PIPE COATING
Synergy Protective Pipe Coating

1. SCOPE

This specification defines the minimum requirements for materials, application and inspection for Synergy Three Layer Coating Systems. The coating is used to electrically isolate buried steel pipe from surrounding soil. The coating consists of a thermally activated stress corrosion cracking (SCC) inhibiting primer, a synthetic thermoplastic elastomer and a polyolefin outer layer for mechanical strength.

2. APPLICABLE DOCUMENTS

2.1 ASTM International (ASTM) D-257, “Standard Test Methods for DC Resistance or Conductance of Insulating Materials.”

2.2 ASTM International (ASTM) D-1000, “Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications.”

2.3 ASTM International (ASTM) D-2240, “Standard Test Method for Rubber Property Durometer Hardness.”

2.4 ASTM International (ASTM) D-4060, “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.”

2.5 ASTM International (ASTM) F-1249, “Standard Test Method for Water Vapor Transmission Rate through Plastic Film and Sheeting Using a Modulated Infared Sensor.”

2.6 ASTM International (ASTM) G-8, “Test Method for Cathodic Disbonding of Pipeline Coatings.”

2.7 ASTM International (ASTM) G-14, “Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).”

2.8 ASTM International (ASTM) G-17, “Test Method for Penetration Resistance of Pipeline Coatings (Blunt Rod).”

2.9 ASTM International (ASTM) G-19, “Standard Test Method for Disbonding Characteristics of Pipeline Coatings by Direct Soil Burial.”

2.10 ASTM International (ASTM) G-20, “Standard Test Method for Chemical Resistance of Pipeline Coatings.”

2.11 ASTM International (ASTM) G-42, “Standard Test Method for Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperatures.”

2. APPLICABLE DOCUMENTS (Cont'd)

2.12 ASTM International (ASTM) G-62, "Standard Test Methods for Holiday Detection in Pipeline Coatings."

2.13 Deutsche Industrial Normen (DIN) 30672, "External Organic Coatings for the Corrosion Protection of Buried and Immersed Pipelines for Continuous Operating Temperatures Up to 50°C-Tapes and Shrinkable Materials."

2.14 National Association of Corrosion Engineers (NACE International) Recommended Practice RP-0274, "High-Voltage Electrical Inspection of Pipeline Coatings."

2.15 United States Department of Transportation (DOT), Code of Federal Regulations, Title 49, Part 192, "Transportation of Natural and Other Gas by Pipelines Minimum Safety Standards."

NOTE: Unless otherwise specified, the edition of the above documents incorporated by DOT 49 CFR 192 are applicable. Documents not incorporated by DOT49 CFR 192 will be the most recent edition.

3. TERMINOLOGY

3.1 General

3.1.1 "Southwest Gas," "Southwest" or "SWG," wherever used in this specification and other related documents will refer exclusively to Southwest Gas Corporation.

3.1.2 The terms "approved," "as approved," "satisfactory," "as directed," "or equal" or other similar terms, wherever used in this specification and other related documents will mean "as determined by Southwest Gas," unless specifically stated otherwise.

3.1.3 "Product Information Package" or "PIP" wherever used in the specification and any other related documents will mean the required technical product information that a manufacturer must submit to SWG to determine if the product is suitable for use by SWG, unless specifically stated otherwise.

4. MATERIALS AND APPLICATION

4.1 The standard nominal thickness of the Synergy Coating System is as follows:

Primer: Wet film thickness will be no less than 2 mils and no greater than 3 mils.
Elastomeric Layer: 25 mils
Polyolefin Layer: 25 mils

NOTE: For thicker coating systems, contact SWG Engineering Staff.

4.2 The primer is supplied in a clear liquid form consisting of thermoplastic components dissolved in a solvent system. The purpose of the primer layer is to provide a continuous layer that bonds directly to the pipe surface and ensures instantaneous bonding with the Elastomer layer. The primer is flammable and should be handled and stored according to local and/or federal regulations as specified for hazardous materials.

4.3 The elastomer layer consists of chemically modified synthetic elastomer bonded onto a modified polyolefin film and prepared into roll form. The modified elastomer is designed to chemically bond and crosslink with components in the primer layer and provide continuous bonding between the pipe surface and the polyolefin layer.

4.4 Al moisture must be removed from the steel pipe prior to the application of the coating system. This may require pre-heating the steel prior to blast cleaning.

4.5 Only Southwest Gas approved steel pipe is to be used for coating.

4.6 The bare steel pipe shall be free of mud, mill lacquer, wax, oil, grease, rust, mill scale and any other foreign material that prevents the coating system from bonding to the steel surface. Visible oil and grease shall be removed by use of a suitable solvent. **KEROSENE SHALL NOT** be used for solvent cleaning. Suitable solvents for cleaning include methyl ethyl ketone (MEK), toluene or heptane.

4.7 The exterior surface of the steel pipe shall be abrasive cleaned to achieve a commercial blast cleaned surface to SSPC-SP-6 or NACE International M-1-70 No. 3. The surface anchor pattern profile shall be a minimum of 1.5 mils and no greater than 3.0 mils.

4. MATERIALS AND APPLICATION (Cont'd)

4.8 All blast material shall be removed from the interior of the pipe after it has been cleaned, prior to the application of the coating system.

4.9 The cleaned exterior pipe surface shall be inspected for adequate surface preparation. Surface imperfections, such as slivers, scabs and gouges shall be removed by grinding or filing to pipe profile.

4.10 Cleaned steel pipe shall not remain overnight or for extended periods under wet or humid conditions on interior or exterior storage racks prior to the application of the coating system. No pipe shall be allowed to flash rust prior to coating application.

4.11 Cleaned pipe shall be pre-heated such that the pipe temperature at the entrance of the primer booth shall be as follows:

Residual Heat Method: Minimum 200°F/Maximum 270°F

Pipe can be pre-heated either prior to or following the blast cleaning process.

4.12 The pipe temperature shall be monitored using a contact (non-marking) or non-contact temperature measuring device or graduated temperature markers. Pre-heat pipe temperature not within the specified range shall require the immediate suspension of the coating operations until corrections are implemented that will meet the pre-heat temperature specification.

4.13 The blasted pipe surface must be free of any cleaning grit, sand, grease, oil, rust particles or other foreign contaminants.

4.14 Primer shall be stored and applied (airless spray, rugs or rollers) at ambient temperature no less than 50°F. Primer is applied to the clean pre-heated pipe surface in a uniform layer. Wet primer thickness is no less than 2 mils and no greater than 3 mils. The primed pipe surface shall be uniform and free of floods, runs, sags, drips and overspray.

4.15 The driving wheels of the conveyor system shall not contact the primed pipe surface.

4. MATERIALS AND APPLICATION (Cont'd)

4.16 The primer must be dry prior to the elastomer layer being applied. Direct flames shall not contact the primer coating.

4.17 The Synergy coating system components, elastomer and polyolefin layer, shall be applied at an elevated roll body temperature between 90°F and 100°F. The individual component rolls shall be stored in a temperature controlled environment for a time sufficient to bring the roll to the minimum application temperature throughout the roll prior to application. The ambient storage temperature shall not exceed 125°F.

4.18 Additional rolls may be stored outside the heated shed if sufficient heat is provided that will maintain the entire roll temperature during the application above the minimum roll body temperature. To maintain roll body temperature of stored materials outside the heated storage shed during application, IR heating lamps or radiant heaters are acceptable.

4.19 The elastomer or polyolefin rolls shall not be left unheated during line shut-down periods.

4.20 The elastomer layer shall be applied directly to the primed steel pipe surface with dispensing equipment equipped with constant tension brake system. The elastomer layer shall pass under a "spreader bar" mounted very close to the pipe. A tight, smooth, wrinkle-free coating shall be maintained throughout the application.

4.21 The elastomer layer shall be spirally applied at an overlap of no less than ¾ inch wide. The coating line is required to have a drive system capable of holding the consistent minimum overlap.

4.22 The elastomer layer shall be applied under minimum tension of 1% and no greater than 2% neck down of the coating width. To assure that uniform, even tension is applied to each pipe joint; the mechanical dispensing equipment will have a constant tension brake system and pressure read-out meters for measurable quality control.

4. MATERIALS AND APPLICATION (Cont'd)

4.23 The end lap of the splice of each new roll of elastomer layer shall overlap the end of the preceding roll be a minimum of six (6) inches. The end lap splice shall be mechanically applied with Polyken splice tape to insure a smooth splice which maintains the continuity of the elastomer layer. The spiral angle of the new roll shall parallel the previous roll's spiral angle. Roll splicing must occur prior to the "new" elastomer layer application onto the pipe surface and before the "old" elastomer layer roll break. A marker line, on the "old" elastomer layer roll backing, will indicate when splicing is to begin.

4.24 The drive wheels shall not contact pipe coated with the elastomer layer only.

4.25 Simultaneous with the application of the elastomer layer, the polyolefin layer shall be spirally applied over the elastomer layer and positioned such that there is no thermal distortion or damage to either layer. A tight, wrinkle-free layer shall be maintained throughout the application. The polyolefin layer shall be applied with dispensing equipment equipped with a constant tension brake system.

4.26 The overlap of the polyolefin layer shall **NOT** be applied directly on to the overlap of the elastomer layer. The overlaps of each layer shall not coincide with each other. The minimum overlap separation shall be 25% of the roll width.

4.27 The polyolefin layer shall be spirally applied at an overlap of no less than ¾ inch wide. The coating line is required to have a drive system capable of holding the consistent minimum overlap.

4.28 The polyolefin layer shall be applied under minimum tension of 1% and no greater than 2% neck down of the coating width. To assure that uniform, even tension is applied to each pipe joint; the polyolefin layer shall pass under a "spreader bar" mounted very close to the pipe and mechanical dispensing equipment will have a constant tension brake system and pressure read-out meters for measurable quality control.

4.29 The end lap of the splice of each new roll of polyolefin layer shall overlap the end of the previous roll by a minimum of six (6) inches. Between the roll splices apply a minimum four (4) inch wide strip of Synergy splice tape, along the entire coating width splice.

4. MATERIALS AND APPLICATION (Cont'd)

4.30 Mechanically apply the end lap splice to ensure a wrinkle free splice which will maintain the continuity of the polyolefin layer. The spiral angle of the new roll should parallel the previous roll's spiral angle. Roll splicing must occur prior to the "new" polyolefin layer application onto the pipe surface and before the "old" layer roll break. A marker line, on the "old" polyolefin layer roll backing, will indicate when splicing is to begin.

4.31 After application, the coating system shall be allowed to fuse using the residual pipe heat no less than 12 seconds. The fused coating shall be water cooled when the temperature of the polyolefin layer at the overlap areas has reached a minimum of 185°F (85°C), in accordance with the current Synergy application guidelines.

4.32 A pressurized contact roller made of heat resistant non-stick material shall be utilized with sufficient pressure to compress the coating system. The roller is located just prior to the water quench and shall be a minimum of twelve (12) inches wide.

4.33 During the time of coating and fusing of the coating system, pipe shall be handled carefully to avoid damage to the coating. Coating operations shall be suspended until corrections are implemented that will meet the above specifications.

4.34 After fusing, cooling is required to permanently seal the coating system. In-line cooling is achieved using water jets placed parallel to the axis of the pipe. A uniform, even water curtain covers the entire pipe diameter to fuse the coating to the pipe.

4.35 Water cooling shall be sufficient to lower the external coating temperature below 150°F to assure no coating damage during handling, inspection and any need for repair. The coating temperature is measured on the outgoing racks using either a contact temperature probe or a non-contact optical pyrometer.

4.36 If conditions are not in accordance with the above cooling requirements, coating operations shall be immediately suspended until corrections are implemented.

4.37 All cutbacks on the coating system shall be a minimum of three (3) inches, (±1 inch) on both ends of the coated pipe, to facilitate welding without damaging the coating. Cutbacks are performed on the coated pipe after water cooling.

4. MATERIALS AND APPLICATION (Cont'd)

4.38 Cutbacks shall be made with a cutting device that is guided from the end of the pipe to insure a straight, uniform cutback.

4.39 Defective coating shall be removed and/or recoated to meet specifications.

4.40 The coating system is to be applied in a pipe coating facility ONLY.

5. PERFORMANCE REQUIREMENTS

5.1 All coated pipe shall meet or exceed the minimum performance requirements as outlined in this section. The manufacturer and the coater will use the latest revisions of Synergy "Application Guidelines" and "Data Sheets" to ensure the quality of the product and its application.

5.2 The fused system components are outlined in Table C-22.1

CHARACTERISTICS	PRIME LAYER	ELASTOMER LAYER	POLYOLEFIN LAYER
Solids (%)	20	__	__
Weight/Gal (LBS)	7.4	__	__
Flash Point (Deg F)	+45	__	__
WFT (mil)	2 TO 3	25	25
Tensile Strength (lbs./in)	__	45	45
Elongation (%)	__	200	500
Initial Modulus (lbs./in)	__	12	25
Tear Strength (lbs.)	__	415	850

TABLE C-22.1

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.3 The fusion properties of the Synergy fused coating system shall be in accordance with requirements outlined in Table C-22-2.

FUSION PROPERTIES		
PROPERTY	**VALUE & UNIT**	**TEST METHOD**
Peel Adhesion to Primed Steel	38 lbs./inch	ASTM D-1000
Elastomer Layer to Elastomer Layer	19 lbs./inch width	ASTM D-1000
Elastomer Layer to Polyolefin Layer	20 lbs./inch	ASTM D-1000
Polyolefin Layer to Polyolefin Layer	20 lbs./inch	ASTM D-1000

TABLE C-22.2

5.4 The Cathodic disbondment properties of the Synergy fused coating system shall be in accordance with requirements outlined in Table C-22.3.

CATHODIC DISBONDMENT		
Property	**Value & Unit**	**Test Method**
30 Days	0.2 in²	ASTM G-8
60 Days	0.4 in²	ASTM G-8
90 Days	1.0 in²	ASTM G-8
Cathodic Disbondment	5.0 in² @122°F (50°C)	ASTM G-42
5 Years	1.01 in²	ASTM G-19
30 Day, -1.5V, 3% NaCl, 125°F	2.5 in²	ASTM G-19
60 Day, -2.0 V, 3% Electrolyte, 73°F	0.31 in²	ASTM G-19
90 Day, -3.0 V, 3% NaCl, 73°F	0.76 in²	ASTM G-19
180 Day, -1.85 V, 9% Electrolyte, 73°F	3.5 in²	ASTM G-19
30 Day, -3.0 V, 3% Electrolyte in Sand, 150°F, 1 meter burial depth	0.42 in²	ASTM G-19
30 Day, -1.5 V, 3% Electrolyte, 150°F Heated Pipe	0.45 in²	ASTM G-19
30 Day, -1.5 V, 3% Electrolyte, 73°F • 15° Bend • 30 in-lb. Impact Drop • 200 lbs. Back Fill Drop • 1 Year Outdoor Exposure	 0.0 in² 0.0 in² 0.0 in² 0.0 in²	ASTM G-19

TABLE C-22.3

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.5 The environmental properties of the Synergy fused coating system shall be in accordance with requirements outlined in Table C-22.4

ENVIRONMENTAL PROPERTIES		
Property	**Value & Unit**	**Test Method**
Water Vapor Transmission	0.03g/100in²/24 Hr.	ASTM F-1249 or E96 Method B
Water Absorption	<0.2%	ASTM G-62
Chemical Resistance		ASTM G-20
H2SO4	Good	
HCl	Good	
NaOH	Good	
NH4	Good	
aCl	Good	
CaCO3	Good	
Hydrocarbon	Fair@Levels <200 ppm	
Environmental Stress Crack Resistance	Tensile (lbs./in)	Kendall Test Method
Initial	39.8 lbs.	
2000 Hrs. Exposure to Igepal Solution	27.0	
Soil Stress Resistance		Kendall/Kellner Method
Gumbo Clay	None	
Pea Gravel	None	
Sand	None	
Direct Burial After 5 Years	None	

TABLE C-22.4

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.6 The handling properties of the synergy fused coating system shall be in accordance with requirements outlined in Table C-22.5

HANDLING PROPERTIES		
Property	**Value & Unit**	**Test Method**
Impact Resistance	50 in-lb.	ASTM G-14
Impact Resistance	1000 lbs. No Holiday	ASTM G-13
Penetration Resistance		
(% of Total Thickness)	<15%	ASTM G-17
	7.8 mils	DIN 30670
Hardness		ASTM D-2240
73°F	50	
90°F	46	
120°F	37	
Abrasion Resistance	Less Than 15% Loss of Total Coating Thickness	ASTM D-4060
CS-10 Wheel	0.010%	
CS-17 Wheel	0.00%	
H-22 Wheel	0.016%	
Bend Flexibility		
	6°/PDL	API-5L at 70°F

TABLE C-22.5

5.7 The electrical properties of the synergy fused coating system shall be in accordance with requirements outlined in table C-22.6

ELECTRICAL PROPERTIES		
Property	**Value & Unit**	**Test Method**
Dielectric Strength	45 kV	ASTM D-1000
Insulation Resistance	7.5 x 108 MΩ	
Volume Resistivity	6.0 x 1015 Ω-cm	ASTM D-257
Holiday Detection Voltage	7,000-10,600V	NACE RP0274

TABLE -22.6

5. PERFORMANCE REQUIREMENTS (Cont'd)

5.8 The Synergy coating system shall be free of voids or flaws.

5.9 The Synergy coating system shall be electrically tested for flaws in the coating with a suitable holiday detector. The electrical holiday inspection shall be performed on the coating system, upon completion of the coating operation but prior to storage. The detector shall impress the following test voltage:

- 50 mil system*: 7,000-10,607 volts

***For thicker coating systems contact Engineering Staff

5.10 All holidays shall be repaired in accordance with the next section. The coating shall be repaired and retested for holidays.

6. COATING REPAIRS

6.1 Unless otherwise specified by SWG, coating repairs shall be subject to all the requirements of this section using any combination of types of repairs listed, but cannot exceed the total number of repairs given in Table C-22.7

Size of Project (Total Number of Pipe Joints)	Number of Repairs Per Pipe Joint	Number of Repaired Pipe Joints Allowed
25 or Less	2	2
25 to 50	2	3
50 to 150	2	4
Greater than 150 of Total	2	2%

TABLE C-22.7

6.2 All holidays shall be repaired. The affected area shall be cleaned of any plant applied Synergy coating and/or foreign material. The holiday area shall be cleaned and dried, brushed (buffed) with a power wire brush to the steel pipe surface. The area shall be clean of abraded Synergy plant applied coating.

6. COATING REPAIRS (Cont'd)

6.3 The holiday area shall be repaired with either Raychem shrink sleeves, Raychem PERP (Polyethylene Repair Patch) or cold applied tapes that are compatible with the Synergy coating system.

6.4 Shrink Sleeve Coating Repair:

6.4.1 The coating system may be repaired by use of shrink sleeve of a type compatible with the Synergy coating system and approved by SWG.

6.4.2 A plastic shrink sleeve repair shall be allowed only where the damaged area of the coating does not exceed a width of 6 inches (152.4 mm) and the shrink sleeve shall extend beyond the damaged area by a minimum of 2 inches (50.8mm) all around. The shrink sleeve must extend around the full circumference of the pipe.

6.4.3 The shrink sleeve shall be applied as recommended by the shrink sleeve manufacturer.

6.5 Tape Coating Repair:

6.5.1 The coating system may be repaired by use of Polyken tape and primer compatible with the Synergy coating system and approved by SWG.

6.5.2 A taped coating repair shall be allowed only where the damaged area of the coating does not exceed a width of 3 inches (76.2 mm) and the repair shall extend beyond the damaged area by a minimum of 2 inches (50.8 mm) all around.

6.5.3 All surfaces that will be under the tape shall be cleaned, all foreign matter removed, and primed with Polyken primer.

6.5.4 Tape repairs must extend around the full circumference of the pipe and may be applied as a spiral half-lap wrapping, or a cigarette wrap.

6. COATING REPAIRS (Cont'd)

6.6 Damage that penetrates the plant applied polyolefin layer but does not test positive for holidays shall be repaired. The repaired Synergy plant coating shall be smooth and free of abraded coating.

6.6.1 The Synergy No. 3056-25 repair coating is hand applied over the Synergy plant applied coating in a patch configuration, or circumferentially around the coated pipe. The repair coating shall overlap the damaged plant applied coating area by a minimum two (2) inches (50.8mm).

6.6.2 As the Synergy repair coating is applied, the underside of the coating shall be heated with an industrial hot air gun. The air gun should not be held in one position, but moved in a circular motion over the coating.

6.6.3 The Synergy repair coating is heated until the underside appears tacky. At this point, the Synergy repair coating is pulled over the repair area and then compressed with a hand held pressure roller.

6.6.4 Continue to apply the Synergy repair coating using the above method until the coating is fused to the plant applied Synergy coating system. Overlap the circumferentially applied Synergy repair coating onto itself by a minimum of two (2) inches (50.8mm).

6.6.5 Begin to reheat the entire Synergy repair coating, moving the hot air gun from the center to the edge of the repair area. Simultaneously move and compress the pressure roller in a similar manner, ensuring the repair area edges are smooth and fused.

6.6.6 Allow the Synergy repair coating to air cool. Visually inspect the repair are for non-fused repair coating. If necessary, repeat the above step until the coating is completely fused.

7. INSPECTION

7.1 Factory applied Synergy protective pipe coating shall be subject to quality control checks during and after application in accordance with the manufacturer's quality control record.

7.2 Successful review of the Product Information Package (PIP), as well as any future reference by SWG to the Seller's part number or internal code number in any future contract or purchase, will mean only that no conflict with the specification was found and will not relieve the seller from meeting all the requirements of the specification.

7.3 SWG retains the option to inspect the manufacture and testing of any and all materials, products or systems referenced in this specification that are sold to SWG.

7.4 SWG will make appropriate inspections and tests of any and all materials, products or systems supplied to this specification. SWG will have the right, at their option, to reject any material which fails to conform to this specification. Any such rejection may take place at the manufacturer's facility; the supplier's warehouse or any subsequent delivery location, before or after SWG assumes possession. Notice of the rejection will be made promptly to the supplier by SWG. The defective product will be replaced or returned for credit at the manufacturer's expense.

7.5 Any changes in the manufacturing of previously approved materials, products or systems described in this material specification for sale to SWG must be approved by SWG's Engineering Staff. **Failure to obtain SWG's approval may be cause for rejection and disqualification as an approved supplier.**

8. CERTIFICATION

The manufacturer's or supplier's certification will be furnished to SWG. This certification will state that samples representing each lot have been manufactured, tested and inspected in accordance with this specification and that all requirements have been met. When requested or specified in the purchase order or contract, a report of test results will be provided.

Upon the request of Southwest, the certification of an independent third party indicating conformance to the specification may be used for verification of conformance to the specification at Southwest's expense.

9. SAFETY DATA SHEETS

In accordance with law, the Seller will supply Safety Data Sheets for all applicable items supplied under this specification to the following:

1) The Receiving Location

2) Engineering Staff

3) Southwest Gas Corporation
Corporate Safety
Mail Station LVA-1201
P.O. Box 98510
Las Vegas, NV 89193-8510

10. PRODUCT MARKING

10.1 The identification marking of the bare pipe (information per API 5L) shall be legibly reproduced on the O.D. of the coating. This information will include:

- Coater's Name
- Synergy and thickness
- Coating application date

10.2 Pipe of different wall thickness for the same project shall have specific colored stripe painted at both ends of the pipe over the coating to differentiate that wall thickness from any other wall thickness.

11. PRODUCT PACKAGING

11.1 Pipe shall be handled, coated, moved and stored in a manner to prevent damage to pipe walls, beveled ends, pipe roundness and coating.

11.2 External coated pipe shall be stacked upon supports that have broad padded bearing surfaces or on padded wooden skids. Synergy coated pipe shall not be placed on bare ground or dirt berms. Where coated pipe is placed in storage, the bottom tier shall be removed far enough from the ground to prevent all laden rainwater from washing into the open ends of the pipe.

11.3 Under no circumstances shall coated pipe be pyramided, each layer of pipe shall be supported separately by the use of padded skids. The ends of the padded skids shall be blocked to prevent the coated pipe from rolling off the end of the skid.

11.4 Pipe sizes and maximum tier heights shall be as follows:

- Pipe sizes 4-inch through 6-inch can be stacked to a maximum of 8 tiers high.
- Pipe sizes 8-inch through 10-inch can be stacked to a maximum of 6 tiers high.
- Pipe sizes 12-inch through 16-inch can be stacked to a maximum of 3 tiers high.
- Pipe sizes 20-inch through 24-inch can be stacked to a maximum of 3 tiers high.

NOTE: Short lengths of pipe shall always be stacked on the top tier to prevent flattening of the ends.

11.5 When loading Synergy coated pipe, it shall be handled using a crane with end hooks or forklift with padded blades.

11.6 Synergy coated pipe shall be rolled off the forklift tractor blades onto the truck trailer in such a manner as to not damage the coated pipe. All pipe handling equipment such as web belts, slings, and/or end hooks shall be designed not to damage the coated pipe. The trailer bed shall be clean and free of foreign matter that will damage the coated pipe. All load bearing surfaces on trailers and/or stringing rigs shall be padded with padding material approved by SWG. Any protrusions on the load bearing surfaces shall be removed or covered with padding.

11. PRODUCT PACKAGING (Cont'd)

11.7 Pipe tiers shall be separated with padded wooden skids. Nested pipe joints shall not be pushed or pulled against each other. Synergy coated pipe shall be lifted off the nested stack prior to moving.

11.8 Synergy coated pipe shall be secured on the trailer bed with web slings. Cables, chains and metal banding material approved by SWG to protect the coated pipe while in transit.

11.9 It is recommended that all trailers and/or stringing rigs shall have rock guards covering all wheels to prevent rocks and debris from damaging the coated pipe.