Phase 3 Handling Protocol

Aliso Canyon RCA:
SS-25 Phase 3 Wellsite Tubulars Handling Protocol

Prepared For:

RCA SS-25:
CPUC, DOGGR, SoCalGas

Purpose:
Protocol for handling the tubulars and wellhead sections that are extracted from the SS-25 well during Phase 3

Version:	**Date:**
004	**31st July, 2017**

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BLADE ENERGY PARTNERS

2600 Network Boulevard, Suite 550
Frisco, Texas 75034

+1 972-712-8407 (phone)
+1 972-712-8408 (fax)

16285 Park Ten Place, Suite 600
Houston, Texas 77084

1-800-319-2940 (toll free)
+1 281-206-2000 (phone)
+1 281-206-2005 (fax)

www.blade-energy.com

Version Record

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000	24-Oct, 2016	Final Draft	WSW, RMK	RMK/RLR	RMK
001	9-Mar, 2017	Final Version	WSW, RMK	RLR, NA	RMK
002	4-Apr, 2017	Corrected Final Version	WSW	RLR	RMK
003	12-July, 2017	Revised Final Version	WSW	RLR	RMK
004	31-July, 2017	Revised Final Version	WSW, RMK	RLR	RMK

Revision History

Revision	Date	Description of Change
001	9-Mar, 2017	Revised per feedback comments from SCG, DOGGR, National Labs, further planning work, and corrosion inhibitor testing results
002	4-Apr, 2017	Corrected error in 7" PRIF form and page break correction in Section 6.3
003	12-July, 2017	Revised per SS-25A results/lessons – removed the redundant PRIF forms, revised several of the other forms, added the roles and responsibilities discussion that was included in the SS-25A protocol, removed the pH measurement step, changed the H_2S/CO_2 measurement frequency, changed Sentinel 747 to 909, and various other minor edits/corrections
004	31-July, 2017	Revised per SoCalGas comments

Table of Contents

1 Introduction

This document describes the steps and procedures for handling the wellhead and tubulars that will be extracted from the SS-25 well as part of Phase 3 of the Root Cause Analysis (RCA) work. The exact type and amount of tubulars that will be extracted will depend on the well conditions experienced during Phase 3.

- 2-7/8" Tubing:
  6.5 ppf N80 with API EUE connections, approximately 184 ft or 6 joints.

  6.5 ppf J55 with API EUE connections, approximately 7,406 ft or 247 joints.
- 7.0" Casing:
  23.0 ppf J55 with Speed Tite connections, approximately 2,398 ft or 60 joints.

  23.0 ppf N80 with Speed Tite connections, approximately 2,202 ft or 52 joints.

The objective of this document is to ensure preservation of the evidence removed from the well by describing the various steps, procedures and requirements from the point of removal of the tubulars (2-7/8" and 7") and the wellhead/tree from the SS-25 wellbore, through onsite examination and cleaning, and then preparation for transport and storage. The goal is to extract the tubulars in their as-recovered downhole condition, mitigate and minimize damage during extraction, and prevent post recovery damage in order to provide as much information as possible for the Root Cause Analysis.

Blade has provisional authority as granted by the CPUC to conduct a Root Cause Analysis on well SS-25. During the work, the Blade Team and those parties under Blade's direction are responsible for directing the work of contractors retained to perform the extraction of Well SS-25 wellhead, tubing and casing - and the preservation and protection of associated evidence. The person in charge (PIC) of the extraction activities and the protection of evidence on-site is the Blade Team Lead, Ravi Krishnamurthy. SoCalGas and those parties under SoCalGas' direction are responsible for directing the contractors who will perform the abandonment of SS-25. Should clarification be required or disagreements arise between Blade and SoCalGas; the CPUC, DOGGR, Blade and SoCalGas (the entities) shall meet and approve forward going steps. If the entities are unable to agree on any activities described for tubulars handling for SS-25, Blade will document such differences and the designated regulatory agency will act as the arbiter, and make the final decision.

All well and wellbore equipment, including tubing and casing, shall be considered potential evidence. Therefore, every effort shall be taken to improve the chance for recovery of the tubing and casing and to avoid inadvertent damage to equipment and/or evidence. During extraction of the tubing the threads may be damaged or galled. Every attempt will be made to mitigate any potential thread damage as a result of tubing extraction. Mitigation against this potential damage includes careful attention to tool selection, operational procedures and process. This implies careful service equipment selection and adhering to procedures that emphasize care over speed when removing the tubing.

Care should be exercised when running tools through the casing. It is important to recognize that the collection of logging data may mildly alter the condition of the casing. For example, the multi-finger caliper and the wellbore casing scraper tool makes contact with the ID of the casing. There may be tool marks on the casing as a result of the contact. The operations sequence and pictures of each tool before and after each run can be used to distinguish tool marks from the pre-existing marks.

Each joint will be numbered as it is extracted to identify its location in the well, and each joint will undergo a visual inspection after it is laid out to identify any damage. The damaged sections will be preserved for later inspection. Each joint will be cleaned and a corrosion inhibitor will be applied. The extracted tubulars will then be loaded onto trucks for transport to a secure, climate controlled warehouse in preparation for the metallurgical examination and full length phased array pipe body ultra-sonic pipe inspection. Likewise, each wellhead section will be numbered, visually inspected, cleaned, a corrosion inhibitor applied, and the section crated for storage and transport. The logistics associated with transporting the tubulars are addressed in a separate protocol document.

The Blade Team and those parties under Blade direction are responsible for handling and protecting evidence during examination, cleaning and preparation for storage, and transport. The person in charge (PIC) of these activities is the Blade Team Lead, Ravi Krishnamurthy.

Blade reserves the right to deviate from these procedures as unique situations arise in the field. Furthermore, the Blade team shall document any significant deviation from these procedures that may affect the ability to collect data and evidence for RCA purposes, and will notify the CPUC, DOGGR and SoCalGas. Blade shall obtain approvals from the CPUC, DOGGR and SoCalGas in advance of subsequent activity.

2 Process Overview

Every tubing and casing joint will be numbered as it is extracted. This Joint Sequence Number (JSN) and the measured length of each joint will be used to identify its depth location in the well. The transition in weight and/or grade will be documented as the tubulars are being retrieved, if possible. This will allow identification of the temperature and stress associated with the tubulars during the well life.

The tubulars will be visually inspected as they are laid down on the pipe rack and given subjective qualitative classifications such as:

A. Flawed: the joint shows obvious indications of damage including corrosion, cracks or other anomalies.

B. No Flaws: the joint shows no obvious indications of damage or anomalies.

Visually identifiable flaws will be documented in detail onsite. If present**,** scale or corrosion product samples will be collected. Joints that have large flaws or have parted downhole will require special handling, more detailed examination and protection of the flaw area. This may include cutting a section from the joint in order to provide sufficient protection of the flaw area. All joints will be characterized by photographs taken during the visual inspection. The purpose of the on-site photography is for general documentation of the condition of the pipe and the communication of items of interest. They are not, at this stage, intended for discrimination of minute details of a flaw or the flaw surface. Detailed examination will be done under laboratory conditions.

After visual inspection, an Evidence Data Sheet will be completed for each joint, and the Chain of Custody (COC) documentation will initiated. The Joint Sequence Number will serve as the unique traceability identifier that will link each joint to their respective Evidence Data Sheet and COC documentation. Corrosion/scale samples, or sections of the joint that are removed, will be considered to be samples of the parent joint. Each sample will be identified by a unique Sample Number that will tie the sample back to the parent joint. In addition, each sample will have a separate Evidence Data Sheet and COC documentation. The COC form will follow the tubing and casing joints, and all samples collected.

After the visual inspection, the individual joints will then be cleaned and a corrosion inhibitor will be applied. Complete joints will be packaged in bolsters for transport and storage. Bolstering will be the primary method used for preventing handling damage during transport and storage. Sections that have been cut from the parent joint will be packaged separately and transported individually in wooden crates.

The internal sections of the wellhead will also be visually inspected, photographed, cleaned and crated for storage and transport. An external NDE on the wellhead has already been completed. Each section will be identified with a unique Section Number, and an Evidence Data Sheet will be completed for each section. The COC documentation will be initiated following the visual inspection.

Photographic documentation of all joints (flawed or not) prior to their departure from the loadout site, and again upon its arrival at the storage facility, will be recorded to ensure any damage from mishandling during transportation is appropriately noted.

3 Wellhead Handling Procedures

A schematic of the SS-25 wellhead is shown in Figure 1, and a picture of the wellhead with the various sections labeled is provided in Figure 2. An NDE of the wellhead exterior was conducted in July 2016, which included Magnetic Particle Inspection (MPI), phased array Ultrasonic Testing (UT) inspections and an x-ray inspection of the surface casing weld line. No major indications were identified, and a report has been issued with the results.

Various parts of the wellhead will be used during the Phase 3 extraction operation. For example, in preparation for pulling the tubing, the crown valves, cross, master valve, and tubing hanger adaptor will be removed. The Blowout Preventer (BOP) and diverter will be installed on the tubing head. Prior to pulling the 7.0" casing, the tubing head and double studded adapter (DSA) will be removed and the BOP will be installed on the casing head.

The internal wellhead sections will be visually inspected, cleaned and prepared for storage after being removed from the well. The crown valve assembly was added for the kill operation and therefore will not be included in the RCA evaluation of the SS-25 wellhead.

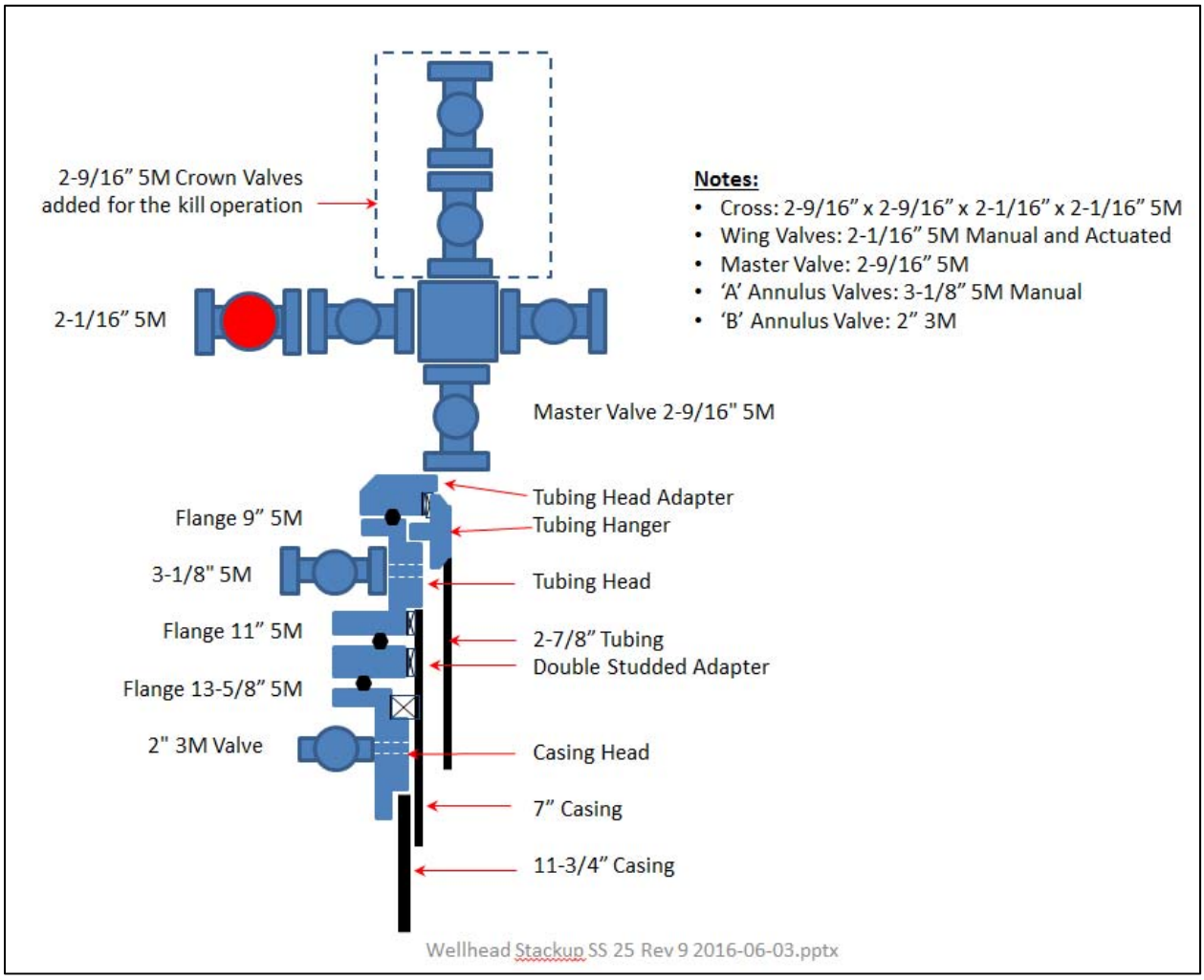


Figure 1. SS-25 Wellhead and Tree Schematic

The wellhead assembly consists of various sections and will undergo the following steps prior to storage. A Blade representative will document the visual inspection, cleaning, and crating for storage and transport.

1. The wellhead will be disassembled into sections that can be crated. Each section will be stenciled as follows W001, W002, etc.
2. A visual examination and photographic documentation of the inner surfaces will be conducted per Section 6.1 (supplements the NDE documentation and measurements already completed).
3. The results of this inspection will be documented on the Wellhead/Tree Evidence Data Sheet per Section 6.3.
4. The section internal surfaces will be cleaned, if necessary, using a brush and low pressure water spray and/or cleaner per Section 6.2.
5. This will be followed by the application of a corrosion inhibitor, or the use of Volatile Corrosion Inhibitor packaging (VCI) (reference Appendix 6.9) for longer term storage per Section 6.2.
6. No further examination of the wellhead/ tree is warranted unless visual observations or data from the tubulars direct the RCA otherwise.
7. The individual sections will be crated for storage and transport.
8. The cleaning and crating process will be documented using the Wellhead/Tree Cleaning and Transport Preparation Form (WCTP) as shown in Figure 16.
9. The Blade representative will complete the Chain of Custody (COC) forms as described in Appendix 6.3. The COC procedures will document the possession and the transfer/movement history of all sections.

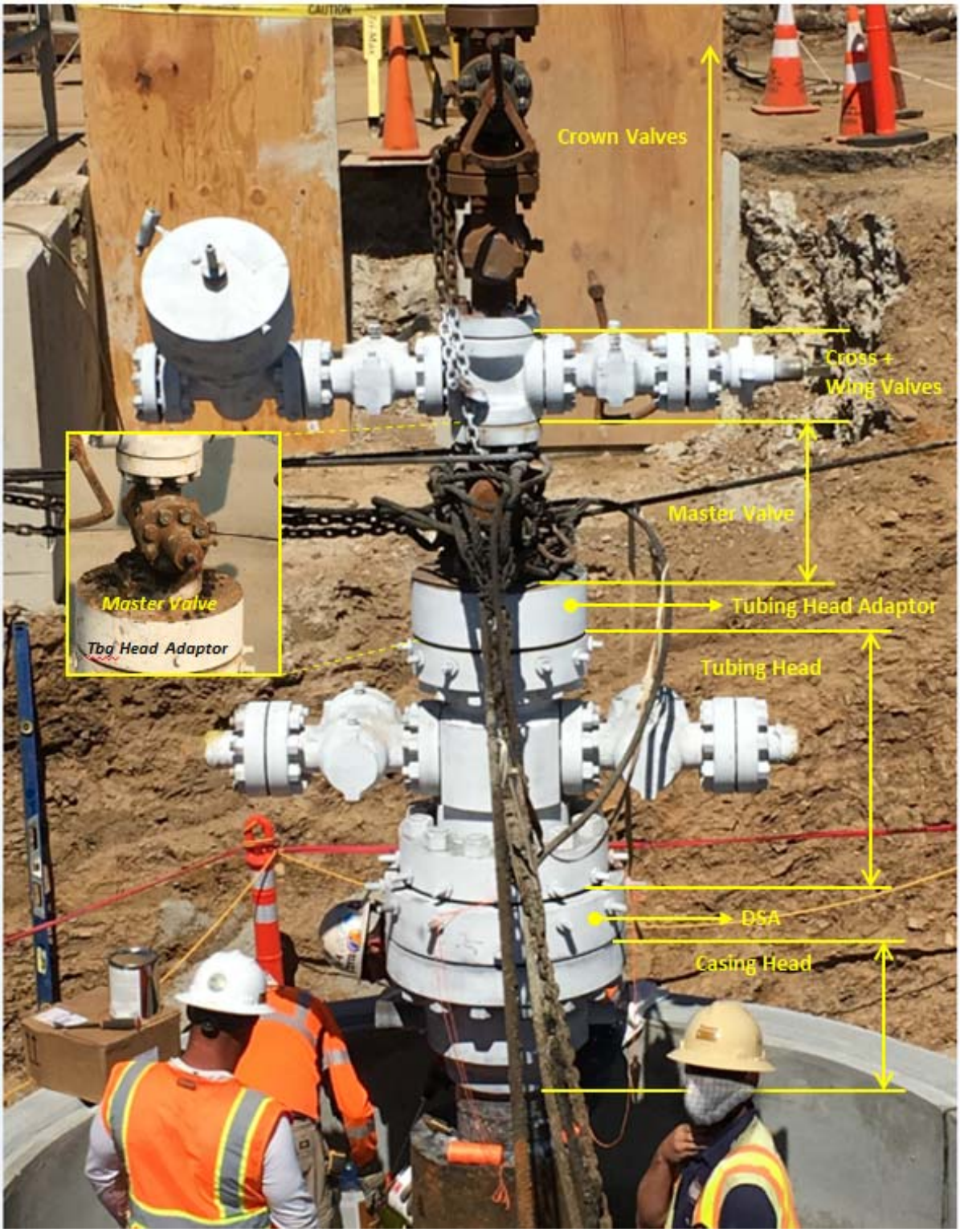


Figure 2. SS-25 Wellhead and Tree Configuration

4 2-7/8” Tubing Handling Procedures

All work in this protocol is being directed by Blade.

The following procedures will be followed while extracting the 2-7/8” 6.50 ppf EUE tubing from SS-25, and preparing the joints for transportation and storage.

The 2-7/8” EUE connections are threaded and coupled with an outside diameter (OD) of 3.668”. The tubing is expected to be cut and pulled from 7,590 ft and may consist of:

- 6.5 ppf N80 with API EUE connections, approximately 184 ft or 6 joints.
- 6.5 ppf J55 with API EUE connections, approximately 7,406 ft or 247 joints.

The recommended make-up torque range per API RP5C1 is as follows:

Table 1. 2-7/8” 6.50 ppf Make-up Torques

Grade	Minimum	Optimum	Maximum
N80	1730 ft-lbs	2300 ft-lbs	2880 ft-lbs
J55	1240 ft-lbs	1650 ft lbs	2060 ft-lbs

Special Requirements:

- EUE thread protectors, pin and box, closed end.
- Low-marking tong dies (with conventional dies as a backup)
- Bolsters
- Casing crew and torque-turn equipment
- Cleaning and Corrosion inhibitor application

Rig Floor Procedures

A Blade representative will document the extraction of each joint using the Rig Floor Tubulars Extraction Form (RFTEF) as shown in Figure 12.

1. Mark a vertical orientation line on the box.
2. Write the Joint Sequence Number on the pipe body just below the connection using a paint stick.
    - The Joint Sequence Numbering format should be T001, T002, etc.
    - Enter the Joint Sequence Number on the RFTEF.
3. Visually examine the connection to determine if there is any observable damage, and then photograph the connection before backing out the connection ensuring that the Joint Sequence Number is also visible in the connection photograph.
4. Break out the connection using tubing tongs and a torque-turn monitoring system.
    - Record the breakout torque on the RFTEF.
    - Record the breakout torque vs. turns electronically using the torque-turn monitoring system. The breakout torque may be significantly higher than the makeup torque so appropriately sized tubing tongs should be selected.

- Photograph the pin and box after backing out the connection.

5. Lay down the joint onto the pipe rack taking care to prevent any metal to metal contact or impact loads.
6. Pull the next joint.
    a. Record the string weight on the RFTEF.
    b. Pick up smoothly and slowly – there is a risk that a tubing coupling could hang up on the 7.0" casing if it is parted. Monitor the weight indicator closely.
    c. Any anomalies observed while pulling the joint will be recorded on the RFTEF.
        - **Avoid any sudden shock loads coming off of or setting the slips.**
7. Set the slips when the next connection clears the rotary table.
    - Write the Joint Sequence Number again on the pipe body near the pin end just above the box of the next joint. The Joint Sequence Number should therefore be written twice on each joint as shown in Figure 3.
8. Check for the presence of H_2S and CO_2 using Draeger tubes initially and then at least after every 30 joints pulled. Take the measurements at the rotary table level in a consistent manner. Record all readings on the RFTEF. Check for H_2S more frequently if non-zero readings are noted.
9. Continue pulling the subsequent tubing joints in this manner.
10. Once all the tubing has been pulled, a report showing the torque vs. turns chart for each connection backed out will be generated from the torque-turn monitoring system.

Pipe Rack Procedures

A Blade representative will conduct and document the visual inspection of each joint using the Tubing Evidence Data Sheet as shown in Figure 7. An Evidence Data Sheet will be completed for each joint per Appendix 6.3

1. As a joint is placed onto the pipe rack, record the Joint Sequence Number on the Evidence Data Sheet.
2. For each joint, measure the Tally Length (TL) from the coupling face to the pin face (excluding the pin threads) as shown in Figure 3, and record the length on the Evidence Data Sheet.
3. Visually inspect the OD of the pipe and coupling. The visual inspection will be followed with photographic documentation of the pipe body. Every observable flaw will be documented photographically. Absence of flaws will be noted, and one to two representative locations on the joint will be documented using photographs. The details on conducting the visual inspection are provided in Appendix 6.1. The focus of the visual inspection is primarily the OD of the tubing. ID examination will require other NDE techniques that will be performed at a later stage in the process.
4. Samples of any scale or corrosion product, or other solid material, if present on the pipe surface, will be collected for further analysis.
5. Any flaw that is located will be cleaned and protectively wrapped, if appropriate and necessary, as described in Section 6.1. There may be certain scenarios where there is a flaw surface that should not be cleaned in to order preserve the surface or the scale and/or

corrosion product. These decisions will be made by Blade on a case-by-case basis after an onsite assessment of the flaw.

6. Enter the classification disposition (Flawed or No Flaws) of the joint, and any other relevant comments about the condition of the joint onto the Evidence Data Sheet.
7. Permanently mark the Joint Sequence Number at both ends of the joint.
8. Continue inspecting each subsequent joint in this manner as they are laid down.

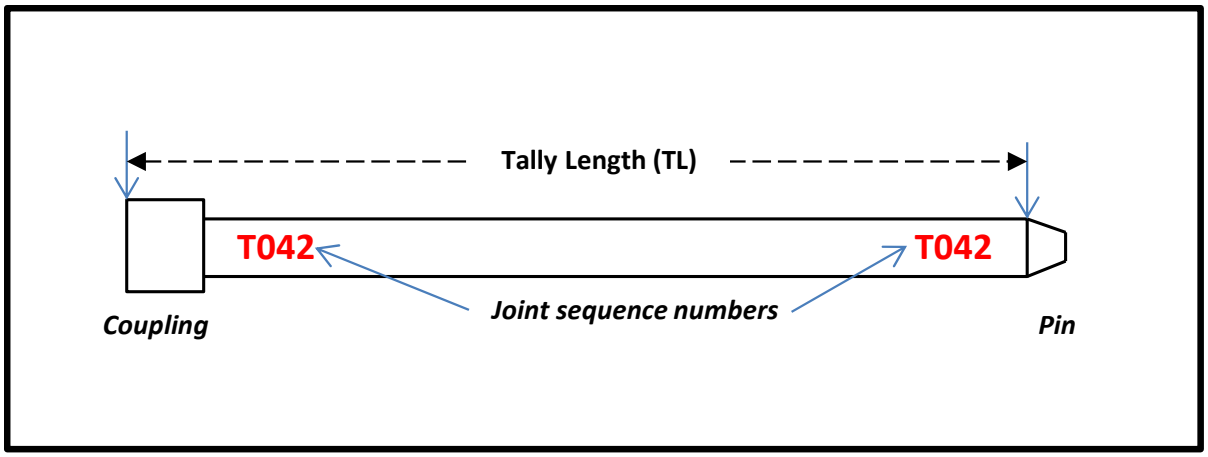


Figure 3. 2-7/8" Tubing Joint Measurement and Numbering Locations

9. Joints that have large flaws or have parted downhole will require special care. Additional onsite inspection of the flaw surface will be conducted, and additional steps taken to preserve the flaw.
    - Detailed examination of the flaw will be taken immediately after the joint is on the rig floor before it is laid down on the pipe rack. It may be necessary to clean, visually inspect and document the flaw inspection before the joint is laid down depending on the nature, condition and extent of the flaw.
    - Sectioning of the joint on the pipe rack to remove the flaw section so that it can be adequately preserved and protected may be required. Sectioning will be done outside the damaged location on the joint.

Pipe Cleaning and Preservation for Transport and Storage:

After visual inspection, every joint will require further treatment for transportation and storage. It is anticipated the tubulars will be required to be stored for an extended period. The cleaning and preservation procedures are intended to mitigate changes during storage. A Blade representative will witness and document the cleaning of each joint using the Pipe Cleaning and Transport Preparation Form (PCTPF) as shown in Figure 13.

Every joint will go through the following process in preparation for transportation and storage.

1. As described in Section 6.2, the entire joint will require cleaning using a brush and low pressure water spray and/or a cleaner.
2. Following cleaning, a visual inspection will be conducted and the flaws will be documented per Appendix 6.1.

3. Then the joint will be treated with a corrosion inhibitor fluid that will protect the carbon steel and mitigate corrosion due to moisture and oxygen exposure over an extended storage period.
4. After the corrosion inhibitor has cured, Volatile Corrosion Inhibitor (VCI) (reference Appendix 6.9) will be inserted into the ID of each joint of tubing, and then the pin and box protectors will be installed.
5. The cleaning process for joints that have large flaws or have parted will be finalized after initial observation and will be commensurate with the type and nature of the flaw. In general, the process will include:
    - The flaw surface will be cleaned, if appropriate. There may be certain types of flaws that need to be preserved in the condition retrieved; the process of cleaning may damage the corrosion or scale product or the flaw fracture surface; in these cases the flaws may not be cleaned.
    - A corrosion inhibitor, if appropriate, will then be applied to protect the flaw surface.
    - The region around the flaw will be protected. Any general cleaning in the region will be carefully completed without impacting the flaw surface.

Transport Preparation Procedures

A Blade representative will witness and document the loading of the joints onto the trucks for transport to the storage facility.

1. Full length joints of tubing will be placed in a bolstering system to minimize the chances of damage during transportation and storage. An example of the bolstering system is shown in Figure 4.
    - **Bolstering is the primary method used for preventing damage during transport and storage.**
2. The bolstered joints will be loaded onto the trucks using a forklift or crane for transport to storage.
    - A forklift will have padded forks.
    - A crane will use nylon slings and spreader bars.
3. The Joint Sequence Number of each joint loaded onto a particular truck will be documented. The Joint Sequence Number will be cross referenced to that truck and trailer license plate number.
4. Joints that have large flaws or have parted may require local sectioning. These sections will be packaged separately and transported in wooden crates. The intent here is to ensure that there is sufficient protection to preserve the flaw in order to conduct a laboratory examination.
    - **Extreme care will be taken to not cause any handling damage.**
5. The cleaning and loading process will be documented using the Pipe Cleaning and Transport Preparation Form (PCTPF) as shown in Figure 13.
6. The Blade representative will complete the Chain of Custody (COC) forms as described in Appendix 6.3. The COC procedures will document the possession and the transfer/movement history of all the joints.

Figure 4. Bolstering System Example

5 7.0” Casing Handling Procedures

All work in this protocol is being directed by Blade.

The following procedures will be followed while extracting the 7.0” 23.0 ppf J55 and 23.0 ppf N80 Speed Tite casing from SS-25 and preparing the joints for transport. The casing is expected to be cut and pulled from approximately 930 ft first. Any further extraction of 7” will be considered based on the wellbore conditions identified at the time and will require further regulatory approval.

The 7.0” Speed Tite connections are integral upset box with an OD of between 7.369” and 7.444”. The connections will not be backed out. Instead, the casing will be cut, and the made-up connection will be preserved for subsequent inspection and testing.

Special Requirements:

- Casing Running Tool (CRT)
- Power Hack Saw (pipe cutter)
- Bolsters
- Cleaning and Corrosion Inhibitor application
- End Caps

Rig Floor Procedures

A Blade representative will document the extraction of each joint using the Rig Floor Tubulars Extraction Form (RFTEF) as shown in Figure 14.

1. Pick up the joint with the casing running tool (CRT). Write the Joint Sequence Number on the pipe body just below the upper end of the joint using a paint stick.
    a. The Joint Sequence Numbering format should be C001, C002, etc.
    b. Enter the Joint Sequence Number on the RFTEF.
    c. Record the string weight on the RFTEF.
2. Continue picking up the joint.
    a. Pick up smoothly and slowly. Monitor the weight indicator closely.
    b. Any anomalies observed while pulling the joint will be recorded on the RFTEF.
        - **Avoid any sudden shock loads coming off of or setting the slips.**
3. Set the slips when the next connection is above the rotary
    a. Write the Joint Sequence Number again on the pipe body just above the slips.
    b. Write the Joint Sequence Number for the next joint just above where it will be cut as shown in Figure 5. Therefore, the upper (long part of the joint) will have a Joint Sequence Number, and the lower part of the cut joint will have the next Joint Sequence Number.
4. Install a collar clamp above the slips with enough room to saw cut the casing and have enough stick-up to latch the next joint with the CRT.
5. Check for the presence of H_2S and CO_2 using Draeger tubes initially and then at least every 6 joints pulled. Take the measurements at the rotary table in a consistent manner. Record all readings on the RFPTF. Check for H_2S more frequently if non-zero readings are noted.

6. Cut the casing 24-30” below the connection torque shoulder as illustrated in Figure 5 using the power hack saw.
7. Back out the CRT and lay down the joint onto the pipe rack taking care to prevent any metal to metal contact or impact loads.
8. Latch the CRT on the cut joint and continue pulling the subsequent casing joints in this manner.

Pipe Rack Procedures

1. A Blade representative will conduct and document the visual inspection of each joint using the Tubing Evidence Data Sheet as shown in Figure 8. An Evidence Data Sheet will be completed for each joint per Appendix 6.3
2. As a joint is placed onto the pipe rack, record the upper Joint Sequence Number on the Evidence Data Sheet.
3. For each joint, measure the Length to Connection (LTC) length from the top of the long end of the joint to top of the box end shown in Figure 5, and record the length in the Evidence Data Sheet.
4. For each joint, measure the Overall Length (OAL) from the top of the long end of the joint to the opposite end of the cut joint as shown in Figure 5.
5. Visually inspect the OD of the pipe. The visual inspections will be followed with photographic documentation of the pipe body. Every observable flaw on the pipe and connection will be documented photographically. Absence of flaws will be noted, and one to two locations on the joint will be documented using photographs. The details on conducting the visual inspection are provided in Appendix 6.1. The focus of the visual inspection is primarily the OD of the casing. ID examination will require other NDE techniques that will be utilized at a later stage in the process.
6. Samples of any scale or corrosion product, or other solid material, if present on the pipe surface, will be collected for further analysis.
7. Any flaw that is located will be cleaned and protectively wrapped, if appropriate and necessary, as described in Section 6.1. There may be certain scenarios where there is a flaw surface that should not be cleaned in order preserve the surface or the scale and/or corrosion product. These decisions will be made by Blade on a case-by-case basis after an onsite assessment of the flaw.
8. Enter the classification disposition (Flawed or No Flaws) of the joint and any other relevant comments about the condition of the joint onto the Evidence Data Sheet.
9. Permanently mark the Joint Sequence Numbers at both ends of the joint (upper end), and mark the Joint Sequence Number of the next joint below the connection (lower end) as shown in Figure 5.
10. Continue inspecting each subsequent joint as they are laid down in this manner.
11. Joints that have large flaws or have parted downhole will require special care. Additional onsite inspection of the flaw surface will be conducted, and additional steps taken to preserve the fracture surface.
    - Detailed examination of the flaw will be taken immediately after the joint is on the rig floor before it is laid down on the pipe rack. It may be necessary to clean, visually

inspect and document the flaw inspection before the joint is laid down depending on the nature, condition and extent of the flaw.

- Sectioning of the joint on the pipe rack to remove the failed section so that it can be adequately preserved and protected may be required. Sectioning will be done outside the damaged location on the joint.

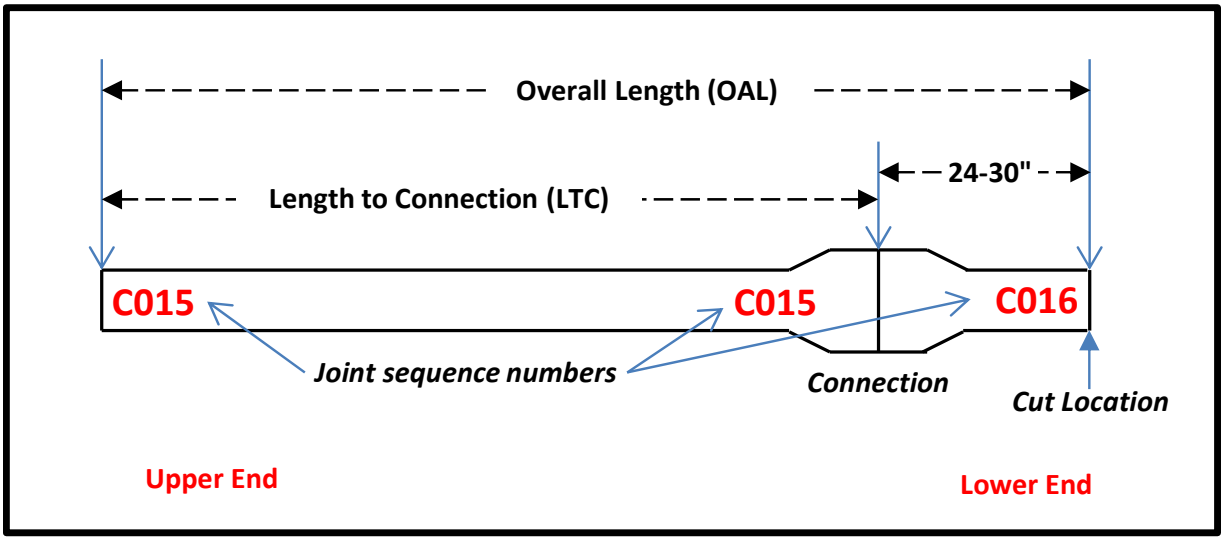


Figure 5. 7" Casing Measurement and Numbering Locations

Pipe Cleaning / Storage Preparation:

After visual inspection, every 7" joint will require further treatment for transportation and storage. It is anticipated the tubulars will be required to be stored for an extended period. The cleaning procedures are intended to mitigate changes during storage. A Blade representative will witness and document the cleaning of each joint using the Pipe Cleaning and Transport Preparation Form (PCTPF) as shown in Figure 15.

Every joint will go through the following process in preparation for transportation and storage.

1. As described in Section 6.2, the entire joint will require cleaning using a brush and low pressure water spray and/or cleaner.
2. Following cleaning, a visual inspection will be conducted and the flaws will be documented per Appendix 6.1
3. Then the joint will be treated with a corrosion inhibitor that will protect the carbon steel and mitigate corrosion due to moisture and oxygen exposure over an extended storage period.
4. After the corrosion inhibitor has dried, VCI (reference Appendix 6.9) will be inserted into the ID of each joint of casing, and then end caps will be installed on either end of the joint.
5. The cleaning process for joints that have large flaws or have parted will be finalized after initial observation and will be commensurate with the type and nature of the flaw. In general, the process will include:
    - The flaw surface will be cleaned, if appropriate. There may be certain types of flaws that need to be preserved in the condition retrieved; the process of cleaning may damage the

corrosion or scale product or the flaw fracture surface; in these cases the flaws may not be cleaned.

- A corrosion inhibitor will then be applied to protect the fracture surface.
- The region around the flaw will be protected. Any general cleaning in the region will be carefully completed without impacting the flaw surface.

Transport Preparation Procedures

A Blade representative will witness and document the loading of the joints onto the trucks for transport to the storage facility.

1. Full length joints of casing will placed in a bolstering system to minimize the chances of damage during transportation and storage. An example of the bolstering system is shown in Figure 4.
   - **Bolstering is the primary method used for preventing damage during transport and storage**.
2. The bolstered joints will be loaded onto the trucks using a forklift or crane for transport to storage.
   - The forklift will have padded forks
   - A crane will use nylon slings and spreader bars.
3. The Joint Sequence Number of each joint loaded onto a particular truck will be documented. The Joint Sequence Number will be cross referenced to that truck's license plate number.
4. Joints that have large flaws or have parted may require local sectioning. These sections will be packaged separately and transported in wooden crates. The intent here is to ensure that there is sufficient protection to preserve the flaw in order to conduct a laboratory examination.
   - **Extreme care will be taken to not cause any handling damage.**
5. The cleaning and loading process will be documented using the Pipe Cleaning and Transport Preparation Form (PCTPF).
6. The Blade representative will complete the Chain of Custody (COC) forms as described in Appendix 6.3. The COC procedures will document the possession and the transfer/movement history of all the joints.

6 Appendix

The following supplemental information is provided in this section.

- Section 6.1: Visual Inspection Procedures
- Section 6.2: Joint Cleaning and Corrosion Protection Procedures
- Section 6.3: Evidence Data Sheet & Chain of Custody Forms
- Section 6.4: Tubulars Performance Data
- Section 6.5 Extraction Documentation Forms
- Section 6.7: Tectyl 506 Product Information
- Section 6.6: Sentinel 909 Cleaning Product Information
- Section 6.8: Tectyl 846 Class 1 Corrosion Inhibitor Product Information
- Section 6.9: Volatile Corrosion Inhibitor (VCI) Product Information

6.1 Visual Inspection Procedures

The focus of the visual inspection is primarily the OD of the tubing and casing. ID examination will require other NDE techniques that will be performed at a later stage in the process. The intent of the visual inspection is to document the as-recovered downhole condition of the tubulars (flawed or not) extracted from the well. The objective is to:

- Identify any metal loss damage (e.g. pits, wall thickness loss or other corrosion that may undermine load and pressure containment) on the casing, and/or tubing, and/or connections.
- Identify any indications of ductile overload; plasticity and/or deformation.
- Identify any large cracks in the body of the joints and/or connection.
- Identify any scars, slip marks, tong marks, and any associated handling damage on the tubing, and/or casing, and/or connections.
- Identify presence of deformations on the pipe joints, and/or connections.
- Identify presence of corrosion products; and/or kill fluid particles.
- Identify indications of over torqueing, and/or other signs of connection damage.

Note that while the procedures described below focus on the tubing and casing, the same philosophy will be applied to the inspection of the wellhead sections.

The inspection will be conducted as follows:

1. Ensure that the Joint Sequence Numbers and Orientation mark are clearly legible.
2. Examine the full length of the joint from the coupling/upper end to the pin/lower end.
3. If a flaw is observed, write the number “1” next to the flaw using a paint marker or paint stick. If another flaw is observed, write the number “2” next to it and so on for each flaw identified.
4. Rotate and examine the joint marking the location of all flaws.
5. Continue this process until the full circumference of the joint has been examined.
6. Photographically document the inspection as follows:
    a. **Begin** by taking a picture of the coupling/upper end of the joint with the Joint Sequence Number visible in the picture.
    b. Photograph all of the flaws that were observed.
        - flaws will also be photographed with a scale placed alongside to indicate size.
        - the distance from the flaw to the coupling or pin end will be measured and recorded.
        - if no flaws are observed, take several pictures that represent the overall condition of the joint.
    c. **End** by taking a picture of the Joint Sequence Number at the pin/lower end of the joint.
    d. All photographs will be backed up to a hard drive at the end of each day.
7. Scale and/or corrosion product or other solids on the pipe surface will be collected after photographing.

- A soft metal (e.g. brass) or plastic scraper/spatula will be used to collect the samples.
- Scale/corrosion and solid samples will be collected in a sample container. Collect as much as reasonably possible. Target to collect at least 2 to 5 grams.
- If there is extensive scale/corrosion on a joint, then one sample each should be taken from 3 to 5 different locations.
- Clean the scraper/spatula with acetone and then rinse with distilled water before each use.

8. Document the results in the Evidence Data Sheet.

The preservation and protection of flaws will be done as follows:

The nature, condition and extent of the flaw will dictate the measures that need to be taken to preserve and protect the flaw for transport. The base case preservation plan is to clean and protect each flaw. Protection for most flaws is provided by the bolstering system, which prevents metal to metal contact and handling damage. Preservation is addressed through the application of the corrosion inhibitor. The exact measures that need to be taken will be determined by Blade at the time. The general process is as follows:

1. As a general guideline, the flaw location will first be cleaned, unless determined that it is better preserved without any further cleaning. There may be a case, for example, where the flaw is a tight crack that is better left as-is for laboratory analyses rather than cleaning and introducing a fluid into the crack that might damage the surface. Such a determination will be made onsite by Blade on a case-by-case basis.
    - If the flaw is small, then acetone will applied using a soft paint brush to clean the flaw surface and surrounding area. Any general cleaning in the region will be carefully completed without impacting the flaw surface.
    - After the area has been allowed to air dry, Tectyl 506 corrosion inhibitor (reference Appendix 6.7) will be applied on the flaw surface and the surrounding area, as per ASM (American Society of Metals) handbook Volume 12, page 73.
    - If the flaw is large, then low pressure water spray will be used to clean the flaw surface and surrounding area. After the area has been allowed to air dry, Tectyl 506 corrosion inhibitor will be applied using a soft paint brush for protection of the flaw surface and surrounding area.
2. Flaws requiring additional protection.
    - Wrap the flaw area to preserve the area in its current condition, and prevent further damage so that it can be examined later. VCI impregnated packaging material (reference Appendix 6.9) will be utilized to supplement the Tectyl 506 coating by providing an additional corrosion inhibiting barrier. Preservation materials include VCI stretch film, VCI foam packaging, or other protective covers.
    - If it is determined that the flaw cannot be adequately be preserved and/or protected in its as-is condition on the joint, the flaw area will be sectioned and removed from the joint to be handled separately. Sectioning will be done outside the damaged location on the joint. Prior to sectioning ultrasonic or other inspection methods will be utilized to ensure that there are no ID flaws in the area where the cut is to be made.
3. Other considerations:

- Do not mechanically clean, sandblast, wire-brush, or acid clean any flaws prior to proper analyses in the laboratory. Deposits in the flaw region might be helpful in determining the cause(s) of the failure.
- When handling sections containing the flaw area, care must be taken to preserve specimens in the as-recovered condition to provide as much information as possible for determination of the cause of the failure.
- If a joint is fractured into two or more separate pieces, do not fit the fracture surfaces back together. Certain metallurgical features on the fracture face can help determine the cause of the failure and can be easily damaged.

6.2 Cleaning and Corrosion Protection Procedures

After visual inspection, each joint will be cleaned and a corrosion inhibitor will be applied as described below. It is envisioned that this will involve moving the joint from the pipe rack to a separate cleaning station.

Note that while the procedures described above focus on the tubing and casing, the same philosophy will be applied to the cleaning and the application of corrosion inhibitor to the internal wellhead sections.

1. The outer circumference of the joint will be cleaned with a brush and low pressure water spray and/or Sentinel 909 cleaner (reference Appendix 6.7) depending on the condition of the surface.
    - The water used for cleaning will be the municipal water available at Aliso Canyon.
    - Brushes will have stiff plastic bristles.
2. The internal area of the joint will then be cleaned with a brush on a lance and low pressure water spray and/or Sentinel 909. Spraying can be done from both ends of the joint.
3. The joint will be allowed to air dry or compressed air will be used to remove moisture.
4. Re-write the Joint Sequence number on both ends of the joint.
5. Tectyl 846 Class 1 corrosion inhibitor (reference Appendix 6.8) will be applied to the OD. Tectyl 846 (or equivalent) and a VCI product will be applied to the ID.
    - Tectyl 846 is the base case product for ID corrosion protection. However, a different VCI product may be used to replace the Tectyl 846 for ID protection, in which case the subsequent steps will be adjusted.
6. The Tectyl 846 should be dry to touch after 4 hours at 77°F. After 4 hours, evaluate the corrosion inhibitor condition to allow bolstering.
7. Volatile Corrosion Inhibitors (VCI) will be used to augment the protection provided by Tectyl 846 by providing supplemental ID protection for both tubing and casing.

    Therefore prior to bolstering:

    a) VCI will be inserted into the ID of each joint of tubing, and the pin and box thread protectors will be installed.

    b) VCI will be inserted into the ID of each joint of casing, and then end caps will be installed on either end of the joint.

6.3 Evidence Data Sheet & Chain of Custody

An Evidence Data Sheet will be generated for every tubing and casing joint extracted from the wellbore as well as for each section removed from the wellhead/tree. The Evidence Data Sheet will contain all the relevant data for each individual joint or wellhead section including quantitative measurements such dimensional measurements, visual observations and so on.

- The Evidence Data Sheet for casing/tubing will use the Joint Sequence Number as a unique traceability identifier. The Evidence Data Sheet for Wellhead/Tree will use the Section Number as a unique traceability identifier.
- Corrosion/scale samples that are collected will be considered “samples" of the parent joint. Each sample will be identified by a unique Sample Number that will tie the sample back to the parent joint. The Sample Number will be generated by adding S1, S2, S3, and so on to the Joint Sequence Number.

  Example: if a scale sample is taken from joint number T001, the scale Sample Number will be “T001S1”. A label with the sample number will be affixed to the bag containing the sample.
- If a portion of a casing or tubing joint is cut and removed, the cut section will be considered as a "section" of the parent joint. Each section will be identified by a unique Section Number that will tie the section back to the parent joint. The Section Number will be generated by adding 'A', 'B', 'C' and so on to the Joint Sequence Number. This Section Number will be stenciled on the OD of the cut section.

  Example: If a section is cut/removed from joint number C001, the Section Number for the different sections will be identified as “C001A", "C001B" and so on.
- Likewise, if a wellhead section is disassembled a unique letter will be assigned to each of the sub-sections. For example, if section W001 is disassembled the different sub-sections will be "W001A", "W001B" and so on.
- A separate Evidence Data Sheet will be generated for each sample or section described above.
- A separate COC form will be generated for each sample or section. The Evidence Data Sheet will also reference the COC Form Number.
- This process for identifying samples/sections will be followed regardless of whether, for example, a joint is sectioned locally or later at the lab.

Once completed, Blade will retain the original form and a scanned copy of the Evidence Data Sheet will be made. As such, there will be a unique identifier for everything that is extracted from SS-25. Examples of Evidence Data Sheet forms are shown in Figure 6 through Figure 8.

Chain of Custody Process

The Chain of Custody (COC) form documents the possession and transfer/movement history of the tubulars, sections and samples that are extracted or removed. Each COC form will have a COC Form Number that will be tied to individual Evidence Data Sheets through the Joint Sequence Number or Section Number.

- **Wellhead/Tree COC**
  Each wellhead/tree section will have its own individual COC form. The Section Number will be entered on the COC form, and the COC Form Number will be entered on the Evidence Data Sheet.

  The wellhead COC Form Numbers will be as follows:

  - Wellhead section: AC-RCA-25-W001, AC-RCA-25-W002, AC-RCA-25-W003….

- **2-7/8" Tubing COC**
  Every 2 7/8" joint will have its own COC form.

  The Joint Sequence Number for each joint covered under a particular COC form will be entered on the COC form, and the COC Form Number will also be entered on the Evidence Data Sheet for each joint covered under the COC form.

  The tubing COC Form numbers will be as follows:

  - 2 7/8" tubing joints: AC-RCA-25-T001, AC-RCA-25-T002, AC-RCA-25-T003…

- **7.0" Casing COC**
  Every 7.0" casing joint will have its own individual COC form. The Joint Sequence Number will entered on the COC form, and the COC Form Number will entered on the Evidence Data Sheet.

  The casing COC Form numbers will be as follows:

  - 7" casing joints: AC-RCA-25-C001, AC-RCA-25-C002, AC-RCA-25-C003…

Once completed, a scanned copy of the COC form will be made. The original tubing and casing COC forms will travel with the bolsters and/or crated samples. Original wellhead COC forms will travel with the crate for that section. The COC forms will therefore travel with the joint/section as it is moved from one location to another. The receiver will be instructed to complete the COC form upon receipt of the evidence and a copy will be sent to the Blade RCA team. The movement history will be recorded in the Blade COC log. As such, the movement history of every tubing, casing and wellhead section that is extracted from the wellbore will be identified and tracked. Examples of Chain of Custody forms are shown in Figure 9 through Figure 11.

AC-RCA
BLADE EVIDENCE DATA SHEET - WELLHEAD/TREE

Description:		
Wellhead/Tree Section No:		**Photos Taken:** Y ☐ N ☐
Sample No. (if applicable)		**Video Taken:** Y ☐ N ☐
Date & Time Collected:		**Has Label:** Y ☐ N ☐
COC Form Number:		**Blade Rep**
Physical Observations:		
Flaw or Anomaly Description:		
Scale Samples Collected and Location:		
Other Notes:		

Figure 6. Wellhead/Tree Evidence Data Sheet

AC-RCA
BLADE EVIDENCE DATA SHEET - TUBING

Description: _____

Joint Sequence Number: _____ **Photos Taken:** Y □ N □

Sample No. (if applicable): _____ **Video Taken:** Y □ N □

Date & Time Collected: _____ **Has Label:** Y □ N □

COC Form Number: _____ _____

Inspection Location: _____ **Blade Rep**

Joint Tally Length (TL): _____

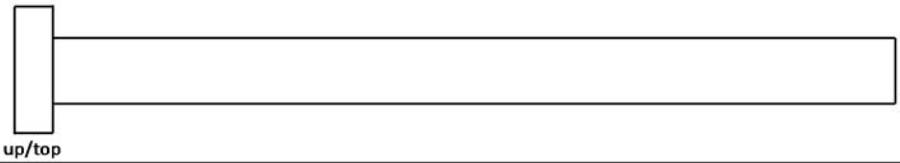
Joint Classification: **Flawed** **No Flaws**

Scale Samples Collected and Location:

Pin/Box Connection & Pipe Body Description Along With Any Flaws or Anomalies:

Visual Inspection Quick Reference:

Tong Marks (T): □
Slip Marks (S): □
Gripper Marks (G): □
Corrosion (C): □
Scale (K): □
Pitting (P): □



Other Visual Observations or Comments:

Figure 7. Tubing Evidence Data Sheet

AC-RCA
BLADE EVIDENCE DATA SHEET - CASING

Description: _____

Joint Sequence Number: _____ **Photos Taken:** Y ☐ N ☐

Sample No. (if applicable): _____ **Video Taken:** Y ☐ N ☐

Date & Time Collected: _____ **Has Label:** Y ☐ N ☐

COC Form Number: _____

Inspection Location: _____ **Blade Rep**

Length to Connection (LTC): _____

Overall Length (OAL): _____

Joint Classification: **Flawed** **No Flaws**

Scale Samples Collected and Location:

Connection OD & Pipe Body Description Along With Any Flaws or Anomalies:

Visual Inspection Quick Reference:

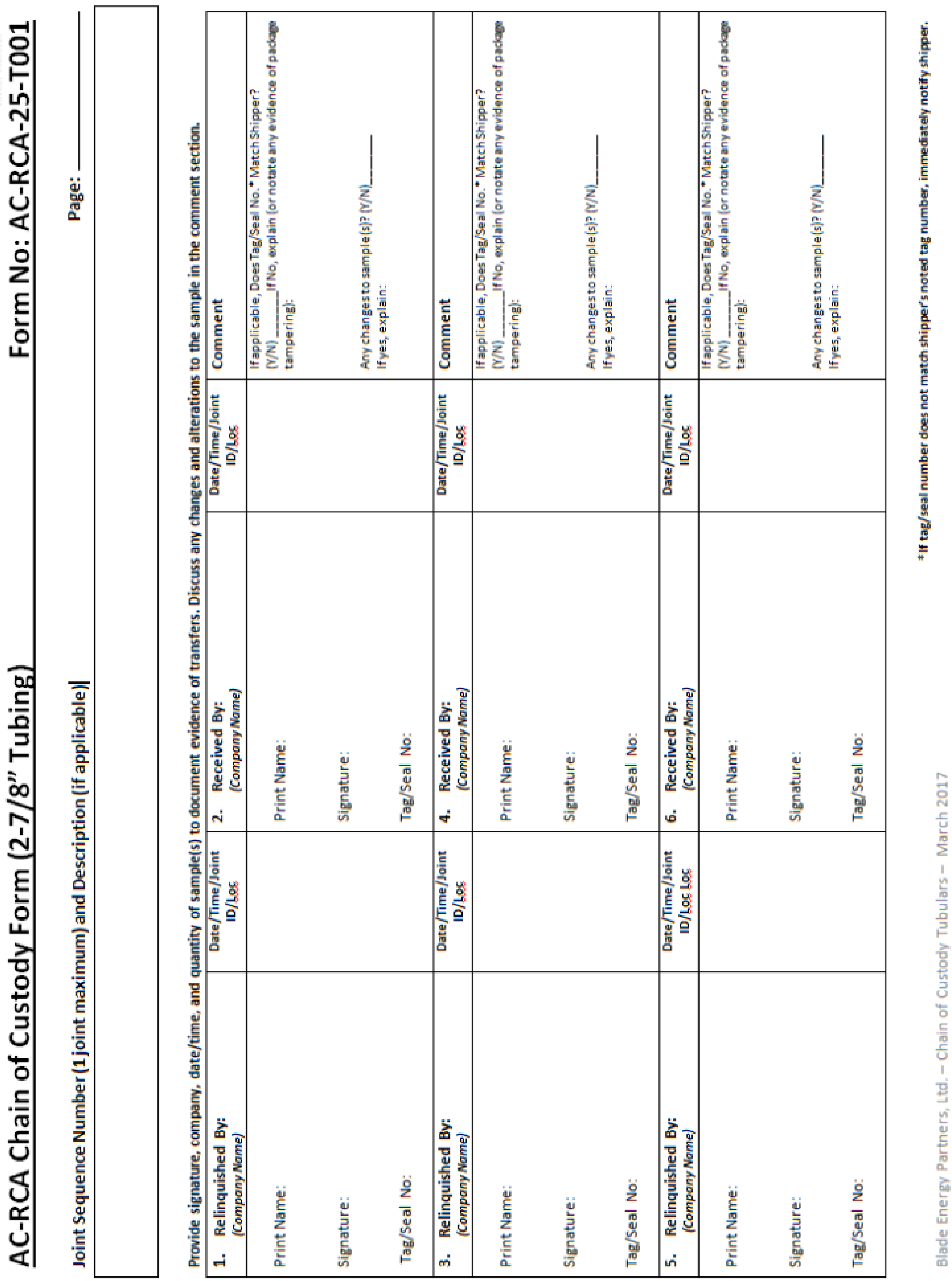
Tong Marks (T): ☐
Slip Marks (S): ☐
Gripper Marks (G): ☐
Corrosion (C): ☐
Scale (K): ☐
Pitting (P): ☐

up/top

Note: Draw Location of Connection

Other Visual Observations or Comments:

Figure 8. Casing Evidence Data Sheet



AC-RCA Chain of Custody Form (2-7/8" Tubing)

Form No: AC-RCA-25-T001

Joint Sequence Number (1 joint maximum) and Description (if applicable)

Page: ______

Provide signature, company, date/time, and quantity of sample(s) to document evidence of transfers. Discuss any changes and alterations to the sample in the comment section.

1. Relinquished By: *(Company Name)*	Date/Time/Joint ID/Loc	2. Received By: *(Company Name)*	Date/Time/Joint ID/Loc	Comment
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______ If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N) ______ If yes, explain:
3. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc**	**4. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______ If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N) ______ If yes, explain:
5. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc Loc**	**6. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______ If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N) ______ If yes, explain:

*If tag/seal number does not match shipper's noted tag number, immediately notify shipper.

Blade Energy Partners, Ltd. – Chain of Custody Tubulars – March 2017

Figure 9. 2-7/8" Tubing COC Forms

AC-RCA Chain of Custody Form (7" Casing)

Form No: AC-RCA-25-C001

Joint Sequence Number (1 joint maximum) and Description (if applicable)

Page: ______________

Provide signature, company, date/time, and quantity of sample(s) to document evidence of transfers. Discuss any changes and alterations to the sample in the comment section.

1. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc**	**2. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:
3. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc**	**4. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:
5. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc Loc**	**6. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:

***If tag/seal number does not match shipper's noted tag number, immediately notify shipper.**

Blade Energy Partners, Ltd. – Chain of Custody Tubulars – March 2017

Figure 10. 7.0" Casing Form

AC-RCA Chain of Custody Form (Wellhead and Tree) Form No: AC-RCA-25-W001

Section Number and Description (if applicable) **Page:** ________

Provide signature, company, date/time, and quantity of sample(s) to document evidence of transfers. Discuss any changes and alterations to the sample in the comment section.

1. Relinquished By: *(Company Name)*	Date/Time/Joint ID/Loc	2. Received By: *(Company Name)*	Date/Time/Joint ID/Loc	Comment
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:
3. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc**	**4. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:
5. Relinquished By: *(Company Name)*	**Date/Time/Joint ID/Loc Loc**	**6. Received By:** *(Company Name)*	**Date/Time/Joint ID/Loc**	**Comment**
Print Name: Signature: Tag/Seal No:		Print Name: Signature: Tag/Seal No:		If applicable, Does Tag/Seal No.* Match Shipper? (Y/N) ______If No, explain (or notate any evidence of package tampering): Any changes to sample(s)? (Y/N)______ If yes, explain:

* If tag/seal number does not match shipper's noted tag number, immediately notify shipper.

Blade Energy Partners, Ltd. – Chain of Custody Tubulars – March 2017

Figure 11. Wellhead/Tree COC Form

6.4 Tubular Performance Data

For reference, dimensional and performance data for the tubulars that were run in the SS-25 well is provided below.

Table 2. Casing and Tubing Data

Tubulars Data

String	OD (in)	Weight (ppf)	Grade	Nom Wall (in)	Nom ID (in)	Drift ID (in)	Setting Depths (MD)		Length ft	Conn	Air Wt lbs
							Hanger	Base			
Conductor	20"	?	?	?	?	?	?	?	?	?	---
Surface	11-3/4"	42.0	YT H40	0.333	11.084	10.928	0	990	990	API STC	41,580
Production	7.0"	23.0	J55	0.317	6.366	6.241	0	2,398	2,398	Speed Tite	55,154
		23.0	N80	0.317	6.366	6.241	2,398	6,308	3,910	Speed Tite	89,930
		26.0	N80	0.362	6.276	6.151	6,308	8,282	1,974	Speed Tite	51,324
		29.0	N80	0.408	6.184	6.059	8,282	8,585	303	Speed Tite	8,787
Tubing	2-7/8"	6.5	N80	0.217	2.441	2.347	0	184	184	API EUE	1,196
		6.5	J55	0.217	2.441	2.347	184	8,496	8,312	API EUE	54,028

Tubulars Nominal Performance

String	OD (in)	Weight (ppf)	Grade	Conn	Pipe Data				Connection Data			
					Nom Wall	Burst	Collapse	Tension	OD	ID	Burst	Tensile
Conductor	20"	?	?	?	?	?	?	?	?	?	?	?
Surface	11-3/4"	42.0	YT H40	API STC	0.333	1,980	1,040	478,000	12.750	11.084	1,980	307,000
Production	7.0"	23.0	J55	Speed Tite	0.317	4,360	3,270	366,000	7.369	6.366		
		23.0	N80	Speed Tite	0.317	6,340	3,830	532,000	7.369	6.366		
		26.0	N80	Speed Tite	0.362	7,240	5,410	604,000	7.369	6.276		
		29.0	N80	Speed Tite	0.408	8,160	7,030	676,000	7.369	6.184		
Tubing	2-7/8"	6.5	N80	API EUE	0.217	10,570	11,100	145,000	3.668	2.441	10,570	145,000
		6.5	J55	API EUE	0.217	7,265	7,676	99,661	3.668	2.441	7,260	99,700

Table 3. Tubing String Details

Description	Length (ft)	Top of Tool (ft)	Bottom of Tool (ft)
DFE	6.35		
Tubing Hanger	0.50	6.35	6.85
6 Jts 2-7/8" 8 rd EUE N-80 Tubing	183.68	6.85	190.53
265 Jts 8 rd EUE J-55 Tubing	8,202.59	190.53	8,393.12
Pup Jt 8 rd EUE N-80 Tubing	4.00	8,393.12	8,397.12
Camco MMG Mandrel with DCRT valve	8.43	8,397.12	8,405.55
Coupling	0.67	8,405.55	8,406.22
1 Jt 2-7/8" 8 rd EUE N-80 Tubing	31.40	8,406.22	8,437.62
Pup Jt 8 rd EUE N-80 Tubing	2.15	8,437.62	8,439.77
Camco SC-1 Safety System (annular flow safety system)	15.27	8,439.77	8,455.04
Camco 20' Blast Joint	19.77	8,455.04	8,474.81
Otis XN No-Go Nipple	1.17	8,474.81	8,475.98
Camco 10' Blast Joint	9.67	8,475.98	8,485.65
Baker Latch-in Locator	1.10	8,485.65	8,486.75
Baker Seal Assembly	4.20	8,486.75	8,490.95
Baker Production Tube	5.26	8,490.95	8,496.21

6.5 Extraction Documentation Forms

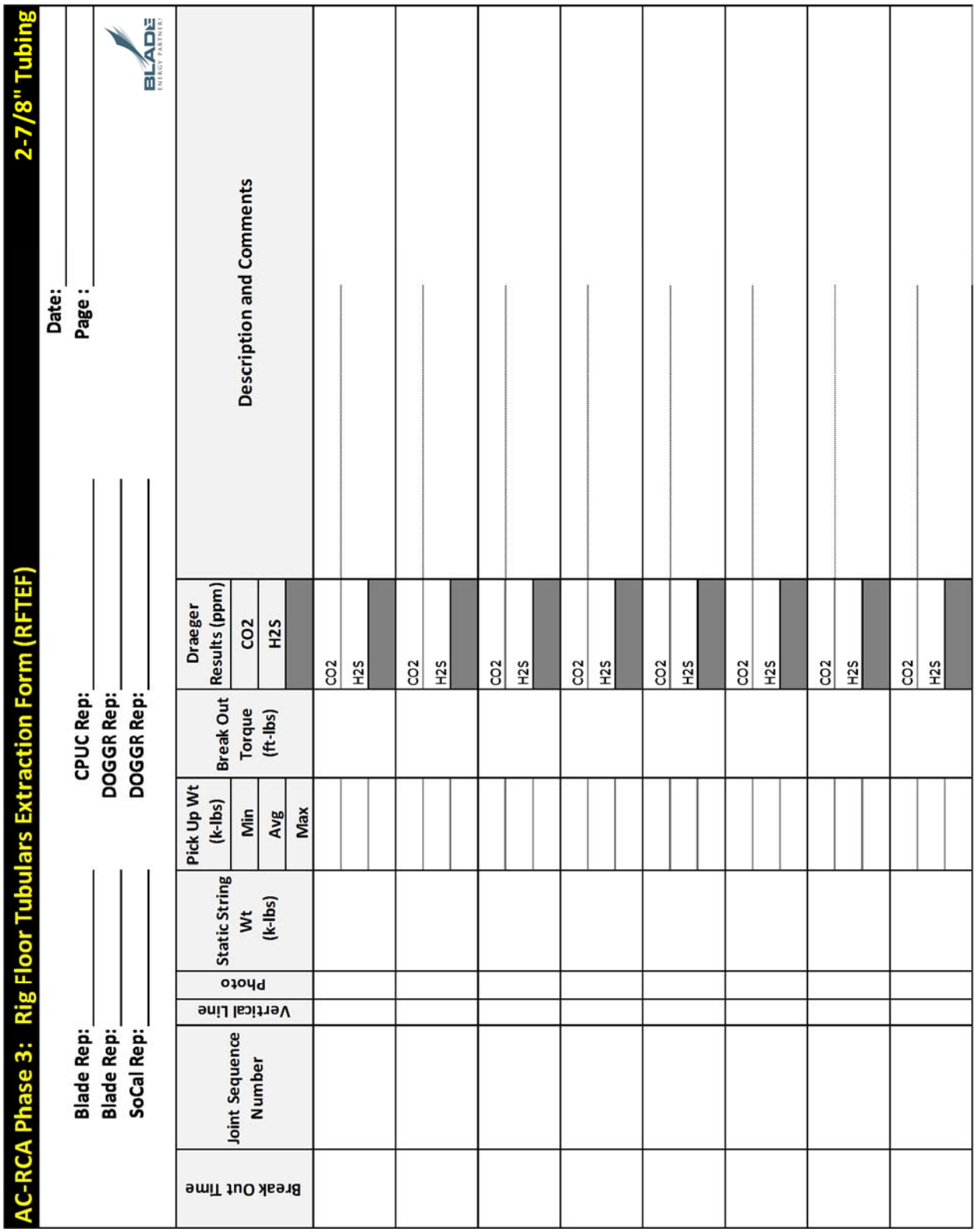


Figure 12. 2-7/8 Rig Floor Tubulars Extraction Form (RFTEF) Example

AC-RCA Phase 3: Pipe Cleaning and Transport Preparation Form (PCTPF) 2-7/8" Tubing

Blade Rep: ______ CPUC Rep: ______ Date: ______

Blade Rep: ______ DOGGR Rep: ______ Page : ______

SoCal Rep: ______ DOGGR Rep: ______

Joint Sequence No.	Cleaning	Corrosion Inhibitor	COC Form Number	Bolstered	Description and Comments
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			

Figure 13. 2-7/8" Pipe Cleaning and Transportation Preparation Form (PCTPF) Example

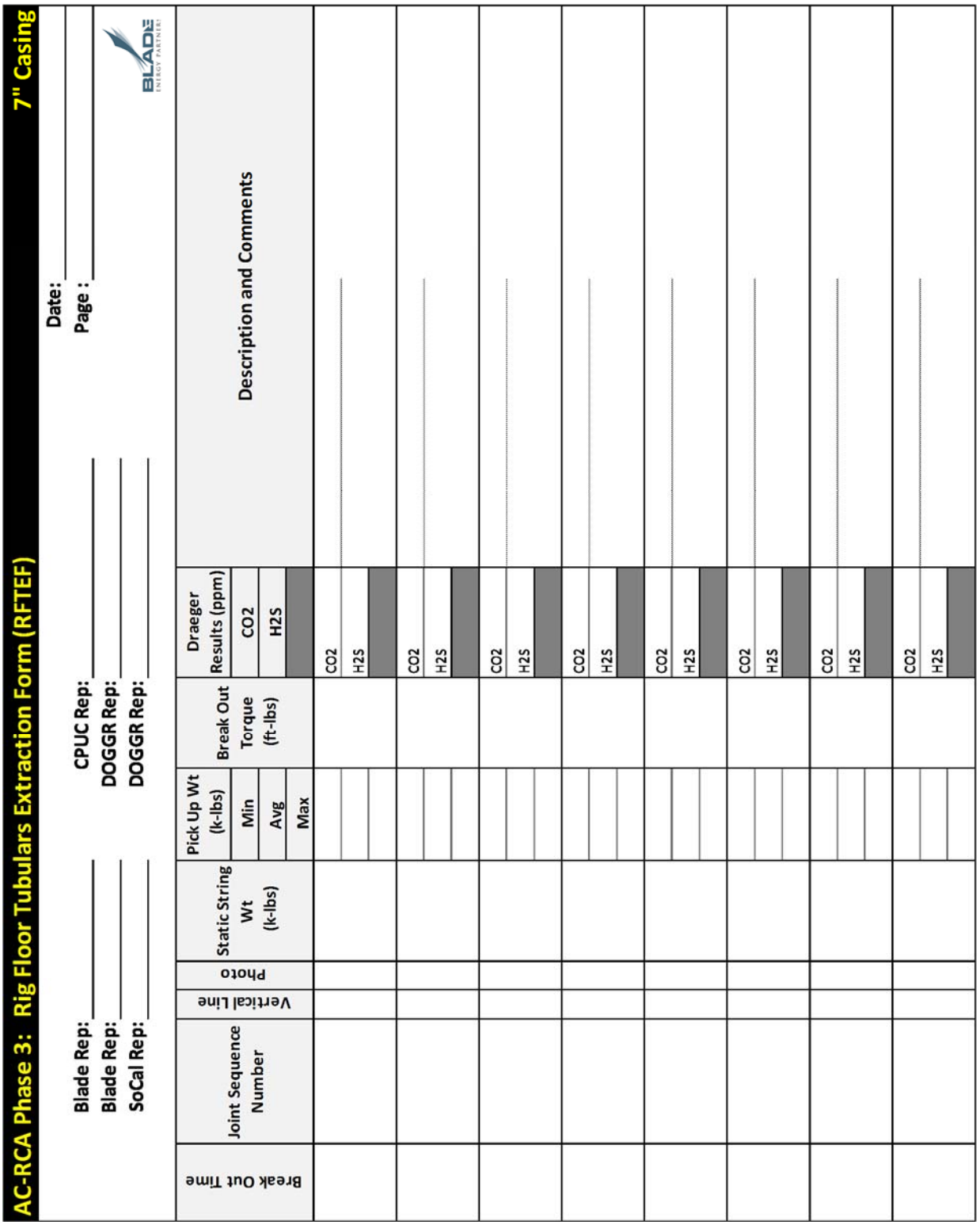


Figure 14. 7.0" Rig Floor Tubulars Extraction Form (RFTEF) Example

AC-RCA Phase 3: Pipe Cleaning and Transport Preparation Form (PCTPF) **7.0" Casing**

Blade Rep: ____________ CPUC Rep: ____________ Date: ____________

Blade Rep: ____________ DOGGR Rep: ____________ Page : ____________

SoCal Rep: ____________ DOGGR Rep: ____________

Joint Sequence Number	Cleaning	Corrosion Inhibitor	COC Form Number	Bolstered	Description and Comments
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			
		T846			
		VCI			

Figure 15. 7.0" Pipe Cleaning and Transportation Preparation Form (PCTPF) Example

AC-RCA Phase 3: Wellhead / Tree Cleaning and Transport Preparation Form (WCTPF)

Blade Rep: ____________ CPUC Rep: ____________ Date: ____________

Blade Rep: ____________ DOGGR Rep: ____________ Page : ____________

SoCal Rep: ____________ DOGGR Rep: ____________

Section Number	Section Description	Cleaning	Corrosion Inhibitor	COC Form Number	Crated	Comments
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			
			T846 VCI			

Figure 16. Wellhead Tree Cleaning and Transportation Preparation Form (WCTPF)

6.6 Tectyl 506 Corrosion Inhibitor Product Information

Tectyl PROTECTIVE PRODUCTS

Product Information

Valvoline.

A PRODUCT OF ASHLAND CONSUMER MARKETS, A COMMERCIAL UNIT OF ASHLAND INC.

Valvoline Performance Products – Tectyl

Version: TE031/01

Tectyl™ 506

Premium solvent based corrosion preventive compound.

TECTYL 506 is a solvent cutback, wax base, general purpose, corrosion preventive compound suitable for the widest range of application requirements for vehicle rustproofing, protection of machinery and parts in storage.
TECTYL 506 protects parts in indoor and outdoor storage as well as domestic and international shipments.
TECTYL 506 cures to a dark amber colored, waxy, translucent, firm film.

Approvals/Performance levels

Tectyl 506

Accelerated Corrosion tests:
@ Average recommended DFT

Salt Spray; 5 % NaCl @ 35°C; ISO 9227 NSS
(Q-Panels, Type R, ASTM A1008)
40+ days

Humidity; 100 % RH; @ 40°C; ISO 6270-2 CH
(Q-Panels, Type R, ASTM A1008)
100+ days

Estimated Protection Period

Indoor: 36 months
Outdoor: 18 months

Application

Surface Preparation:
The maximum performance of **TECTYL 506** can be achieved only when the metal surfaces to be protected are clean, dry and free of rust, oil and mill scale and a substrate temperature of 10-35 °C at the time of product application.

Application:
TECTYL 506 is formulated to be used as supplied. Due to its composition **TECTYL 506** can be subject to postproduction viscosity changes and/or wax sedimentation.
Always ensure homogeneous consistency by agitation before use. If the product thickens due to cold storage or loss of solvent during use, thinning with Valvoline 150 is possible to get the desired consistency. Incorrect thinning will affect film build, dry time and potentially product performance.
Tectyl 506 can be applied by low pressure air spray or brush.

Removal:
TECTYL 506 can be removed with mineral spirits or any similar petroleum solvent, hot alkaline wash or low pressure steam. If dried and cured the film of **TECTYL 506** can also be removed with Tectyl Biocleaner.

Features and Benefits

Superior Protection
At the recommended dry layer thickness Tectyl 506 will protect against corrosion during storage, domestic and overseas transport.

Processing
Tectyl 506 is easy to apply and easy to remove, when no longer needed.

Economical
With a Dry Film Thickness of only 50 microns, Tectyl 506 can protect a big surface with just a little product.

Page 1 of 2

ASHLAND

Tectyl PROTECTIVE PRODUCTS Product Information

Valvoline.

A PRODUCT OF ASHLAND CONSUMER MARKETS, A COMMERCIAL UNIT OF ASHLAND INC.

Health and Safety
For the health and safety related properties of this product reference is made to the Safety Data Sheet (SDS). A Safety Data Sheet is available on request via your local sales office or via the internet @ **http://msds.ashland.com**

Protect the Environment
Do not discharge into drains, soil or water.

Storage
Tectyl 506 should be stored at temperatures between 10-35 °C. Mild agitation is recommended prior to use.
Due to its composition Tectyl 506 can be subject to postproduction viscosity changes during storage. Under proper storage conditions Tectyl 506 can have a shelf life of 36 months minimum.

Typical Properties
Typical property characteristics are based on current production. Whilst future production will conform to Tectyl specifications, variations in these characteristics may occur.

Tectyl 506	
Flash Point, PMCC [°C]	40
Density @ 20°C [kg/ltr]	0,87
Recommended Dry Film Thickness over metal profile [microns]	50
Theoretical coverage @ recommended DFT [m²/ltr]	9,2
Non Volatile [weight %]	52
Dry to touch time @ 20°C [hours]	2
Cure time @ 20°C [hours]	24
Volatile Organic Content ISO 11890-2 (10.4) [g/ltr]	411

This information only applies to products manufactured in the following location(s): Europe

Trusted since 1930
Since 1930, Tectyl™ protective coatings have been extending the operational life of cars, trucks, buses and other vehicles and equipment.
The Tectyl name is synonymous with quality coatings that are easy to apply, long-lasting and easy to remove when no longer required.

For more information on Tectyl products, programs and services please visit **www.tectyl-europe.com**

Caution
Adequate ventilation is required for cure and to ensure against formation of combustible liquid. THE PARTIALLY CURED FILM SHOULD NOT BE EXPOSED TO IGNITION SOURCES SUCH AS FLARES, FLAMES, SPARKS, EXCESSIVE HEAT OR TORCHES. Refer to The Safety Data Sheet for additional handling and first aid information.

Note
The addition of any product over or under this coating is not recommended. The use of additional coatings could result in chemical incompatibility, thus affecting the performance of this coating as stated in the Typical Properties section. If a primer, other than a Valvoline recommended product is required, written authorization must be obtained from Valvoline.

Author:
RdB, August 2015
Replaces: August 2006

ASHLAND

6.7 Sentinel 909 Cleaning Product Information

Sentinel Products, Inc.
BETTER SOLUTIONS FOR A CLEANER ENVIRONMENT

C.A.R.B. COMPLIANT

*When determining VOC concentration in accordance with the requirements set forth by the California Air Resource Board.

HIGH PERFORMANCE ECO-FRIENDLY PRODUCTS

SOY-BASED MASTIC REMOVER

FORMULA 909

BIODEGRADABLE
ODORLESS
RINSES BETTER
GREATER COVERAGE RATES
(70-120 ft^2/gallon)

PRODUCT DESCRIPTION

Sentinel 909 Soybean Degreaser & Mastic Remover is a soybean-based, biodegradable solvent cleaner, ideal for the removal of asphalt-based mastics, adhesives, grease, lubricants, inks, and other petroleum-based residues. 909 is a safe alternative to hazardous and flammable solvents such as citrus, terpene, chlorinated and petroleum.

DIRECTIONS FOR USE (For Floor Tile Mastic Removal) :

1. If necessary, protect walls, drains, cracks and other flooring with an absorbent (rags, kitty litter, sawdust) to keep liquefied mastic contained.
2. Apply enough 909 to the entire adhesive surface to completely penetrate all adhesive to be removed. Allow 909 to soak and penetrate the mastic for 40-60 minutes.
3. Agitate the 909 into the adhesive with a stiff, short-bristled brush or coarse stripper pad. Squeegee or scrape the softened or liquefied adhesive from the floor and absorb for disposal.
4. If necessary, reapply 909 and repeat steps above.
5. Wash and rinse floor with Envirowash 805 and water to ensure a clean surface. Allow to dry completely.

SPECIFICATIONS:

APPEARANCE	CLEAR
APPROXIMATE BOILING POINT	400°F
ODOR	ODORLESS
SPECIFIC GRAVITY (TEMP)	(60°F) .806
FLASHPOINT	>200°F . PMCC
VAPOR DENSITY (Air=1)	Heavier than Air

800-373-0633
www.senpro.com

Sentinel Products, Inc
8901 Wyoming Ave. N.
Brooklyn Park MN 55445

Sentinel Products, Inc.
BETTER SOLUTIONS FOR A CLEANER ENVIRONMENT

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 12/23/2015 Supersedes: All previous versions Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name : Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Product form : Mixture

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Degreasing, Mastic adhesive removal

1.3. Details of the supplier of the safety data sheet

Sentinel Products Inc.
8901 Wyoming Avenue North
Brooklyn Park, MN 55445
Phone: (763) 571-0630
Toll-free: (800)-373-0633
www.senpro.com

1.4. Emergency telephone number

Emergency number : 1-866-359-5661

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Skin Irritation 2 H315
Eye Irritation 2 H319

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS07

Signal word (GHS-US) : **Warning**

Hazard statements (GHS-US) : H315 - Causes skin irritation
H319 - Causes serious eye irritation

Precautionary statements (GHS-US) : P264 - Wash hands thoroughly after handling.
P280 - Wear eye protection, protective clothing, protective gloves.
P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P362 - Take off contaminated clothing and wash before reuse.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P501 - Dispose of contents/container to licensed waste handling facility.

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Name	Product identifier	%
Unsaturated Methyl Esters	(CAS No) 67762-26-9	Proprietary*
2-(2-butoxyethoxy)ethanol	(CAS No) 112-34-5	Proprietary*
Surfactant	(CAS No) Proprietary*	Proprietary*

*The exact product identification and/or percentage of composition has been withheld as a trade secret

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if unwell.

First-aid measures after skin contact : IF ON SKIN: Immediately rinse with plenty of soap and water (for at least 15 minutes). Take off contaminated clothing and wash before reuse. If irritation persists: Get medical advice/attention.

First-aid measures after eye contact : IF IN EYES: Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses if present and easy to do so. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : IF SWALLOWED: Rinse mouth, Do NOT induce vomiting, Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after skin contact : Contact during a long period may cause irritation.

Symptoms/injuries after eye contact : Direct contact with the eyes is likely to be irritating.

Chronic symptoms : No data available.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Dry chemical. Carbon dioxide. Foam.

5.2. Special hazards arising from the substance or mixture

Fire hazard : This material is an NFPA IIIB combustible liquid.

Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity : No dangerous reactions known under normal conditions of use.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Do not dispose of fire-fighting water in the environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Keep sources of ignition away from spill. Evacuate area. Keep upwind. Ventilate area. Spill should be handled by trained clean-up crews properly equipped with respiratory equipment and full chemical protective gear (see Section 8).

6.1.1. For non-emergency personnel

Protective equipment : Wear Protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye or face protection. Approved supplied-air respirator, in case of emergency.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

6.3. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Foam may be used to suppress vapors.

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Place in a suitable container for disposal in accordance with the waste regulations (see Section 13).

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Do not breathe mists. Keep away from sources of ignition - No smoking.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Heat sources. Keep container closed when not in use.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Unsaturated Methyl Esters (67762-26-9)	
Remark (ACGIH)	OELs not established
Remark (US OSHA)	OELs not established

2-(2-butoxyethoxy)ethanol (112-34-5)	
Remark (ACGIH)	TWA - 10 ppm
Remark (US OSHA)	OELs not established

Surfactant (Proprietary)	
Remark (ACGIH)	OELs not established
Remark (US OSHA)	OELs not established

8.2. Exposure controls

Appropriate engineering controls : Ensure adequate ventilation, especially in confined areas.

Personal protective equipment : Gloves. Protective clothing. Protective goggles. Respiratory protection of the dependent type.

Hand protection : Use gloves chemically resistant to this material when prolonged or repeated contact could occur. Gloves should be classified under Standard EN 374 or ASTM F1296. Suggested glove materials are: Natural rubber ("latex"), Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, PVC or vinyl.

Eye protection : Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists for eye contact due to spraying liquid or airborne particles.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits.

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear
Color	: None to Amber
Odor	: Mild odor
Odor Threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: 204 °C (470 °F)
Flash point	: 94 °C (200 °F) Note: Minimum. Method: TCC
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: < 0.1 mm Hg @ 68 °F
Relative vapor density at 20 °C	: Heavier than air.
Relative density	: No data available
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

9.2. Other information

VOC content	: < 14 g/l *When determining VOC content in accordance with the requirements set forth by the Ozone Transport Commission (OTC), effective 01-01-2009

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

Sparks. Heat. Open flame.

10.5. Incompatible materials

Avoid contact with : Oxidizing agent.

10.6. Hazardous decomposition products

Thermal decomposition generates : Carbon oxides (CO, CO2).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Acute toxicity : Not classified

Unsaturated Methyl Esters (67762-26-9)	
LD50 oral rat	> 17,500 mg/kg
LD50 dermal rat	> 2000 mg/kg

2-(2-butoxyethoxy)ethanol (112-34-5)	
LD50 oral rat	> 4500 mg/kg
LD50 dermal rabbit	> 2500 mg/kg

Surfactant (Proprietary)	
LD50 oral rat	> 1300 mg/kg
LD50 dermal rabbit	> 2 g/kg

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Category 2A

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : May be fatal if swallowed and enters airways.

Symptoms/injuries after inhalation : Inhalation in high concentrations may cause irritation of the mucous membranes. Solvent vapors are hazardous and may cause nausea, sickness and headaches. Aspiration of this material into the lungs may cause chemical pneumonia or death.

Symptoms/injuries after skin contact : Contact during a long period may cause light irritation.

Symptoms/injuries after eye contact : Direct contact with the eyes is likely to be irritating.

Symptoms/injuries after ingestion : Acute ingestion causes CNS depression, oropharyngeal and gastric pain and vomiting.

Chronic symptoms : No data available.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Do not discharge to public wastewater systems without permit of pollution control authorities. No discharge to surface waters is allowed without an NPDES permit.

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Do not allow the product to be released into the environment.

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 14: Transport information

In accordance with DOT

Transport document description : Cleaning Compound

Department of Transportation (DOT) Hazard Classes : Not Regulated

Transport by sea

No additional information available

Air transport

No additional information available

In accordance with ADR / RID / IMDG / IATA / ADN

SECTION 15: Regulatory information

15.1. US Federal regulations

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)	
All chemical substances in this product are listed in the EPA (Environmental Protection Agency) TSCA (Toxic Substances Control Act) Inventory	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

Unsaturated Methyl Esters (67762-26-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

2-(2-butoxyethoxy)ethanol (112-34-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Surfactant (Proprietary)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Unsaturated Methyl Esters (67762-26-9)
Listed on the Canadian DSL (Domestic Substances List) inventory.

2-(2-butoxyethoxy)ethanol (112-34-5)
Listed on the Canadian DSL (Domestic Substances List) inventory.

Surfactant (Proprietary)
Listed on the Canadian DSL (Domestic Substances List) inventory.

No additional information available

15.2.2. National regulations

2-(2-butoxyethoxy)ethanol (112-34-5)
Listed on Inventory of Existing Chemical Substances (IECSC) Listed on the AICS (the Australian Inventory of Chemical Substances) Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory. Listed on the Korean ECL (Existing Chemical List) inventory. Listed on the Philippines CCS (Chemicals & Chemical Substances) inventory.

Surfactant (Proprietary)
Listed on Inventory of Existing Chemical Substances (IECSC) Listed on the AICS (the Australian Inventory of Chemical Substances) Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory. Listed on the Korean ECL (Existing Chemical List) inventory. Listed on the Philippines CCS (Chemicals & Chemical Substances) inventory.

15.3. US State regulations

California Proposition 65

Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

Indication of changes	: Revision 1.1 – 23 December 2015 - Section 15 Updated
Other information	: Author. KAD.

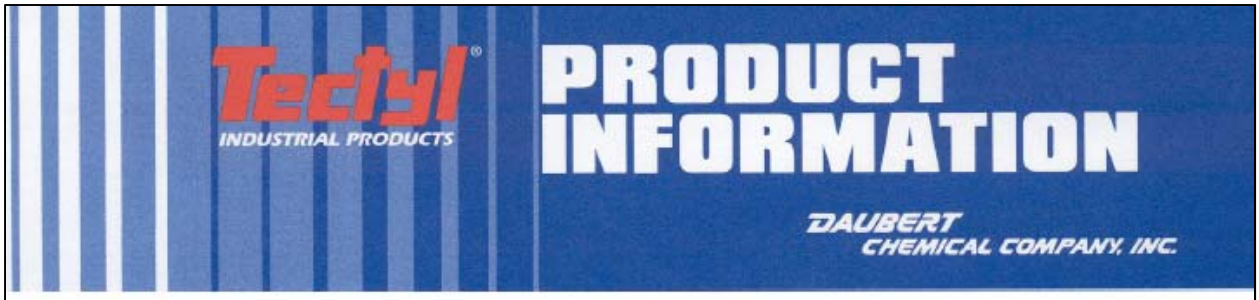
NFPA health hazard	: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.
NFPA fire hazard	: 1 - Must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature condition, before ignition and combustion can occur.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating

Health	: 1
Flammability	: 1
Physical	: 0
Personal Protection	:

The information in this document is believed to be correct as of the date issued. However, no warranty of merchantability, fitness for any particular purpose, or any other warranty is expressed or is to be implied regarding the accuracy or completeness of this information, the results to be obtained from the use of this product or the hazards related to its use. This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

6.8 Tectyl 846 Class 1 Corrosion Inhibitor Product Information



Tectyl® 846 CLASS I

Description

TECTYL® 846, Class I is a solvent cutback, water displacing corrosion preventive compound. The dry film is firm, amber, transparent, and non-tacky.

TECTYL® 846, Class I is approved under Military Specifications MIL-PRF-16173E, Grade 4, for Class I, and MIL-P-116J, Type P-19.

Laboratory Data / Typical Properties

Flash, PMCC*, Minimum	106°F
Density, Weight/Gallon @ 77°F (25°C)	7.3 ± 0.1 lbs./gallon
Specific Gravity @ 60°F (15.6°C)	0.87
Recommended Dry Film Thickness over Metal Profile	1.0 mil
Theoretical Coverage @ Recommended DFT	818 sq. ft./gallon
Non-Volatile % by Weight	57 ± 3
Non-Volatile % by Volume	51 ± 1
Volatile Organic Content (VOC), Maximum	3.40 lbs./gallon
Approximate Dry to Touch Time @ 77°F (25°C)	4 hours
Cure Time	24 hours
Resistance to Flow per MIL-C-16173E	Pass
Accelerated Corrosion Tests:	
5% Salt Spray (Hours) ASTM** B-117 @ Recommended DFT (2x4x1/8 in. Polished Steel Panels)	1920
100% Relative Humidity (Hours) ASTM D-1748 @ Recommended DFT (2x4x1/8 in. Polished Steel Panels)	1000

*PMCC (Penske Martin Closed Cup)
**ASTM (American Society for Testing and Materials)

Page 1 of 2

Surface Preparation

The maximum performance of TECTYL® 846, Class I can be achieved only when the metal surfaces to be protected are clean, dry and free of rust, oil and mill scale. Daubert Chemical Company recommends that the metal substrate temperature be 50-95°F (10-35°C) at the time of product application.

Application

TECTYL® 846, Class I is formulated to be used as supplied. Ensure uniform consistency prior to use. Continued stirring is generally not required. If the product thickens due to cold storage or loss of solvent during use, contact Daubert Chemical Company. DO NOT THIN TECTYL® 846, Class I. Incorrect thinning will affect film build, dry time and product performance. Daubert Chemical Company recommends that the ambient and product temperature be 50 - 95°F (10 - 35°C) at time of application. TECTYL® 846, Class I can be spray or dip applied.

Removal

TECTYL® 846, Class I can be removed with TECTYL® HPS solventborne thinner, vapor degreasing, hot alkaline wash, or low pressure steam. TECTYL® 846, Class I can be removed from fabrics by normal dry cleaning procedures. Avoid the use of chlorinated or highly aromatic solvents when removing from painted surfaces, as these solvents may adversely affect paint.

Storage

Store TECTYL® 846, Class I at temperatures between 50-95°F (10-35°C). Mild agitation is recommended prior to use.

Caution

Adequate ventilation is required for cure and to ensure against formation of a combustible liquid. THE PARTIALLY CURED FILM SHOULD NOT BE EXPOSED TO IGNITION SOURCES SUCH AS FLARES, FLAMES, SPARKS, EXCESSIVE HEAT, OR TORCHES. Refer to Daubert's Material Safety Data Sheet for additional handling and first aid information.

Note:

The addition of any product over or under this coating is not recommended. The use of additional coatings could result in chemical incompatibility, thus adversely affecting the performance of this coating as stated in the lab data section. If a product other than Daubert Chemical Company's recommended product is required, written authorization must be obtained from Daubert Chemical Company.

December 3, 2010:co

CAUTION: The data, statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by us, and we believe such data, statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly, we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

WARRANTY: Daubert Chemical Company, Inc. ("Daubert") warrants all products manufactured by it to be free from defects in material and workmanship. DAUBERT MAKES NO OTHER WARRANTIES, WHETHER, EXPRESSED OR IMPLIED, WITH RESPECT TO SUCH PRODUCTS, AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND IMPLIED WARRANTIES ARISING FROM A COURSE OF DEALING OR USAGE OF TRADE, ARE DISCLAIMED BY DAUBERT. All claims hereunder must be made in writing within 30 days after receipt of the products at the buyer's plant and prior to further processing the products or combining them with other materials or products. Daubert's liability, whether under this warranty or in contract, tort, negligence or otherwise, is limited to the return of the net purchase price paid for any products proven defective or, at Daubert's option, to the repair or replacement of said products upon their return, transportation prepaid, to Daubert. THE REMEDY HEREBY PROVIDED SHALL BE THE EXCLUSIVE AND SOLE REMEDY OF THE BUYER, AND UNDER NO CIRCUMSTANCES SHALL DAUBERT BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES. No Daubert representative or other person is authorized to change this warranty in any way or to assume for Daubert any other liability in connection with the sale or use of its products.

REFER TO MATERIAL SAFETY DATA SHEET FOR HEALTH AND SAFETY INFORMATION.

DAUBERT CHEMICAL COMPANY, INC.

4700 South Central Avenue ■ Chicago, IL 60638 ■ 1-800-688-0459 ■ or 708-496-7350 ▪ Fax: 708-496-7367

Visit our web site at www.daubert.com ■ Our e-mail is dauchem@daubert.com

6.9 Volatile Corrosion Inhibitor (VCI) Product Information

VCI are compounds that release molecules into the air which attach to metal surfaces forming a corrosion inhibiting layer a few molecules thick. An advantage of using VCI's is that the molecules will penetrate into inaccessible crevices and gaps thereby reaching complex surfaces that are difficult to coat with conventional products. VCI compounds can be added to various types of packaging and wrapping materials, and will therefore provide corrosion protection without having to be in direct contract with area being protected. VCI products that are compliant to US Military Performance or NACE specifications will be utilized.

CORTEC CORPORATION
Environmentally Safe VpCI®/MCI® Technologies

To: Whom It May Concern
Subject: Safety Data Sheets (SDS)
Date: December 22, 2016

VpCI®: 101, 105, 111, 125, 126, 126 CorrCap, 130, 131, 132, 133, 134, 136, 137, 143, 144, 145, 146, 148, 149, 150, 170, 308 Pouch, 309 Pouch, Pipe Caps

Cor-Pak®: 1-Mul Pouch, Ex Film, Fabric, Pipe Strip

Cor-Pak® VpCI®: Caps, Corrugated PE Sheeting, Polycoated Paper, Reinforced Paper, Stretch Film

Clay Coated Papers: 42NRSC, 50NRSC, 63BRSC, 63NRSC

Anti-Skid Liner Board, BioEmitterTM, BioPad®, BioPouch®, CorNettingTM, Corr SealTM, VpCI® Film, CorrCap VpCI® Protective Cover, CorrLam® LD, Corrosorber® Cup, Corrosorber® Pouch, Corrologic Emitter, Corrosorber® Paper, CorrTainer®, CorrTube®, CorShield® VpCI®-146, CorShield® VpCI®-146 Creped Paper, CorShield® VpCI® Packaging Fabric, Desicorr® VpCI®, Desicorr®, Eco-Tie®, EcoDevice®, EcoEmitter®, EcoPouch®, EcoShield® VpCI®-226 Film, EcoShield® Fabric, EcoShield® Linerboard, EcoShield® Paper, EcoSol®, EcoSonic® ESD Paper powered by Nano-VpCI®, EcoWeave®, Eco Works® AD, Eco Works® Biodegradable & Compostable Films and Bags, Eco Works® Resin, MCI® Fibers, MilCorr® VpCI® Shrink Film MilCorr® FR VpCI® Shrink Film, M-126/3 Blue, M-126/3 Clear, M-229 Blue, OGshield VpCI® Wrap, PTC Emitters

Bull Frog: Gun Sleeves, Emitter Strips, Emitter Cups, Emitter Shield, Motorcycle and Automotive Cocoons

We have discontinued providing SDSs for the above listed products as we consider these products "articles" as defined by OSHA's, Canada's, and Europe's Hazard Communication Standards. Therefore they are exempt from the safety data sheet requirements of these regulations. OSHA Section 1910.1200 of Title 29 of the Code of Federal Regulations specifically states that its Hazard Communications section does not apply to "articles." An "article" is defined as follows:

Article means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Article 3(3) of the REACh regulation defines an article as "an object which during production is given a special shape, surface, or design, which determines its function to a greater degree than its chemical composition." After assessment according to ECHA Guidance on requirements for substances in articles (Version 2-2011) including process described in Figure 2, it has been determined the above products fall under the category of articles according to REACh. In addition, none of the above products contain SVHC above 0.1wt%.

Thank you for your interest in our products. If you have any further questions or need additional information, please contact regulatory@cortecvci.com.

Sincerely,

THE CORTEC® CORPORATION

4119 White Bear Parkway • St. Paul, MN 55110 USA
Phone: (651) 429-1100 • (800) 4-CORTEC • Fax: (651) 429-1122
www.CortecVCI.com • info@CortecVCI.com

Cor-Pak® VpCI® Stretch Film

High Technology Anti-Corrosion Films

Hand Wrap

Multimetal VpCI® Systems

DESCRIPTION

Cor-Pak VpCI Stretch Film is the ultimate high performance film, developed for corrosion protection of ferrous and non-ferrous metals. This film is coextruded using state-of-the-art resins, which offers superior strength and stretch characteristics as well as multimetal corrosion inhibiting properties that only VpCI technology can deliver. Cor-Pak VpCI Stretch Film delivers puncture resistance and load holding, which allows a user to down-gauge, contain aggressive loads, and produce a better package at reduced cost.

The combination of enhanced polyethylene resins with VpCI technology makes Cor-Pak VpCI Stretch Film the most advanced corrosion inhibiting stretch film available today on the market.

METHOD OF APPLICATION

Cor-Pak VpCI Stretch Film is compatible with commercially available manual and automatic stretch wrapping equipment.

BENEFITS

- Does not contain polyisobutylene (PIB) or other tackifiers in cling layer, allowing discarded stretch film to be recycled
- Does not leave residue on parts
- Provides multimetal corrosion protection with VpCI action
- Protected parts can be used immediately without cleaning or degreasing
- More economical and secure than tape, twine, or strapping
- Holds protected parts securely in place
- Self-adhering film bonds to each layer for added strength
- Helps keep dust, dirt, and moisture off warehouse stock
- Superior performance in light gauges allows down-gauging and cost effectiveness
- Can be applied with standard equipment
- Excellent clarity and cling
- Up to a 3:1 stretch ratio
- FDA approved for use on food handling equipment
- Recyclable, environmentally friendly

PACKAGING AND STORAGE

Available in standard machine film sizes and gauges. Contact Cortec Customer Service for inquiries and custom requirements.

Cor-Pak VpCI Stretch Film should be stored indoors at room temperature, sealed in its original packaging.

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TYPICAL MECHANICAL PROPERTIES OF COR-PAK VPCI STRETCH FILM

Property		Test Method	Units		
Thickness		ASTM D6988	mil	1.00	2.00
Breaking Factor	MD	ASTM D882-02	lbs/in	6.44	11.27
	TD			6.12	10.74
Tensile Strength at Break	MD	ASTM D882-02	psi	4836.10	5244.25
	TD			4990.33	5369.00
Elongation at Break	MD	ASTM D882-02	%	647.17	680.05
	TD			730.74	737.11
Tear Strength	MD	ASTM D1922-06a	mN	1569.60	5179.68
	CD			5791.83	11379.60
Dart Drop Impact Resistance		ASTM D1709-04, Test Method A	grams	819.16	> 1300
Coefficient of Friction	Static			1.20	0.40
	Kinetic			1.23	0.47
*Typical properties represent average laboratory values and are not intended as specifications but as guides only.					
Cor-Pak VpCI Stretch Film is produced by Cortec Corporation and EcoCortec (a European Subsidiary of Cortec Corporation)					

FOR INDUSTRIAL USE ONLY
KEEP OUT OF REACH OF CHILDREN
KEEP CONTAINER TIGHTLY CLOSED
NOT FOR INTERNAL CONSUMPTION
CONSULT SAFETY DATA SHEET FOR MORE INFORMATION

LIMITED WARRANTY

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CORTEC CORPORATION
Environmentally Safe VpCI®/MCI® Technologies

4119 White Bear Parkway, St. Paul, MN 55110 USA
Phone (651) 429-1100, Fax (651) 429-1122
Toll Free (800) 4-CORTEC, E-mail info@cortecvci.com
Internet http://www.cortecvci.com

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