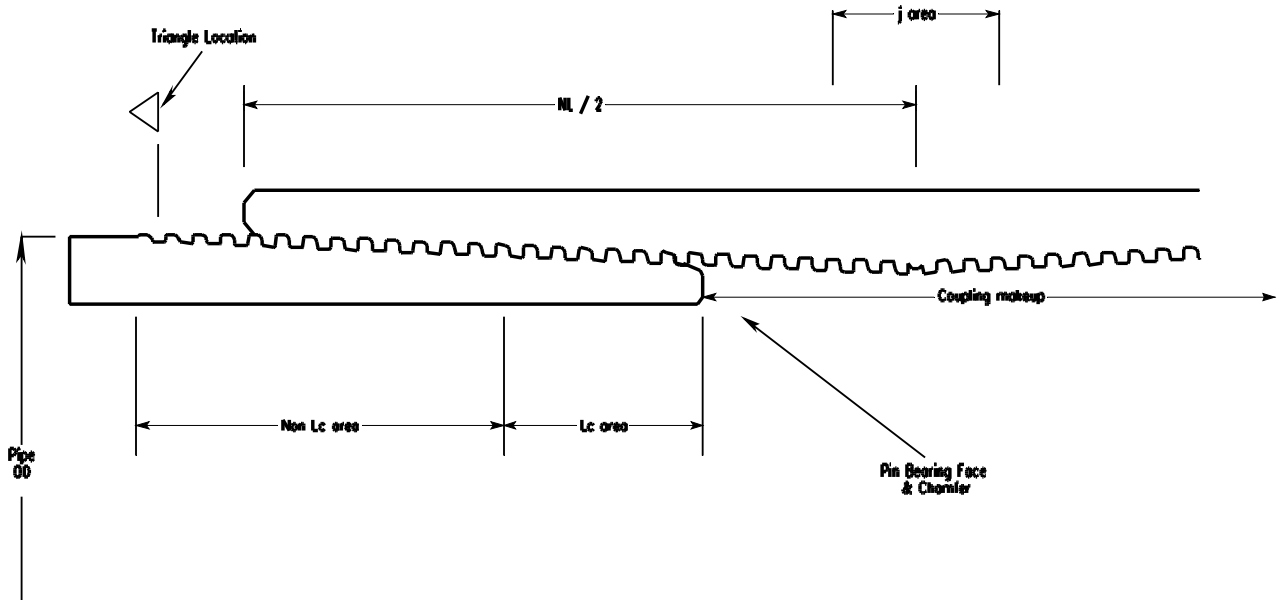
1. Any metal protrusions that would prevent proper makeup.
2. Any feather edges.
3. Any mashes or dings.

\*\* (coupling makeup) Examine for:

1. Coupling shall be made up to within one thread turn (.200") from the base of the triangle stamp for minimum power tight makeup.
2. Coupling shall not be made up further than the apex of the triangle for maximum power tight makeup.
3. If the triangle is not visible on the coupling end the makeup can be verified by measuring the distance from the end of the coupling to the end of the pipe inside the coupling. The formula for determining nominal makeup position is: (actual coupling length divided by 2 plus the j dimension). The tolerance on buttress coupling makeup is: nominal distance plus .200" for maximum measured distance and nominal distance minus .375" for minimum measured distance.

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**Figure 11.2**  
**\*\* Buttruss Thread \*\***



## 8.0 Records

- 8.1 Keep an accurate count of pipe that was maintained as this will be recorded and reported to the Customer.
- 8.2 The final report will consist of type of service, count of pipe and any relevant concerns noticed of the pipe.
- 8.3 All records shall be kept for a minimum of 5 years.

## 9.0 Attachments

- 9.1 The following Tables are part of State Energy's SOP number 10.0 of this manual and should be referenced during visual inspection of threads.
  - a) Table 10-1, Round thread tolerances
  - b) Table 10-2, Buttress thread tolerances
  - c) Table 10-3, Thread dimensions for Round and Buttress