

Cold Root Rolling for API 7-2, DS-1 & NS-1

This is an overview of what steps and procedures are necessary to cold roll API connections as well as many proprietary style connections using CJWinter's cold roll tooling. This is not a step by step instruction to meet requirements for API 7-2, DS-1 or NS-1 cold root rolling but to ensure the end user CJWinter's cold roll tooling is capable of being used to meet these specification for cold root rolling.

- With proper use, CJWinter's cold roll tools will cold roll threads compliant with ANSI/API Specification 7.2:2008 and ISO 10424-2:2007, and in accordance with specifications NS-1 sub-spec 143 and DS-1.
- CJWinter has earned Fearnley Procter NS-1 Level 2 Accreditation.
- Cold rolling is a requirement to be performed on all new and re-cut BHA and HWDP API connections.
- The tool must be a hydraulic – all of CJWinter's cold roll tools are self-contained hydraulic units that are commercial grade.
- The tool must have a pressure gauge that is calibrated for accuracy within the past six months – all of CJWinter's cold roll tools are shipped with a Certified Calibration Record traceable to NIST. All of CJWinter's gauges come with a Max Indicating Pointer to read pressures after the cold roll process.
- CJWinter's cold roll tools are designed, and rated to operate safely at up to at least 8,000 lbs. which is twice the maximum required roller force for any standard API Rotary Threaded Connection.
- The roller / wheel material must have a hardness of at least 57 HRC – CJWinter's roller / wheels meet's this requirement.
- The hydraulic system must be equipped with an accumulator of sufficient capacity to maintain recommended pressures and force as the roller / wheel moves along the tapered threads – CJWinter's cold rolling tools do not require an external accumulator to roll the run-out thread nor does our tools require an external power device to pressurize the roller piston.
- Prior to cold rolling the thread root must be cleaned and inspected for scratches that visually are estimated to exceed .002". Scratches exceeding .002" may leave remnant defects after cold root rolling, and are not allowed.
- Roller force requirements for API connections can be found in the DS-1 roller force chart – CJWinter's cold roll tools requires no conversion between values of hydraulic pressure, and roller force. We have simplified the process by design of our working piston which converts 1 PSI to 1 pound of force.
- CJWinter's roller / wheel holder is on a 5 degree angle which is a requirement
- How to determine the proper roller / wheel for the specific API connection, and what radius is on the specific roller / wheels. Can be found at www.coldrootrolling.com.
- CJWinter recommends cold rolling at no more than 60 SFM for box connections and no more than 100 SFM on pin connections. Some specifications require 8 to 15 RPM.

- A standard lathe can be used for this cold root rolling process.
- Check and record tooth height prior to cold rolling.
- Cold rolling procedure - a minimum of three passes are completed.
- It is recommended that the depth of root deformation of .004" be measured after the cold roll process. Check tooth height after the cold rolling process. The NS-1 specification requires an increase in tooth height of .002" to .006". The DS-1 recommends (but does NOT require) a minimum of .004" increase in tooth depth after cold rolling. Specifications are different.
- Coolant or lubricant should be used during the cold roll process. This is not a DS-1 requirement but will prolong the life of the roller / wheels.
- After cold root rolling, a visual inspection under a 10X magnification shall be performed to ensure the root has been burnished, and has a smooth and polished appearance.
- Quantitative inspection should be performed using appropriate micrometer and anvil tip to measure tooth depth achieved.
- Cold rolled connections should be marked with letters "CW" when completed.
- If on-site training is provided, a much more in depth step by step procedure including programming tool path, tool offsets, and setting pressures will be covered specifically to CJWinter's cold roll tooling. Depending on the style lathe used will determine the specific step by step procedure to meet the DS-1 specification. There are manuals available on www.coldrootrolling.com.

The above information is an overview not a step by step instruction of what a customer needs to accomplish for cold rolling of API threads, and to meet the API 7-2, DS-1 and NS-1 requirements. This document is not intended to be the only source of instructions to meet the DS-1 cold rolling specification. You should reference the actual DS-1 specifications since this document references many of the features and benefits of CJWinter's cold root rolling tools and are not mentioned in the actual DS-1 specification.

If you have any questions or concerns regarding the understanding of the DS-1 specification you can contact CJWinter at 1.800.288.7655, www.cjwinter.com or www.coldrootrolling.com.

Works Cited

T.H. Hill Associates / Tom H Hill, P.E. et al. Standards DS-1 Drill Stem Inspection: January 2004, Vol 3

API (American Petroleum Institute) Specification for Threading and Gauging of Rotary Shouldered Connections: December 1, 2008 ANSI/API 7-2

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