Treating Irons:
Types of HP Unions & Connections

Class-Based Training

Coiled Tubing Services Department

Outline

- Training Objectives.
- NPST vs. threaded connections.
- 1502 vs. 602 and 1002 connections.
- Acme threads vs. NPTs.
- Standard vs. H_2S treating iron.
- Summary.

Training Objectives

- Identify the difference between a NPST and a threaded connection.
- Identify the difference between a 1502 and a 602 or 1002 union.
- Identify the difference between an Acme thread and a NPT.
- Identify the differences between standard and H_2S treating iron.

NPST (Non Pressure Seal Thread) vs. Threaded Connections

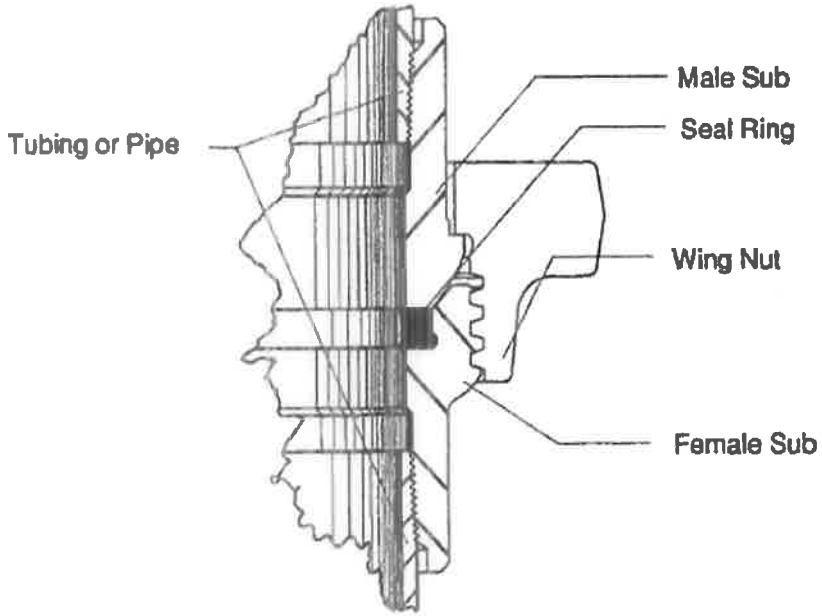


Figure 1. Typical threaded connection.

Cutaway of a Threaded Connection

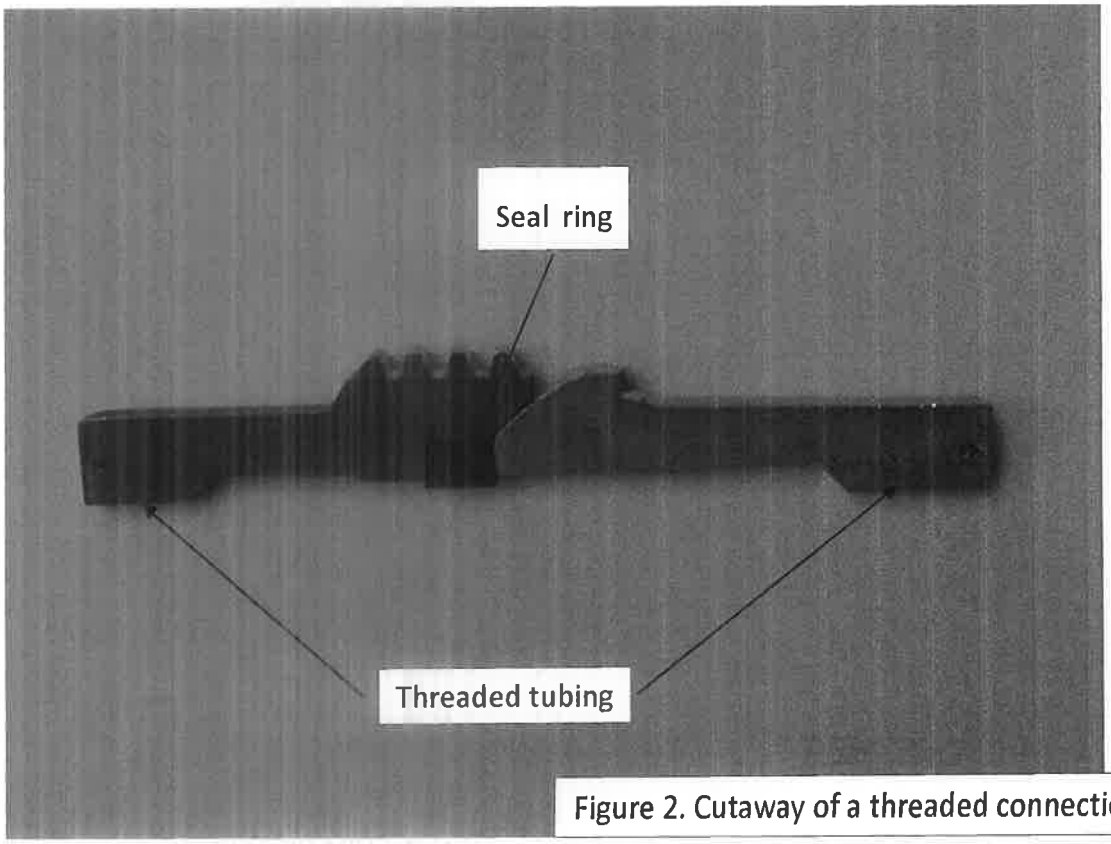


Figure 2. Cutaway of a threaded connection.

Cutaway of a Threaded Connection

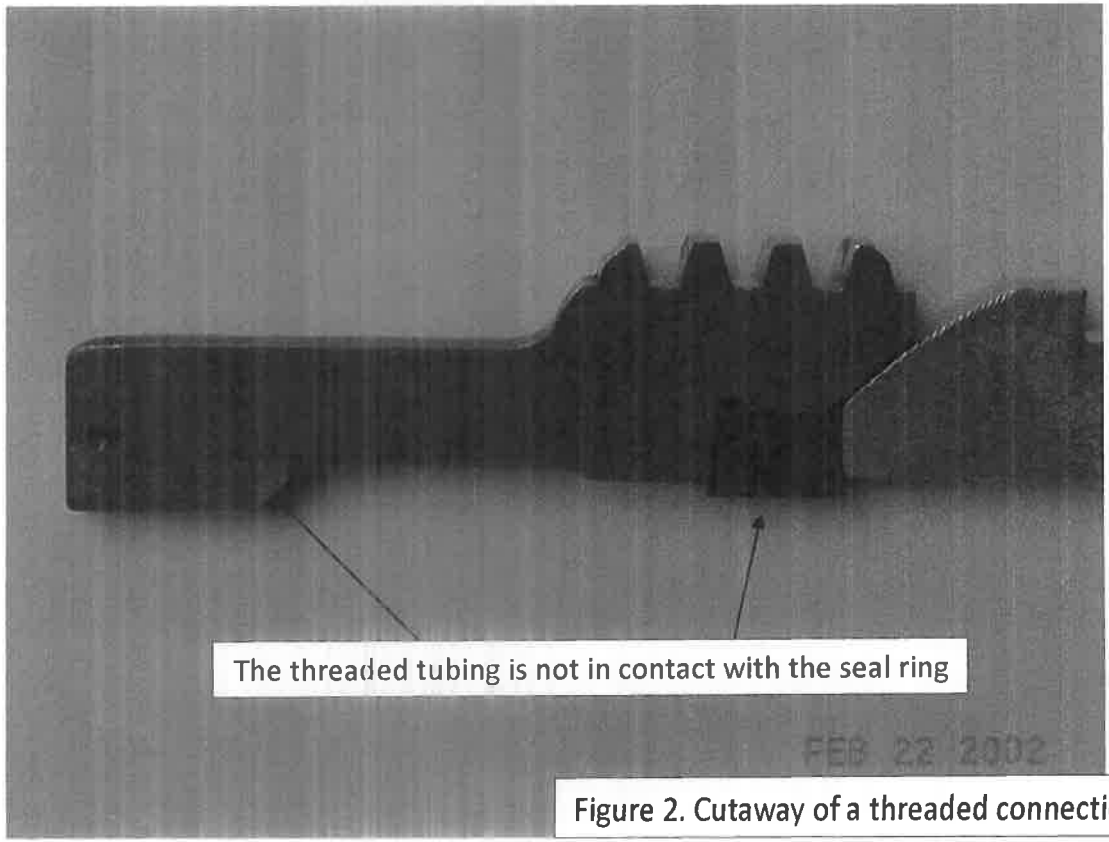


Figure 2. Cutaway of a threaded connection.

NPST vs. Threaded

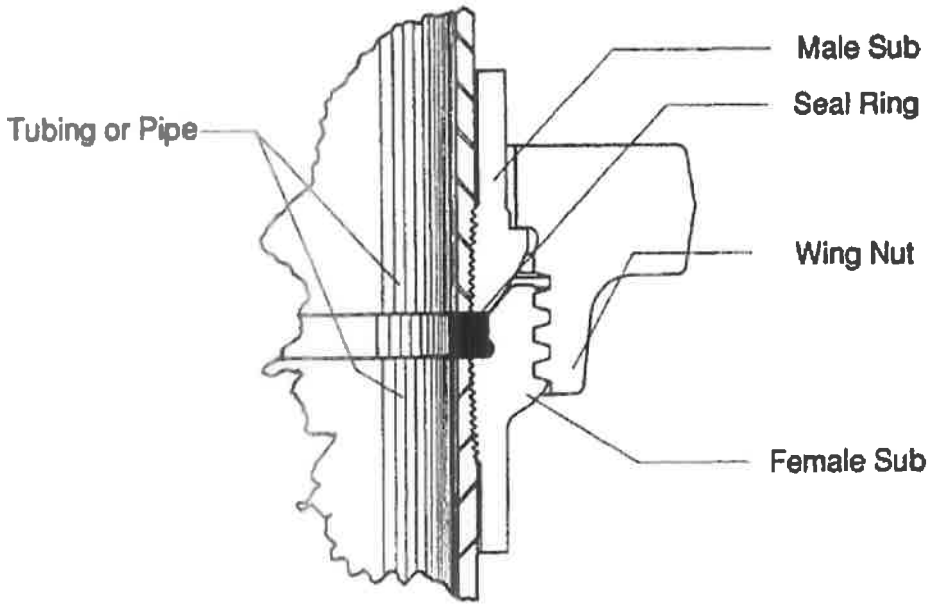


Figure 3. NPST (Non Pressure Seal Thread) connection.

Cutaway of a NPST Connection

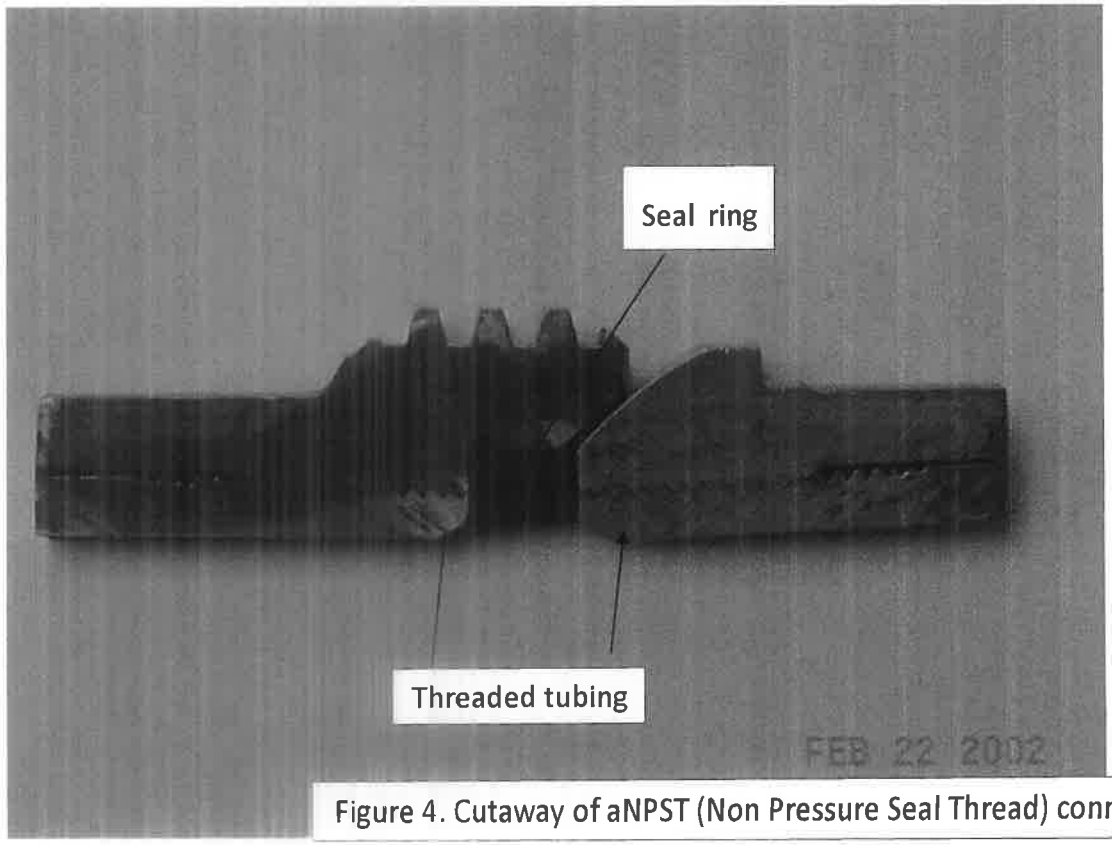


Figure 4. Cutaway of aNPST (Non Pressure Seal Thread) connection.

Cutaway of a NPST Connection

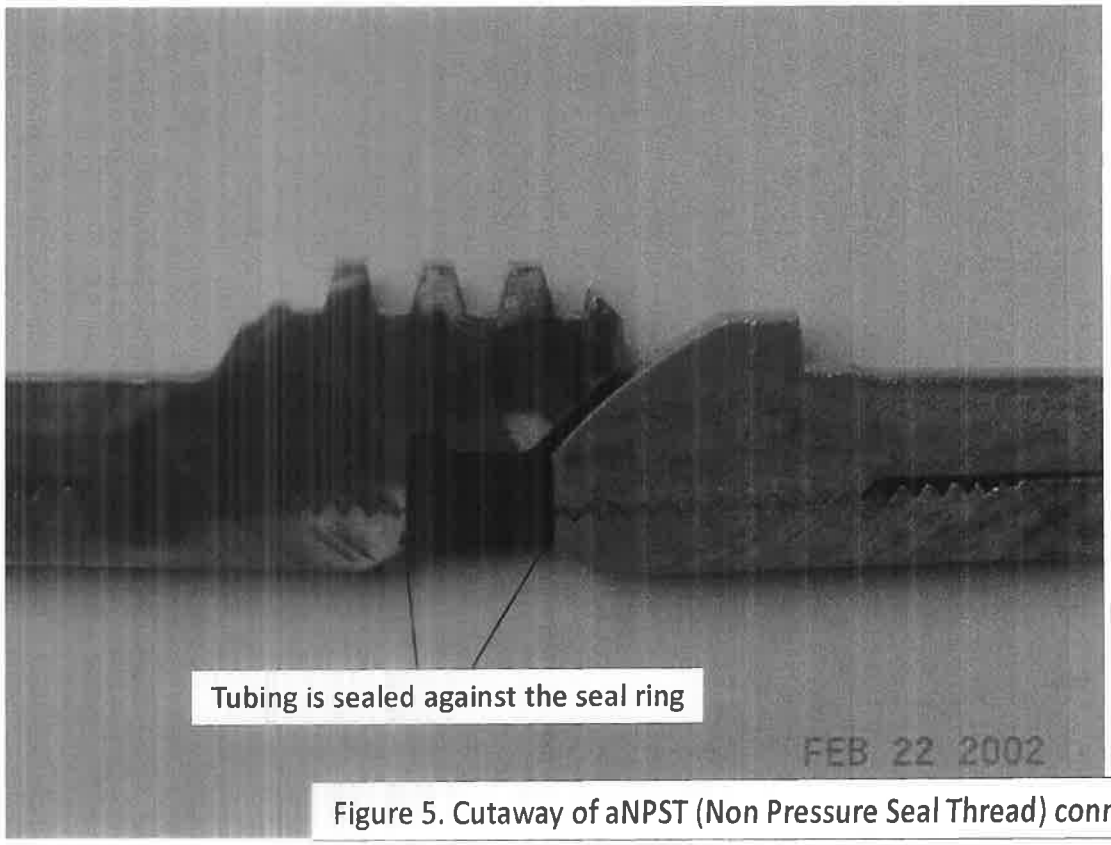


Figure 5. Cutaway of aNPST (Non Pressure Seal Thread) connection.

1502 Wing Nut on a 602 or 1002 Female Union

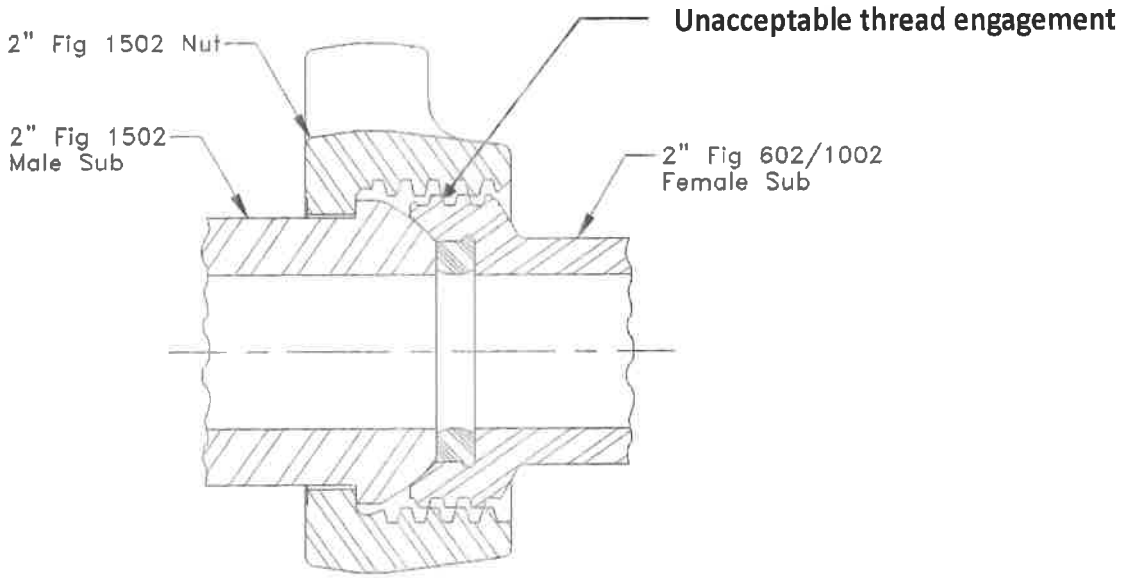


Figure 6. 1502 wing nut on a 602 or 1002 female union.

602 (6Kpsi) and 1002 (10kpsi)Connections

- Dimensionally the two connections are the same.
  - Made of the same type of material.
  - The 1002 material is a stronger material(higher yield strength) than the 602.
- 1502 (15,000 psi) Connections.
  - Dimensionally larger than the 602 or 1002.
  - Significantly stronger material (110,000 psi yield strength).
- 1502 wing nut has enough overlap on the 602 or 1002.
  - Thread half to give the impression that it fits properly.

1502 Wing Nut on a 1502 Female Union

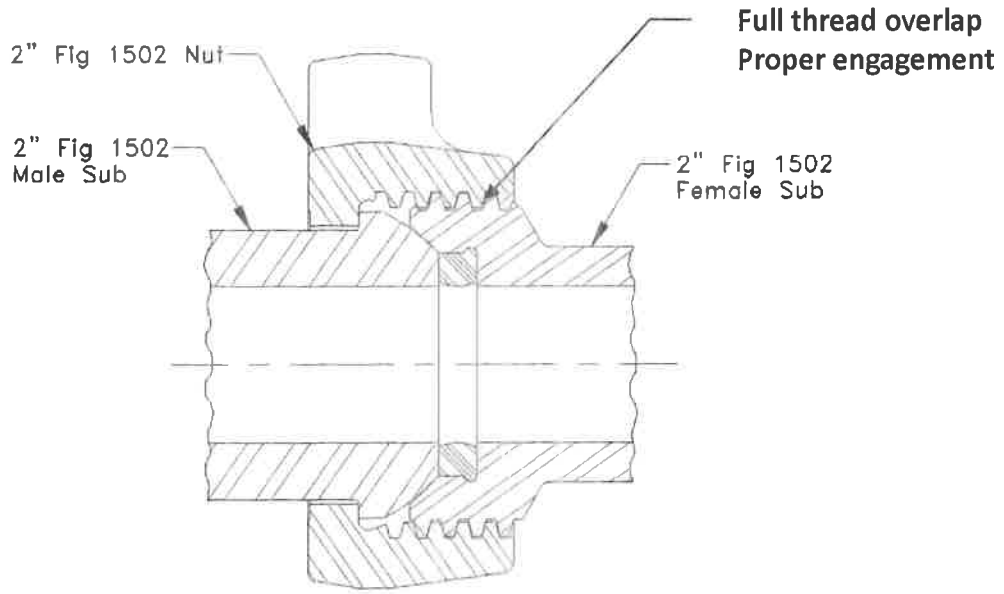


Figure 7. 1502 wing nut on a 1502 female union.

Threaded Connections

- **Definition:** The use of a V type thread to construct a cross over from one union or thread to another.
- **Example**: Using a nipple with NPT (National Pipe Threads) threads on both ends to construct a cross over from 2" 1502 male to a 2" 1502 male.

- **Issues**
  - The ends and ID of the nipple wash over time.
  - The NPT thread tends to get cracks in root of the thread.
  - Difficult to adjust to proper length and maintain a pressure seal.

Threaded Connections

Acme Threads

- Acme Threads are a square shouldered thread.
  - Example: 1502 female thread half.
- Acme threads are not a tapered thread.
- Acme threads do not have a tendency to crack in the root.
- Generally can be disassembled without being damaged.

Acme Threads vs. NPT

- **Acme threads**
  - Same as 1502 union.
  - Used in Frac Crosses.
  - Used in fluid ends.
  - Used in integral cement heads.

- **NPT (National Pipe Threads)**
  - Old Cementer Manifolds.
  - Old cement head manifolds (acceptable by on standard pressure, 5000 psi, heads).
- The use of an acme thread is not considered a threaded connection.

Treating Iron Inspection

- What is it?
  - System by which the pressure containing competency of the HP component is determined and documented.
- What does it do?
  - Minimum of once a year establish that treating components meet minimum requirements with respect to
    - wall thickness
    - pressure test
    - union acceptability.

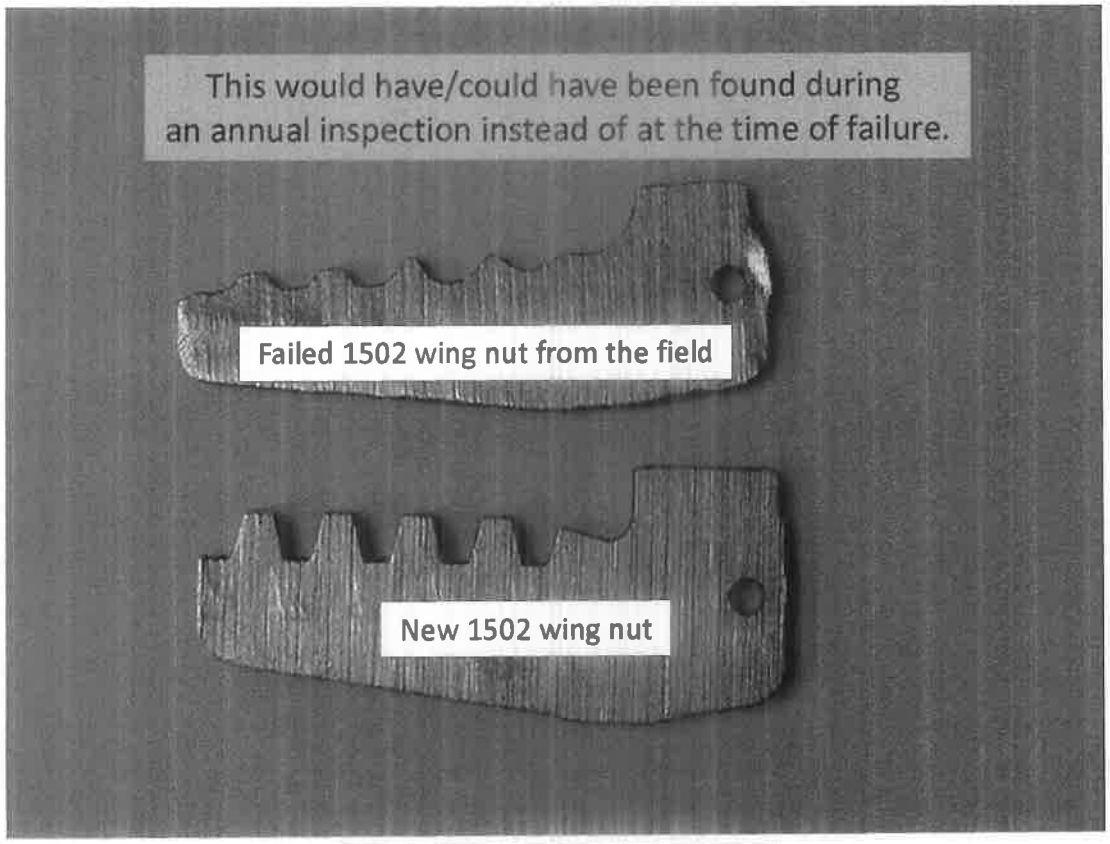


Figure 9. Failed 1502 wing nut.

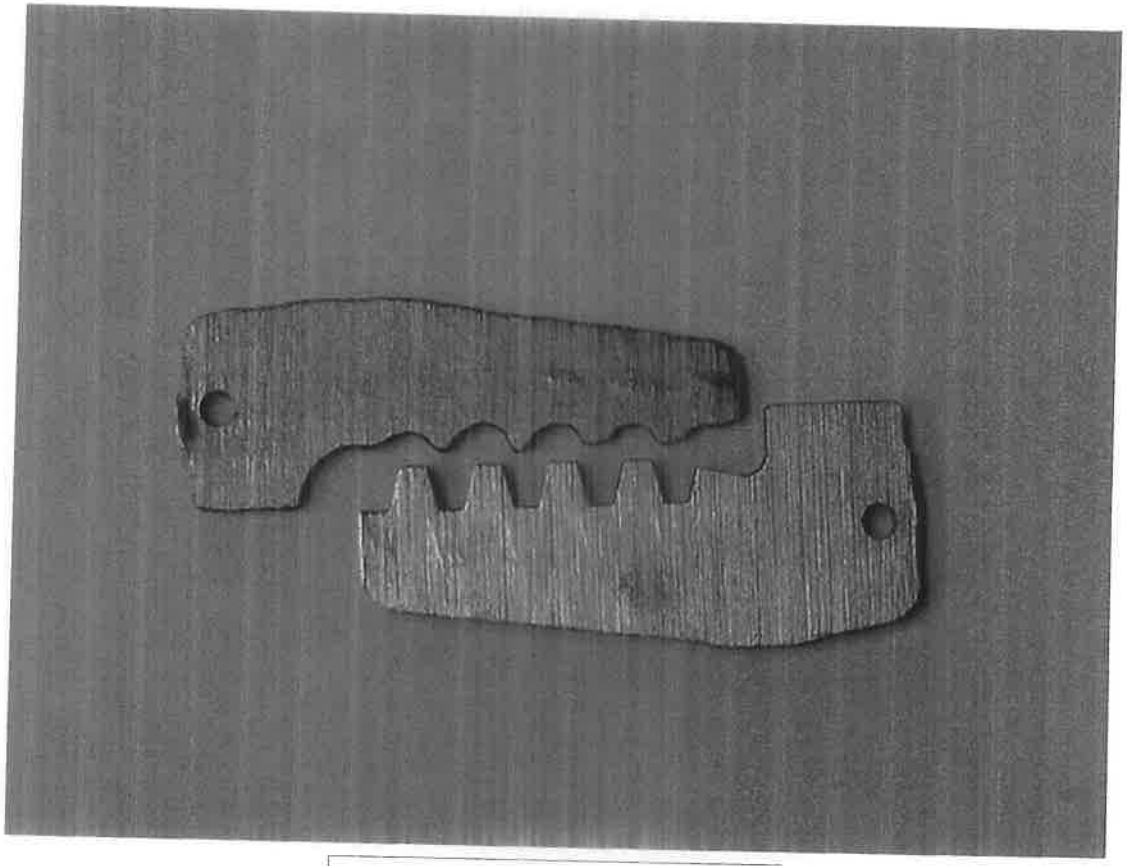


Figure 10. Failed 1502 wing nut.

H_2S vs. Standard Treating Equipment

- Primary difference is that H_2S iron (piping) is constructed from different material.
- The different material is used to prevent SSC (Sulfide Stress Cracking).
- The material is select per NACE MRO175.
- Primary differences are:
  - Yield strength of the metal(80,000psi).
  - Hardness of the metal(18-22 RC).

H_2S vs. Standard Treating Equipment

- What does this mean to you?
  - 2002 (Standard Service) iron rated for 20K psi.
  - 2202 (H2S Service) iron is rated for 15K psi.
  - 1502 (Standard Service) iron rated for 15K psi.
  - 1502 (H2S Service) iron is rated for 10K psi.
- The same principle applies to well heads connections.

Iron used by Testing Segment

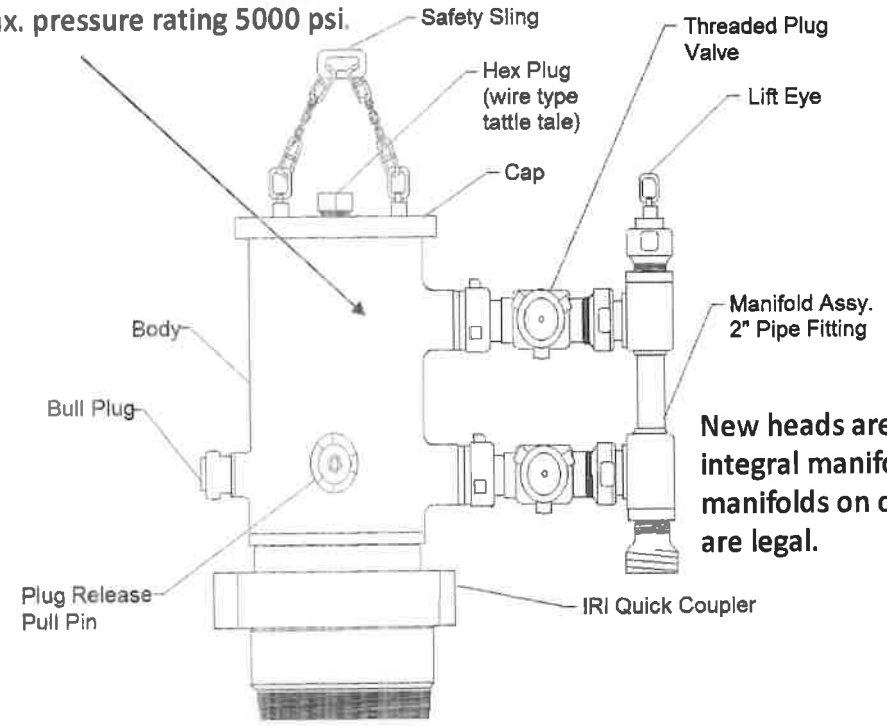
- The "Testing" segment uses 602 and 1002 iron.
- Typically the iron is H_2S resistant.
- During inspection they typically go to "test pressure" where we go to "working pressure".

Summary

- Identify the difference between a NPST and a threaded connection.
- Identify the difference between a 1502 and a 602 or 1002 union.
- Identify the difference between an Acme thread and a NPT.
- Identify the differences between standard and H_2S treating iron.

Standard Pressure Cement Head

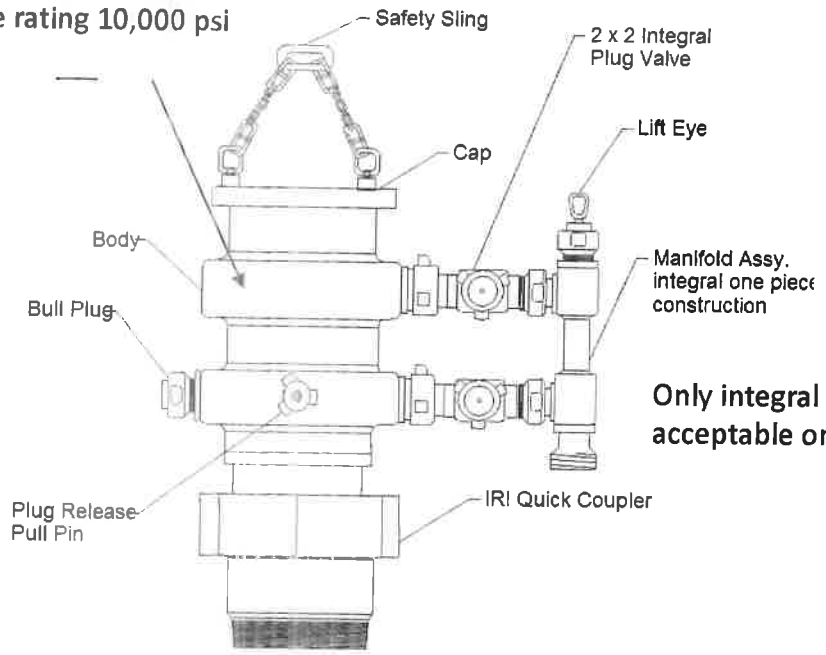
Standard pressure (fabricated) cement heads can be identified by the straight exterior of the body. Typical max. pressure rating 5000 psi.



New heads are coming with an integral manifold. Threaded manifolds on older heads are legal.

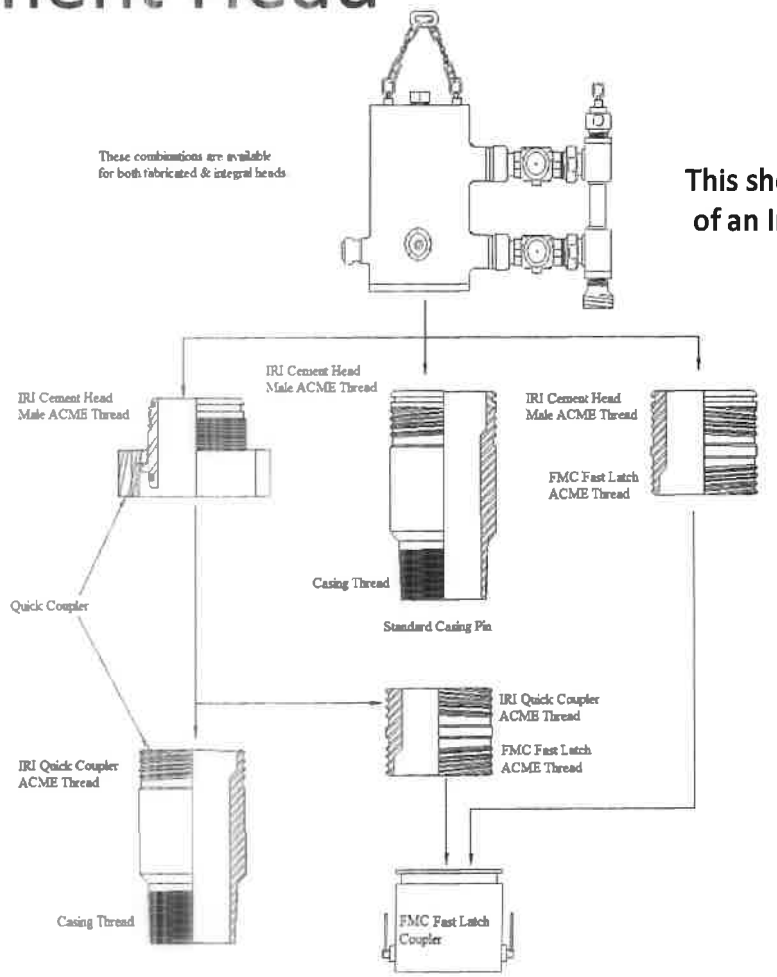
Integral Cement Head

Integral cement heads can be Identified the raised bands on the body.
Typical pressure rating 10,000 psi



Only integral manifolds are acceptable on integral heads

Industrial Rubber Cement Head



This shows the possible configurations of an Industrial Rubber cement head.

Treating Iron Suppliers

• **FMC**	**Standard treating iron**
• Woods	Standard treating iron
• Grant (Smith)	Dart check valves
• Industrial Rubber, Inc.	Cement heads
• Parker – Hannifin	HP 2" Hose
• Coflexip	HP Steel hose
• Dayco	CemSTREAK hose
• Texas Oil Tool	CT well head connections

TEST PAPER
Treating Iron
10 Questions / Maximum 30 minutes

Instruction:

1. *This questions paper consists of 1 Section: Treating Iron*
2. *All question in Objective form*
3. *Answer all the question*

NAME	
POSITION	
DATE	

.....FOR ASSESSOR USE ONLY.....

Section	SCORE	MAX SCORE	REMARKS /COMMENTS
Treating Iron		10	
TOTAL SCORE %			
ASSESSOR NAME			
TEST RESULT (Passing Marks = 75%)	☐ PASSED ☐ FAILED		

Sections1: Treating Iron

1. What is working pressure for 1502 treating irons
   A) 150 psi
   B) 1500 psi
   C) 15000 psi
   D) 1502 psi

2. Define NPST
   A) Non- pressurized seal threaded
   B) Non-pressurized standard threaded
   C) Non-protective seal threaded
   D) Non-protective standard threaded

3. What is nominal ID of 2inch treating
   A) 1.875in
   B) 1.6875in
   C) 1.995in
   D) 2in

4. 2-Way chiksan is use for
   A) Changing elevation
   B) Changing direction
   C) All above

5. What is maximum flowrate for inch treating iron
   A) 8.5 bpm
   B) 9.5 bpm
   C) 10.5 bpm
   D) 7.5 bpm

6. When rig-up treating iron, the wing must face to
   A) To the well
   B) To the pump
   C) None of the above

7. What is well service iron tested to
   A) 2 times the working pressure
   B) 1.5 times the working pressure
   C) Working pressure
   D) Not tested

8. An important use of 2xl plug valve is
   A) Backup valve to the 2x2 plug valve
   B) Main pressure control valve
   C) Master valve on a tree saver
   D) Bleed of valve on the treating line

9. All connections in the treating lines should be the same ID as the treating line
   A) True
   B) False

10. 2xl can be used as a choke
    A) True
    B) False

Neu Dimension

ATTENDANCE FORM

TOPIC/SUBJECT : Treating Equipment
DATE : 24/02/2020 DAY : Monday
VENUE : CTS Meeting Room TIME : 2:30 p.m

NO	NAME	POSITION	SIGNATURE
1.	Yusoff		
2.	Taufiq		
3.	Nazri		
4.	Hamis		
5.	Shahril		
6.	Ufizaal		
7.	Firdaus		
8.	Engku Nazri		
9.	Syukri		
10.	Mat Nor		
11.	Zalani		
12.	Aizam		
13.	Nurfi		
14.			
15.			
16.			
17.			
18.			
19.			
20.			

TRAINING COORDINATOR:

NO	NAME	POSITION	SIGNATURE
1.			
2.			
3.			

REMARKS:

CTS PRESENTATION ASSESSMENT FORM

Presenter's Name	MOHD FAIZ BASHIR	Date	24/02/2020
Position		Location	CTS MEETING ROOM
Topic	TREATING EQUIPMENT		
Objective			

Rating: ***Improvement Needed*** *(IN)* ***Adequate*** *(A)* ***Strong*** *(S)*

		Rating	Comment
1	**Presentation Skill**		
	a. The presenter was well prepared and delivered the material in a clear and structured manner.	S	
	b. The presenter was knowledgeable about the topic and able to relate the importance of the subject matter to his job	S	
	c. The presentation contained practical examples and useful techniques that applied to current work.	S	
2	**Creativity**		
	a. Did the presenter show creative thinking in the method of development and presentation?	S	
	b. Did presenter get audience involved in "learning" the material?	S	
3	**Content**		
	a. Did the presenter cover all the key points of the subject matter	S	
	b. Did the presentation incorporate strong, effective supporting material throughout?	A	
	c. Did the presenter give clear and concert explanation and example?	S	
	d. Was the presenter able to answer questions on subject matter? Answers were correct and corresponded with the required understanding?	S	
4	**Overall Assessment**		

Additional Comments:

Assessed By:	Verified By:
Name: TAUFIQ ISMAIL	Name: NAZRI
Position: CT SUPV	Position: LSM
Date: 24/02/2020	Date: 24/2/20

CTS PRESENTATION ASSESSMENT FORM

Presenter's Name	MOHAMED FAIZ	Date	24/02/2020
Position	SENIOR EO	Location	KSB
Topic	TREATING EQUIPMENT.		
Objective			

Rating: ***Improvement Needed*** *(IN)* ***Adequate*** *(A)* ***Strong*** *(S)*

		Rating	Comment
1	**Presentation Skill**		
	a. The presenter was well prepared and delivered the material in a clear and structured manner.	S	
	b. The presenter was knowledgeable about the topic and able to relate the importance of the subject matter to his job	S	
	c. The presentation contained practical examples and useful techniques that applied to current work.	S	
2	**Creativity**		
	a. Did the presenter show creative thinking in the method of development and presentation?	S	
	b. Did presenter get audience involved in "learning" the material?	S	
3	**Content**		
	a. Did the presenter cover all the key points of the subject matter	S	
	b. Did the presentation incorporate strong, effective supporting material throughout?	S	
	c. Did the presenter give clear and concert explanation and example?	S	
	d. Was the presenter able to answer questions on subject matter? Answers were correct and corresponded with the required understanding?	S	
4	**Overall Assessment**		

Additional Comments:

- GOOD PRESENTATION -

Assessed By:	Verified By:
Name: YUSOF AMAN	Name: NADIA
Position: FOREMAN	Position: FSM
Date: 24/02/2020	Date: 24/2/20