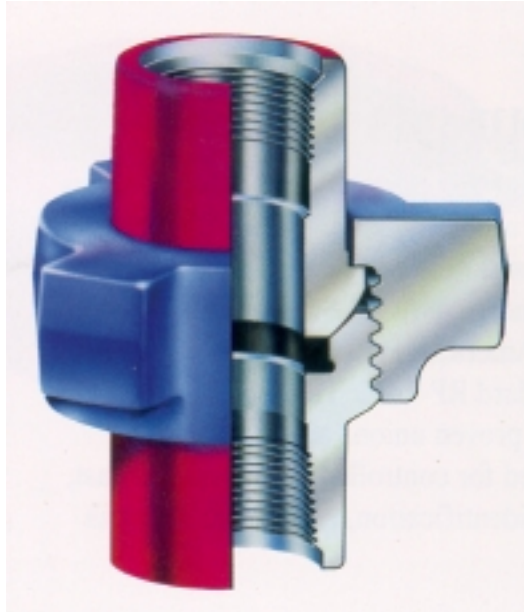


Weco Hammer Unions



MisMatched Unions have caused fatal accidents !

Do you know :


- ... what are Weco Unions and who makes them?
- ... what are the Dowell Standards?
- ... of the potentially fatal hazards?
- ... how to eliminate the hazards?

Weco Hammer Unions

... what are they? ... who makes them?

- ... connectors for temporary pipe and flow lines installations.
- FMC acquired the original Weco company, in the 1950s.
- The design is old, and manufactured many companies.
- ... used in steel and chemical plants, on marine dredging vessels, in strip mines, and in the oil industry.
- ... more than a dozen design variations;
... designated by
the nominal pipe diameter and a 'Fig' number

i.e. 2" 1502.



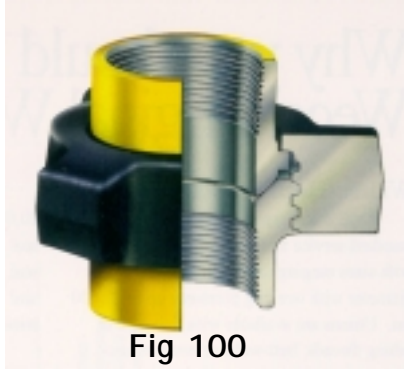


Fig 100
1000 psi
2" to 8"

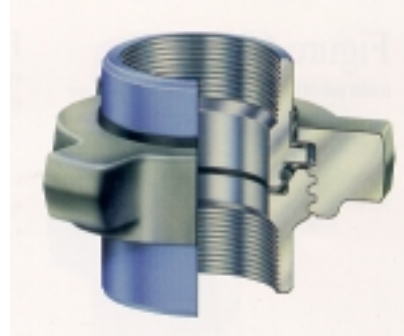


Fig 211
2000 psi
1" to 4"



Fig 602
6000 psi
1" to 4"

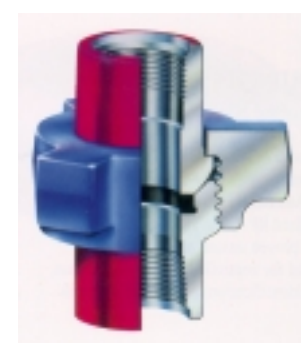


Fig 1502
15,000 psi
1" to 4"

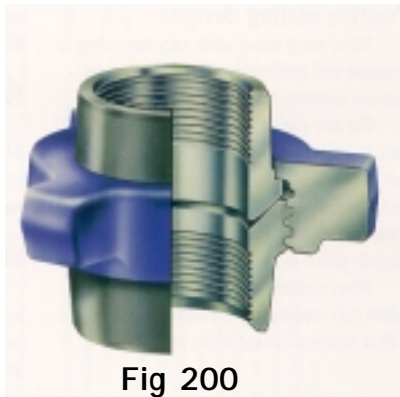


Fig 200
2000 psi
1" to 4"



Fig 400
2500 to 4000 psi
2" to 12"

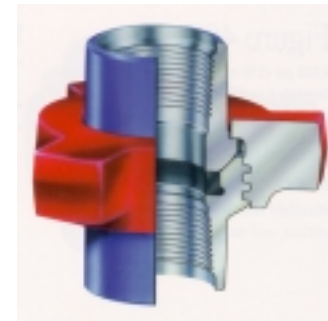


Fig 1002
10,000 psi
1" to 6"

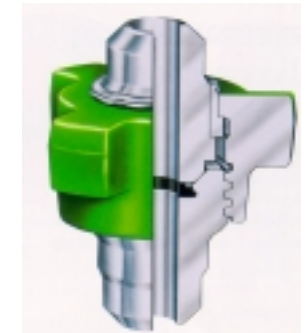


Fig 2002
20,000 psi
2" or 3"

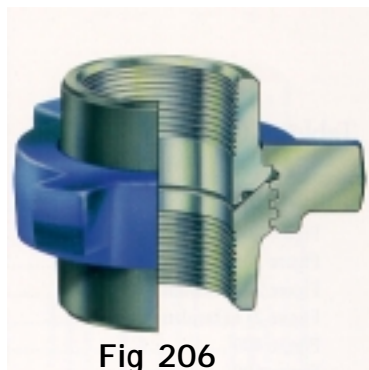


Fig 206
2000 psi
1" to 10"

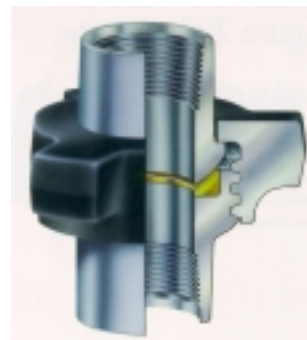


Fig 600
6000 psi
1" to 4"

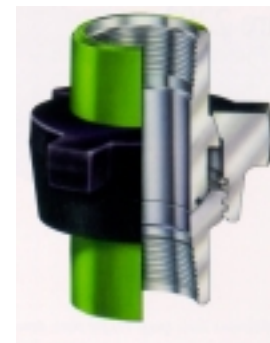


Fig 1003
10,000 psi
2" to 5"

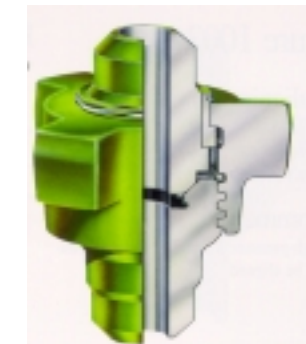


Fig 2202
15,000 psi - H₂S
2" to 3"

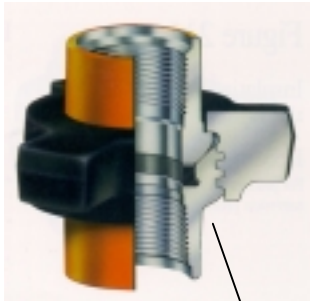
Dowell Standards

Dowell Uses these High Pressure Weco Unions

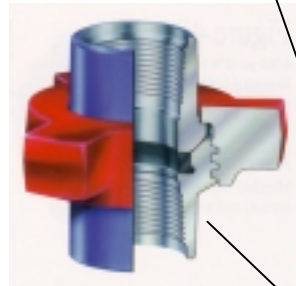
Standard Service Series	Pressure Rating				Nominal Pipe Sizes (dia - inches)
	Standard Service		Sour Gas Service		
	Working	Test	Working	Test	
1002	10,000	15,000	7,500	12,000	4, 5
1502	15,000	22,500	10,000	15,000	1, 1½, 2, 3,
2002	20,000	30,000	NA	NA	3

The First Hazard

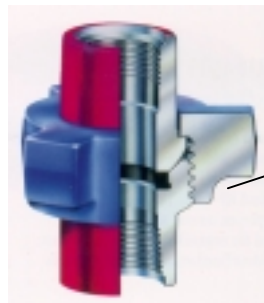
A 2" 1502 Wing Nut will make up to a 2" 602 or 1002 thread half but will fail ... **explosively**.



602



1002



1502

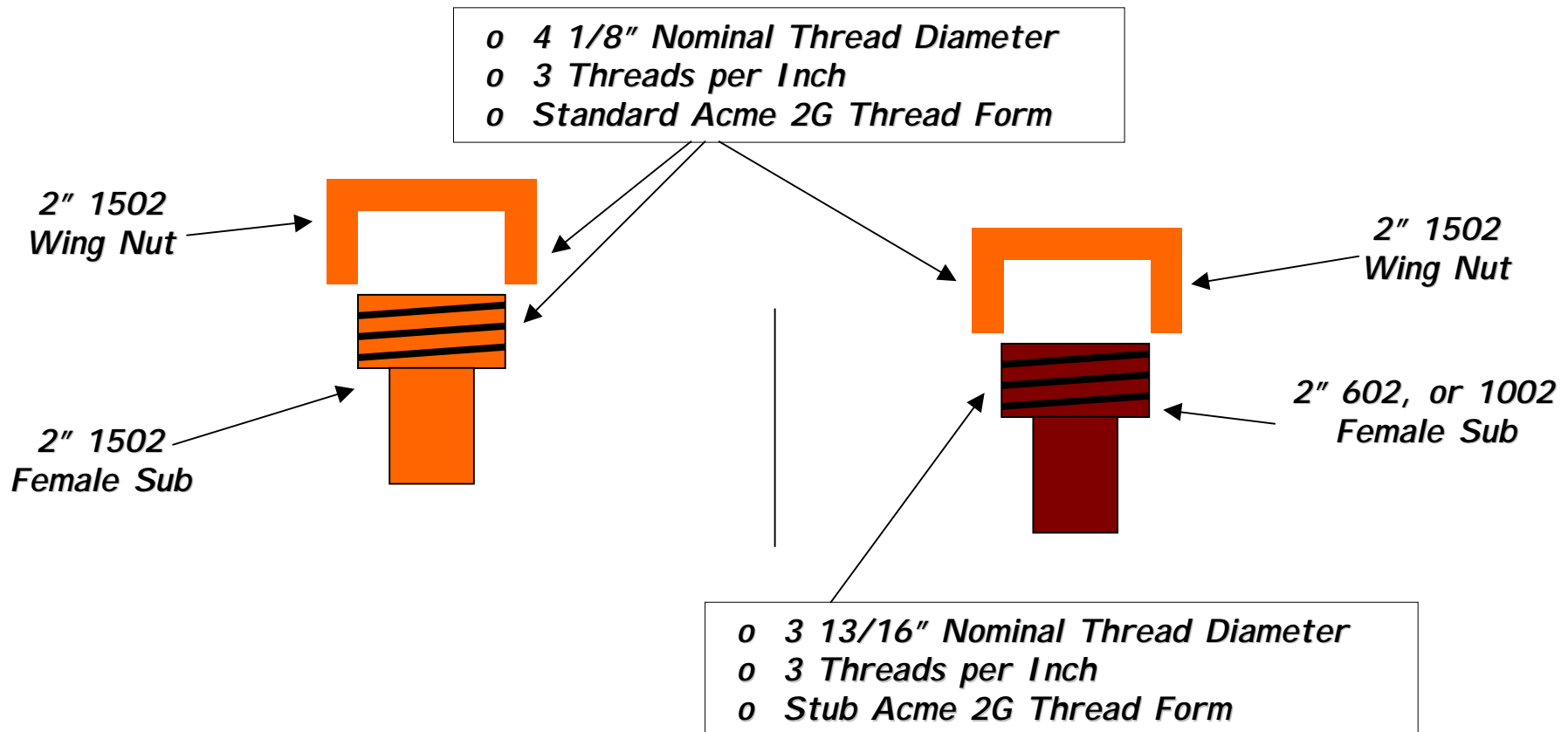
Series (Figure)	Standard Working Pressure	Nominal Pipe Sizes (dia - inches)
100	1,000	2, 2½, 3, 4, 6, 8
200	2,000	1, 1¼, 1½, 2, 2½, 3, 4
206	2,000	1, 1¼, 1½, 2, 2½, 3, 4, 6, 8, 10
207	2,000	3, 4, 6, 8, 10
211	2,000	1, 1¼, 1½, 2, 2½, 3, 4
400	2,500	5, 6, 8, 10, 12
400	4,000	2, 2½, 3, 4
600	6,000	1, 1½, 2, 2½, 3, 4
602	6,000	1, 1¼, 1½, 2, 2½, 3, 4
1002	10,000	1, 1¼, 1½, 2, 2½, 3, 4, 5, 6
1003	10,000	2, 3, 4, 5
1502	15,000	1, 1½, 2, 2½, 3, 4
2002	20,000	2, 3
2202	15,000	2, 2½, 3

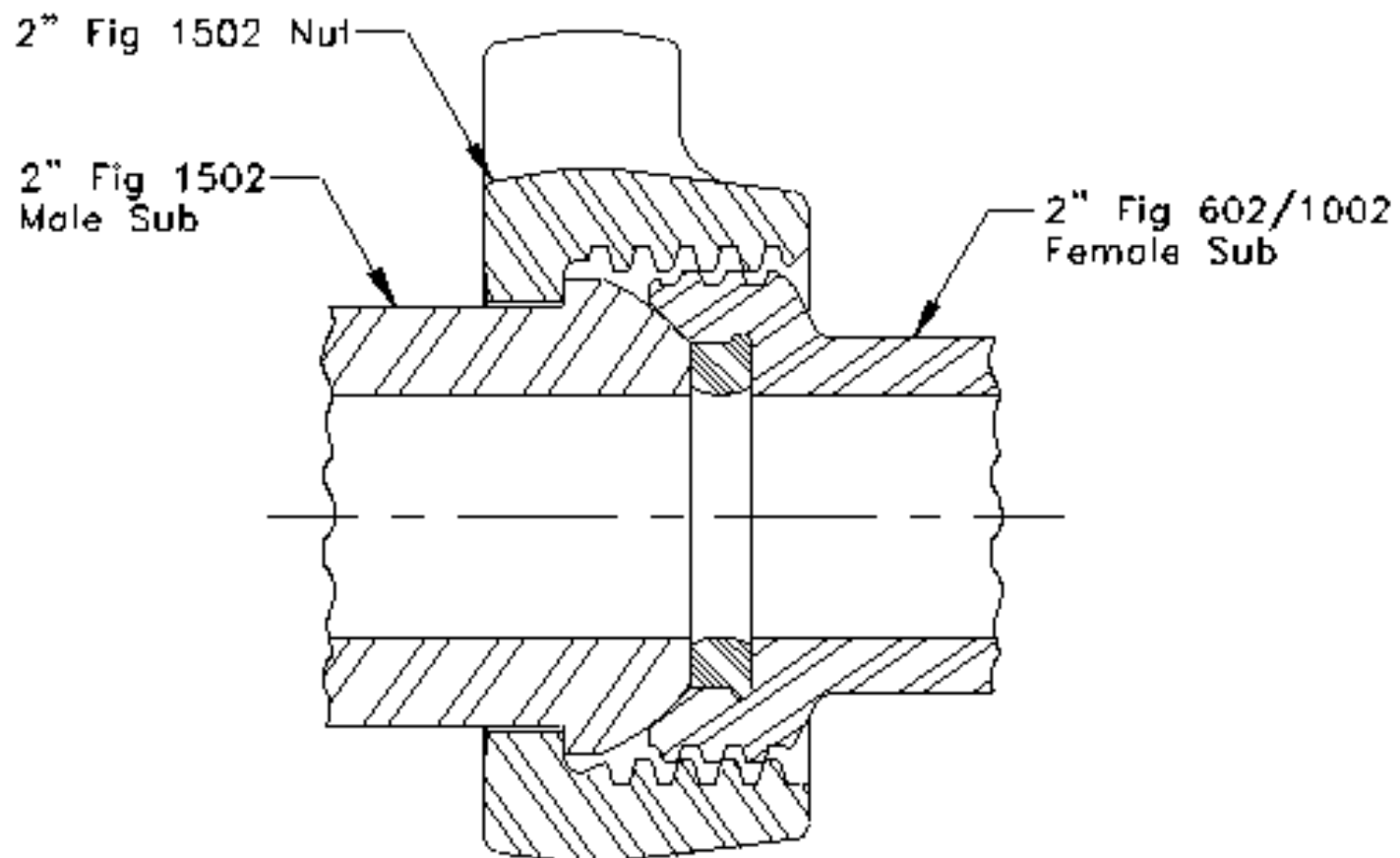
Potentially Fatal Combinations

2, 2½, 3, 4
2, 2½, 3, 4, 5, 6
2, 2½, 3, 4

The First Hazard

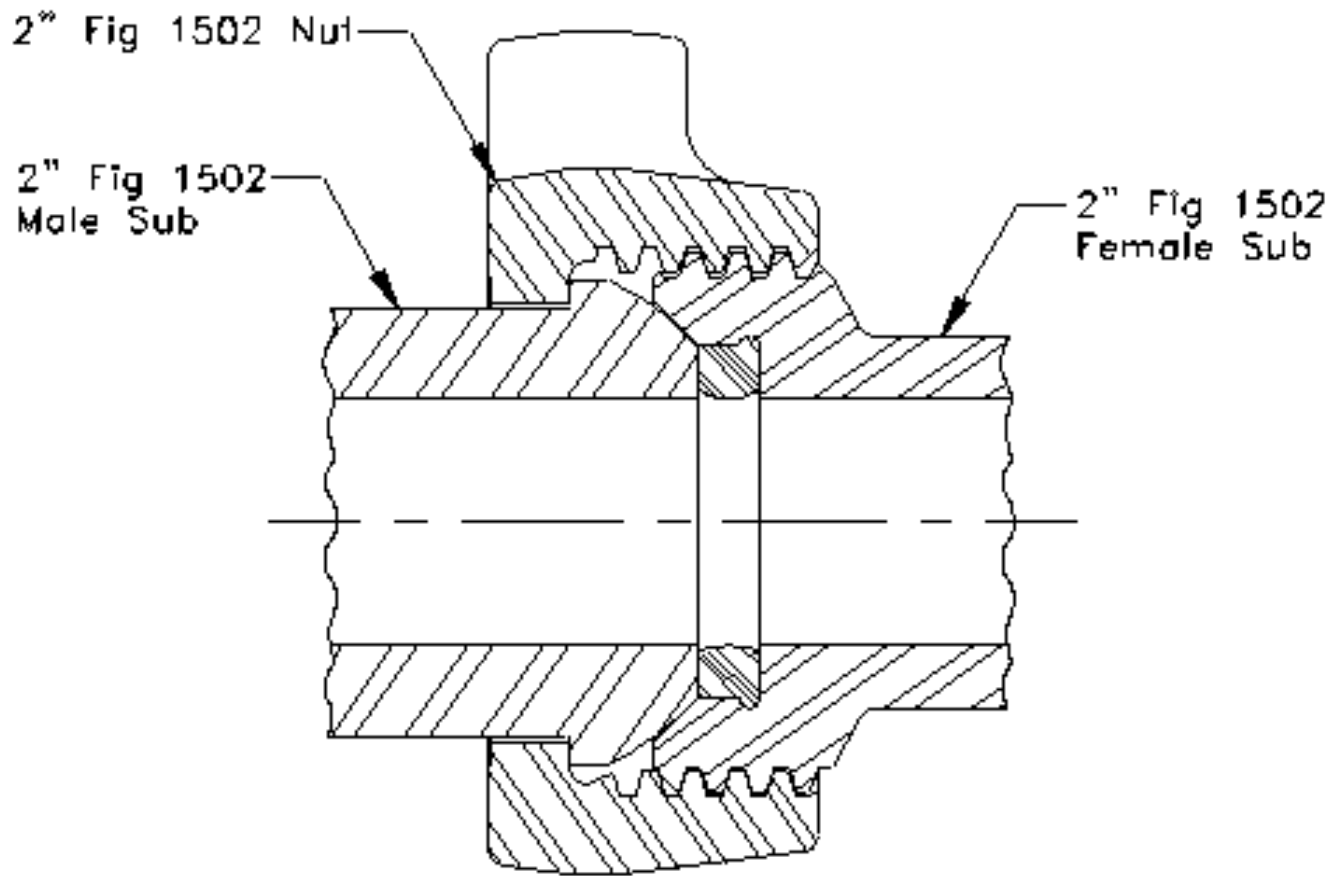
- A 2" 1502 Wing Nut will make up to a 2" 602 or 1002 thread half and will hold some pressure ! However ...
... it will fail **explosively**.





Incorrect Combination

2" 602 Thread Half (Female Sub) with 2" 1502 Wing Nut (Male Sub)



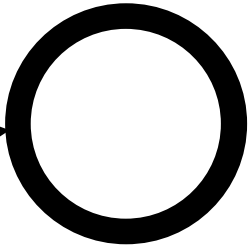
Correct Combination
2" 1502 on Both Sides

Prevention

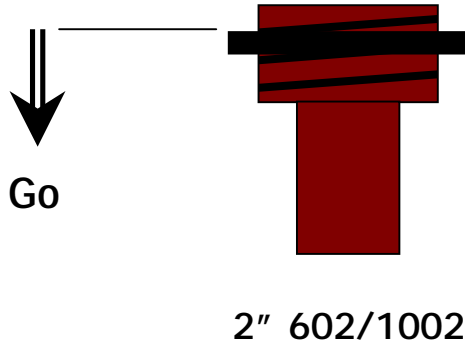
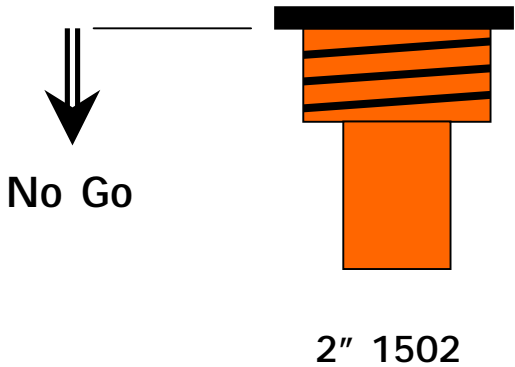
Destroy 2" 602 & 1002 Weco unions or old Guiberson Unions found in your operation.

*When there is uncertainty ...
(Connecting to other companies equipment)*

*Use the Go No-Go Gage to be sure you have
a 1502 Thread Half (Female Sub)*

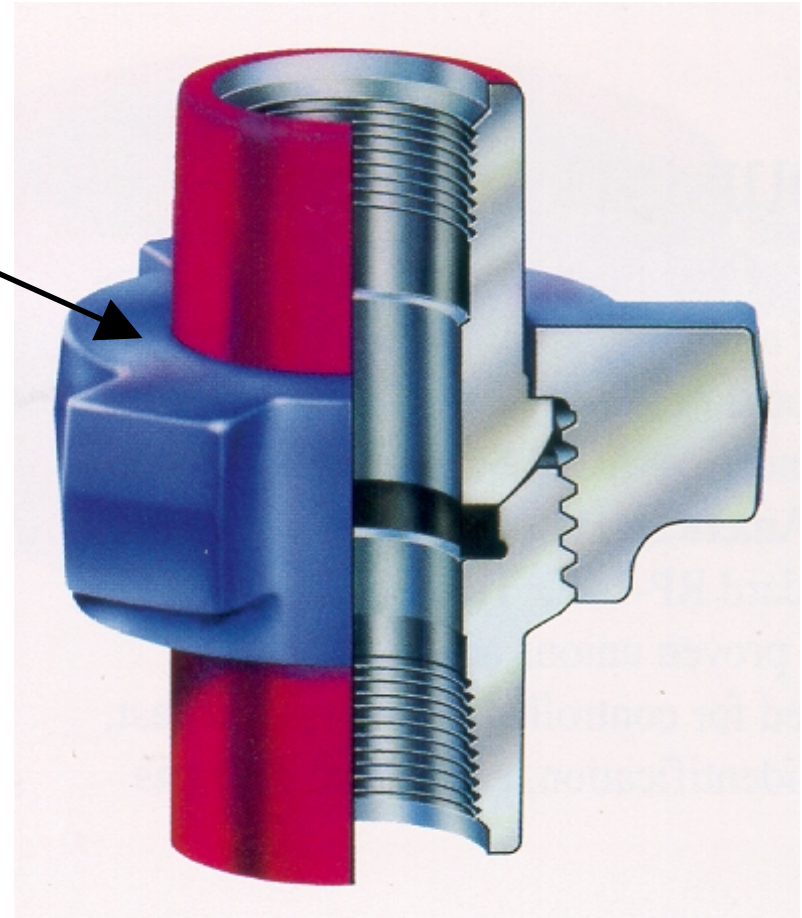


Order from Wood Machine - Tulsa
Fax : 918-437-0007
Dowell P/N 47990000

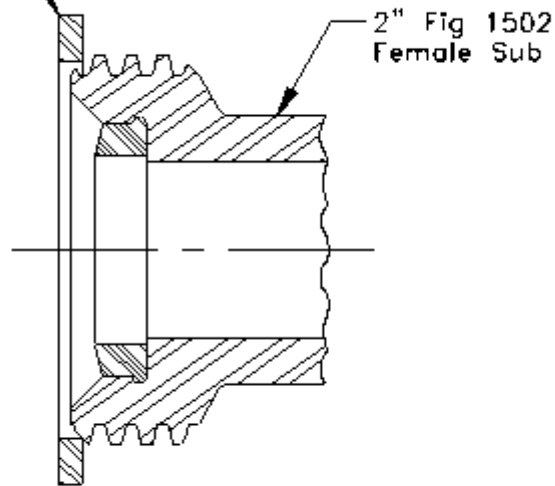


Prevention

Find the Identification Markings (2" 1502) on the Wing Nut ... Here

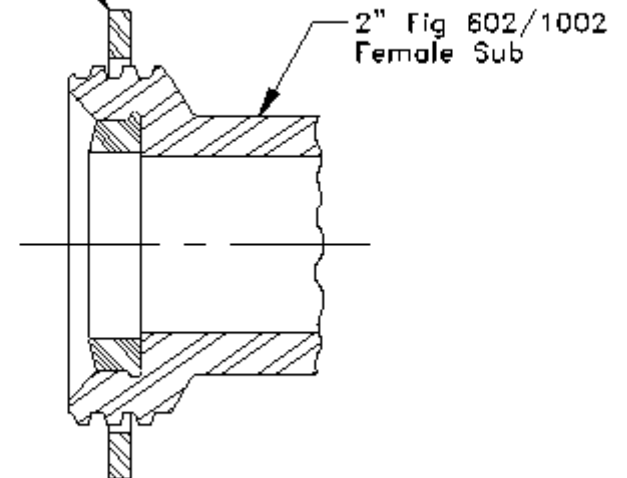


2" Union Gauge Ring
P/N 477990000



Acceptable
Union Gauge Ring will not go over threads

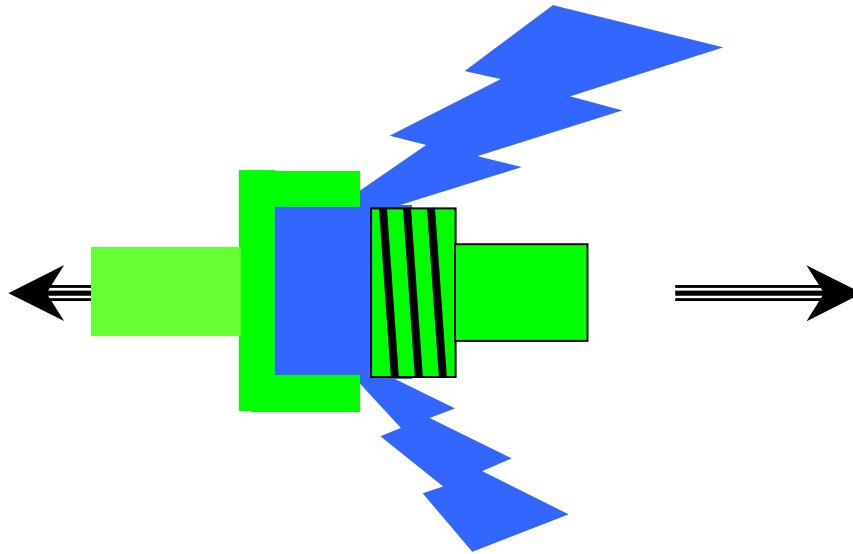
2" Union Gauge Ring
P/N 477990000



UnAcceptable
Union Gage Ring will go over threads

The Second Hazard

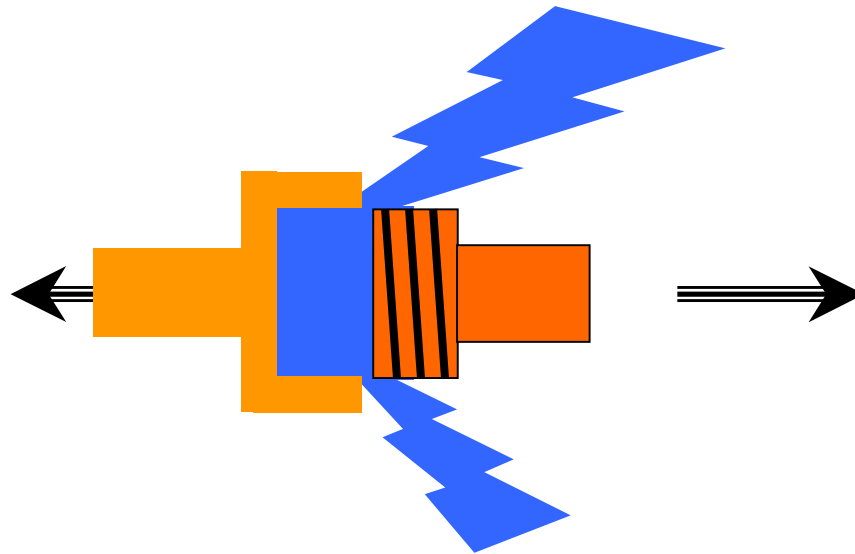
Off brand unions may not hold rated pressure.



Use only Unions supplied by FMC
and in good condition.

The Third Hazard

Like 1002 and 602 Unions, a Guiberson thread half will make up to a 1502 wing nut, but will fail explosively.

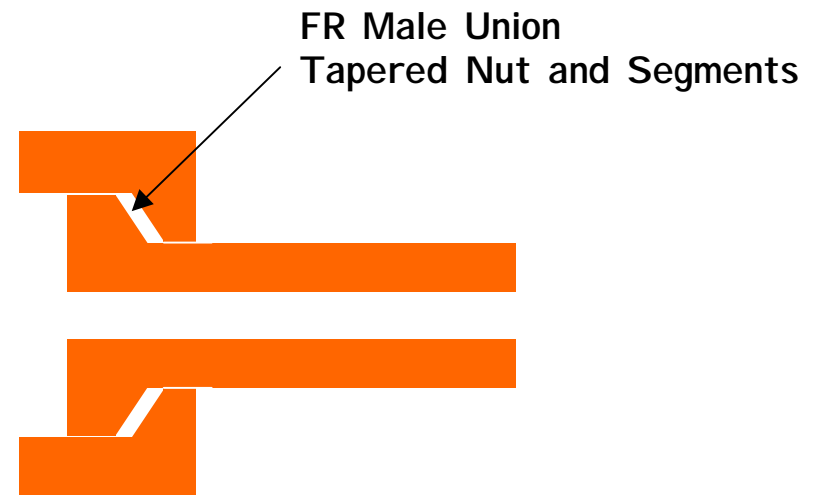
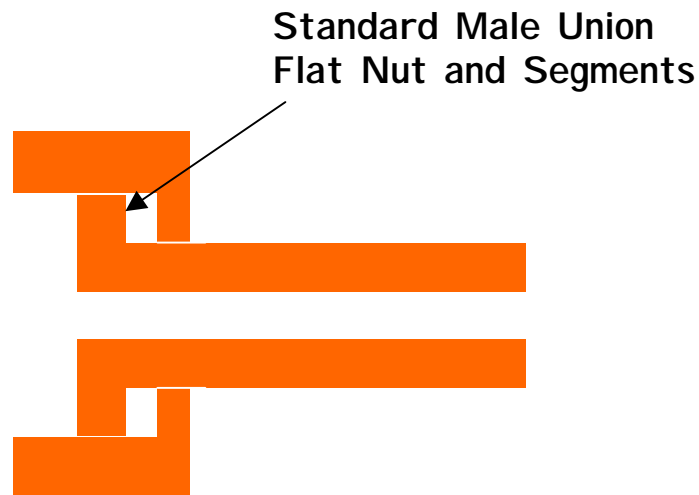


**Use only Unions supplied by FMC
and in good condition.**

**Guiberson unions have been banned from Dowell
operations for more than ten years. Be sure there
are none remaining in your operation.**

The Fourth Hazard - The FR Male Union

- Since 1995 FMC offers a Fatigue Resistant Male Union
- FR Components will fit on Non FR assemblies
- Mixed assemblies may fail below the rated pressure.



Do not mix FR and Non FR Male Union Parts.

See Maintenance Bulletin 957.

Recap

- **Suppliers**
 - o There are many suppliers (use only FMC)
- **The Hazards**
 - o A 2" 1502 Wing Nut will attach to a 2" 602 or 1002 Thread Half and hold limited pressure, but will fail explosively.
 - o Off brands may not hold rated pressure (use only FMC).
 - o Beware of old Guiberson connections.
 - o Do not mix FR and non FR Wing Nut (Male Ends)
- **Prevention**
 - o Use only 2" 1502 unions by FMC, in good condition.
 - o Check before you connect :
 - o Use the Go No-Go Gage to insure a 2" 1502 thread half.
 - o Look for 2" 1502 on the Wing Nut.

Optional Slides

This 1998 IADC Safety Alert followed a fatal accident on a drilling rig in the USA Gulf of Mexico.



ALERT 98-1

Safety Alert

High Pressure Lines and Hammer Unions

A drill crew was drilling ahead when a third party pressure sensor attached to the stand pipe stopped working. The sensor was made up to the standpipe with a size "602" hammer union rated at 6,000 psi working pressure. The crew removed the faulty sensor and replaced it. The hammer union on the new pressure sensor had a size "1502" wing nut rated to 15,000 psi. The "1502" female threads in the wing nut appeared completely made up to the "602" male threads coming off the standpipe.

The mud pumps were engaged and drilling operations resumed. As the mud pump pressure increased, no leaks were detected. Then, at approximately 2,000 psi, the pressure sensor and "1502" wing nut were blown off the standpipe. Fortunately, no one was struck by the projectile or the ensuing stream of drilling fluid. Approximately one barrel of oil-based mud was sprayed on the rig floor before the mud pumps were secured and the standpipe was isolated.

The mishap was considered an environmental incident and a significant near miss, which could have resulted in serious injury or death.

After investigating the incident, operator offered the following suggestions:

1. Only unions with like threads should be made up. Although mismatched threads may appear made up (as they did in this case), only a portion of the threads are engaged and the union will fail under pressure.
2. Both halves of the union should have the same pressure rating.
3. All pressure lines should be inspected to ensure there are no mismatched unions.

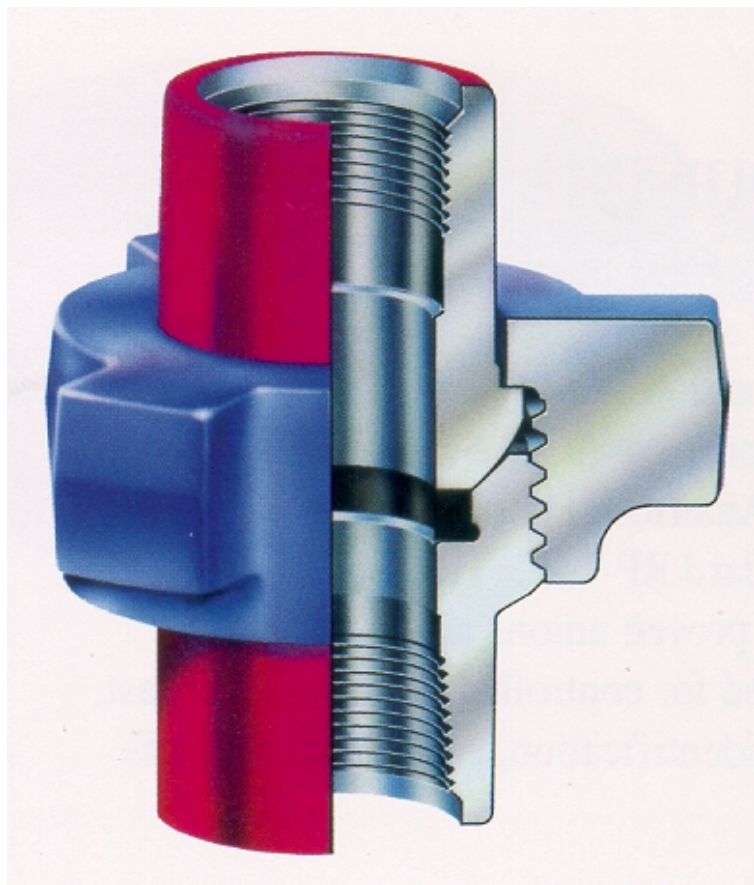
This material is presented for information purposes only. Managers & supervisors should evaluate this information to determine if it can be applied to their own situations and practices.

From : <http://iadc.org/alerts/sa98-1.htm>

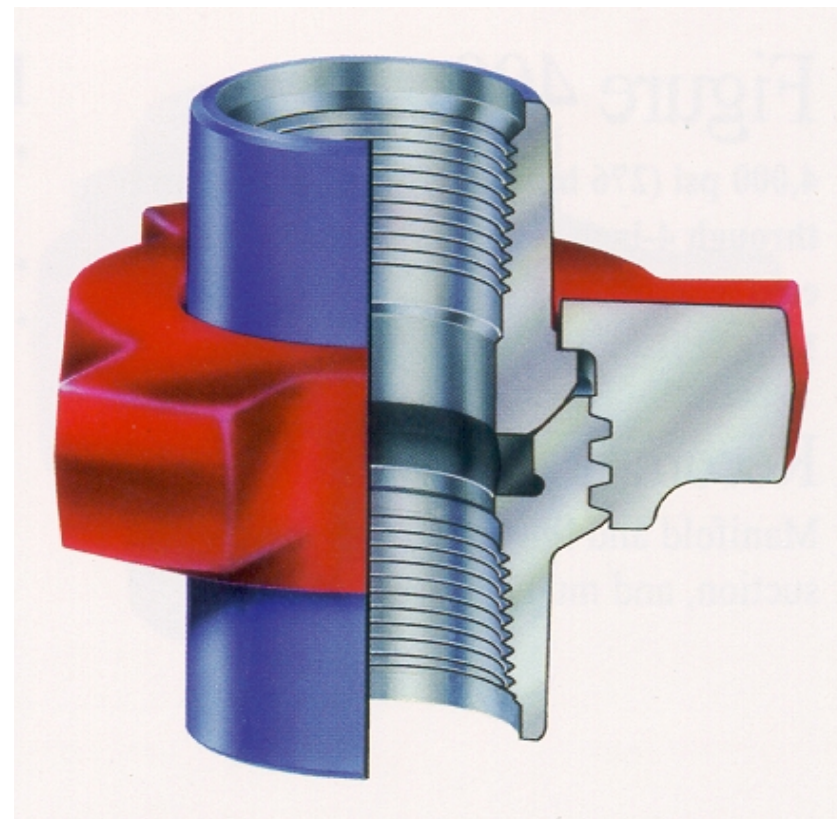
Weco Unions - Variations

Series	Pressure Rating				Nominal Pipe Sizes
	Standard Working	Service Test	Sour Gas Working	Service Test	
100	1,000	1,500	NA	NA	2, 2½, 3, 4, 6, 8
200	2,000	3,000	NA	NA	1, 1¼, 1½, 2, 2½, 3, 4
206	2,000	3,000	NA	NA	1, 1¼, 1½, 2, 2½, 3, 4, 6, 8, 10
207	2,000	3,000	NA	NA	3, 4, 6, 8, 10
211	2,000	3,000	NA	NA	1, 1¼, 1½, 2, 2½, 3, 4
400	2,500	3,750	2,500	3,750	5, 6, 8, 10, 12
400	4,000	6,000	4,500	6,000	2, 2½, 3, 4
600	6,000	9,000	NA	NA	1, 1½, 2, 2½, 3, 4
602	6,000	9,000	6,000	9,000	1, 1¼, 1½, 2, 2½, 3, 4
1002	10,000	15,000	7,500	12,000	1, 1¼, 1½, 2, 2½, 3, 4, 5, 6
1003	10,000	15,000	7,500	12,000	2, 3, 4, 5
1502	15,000	22,500	10,000	15,000	1, 1½, 2, 2½, 3, 4
2002	20,000	30,000	NA	NA	2,3
2202	NA	NA	15,000	22,500	2, 2½, 3

Look Alikes - Weco 1502 & 1002

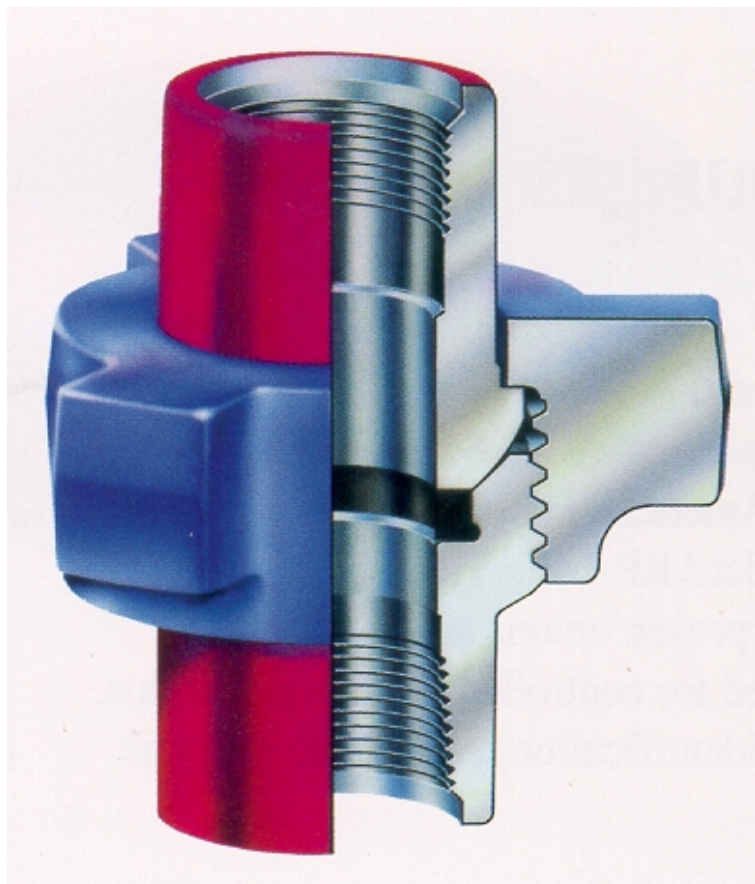


Weco 1502
Hammer Union Assembly

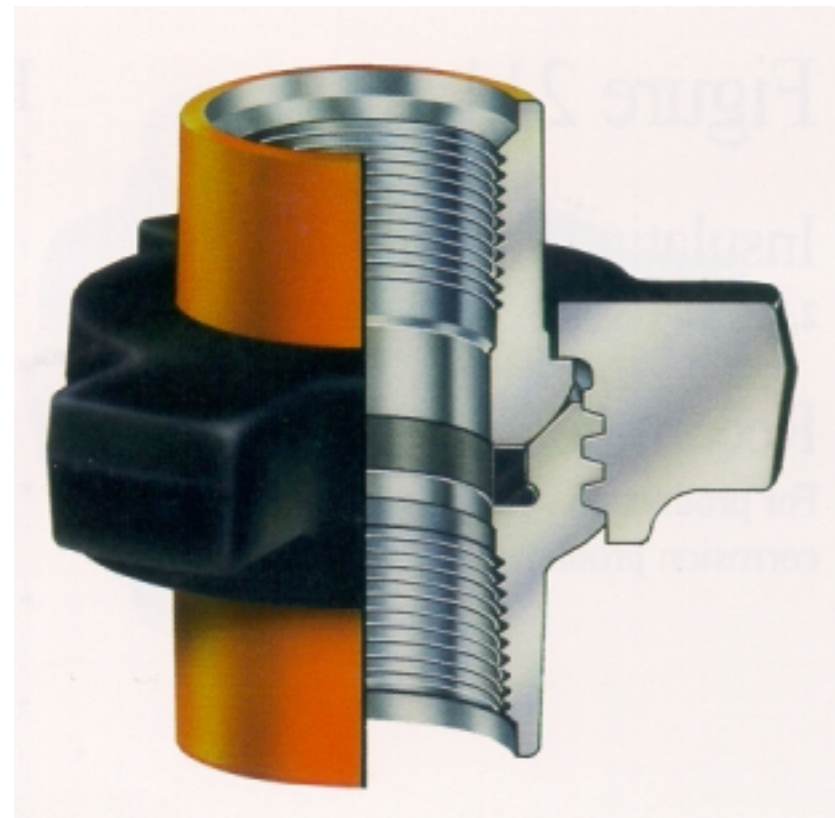


Weco 1002
Hammer Union Assembly

Look Alikes - Weco 1502 vs 602

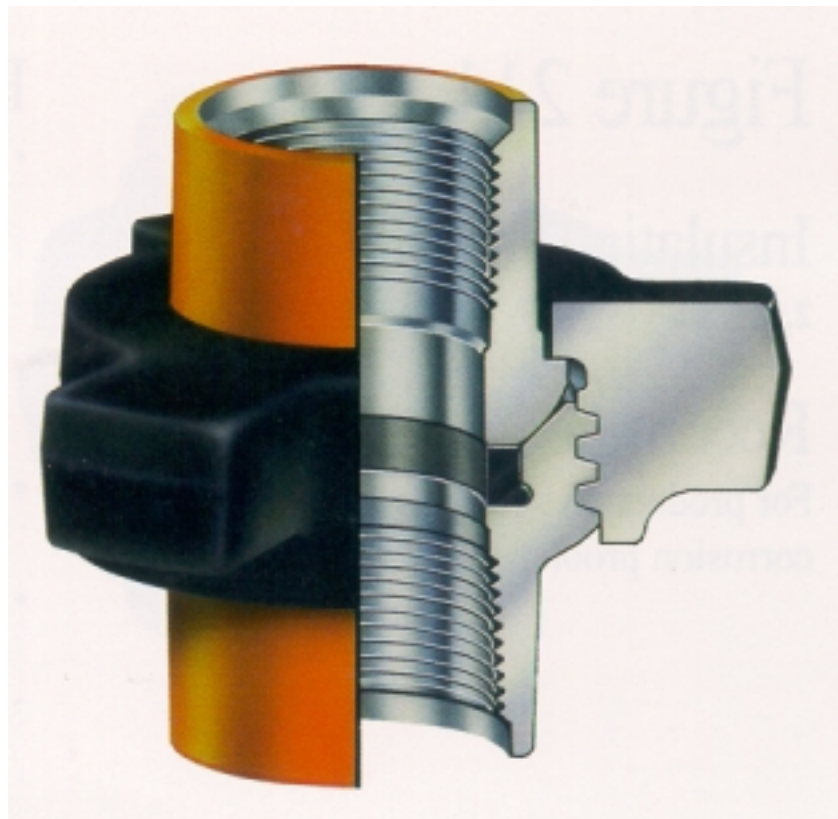


Weco 1502
Hammer Union Assembly

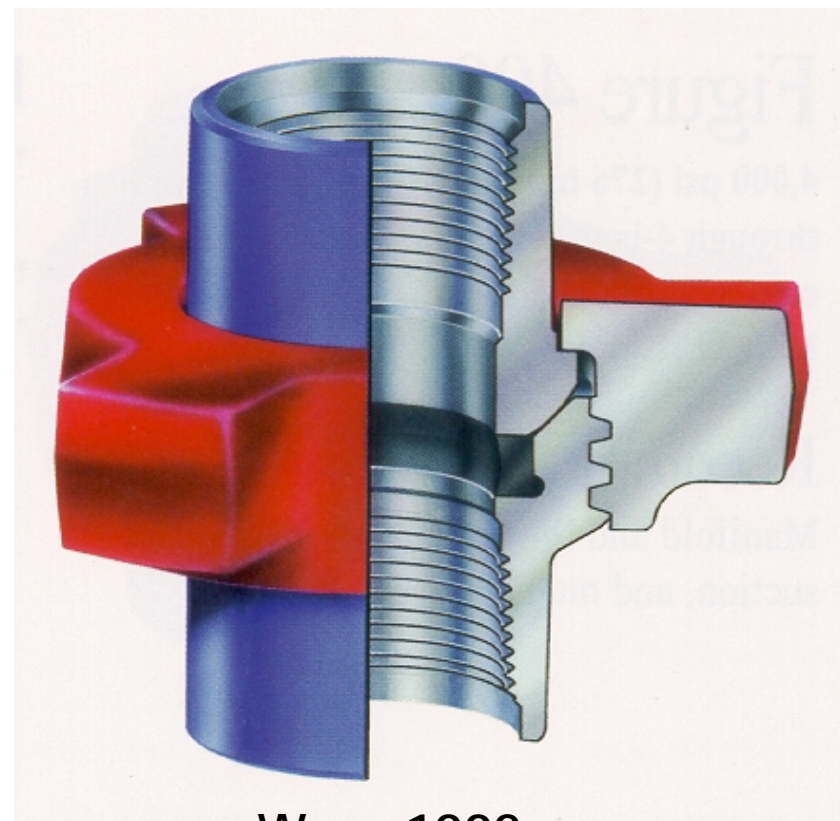


Weco 602
Hammer Union Assembly

Look Alikes - Weco 602 & 1002



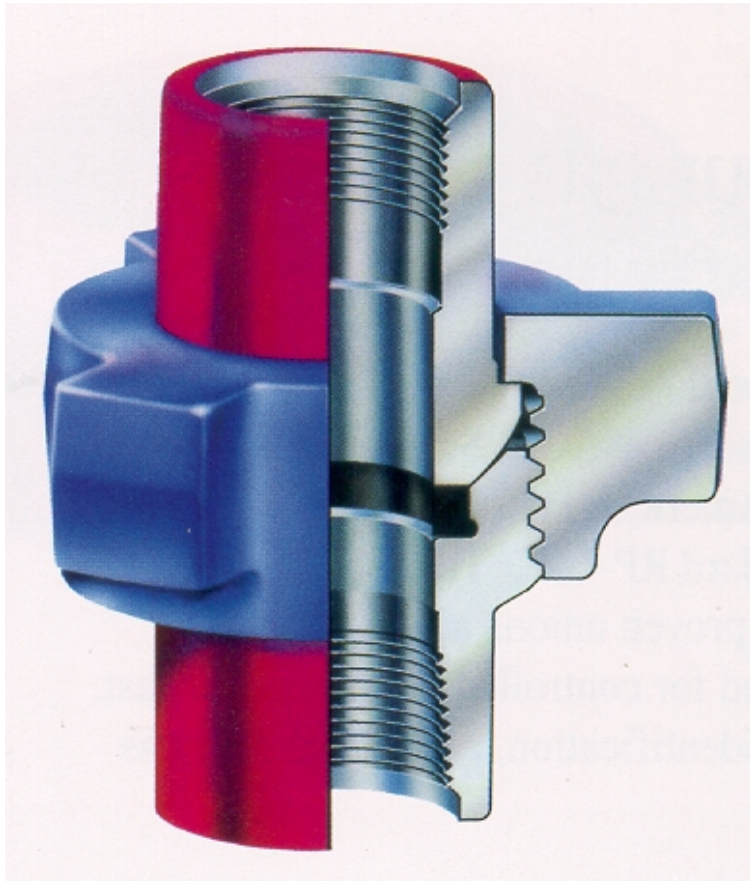
Weco 602
Hammer Union Assembly



Weco 1002
Hammer Union Assembly

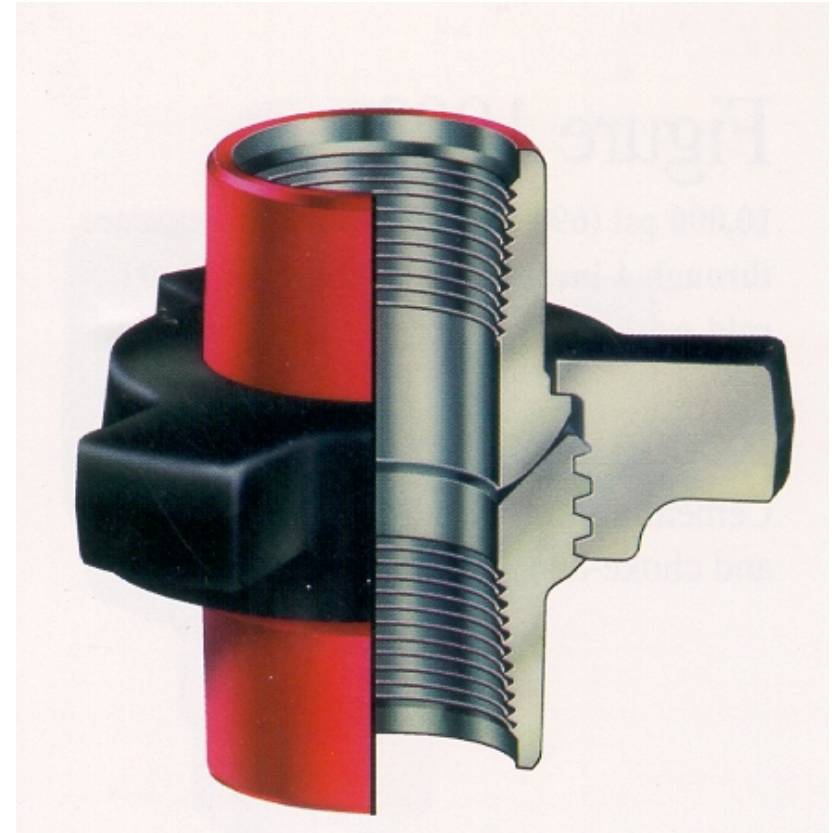
Look Alikes - Weco 1502 vs 402

A 2" 1502 Wing Nut will, also, attach to a 2" 402 Thread Half.



Weco 1502

Hammer Union Assembly



Weco 400

Hammer Union Assembly