

Final

Aliso Canyon RCA: SS-25A Wellsite Tubulars Handling Protocol

Prepared For:

RCA SS-25:
CPUC, DOGGR, SoCalGas



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

Purpose:

Protocol for handling the tubulars and wellhead sections that are extracted from the SS-25A well.

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Revision History

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001	29-Apr, 2017	Clarifications around handling completion components, various corrections
002	05-May, 2107	Added comments from SCG to Sections 1 and 4, changed Sentinel 747 to Sentinel 909
003	09-May, 2017	Updated Section 1 to clarify Blade's authority.

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1 Introduction

This document describes the steps and procedures for handling the wellhead and tubing that will be extracted from the SS-25A well as part of the SS-25 Root Cause Analysis (RCA) work. The tubing that will be extracted consists of the following:

- 3-1/2" 9.3 ppf N80 with API EUE connections - 343 ft or 11 joints.
- 5-1/2" 20.0 ppf N80 with API LTC connections - 7,794 ft or 202 joints
- 2-7/8" 6.4 ppf N80 with API 8RD connection - 31 ft or 1 joint

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 tubing and the wellhead/tree from the SS-25A wellbore, through onsite examination and cleaning, and then preparation for transport and storage. The goal is to preserve the tubulars in their as-recovered downhole condition, and to prevent post recovery damage.

Blade has provisional authority as granted by the CPUC to conduct a Root Cause Analysis (RCA) on well SS-25. This authority includes overseeing RCA related work on the SS-25A well. During that 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-25A wellhead and tubing 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 permanent or partial abandonment of SS-25A. 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-25A, Blade will document such differences and the designated regulatory agency will act as the arbiter, and make the final decision.

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. 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 storage location. Likewise, each wellhead section will be numbered, visually inspected, cleaned, a corrosion inhibitor applied, and the section crated for transport.

The Blade Team and those parties under Blade direction are responsible for handling and protecting evidence during examination, cleaning and preparation for storage. 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 joint of tubing 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 tubing joints 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 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. If necessary, 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 be 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 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, preserved and crated for transport and storage. 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.

3 Wellhead Handling Procedures

A schematic of the SS-25A wellhead is shown in Figure 1. The internal wellhead sections will be visually inspected, cleaned and prepared for storage after being removed from the well.

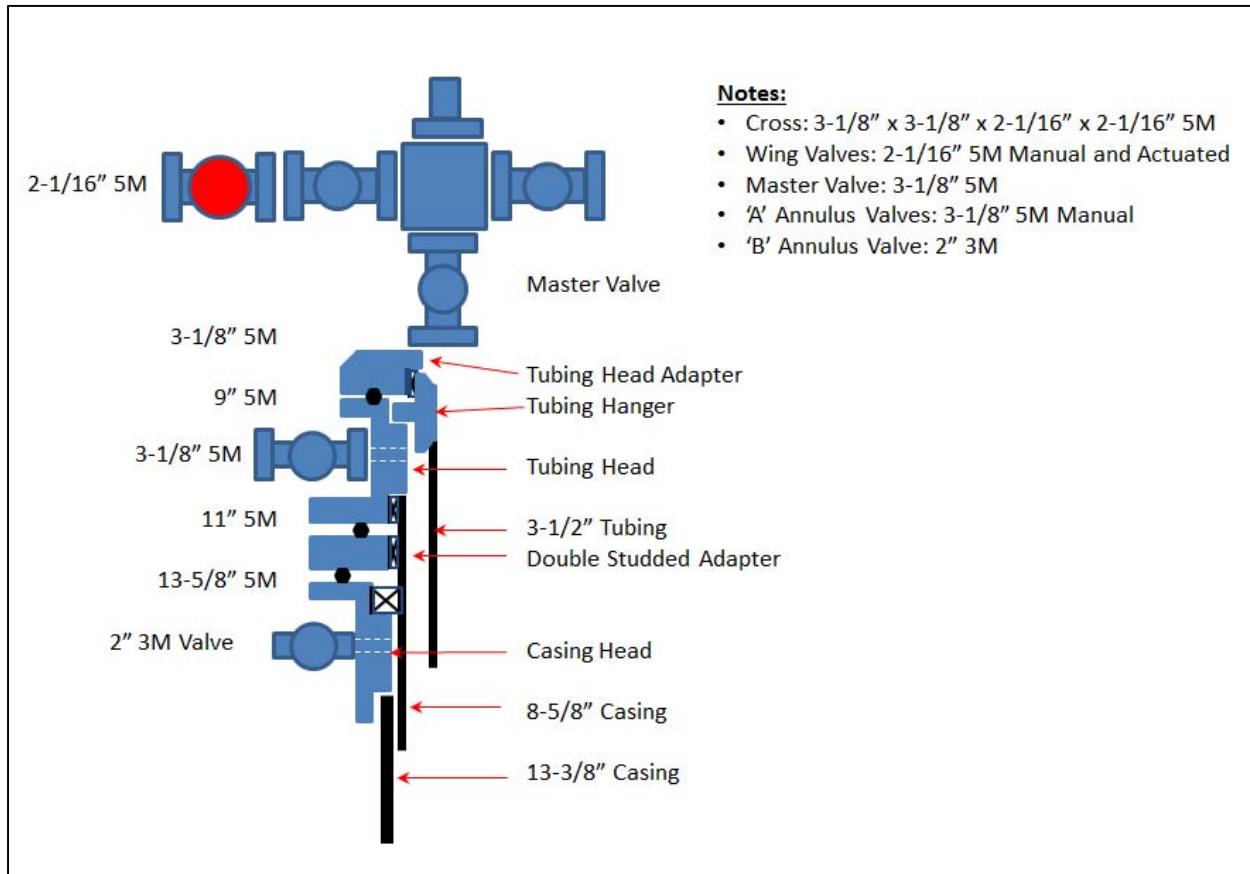


Figure 1. SS-25A Wellhead and Tree Schematic

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 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 5.1 using the Wellhead/Tree Inspection form (WIP) as shown in Figure 11.
3. The results of this inspection will be documented on the Wellhead/Tree Evidence Data Sheet per Section 5.3.
4. The section internal surfaces will be cleaned, if necessary, using a brush and low pressure water spray and/or cleaner per Section 5.2.
5. This will be followed by the application of a corrosion inhibitor, or the use of Volatile Corrosion Inhibitor packaging (VCI) (reference Appendix 5.9) for longer term storage per Section 5.2.

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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 transport and storage.
8. The cleaning and crating process will be documented using the Wellhead/Tree Cleaning and Transport Preparation Form (WCTP) as shown in Figure 12.
9. The Blade representative will complete the Chain of Custody (COC) forms as described in Appendix 5.3. The COC procedures will document the possession and the transfer/movement history of all sections.

4 Tubing Handling Procedures

All work in this protocol is being directed by Blade.

All well and wellbore equipment, including tubing, shall be considered potential evidence. Therefore, every effort shall be taken to improve the chance for recovery of tubing and downhole equipment 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 and wire scratcher / brushes tool make 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.

The following procedures will be followed while extracting the tubing from SS-25A, and preparing the joints for transportation and storage. The tubing string and associated completion equipment is expected to be pulled from 8,215 ft and will consist of the following:

- 3-1/2" 9.3 ppf N80 with API EUE connections - 343 ft or 11 joints.
- 5-1/2" 20.0 ppf N80 with API LTC connections - 7,794 ft or 202 joints
- 2-7/8" 6.4 ppf N80 with API 8RD connection - 31 ft or 1 joint

Details about the completion equipment are provided in Appendix 5.4.

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

Table 1. Tubing Make-up Torques

OD	Wt	Conn	Conn OD	Minimum	Optimum	Maximum
3-1/2"	9.3	EUE	4.500"	2400 ft-lbs	3200 ft-lbs	4000 ft-lbs
5-1/2"	20.0	LTC	6.505"	4350 ft-lbs	5800 ft-lbs	7250 ft-lbs
2-7/8"	6.4	EUE	3.668"	1730 ft-lbs	2300 ft-lbs	2880 ft-lbs

Special Requirements:

- 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 and individual completion component using the Rig Floor Tubulars Extraction Form (RFTEF) as shown in Figure 8.

- Note: individual completion components include – crossovers, gas lift mandrel, sliding sleeve, wireline nipples, packers, etc.
2. Draw vertical Orientation Line on the box.
 3. 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., for full joints and individual completion components.
 - Enter the Joint Sequence Number on the RFTEF.
 4. Visually examine the connection to determine if there is any observable damage, and then photograph the connection ensuring that the Joint Sequence Number is also visible in the connection photograph.
 5. 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.
 6. Install a thread protector on the pin.

➤ **Do not apply any thread compound to the connection**
 7. Lay down the joint onto the pipe rack using a pipe wrangler or crane taking care to prevent impact loads.
 8. Latch the elevators onto the next joint, and POOH with the joint.
 - a. Record the string weight (hookload) on the RFTEF.
 - b. Record the drag on the RFTEF.
 - c. Pick up smoothly and slowly. Monitor the weight indicator closely.
 - d. 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.**
 9. 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 2.
 10. Check for the presence of H₂S and CO₂ using Draeger tubes at least every 5 joints pulled. Take the measurements at the rotary table level in a consistent manner. Record all readings on the RFPTF. Check for H₂S more frequently if non-zero readings are noted.
 11. Continue pulling the subsequent tubing joints in this manner.
 12. 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 Pipe Rack Inspection Form (PRIF) as shown in Figure 9.

1. As a joint is placed onto the pipe rack, record the Joint Sequence Number on the PRIF.
2. Measure the pH of the fluid on the joint surface at a minimum of one and preferably three locations along the length of the joint using pH paper. If the pH cannot be measured, the reason should also be documented on the PRIF.
3. For each joint, measure the Tally Length (TL) from the coupling face to the pin face (excluding the pin threads) as shown in Figure 2, and record the length on the PRIF.
4. 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 5.1. The focus of the visual inspection is primarily the OD of the tubing. ID examination requires other NDE techniques.
5. Samples of any scale or corrosion product, or other solid material present on the pipe surface will be collected.
6. Any flaw that is located will be cleaned and protectively wrapped, if appropriate and necessary, as described in Section 5.1. 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.
7. Enter the classification disposition (Flawed or No Flaws) of the joint, and any other relevant comments about the condition of the joint onto the PRIF.
8. Permanently mark the Joint Sequence Number at both ends of the joint and on either end of individual completion components.
9. An Evidence Data Sheet will then be completed for each joint per Appendix 5.3.
10. Continue inspecting each subsequent joint as they are laid down in this manner.

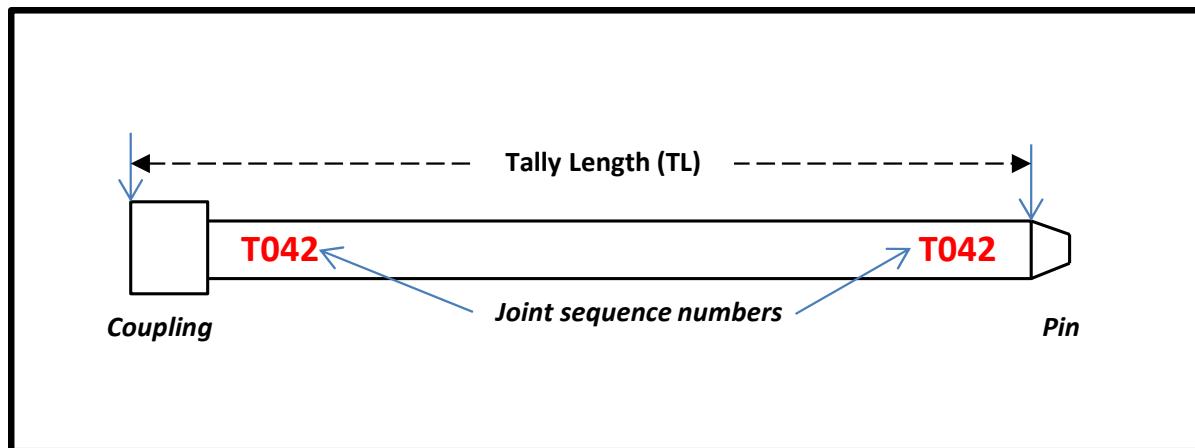


Figure 2. Tubing Joint Measurement and Numbering Locations

11. Joints that have large flaws 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 10.

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

1. As described in Section 5.2, 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 5.1.
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 5.9) 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 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 3.
 - **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 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.
 - **Extreme care will be taken 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 10.
6. The Blade representative will complete the Chain of Custody (COC) forms as described in Appendix 5.3. The COC procedures will document the possession and the transfer/movement history of all the joints.





Figure 3. Bolstering System Example

5 Appendix

The following supplemental information is provided in this section.

- Section 5.1: Visual Inspection Procedures
- Section 5.2: Joint Cleaning and Corrosion Protection Procedures
- Section 5.3: Evidence Data Sheet & Chain of Custody Forms
- Section 5.4: Tubulars Performance Data
- Section 5.5: Extraction Documentation Forms
- Section 5.7: Tectyl 506 Product Information
- Section 5.6: Sentinel 747 Cleaning Product Information
- Section 5.8: Tectyl 846 Class 1 Corrosion Inhibitor Product Information
- Section 5.9: Volatile Corrosion Inhibitor (VCI) Product Information

5.1 Visual Inspection Procedures

The focus of the visual inspection is primarily the OD of the tubing. ID examination requires other NDE techniques. 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 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 connections.
- Identify presence and/or absence of deformations on the pipe joints, and/or connections.
- Identify presence or absence of corrosion products.
- Identify whether there was any over torqueing, and/or other signs of damage.

Note that while the procedures described below focus on the tubing, 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 any 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 end of the joint with the Joint Sequence Number visible in the picture.
 - b. Photograph all of the flaws that were observed.
 - flaws will be photographed with an index card placed next to the flaw. The Joint Sequence Number will be written on the index card. The flaw number should be visible in the picture.
 - 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 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 PRIF and the Evidence Data Sheet.
9. At night, the inspection area should be illuminated using portable equipment providing a light level of at least 50 ft-candles (500 lux) as per API 5A5 (Field Inspection of Casing, Tubing and Plain-End Drill Pipe).

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 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 5.6) 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. VCI impregnated packaging material (reference Appendix 5.9) 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.

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- 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.
- When handling sections containing the flaw area, care must be taken to preserve specimens in the as-recovered condition.
- If a joint is fractured into two or more separate pieces, do not fit the fracture surfaces back together.

5.2 Cleaning and Corrosion Protection Procedures

After visual inspection, each joint will be cleaned, re-inspected, 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, 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 (or equivalent, reference Appendix 5.7) 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 and low pressure water spray and/or Sentinel 909 cleaner using a lance to direct the spray inside the joint. Spraying will 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-apply the Joint Sequence number on both ends of the joint.
5. Tectyl 846 Class 1 corrosion inhibitor (reference Appendix 5.8) will be applied to the OD. Tectyl 846 (or equivalent) or 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 the tubing.

Therefore prior to bolstering:

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

5.3 Evidence Data Sheet & Chain of Custody

An Evidence Data Sheet will be generated for every tubing 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 as pH, dimensional measurements, visual observations and so on.

- The Evidence Data Sheet for 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 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 T001, the Section Number for the different sections will be identified as "T001A", "T001B" 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 have a link to the COC Form Number.
- This process for identifying samples/sections will be followed regardless of whether, for example, a joint is sectioned locally or at different location.

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-25A. Examples of Evidence Data Sheet forms are shown in Figure 4 and Figure 5.

Chain of Custody Process

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

- **Wellhead/Tree COC**

Each wellhead 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 sections: AC-RCA-25A-W001, AC-RCA-25A-W002, AC-RCA-25A-W003....

- **Tubing COC**

Every tubing 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:

- Tubing joints: AC-RCA-25A-T001, AC-RCA-25A-T002, AC-RCA-25A-T003...

Once completed, a scanned copy of the COC form will be made. The original tubing COC forms will travel with the bolsters and/or crated sections. 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 joint and wellhead section that is extracted from the wellbore will be identified and tracked. Examples of Chain of Custody forms are shown in Figure 6 and Figure 7.

AC-RCA
BLADE EVIDENCE DATA SHEET - WELLHEAD/TREE



Description:	
Wellhead/Tree Component No:	Photos Taken: Y <input type="checkbox"/> N <input type="checkbox"/>
Sample No. (if applicable)	Video Taken: Y <input type="checkbox"/> N <input type="checkbox"/>
Date & Time Collected:	Has Label: Y <input type="checkbox"/> N <input type="checkbox"/>
COC Form Number:	Blade Rep
Physical Observations:	
Flaw or Anomaly Description:	
Scale Samples Collected and Location:	
Other Notes:	

Figure 4. Wellhead/Tree Evidence Data Sheet

AC-RCA
BLADE EVIDENCE DATA SHEET - TUBING



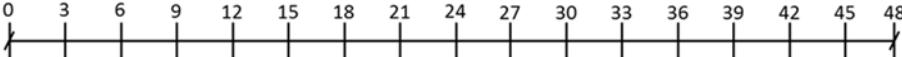
Description:						
Joint Sequence Number:						Photos Taken: Y <input type="checkbox"/> N <input type="checkbox"/>
Sample No. (if applicable):						Video Taken: Y <input type="checkbox"/> N <input type="checkbox"/>
Date & Time Collected:						Has Label: Y <input type="checkbox"/> N <input type="checkbox"/>
COC Form Number:						
Inspection Location:						Blade Rep
Joint Classification:		Flawed	No Flaws			
pH Measurements		Location	Measurement			Comment
Scale Samples Collected and Location:						
Pin/Box Connection & Pipe Body Description Along With Any Flaws or Anomalies:						
Visual Inspection Quick Reference:  					Tong Marks (T): <input type="checkbox"/> Slip Marks (S): <input type="checkbox"/> Gripper Marks (G): <input type="checkbox"/> Corrosion (C): <input type="checkbox"/> Scale (K): <input type="checkbox"/> Pitting (P): <input type="checkbox"/>	
Other Visual Observations or Comments:						

Figure 5. Tubing Evidence Data Sheet

AC-RCA Chain of Custody Form (Tubing)**Form No: AC-RCA-25A-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:		Print Name:		If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain:
Signature:		Signature:		
Tag/Seal No:		Tag/Seal No:		
3. Relinquished By: (Company Name)	Date/Time/Joint ID/Loc	4. Received By: (Company Name)	Date/Time/Joint ID/Loc	Comment
Print Name:		Print Name:		If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain:
Signature:		Signature:		
Tag/Seal No:		Tag/Seal No:		
5. Relinquished By: (Company Name)	Date/Time/Joint ID/Loc	6. Received By: (Company Name)	Date/Time/Joint ID/Loc	Comment
Print Name:		Print Name:		If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain:
Signature:		Signature:		
Tag/Seal No:		Tag/Seal No:		

* 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

AC-RCA Chain of Custody Form (Wellhead and Tree)**Form No: AC-RCA-25A-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/ <u>Loc</u>	2. Received By: (Company Name)	Date/Time/Joint ID/ <u>Loc</u>	Comment	
Print Name:	Print Name:			If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain: _____	
Signature:	Signature:				
Tag/Seal No:	Tag/Seal No:				
3. Relinquished By: (Company Name)	Date/Time/Joint ID/ <u>Loc</u>	4. Received By: (Company Name)	Date/Time/Joint ID/ <u>Loc</u>	Comment	
Print Name:	Print Name:			If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain: _____	
Signature:	Signature:				
Tag/Seal No:	Tag/Seal No:				
5. Relinquished By: (Company Name)	Date/Time/Joint ID/ <u>Loc</u>	6. Received By: (Company Name)	Date/Time/Joint ID/ <u>Loc</u>	Comment	
Print Name:	Print Name:			If applicable, Does Tag/Seal No. * Match Shipper? (Y/N) _____ If No, explain (or note any evidence of package tampering): Any changes to sample(s)? (Y/N) _____ If yes, explain: _____	
Signature:	Signature:				
Tag/Seal No:	Tag/Seal No:				

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

5.4 Tubular Performance Data

For reference, dimensional and performance data for the tubulars that were run in the SS-25A 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	?	?	?	?	?	?	?	?	?	?	---
Surface	13-3/8"	48.0	H40	0.330	12.715	12.559	0	806	806	STC	38,688
Production	8-5/8"	36.0	K55	0.400	7.825	7.700	0	2,970	2,970	BTC	106,920
		Homco Casing Patch		---	7.525	7.400	2,970	3,010	40	---	---
		36.0	K55	0.400	7.825	7.700	3,010	5,422	2,412	BTC	86,832
		36.0	N80	0.400	7.825	7.700	5,422	8,112	2,690	BTC	96,840
	6-5/8"L	27.65	K55	0.417	5.791	5.666	7,926	8,908	982	Vetco FJ	27,152
Tubing	3-1/2"	9.3	N80	0.254	2.992	2.867	0	50	50	EUE	465
	5-1/2"	20.0	N80	0.361	4.778	4.653	50	7,854	7,804	LTC	156,080
	3-1/2"	9.3	N80	0.254	2.992	2.867	7,854	8,184	330	EUE	3,069
	2-7/8"	6.4	N80	0.217	2.441	2.347	8,184	8,215	31	EUE	198

Tubulars Nominal Performance

String	OD (in)	Weight (ppf)	Grade	Conn	Pipe Data				Connection Data			
					Nom Wall	Burst	Collapse	Tension	OD	ID	Burst	Tension
Conductor	20"	?	?	?	?	?	?	?	?	?	?	?
Surface	13-3/8"	48.0	H40	STC	0	1,730	740	541,000	14.375	12.715	1,730	322,000
Production	8-5/8"	36.0	K55	BTC	0.400	4,460	3,450	568,000	9.625	7.825	4,460	780,000
		36.0	N80	BTC	0.400	6,490	4,100	827,000	9.625	7.825	6,490	895,000
	6-5/8"L	27.65	K55	Vetco FJ	0.417	6,060	6,170	447,000	?	?	?	?
Tubing	3-1/2"	9.3	N80	EUE	0.254	10,160	10,540	207,200	4.500	2.992	10,160	207,200
	5-1/2"	20.0	N80	LTC	0.361	9,190	8,830	466,000	6.050	4.778	9,190	428,000
	3-1/2"	9.3	N80	EUE	0.254	10,160	10,540	207,200	4.500	2.992	10,160	207,200
	2-7/8"	6.4	N80	EUE	0.217	10,570	11,170	145,000	3.668	2.441	10,570	145,000

Table 3. Tubing String Details

Description	OD (in)	ID (in)	Length (ft)	Top of Tool (ft)	Bottom of Tool (ft)
DFE			15.00		
Tubing Hanger	7.825	2.992	0.46	15.00	15.46
Pup Joint 3-1/2" 9.3ppf EUE N-80 Tubing (0.007985bpf)	3.500	2.992	1.58	15.46	17.04
1 Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	31.10	17.04	48.14
Crossover 3-1/2" x 5-1/2"	5.500	2.992	1.58	48.14	49.72
202 joints 5-1/2" 20ppf N-80 LTC (0.02103bpf)	5.500	4.778	7,794.30	49.72	7,844.02
Crossover 5-1/2" x 3-1/2"	5.500	2.992	1.26	7,844.02	7,845.28
1 Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	31.18	7,845.28	7,876.46
Pup Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	3.70	7,876.46	7,880.16
Gas Lift Mandrel	3.500	2.992	6.12	7,880.16	7,886.28
Pup Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	4.20	7,886.28	7,890.48
7 Joints 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	218.21	7,890.48	8,108.69
Sliding Sleeve	3.500	2.813	4.25	8,108.69	8,112.94
1 Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	31.18	8,112.94	8,144.12
XN Nipple	3.500	2.635	1.40	8,144.12	8,145.52
1 Joint 3-1/2" 9.3ppf EUE N-80 Tubing	3.500	2.992	31.22	8,145.52	8,176.74
Crossover 3-1/2" x 2-7/8"	3.500	2.441	1.10	8,176.74	8,177.84
COE	3.500	2.365	2.65	8,177.84	8,180.49
HES G77 Packer	5.515	2.365	3.39	8,180.49	8,183.88
Ball catcher	2.875	2.441	0.38	8,183.88	8,184.26
1 Joint 2-7/8" 6.4ppf 8rd N-80 Tubing	2.875	2.441	30.69	8,184.26	8,214.95
Casing patch 2,970 - 3,010'					
Otis Permatrivative Packer at 8,200'					
HES G77 Packer at 8,180'					
Tubing Up Wt 158k. Tubing Down Wt 134k.					
Landed with 12,000 lb on Packer					

5.5 Extraction Documentation Forms

Figure 8. Rig Floor Tubulars Extraction Form (RFTEF) Example

Figure 9. Pipe Rack Inspection Form (PRIF) Example

Figure 10. Pipe Cleaning and Transportation Preparation Form (PCTPF) Example

Figure 11. Wellhead/Tree Inspection Form (WIP) Example

Figure 12. Wellhead Tree Cleaning and Transportation Preparation Form (WCTPF)

5.6 Tectyl 506 Corrosion Inhibitor Product Information



Product Information

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.

<p>Approvals/Performance levels</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 100%; padding: 5px;">Tectyl 506</td> </tr> <tr> <td style="width: 100%; padding: 5px;"> Accelerated Corrosion tests: @ Average recommended DFT Salt Spray; 5% NaCl @ 35°C; ISO 9227 NSS (Q-Panels, Type R, ASTM A1008) 40+ days </td> </tr> <tr> <td style="width: 100%; padding: 5px;"> Humidity; 100 % RH; @ 40°C; ISO 6270-2 CH (Q-Panels, Type R, ASTM A1008) 100+ days </td> </tr> <tr> <td style="width: 100%; padding: 5px;"> Estimated Protection Period Indoor: 36 months Outdoor: 18 months </td> </tr> </table>	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	<p>Application</p> <p>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.</p> <p>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.</p> <p>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.</p>
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					
<p>Features and Benefits</p> <p>Superior Protection At the recommended dry layer thickness Tectyl 506 will protect against corrosion during storage, domestic and overseas transport.</p> <p>Processing Tectyl 506 is easy to apply and easy to remove, when no longer needed.</p> <p>Economical With a Dry Film Thickness of only 50 microns, Tectyl 506 can protect a big surface with just a little product.</p>					



Product Information

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

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All statements, information and data presented herein are believed to be accurate and reliable, but are not to be taken as a guarantee, an express warranty, or an implied warranty of merchantability or fitness for a particular purpose, or representation, express or implied, for which Ashland Inc. and its subsidiaries assume legal responsibility.

5.7 *Sentinel 909 Cleaning Product Information*


BETTER SOLUTIONS FOR A CLEANER ENVIRONMENT



*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 ft²/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 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) :



GH007

Signal word (GHS-US) : Warning

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

H319 - Causes serious eye irritation

Precautionary statements (GHS-US)

: P284 - 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

12/23/2015

Sentinel 909 Soybean Based Mastic
Remover (VOC Compliant)

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1

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 F1298. 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.

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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

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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.

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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

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Sentinel 909 Soybean Based Mastic Remover (VOC Compliant)

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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.

5.8 Tectyl 846 Class I Corrosion Inhibitor Product Information


PRODUCT INFORMATION

DAUBERT CHEMICAL COMPANY, INC.

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.

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

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

AC-RCA – Wellsite Tubulars Handling Protocol, SS-25A

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 numerous 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.

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

DAUBERT
CHEMICAL COMPANY, INC.

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



5.9 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 contact 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, BioEmitter™, BioPad®, BioPouch®, CorNetting™, 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®, 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 Coconuts

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 0.1 wt%.

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




HIGH PERFORMANCE VpCI® PACKAGING

Cor-Pak® VpCI® Stretch Film

High Technology Anti-Corrosion Films

Hand Wrap

Multimetal VpCI® Systems



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

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.

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.



AC-RCA – Wellsite Tubulars Handling Protocol, SS-25A
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

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4119 White Bear Parkway, St. Paul, MN 55110 USA
 Phone (651) 429-1100, Fax (651) 429-1122
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