Running Procedure for Rattler® Connection

Procedure No: FT-RP-001

Rev: 03

Fermata Connections

Approvals

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Revision Control

REV	Description of Changes	Date Issued
03	Revised to include additional make-up criteria/examples & added Table 1	5/24/2025

1. General Running Procedure

1.1 Refer to General Running Procedure No. FT-RP-000 latest revision.

1.2 Fermata® strongly recommends the use of a Fermata® certified and trained thread rep service company during all Fermata® Connections casing runs. If a Fermata® certified/trained thread rep service is not used, the operator is responsible for approving and ensuring that all connection make-ups meet Fermata® make-up criteria.

2. Thread Compound Application

2.1 Fermata® recommends the use of BOL 2000, BOL 72733, or API Modified. Ensure thread compound is properly mixed prior to using. The thread compound shall be in good condition without any debris or contaminants.

2.2 The amount of applied thread compound will depend on the size and weight configuration of the connection.

2.3 Using a measuring device, apply the amount of thread compound or sealant specified in Table 1 to the coupling box threads. Adjust thread compound or sealant amount by up to 2mL as needed to achieve comparable application to that in Figure 3. DO NOT apply thread compound or sealant on the pin connection. Under certain circumstances dope application may be altered only if approved by Fermata® Engineering.

Table 1: Thread Compound Amounts

OD (inches)	Volume (mL)
3-1/2”	3.25
4-1/2”	5
5”	5.5
5-1/2”	7
7	7
7-5/8”	8.25
8-5/8”	8.25
9-5/8”	9.5

2.4 The use of a fine bristle mustache or 1” paint brush is recommended to best control the application of thread compound. The brush should be free of any water. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. Apply a light coat of thread compound to the threads in the coupling only. Leave the last ¼” bare (See Figure 3). When applying thread compound ensure the mill end pin is made up to the center of the coupling to prevent a low or high shoulder torque.

2.5 Under certain circumstances thread compound application may be altered only if approved by Fermata® Engineering.

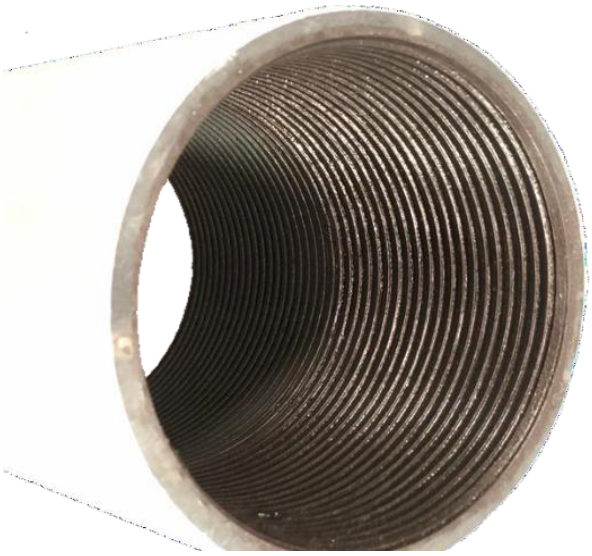

Figure 1: Proper Thread Compound Application Example

Figure 2: Proper Thread Compound Coverage Example

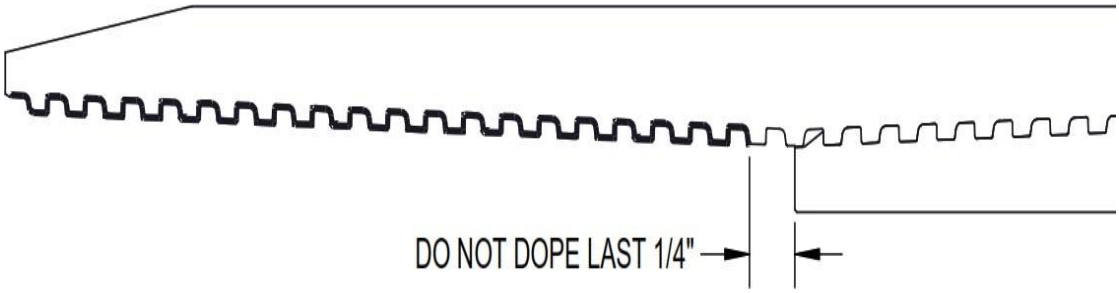

Figure 3: Proper Thread Compound Application Criteria for the Box Ends

Figure 4: Do NOT Apply Thread Compound to Rattler® Pins

2.6 Ensure not to overapply thread compound. When using a measuring spoon to measure the thread compound amount, level the spoon by scraping the top of the spoon with flat edge if the volume increment is equivalent to the spoon (example: if 5mL is specified in the running procedure and a 5mL spoon is used for measuring, level the spoon). Use the applicator brush to clean out the spoon and spread the compound evenly across all threads. Do not apply any compound past the base of the make-up indicator.

2.7 Excessive thread compound can cause dope squeeze and/or yielding on a connection. If dope squeeze or yielding is observed, reduce the amount of thread compound. It is recommended to start with a reduction of 30%. Ensure that the connection maintains light and full coverage. The following figures (Figures 5 & 6) are 2 unacceptable graphs due to excessive compound.

Figure 5: Yielding

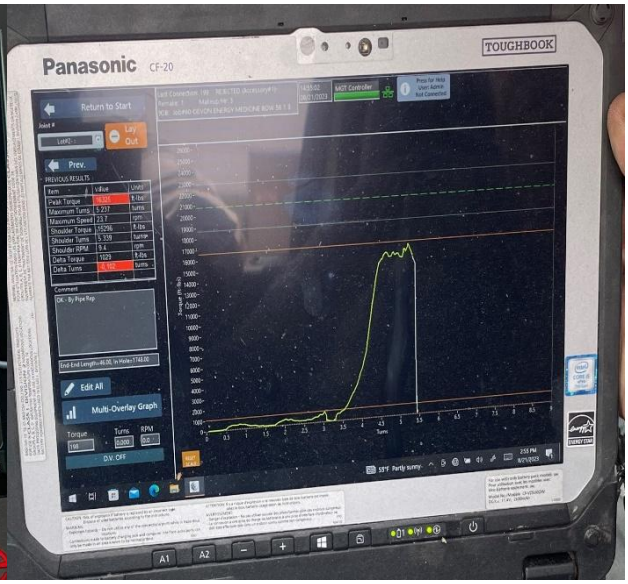

Figure 6: Dope Squeeze

3. Compatibility

3.1 Rattler® has limited compatibility with API BTC and differing weights within the same OD. Careful consideration of the performance properties of the weakest connection must be made by the operator. Table 2 describes the make-up and performance criteria:

Table 2

Pin End	Box End	Makeup Criteria	Performance
Rattler®	Rattler®	Rattler®	Rattler®
Rattler®	API BTC	API BTC	API BTC*
API BTC	Rattler®	Rattler®	API BTC*

(*) The string may retain Rattler® performance if the API BTC connection is limited to accessories at the toe of the string and thread lock compound is used (ex: float equipment). Accessories threaded to API BTC used higher in the string (ex: air lock sub) will limit the string to API BTC performance.

4. Make-up

4.1 The Field Service Technician must ensure that he has the correct and latest data sheets.

4.2 The Field Service Technician will apply all thread compound per Fermata® recommendations prior to starting the casing run. If any joints are not able to have thread compound applied on the pipe rack due to the arrangement of the pipe, the Field Service Technician will apply the thread compound as pipe is brought to the rig floor, or as the ends are accessible on the pipe rack during the run.

4.3 The Field Service Technician must remain on the tower or rig floor to accept all make-up graphs and notify the rig crew if he leaves the rig floor to apply thread compound to any pipe on the pipe rack.

4.4 During the running of the casing, the Field Service Technician is responsible for approving all make-up graphs and verifying the torque shoulder. If the movement of cables, slips, or binding of elevators is observed, all efforts must be made to fix the issue and shall be noted in the comments of the make-up graph and the field service report.

4.5 Fermata® recommends targeting the optimum make-up torque listed on the current connection data sheet. Any make-up torque between the minimum and maximum make-up torque is acceptable, but the optimum make-up torque is ideal for most conditions and common equipment. Add 10% to all specified make-up torque values when using thread locking compound. A torque shoulder must be visible for proper make-up.

4.6 Spin in the connection in high gear at a Revolutions per Minute (RPM) at or below that listed in Table 3.

4.7 Switch to low gear prior to shouldering and keep the RPM's at or below that listed in Table 3

4.8 The following (Table 3) is the recommended maximum make-up RPM.

Table 3

Pipe Diameter	High Gear not to exceed	Low Gear not to exceed
4-1/2" to 5-1/2"	40 RPMs	15 RPMs
7" to 7-5/8"	20 RMPs	10 RPMs
9-5/8" and greater	15 RPMs	7 RPMs

4.9 Verify the make-up result against the torque-turn graph to ensure that there were no abnormal make-up scenarios that could affect the make-up and performance of the connection.

4.10 The shoulder torque is the point in which the pin noses make contact. This is indicated by a dramatic spike in the torque-turn graph and shall be clearly visible at a minimum of 5% of make-up torque and at a maximum of 90% of make-up torque. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.

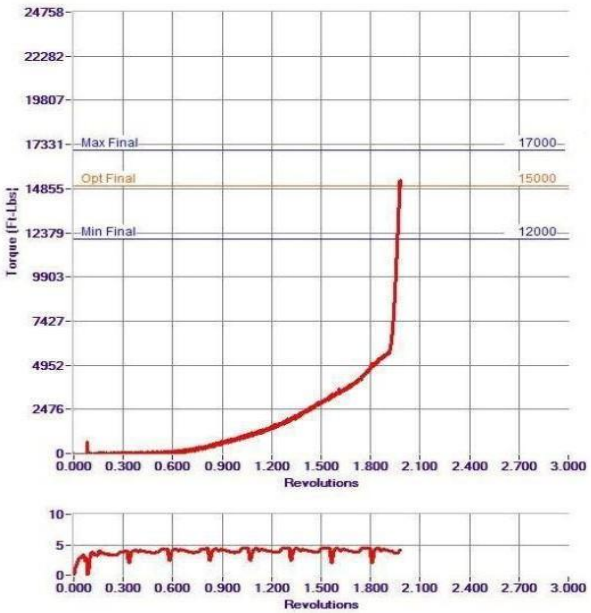

Figure 7: Example of a Proper Make-up Graph

4.11 Figures 8 and 9 are examples of unacceptable graphs where too much thread compound was applied.

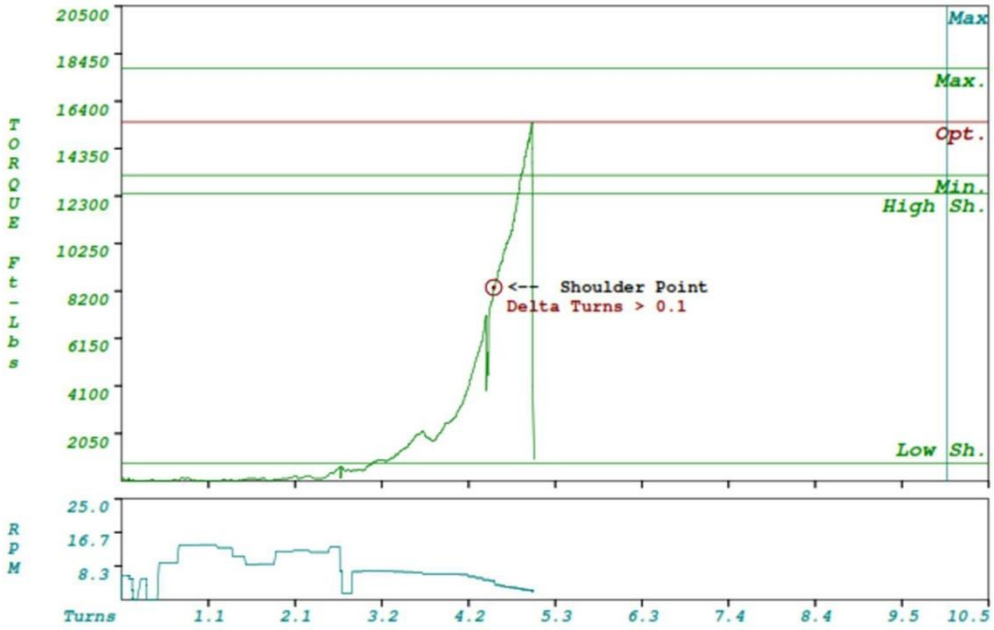

Figure 8: Unacceptable Make-Up Graph

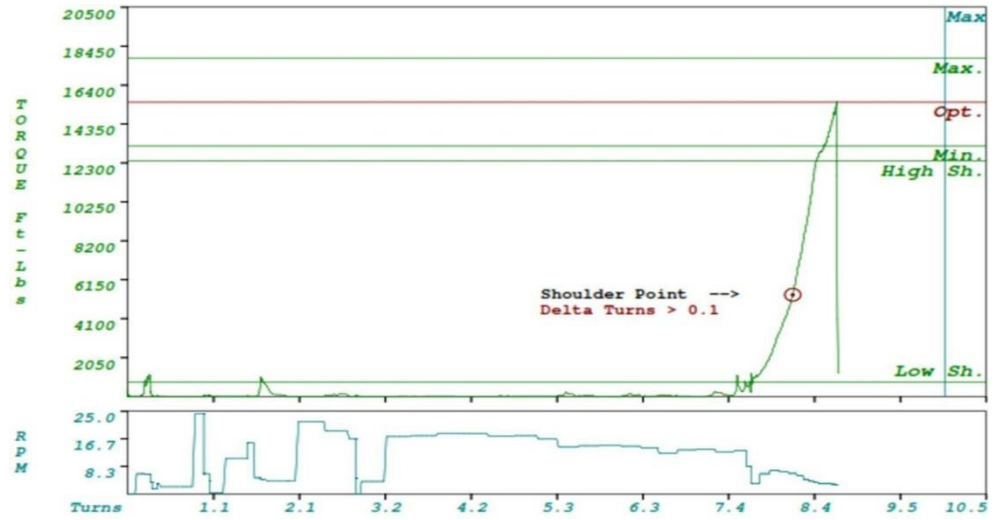

Figure 9: Unacceptable Make-Up Graph

4.12 Verification of proper Ratter® connection make-up can be made by checking that the box face falls within the knurl marking on the pin/pipe body (Figure 11), or that the base of the triangle is aligned within ±.063” of the box face (Figure 13).

4.13 Knurl band acceptable coverage is 50% - 100% of pipe circumference.

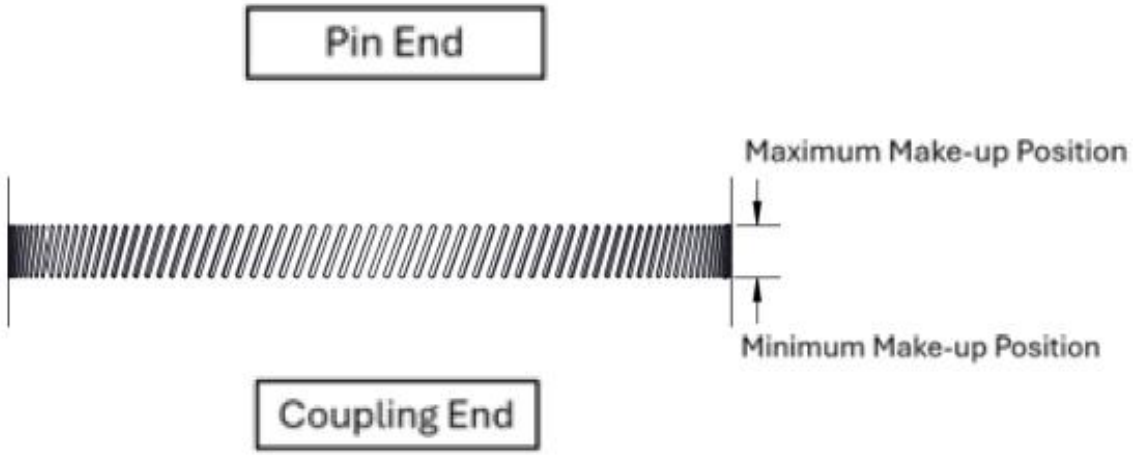

Figure 10: Knurl Band Tolerance Criteria

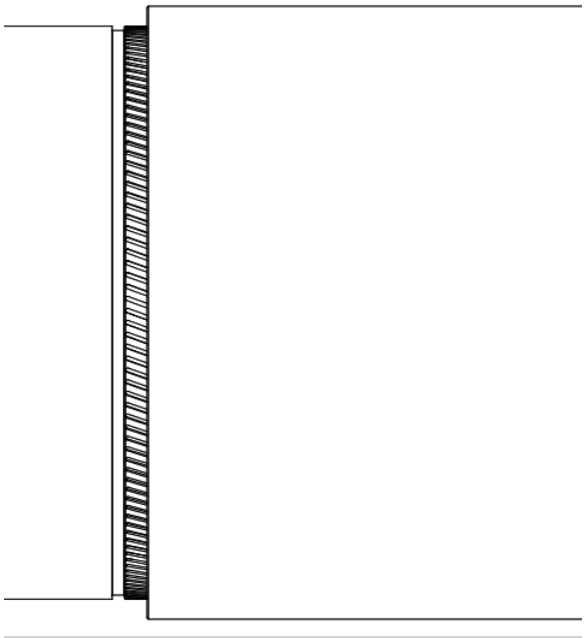

Figure 11: Knurling Area After Box/Pin Make-Up

4.14 For connections with a triangle stamp, a 1” wide X 4” long white paint stripe is applied to the mill and 1” wide X 24” long field end to aid in locating the triangle stamp (Figure 12).

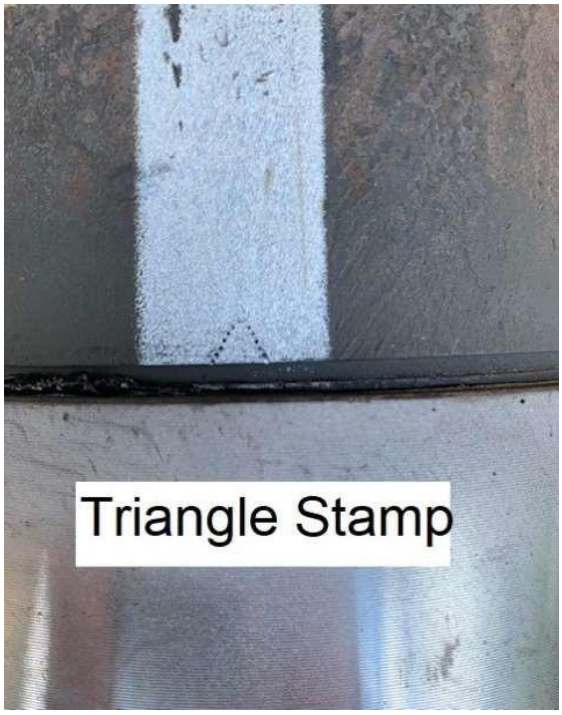

Figure 12: Example of Proper Triangle Stamp Position After Make-Up

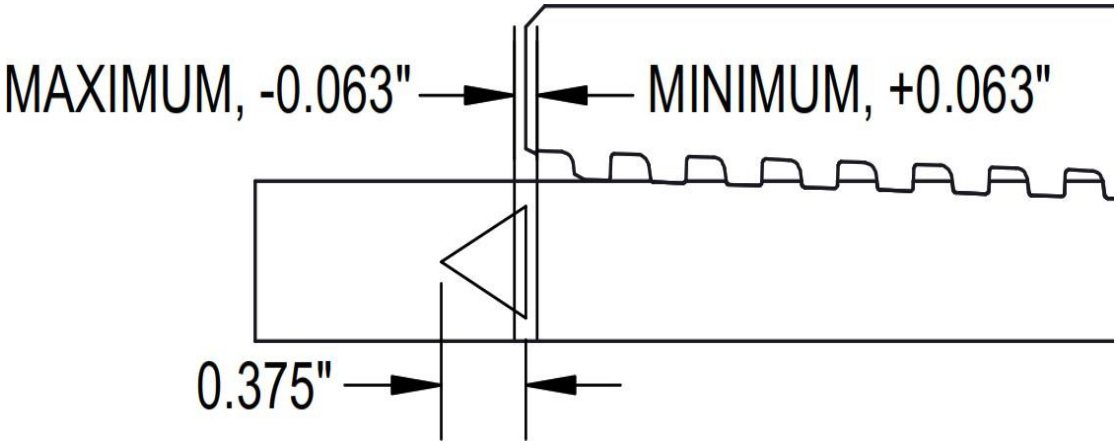

Figure 13: Triangle Stamp Make-Up Tolerance Criteria

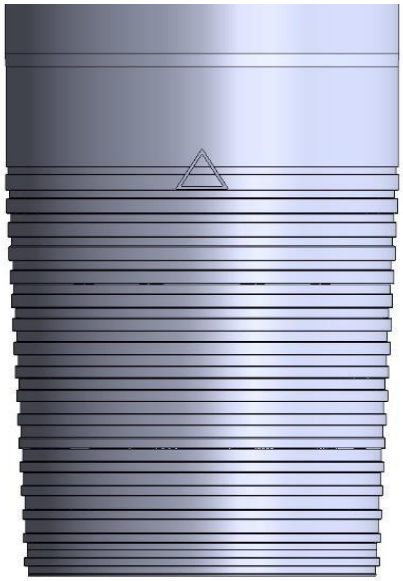

Figure 14: Triangle Stamp Applied to Pin

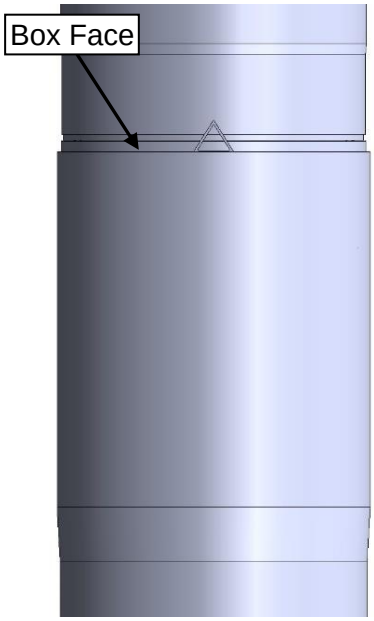

Figure 15: Triangle Stamp Location After Make-Up

5. Downhole Rotation

5.1 The maximum operating torque listed on the current connection data sheet is the maximum torque for downhole rotation. Speed should not exceed 40 RPM.

5.2 Take care to gradually increase or decrease rotation speed and torque to prevent potential dynamic loading scenarios.

6. Break out and Inspection of Connection

6.1 Verify back-up tongs are equipped with the appropriately sized dies prior to break-out.

6.2 Place the back-up tongs on the lower half of the coupling and not on the pipe body for threaded & coupled connections to ensure breaking out the field end pin.

6.3 Break-out the connection in low gear to ensure adequate torque capability.

6.4 Keep break-out speed low to prevent galling (preferably 5 RPM or less).

6.5 Break-out slowly until the pin “jumps”, indicating disengagement.

6.6 Use a stabbing guide prior to disengagement to prevent damage to the connection.

6.7 Alignment is equally important during the connection break-out as during make-up. Verify alignment prior to break-out of the connection.

6.8 If re-running, fully break out the connection, remove all thread compound and debris, inspect, and follow the make-up procedure. If laying down, apply storage compound and thread protectors free of grime and debris.

6.9 If it is necessary to re-run the connection, make sure to fully break-out the connection, remove all thread compound and debris, inspect the connection for damage (galling/gouging), and follow the make-up procedure outlined in Section 4.

6.10 When necessary to lay down the string, the connection must be stored and covered with an approved storage compound and covered with the proper sized thread protectors. Ensure that the thread protectors are clean and free of grime, debris and foreign contaminants.

6.11 All used, rejected, and/or repairable pipe left at the rig location must be identified, tagged and categorized based on the chart shown in Figure 16, and must be submitted to Field Service Management as soon as possible via email.

Summary of Pipe left on Rig Location

Customer: _____ **Rig:** _____ **Well Name:** _____

String 1	String 2	
		Prime Joints, conduct VTI leave insructions to apply storage compound prior to having thread protectors placed back on. (Joints that never left the pipe rack)
String 1	String 2	
		Rig Returns, identified by **1 White band** near mill end & **1 Yellow band** at repairable end / area. (Joints that were made up never went below the rig floor, broken out, laid down, and passed VTI.)
String 1	String 2	
		Used Pipe, identified by a **1 Orange band** 6 inches each side of the defect, damage, or made up end and near the mill end. (Joints failed VTI or went below rig floor.)
String 1	String 2	
		Rejected Pipe, identified by a **1 Red band** 6 inches each side of the defect, damage, or made up end and near the mill end. (Joints rejected with signs of galling, pitting, or other damage.)

Figure 16: Pipe Classification Summary