

PLAINTIFF'S EXHIBIT

MON-2340

SAB ENERGY Reduction

INSULATION SPECS

LAM021330

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EQUIPMENT INSULATION AND PAINTING SUMMARY ES-11-MKLE LC4951

Monsanto

SYNOPSIS	DATE 1/1/79	BY 000	DATE 1/1/79	BY 000
PROJECT	DATE 1/1/79	BY 000	DATE 1/1/79	BY 000

ITEM NO.	DESCRIPTION	HATL CONS	OPER TEMP °F	EFD NO.	VENDOR DRAWING NUMBER	INSUL THK IN.	MONSANTO INSUL SYS	REMARKS	MONSANTO COATING SYSTEM SPEC	VEHICLE PAINT SPEC	SHOP PAINTED (FP)	SURF PAINT	FIELD REQUIREMENTS				LEGEND
													SP	PR	BC	CC	
101.000	Paraffin Vaporizer	CS & CS-1360	850	D13	58078-1-A	6	9 MC				NONE	SP7-63 MC					SC - SOLVENT CLEANING MC - HAND CLEANING PT - POWER TOOL BC - BLAST CLEANING TU - TOUCH UP CC - COMPLETE COAT
102.000	Paraffin Vaporizer	CS & CS-1360	850	D13	58078-1-A	6	9 MC				NONE	SP7-63 MC					SYSTEM REMARKS NOTE 1: Entire surface shall be painted one coat of Parter Super Target.
103.000	Thermol Tank	CS	100	D19	D-1790-0	1	5 MC		CI		SP & FP	SP10-63 MC					NOTE 2: at 10 mils minimum dry film thickness.
106.000	Thermol Pump	CS	223	D19	107-53 MC1.1				CI		SP & FP	SP2-63 MC					
107.000	Thermol Cooler	CS	121	D19	J-8338-1-D	1	5 MC		BASE=U2		SP & FP	SP10-6 MC					
201.000	F.D. Fan #1	CS	AMB	D14	D19-0-1084				CI		SP & FP	SP7-63 MC					NOTE 2: Color shall match surrounding.
201.001	Motor	CS		D14	MC1.1				CI		SP & FP	SP7-63 MC					Ca. Gray #224
202.000	Air Preheater	CS	740	D14	27-3417-5-86 & 96	6	9 MC		A6		SP & FP	SP7-63 MC					NOTE 3: Paint insulated areas per K1.3 STD A6, finish color black
203.000	L.D. Fan #1	CS	350	D14	D19-0-1083	2 1/2	9 MC		CI		SP & FP	SP7-63 MC					NOTE 4: Prime coat shall be RRG Co. multi-epoxy red
203.001	Motor	CS		D14	MC1.1						SP & FP	SP7-63 MC					
204.001	burner for 1st Stage Superheaters	CS	550	D14	B-Y-11720 & 11729	3	9 MC				SP & FP	SP7-63 MC					
205.001	burner for 2nd Stage Superheaters	CS	550	D14	B-Y-11729	3	9 MC				SP & FP	SP7-63 MC					
209.000	F.D. Fan #2	CS	AMB	D15	D19-0-1084				CI		SP & FP	SP7-63 MC					
209.001	Motor	CS		D15	MC1.1				CI		SP & FP	SP7-63 MC					
210.000	Air Preheater	CS	740	D15	27-3417-5-86 & 96	6	9 MC		A6		SP & FP	SP7-63 MC					
211.000	L.D. Fan #2	CS	350	D15	D19-0-1083	2 1/2	9 MC		CI		SP & FP	SP7-63 MC					
211.001	Motor	CS		D15	MC1.1				CI		SP & FP	SP7-63 MC					

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EQUIPMENT INSULATION AND PAINTING SUMMARY ES-11-HEKEE 104951

Monsanto

ITEM NO.		DESCRIPTION	MATERIAL COST		OPEN TEMP °F	EFD NO.	VENDOR DRAWING NUMBER	THERMAL INSULATION		REMARKS	PAINTING						LEGEND
BY	DATE		BY	DATE				INSUL THICK IN.	ADJUSTED INSUL SYS		MONSANTO COATING SYSTEM SPEC	VEHICLE PAINT SPEC	SHOP PAINTED (SP) FILL'D PAINTED (FP)	SURF PREP SSPC	PRIME COAT	BODY COAT	
301.000		Impeller for L.E. Feed Pump	CI	125	028	DT 2841331					K1.3						SC - SOLVENT CLEANING HC - HAND CLEANING PT - POWER TOOL UC - ULAST CLEANING TU - TOUCH UP CC - COMPLETE COAT SYSTEM - REMARKS
302.000		Not Used															
301.001		L.E. Freshwater	CS	470	016	28678-1-A	2	5 MC									
302.001		Blanking Section & L.E. Column	SS	468	2284-D1		2 1/2	5 MC									
301.000		Disinfect Feed Pump Motor	CS	100	2204-D2	78119088-3-9-1				C3		SP & FP	SP2-63 HC	TU			NOTE 2 TU
302.000		Bz. Col. Flush Drum Pump Impeller	Cast Steel	295	2128-D4												
301.001		Bz. Col. Feed Interchanger	CS & Monel	450	018	1-0054-1-D	2 1/2	5 MC			C3		SP & FP	SP2-63 HC	NOTE 4 CC		NOTE 2 CC
601.000		F.D. Fan #3	CS	AMU	020	019-0-1084					C3		SP & FP	SP2-63 HC	NOTE 4 CC		NOTE 2 CC
601.001		Motor			020	021-0-1081					C3		SP & FP	SP2-63 HC	NOTE 4 CC		NOTE 2 CC
602.000		AUX Freshwater	CS	740	020	27-3417-97 & 87	6	9 MC			A6		SP	SP7-63 HC	NOTE 3 CC		NOTE 1 CC
603.000		I.D. Fan #1	CS	350	020	019-0-1081	2 1/2	9 MC			NOTE 3		SP	SP2-63 HC	NOTE 4 CC		NOTE 2 CC
601.001		Motor				021-0-1081					C3		SP & FP	SP2-63 HC	NOTE 4 CC		NOTE 2 CC
604.001		Bottoms for Bz. Col. Reboiler	CS	550	020	0-11719	1 1/2	9 MC					SP	SP7-63 HC			
605.001		Bottoms for Paraffin Col. Reboiler	CS	550	021	0-11720	1 1/2	9 MC					SP	SP7-63 HC			

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EQUIPMENT INSULATION AND PAINTING SUMMARY ES-11-MCKE LC4951

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SAB ENERGY REDUCTION
SUMMARY OF WORK
FOR INSULATION

1.0 SCOPE

- 1.1 The Contractor shall provide all insulation material, labor, supervision, tools, equipment, and accessories to insulate ductwork, pipe and equipment at Monsanto Company, Chocolate Bayou, Alvin, Texas.
- 1.2 Insulation materials and application shall be in accordance with specifications, drawings and other documents included in this Insulation Bid Package.
 - 1.2.1 The Pipeline Schedule shall be used to determine lines to be insulated, insulation type, weather barrier and insulation thickness on piping.
 - 1.2.2 Form ES11, Equipment Insulation and Painting Summary, shall be used to determine those items of equipment which are insulated, insulation type, weather barrier and insulation thickness.
 - 1.2.3 The isometrics and other piping drawings shall be used to determine size and configuration of lines.
 - 1.2.4 When a line is to be insulated all pipe sizes of that line are to be insulated even though some sizes may not be listed on the Pipeline Schedule.
 - 1.2.5 When lines are heat traced, two isometric sheets may be furnished.
 - 1.2.6 The insulation contractor shall be responsible for locating lines to be insulated using the plot plans and other data furnished.
 - 1.2.7 Sections of insulated lines which are carried inside vessel skirts shall be insulated the same as sections on the exterior of the skirts.
 - 1.2.8 When a line is insulated, all in-line components shall also be insulated except where noted.
 - 1.2.9 All insulation required for personnel protection is to be considered a part of this contract package.

2.0 COORDINATION

- 2.1 The Contractor shall coordinate his work with all other disciplines so as to complete the work as expeditiously as possible.

END OF SPEC 1A-4

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1.0 GENERAL

1.1 Scope - This specification describes the materials required and the application of insulation and weather-barriers for use on industrial piping, vessels and equipment shown in the accompanying drawings and documents.

1.2 Related Documents Specified Elsewhere

Identification Symbols and Summary	K11.1 STD 2
Construction Details -	
Elevated Temperatures	K11.4 STD 10
Barrier Construction Details	K11.4 STD 80

1.3 Quality Assurance

1.3.1 Qualification of Applicator The insulation shall be performed by an insulation contractor approved by Monsanto the insulation contractor shall furnish competent supervision and labor experienced in this class of work and shall also furnish materials, equipment and scaffolding necessary to complete the installation.

1.4 Product Delivery and Storage

1.4.1 Marketing Shipping containers shall be legibly marked with the name of the manufacturer, material, size, type and quantity.

1.4.2 Storage Materials shall be stored at the job site in a building or shelter which will completely protect them from the weather. Heated storage facilities are not required, except for materials requiring freeze protection (PVA mastic, water base adhesives, etc.). Material shall be retained in shipping containers until ready for use.

2.0 PRODUCTS

2.1 Material Specification The following Thermal Insulation System specifications are a part of and are to be attached to this spec.

K11.2 STD 5	Rigid Fibrous Glass System
K11.2 STD 9	Rigid Mineral Fiber System

2.1.1 Materials Callout Materials are called out on piping and equipment drawings, Equipment Summary, and the Pipeline Schedule.

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- 2.2 Solvents Solvent materials used for thinning and clean-up shall be those recommended by the material vendor. Deviation from these recommendations is not permitted.

3.0 EXECUTION

- 3.1 Installation Before the application of any insulation, all piping, vessels and equipment shall be released by the Engineer. This is to assure that painting, inspection and testing procedures have been completed. Any insulation applied to these items without release by the Engineer is subject to removal by the Contractor at his own expense.

3.1.1 Special Requirements Any welding required to attach equipment name plates, insulation support rings and angles, clips, studs, and rods for bands and wires to the surface of the equipment, vessels or piping shall be by others. Many of the vessels and items of equipment to be insulated are fabricated of special alloys or receive special heat treatments. No welding shall be done for additional insulation attachments except spotwelding of pins to heating duct surfaces where approved by the Engineer.

3.1.2 Surface Condition Surfaces to be insulated shall be clean and dry. The insulation contractor shall be responsible only for the removal of oil, grease, dust, and similar accumulations of surface dirt; he will not be held responsible for the removal of mill scale, rust scale or deposits, old paint, or similar firmly adhering accumulations.

3.1.3 Protection At the close of work each day, insulating materials that have been applied during the day shall be protected from the weather by coverings or methods acceptable to the Engineer. However, insulating materials fully protected by weather barrier mastics or jacketing need not be so protected.

- 3.2 Installation Specifications The following listed installation specifications edited to comply with project requirements shall be attached to and become a part of this specification.

END OF SPEC 15K-1

1.0 GENERAL

- 1.1 Scope - This specification covers the installation of Rigid Fibrous Glass insulation including the barrier application, to piping, vessels and equipment.
- 1.2 Application - This specification is limited, in that it only covers the application of the insulation. It is therefore to be used with the project specification 15K-1.

2.0 PRODUCTS

- 2.1 Materials used in this specification are specified in Part 2 of the project spec 15K-1, and the specified system is described in K11.2 STD 5.

3.0 EXECUTION

- 3.1 Information and instructions contained in Part 3, Execution, of the project specification 15K-1 are applicable to the type of insulation specified herein.
- 3.2 Pipe Insulation
 - 3.2.1 Piping Supports - Install pipe saddle insulation components at pipe support locations (pipe handers, steel supports, etc.). The thickness of the load bearing saddle insulation is the same as adjacent insulation thickness and as specified in the drawings and schedule.
 - 3.2.2 Straight Pipe - Apply the pipe insulation directly to the pipe surface of the thickness shown in the drawings and pipeline schedule. Secure insulation to the surface with joints butted tightly together. Application methods are shown in K11.4 STD 10, Insulation Construction Details.
 - 3.2.3 Components - All pipe components shall be insulated except as noted on the drawings and schedule. Insulation components may be premolded or of mitered construction. Premolded insulation fittings shall be installed in accord with the manufacturer's instructions. Mitered insulation pieces shall be butted tightly together and secured to the pipe component with wire. Insulation cement shall be used to fill voids, surface breaks and irregularities to form a smooth configuration.

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3.3 Vessel and Equipment Insulation

- 3.3.1 General - Apply the insulation in thickness shown on equipment drawings directly to the surface with tightly fitted joints. Where applicable use curved segments, or pipe covering sections to obtain tight joint construction. Application methods are shown in K11.4 STD 10, Insulation Construction Details.
- 3.3.2 Cylindrical Surface - Apply insulation directly to the surface with tightly fitted joints. If necessary to make the insulation conform to the cylindrical surface cut the outside surface to a depth of not greater than half the insulation thickness. Secure the insulation in place with 3/4" strapping on 12" centers.
- 3.3.3 Flat Surfaces - Apply insulation directly to surface with joints butted tightly together. Secure insulation to surface with wire attached to studs or with support pins.
- 3.3.4 Vessel Heads - Fit insulation in place and butt joints tightly together. High compression sheet insulation shall be applied to the top head surface of vessel and equipment subjected to foot traffic. Secure insulation in place with 3/4" strapping, spaced at 12" centers around the head perimeter. A small quantity of wire may be used for securing insulation where strapping is impractical.

Fill voids, depressions and irregularities in the insulation surface with insulation cement.

Apply insulation to nozzles, manholes, legs and skirt as shown in K11.4 STD 10, Insulation Construction Details.

3.4 Barrier Application - Piping Vessels and Equipment

- 3.4.1 Piping Field Applied - Jacketing applied to insulated piping shall be cut to suit the outside diameter; provide a 2" minimum lap at all joints. Position the laps to provide maximum protection against wind, blowing rains and water cleaning operations. Secure the jacket in place with wire or strapping. Use wire ties at a maximum spacing of 6" for insulation outside diameter to 6". Use 1/2" strapping at a maximum spacing of 9" for insulation diameter greater than 6" and up to 24". Use 3/4" strapping at a maximum spacing of 12" for insulation diameter greater than 24".

- 3.4.2 Components - Apply premolded jacket or membrane reinforced mastic to in-line pipe components, pumps, instruments and special fittings. Premolded jacket shall be installed as directed by the manufacturer and secured with adhesive and tape. Installation of mastic barrier shall be uniform with reinforcement cloth embedded into wet mastic. Provide a 2" minimum lap at joints. The minimum dry-film thickness of the mastic barrier shall be as specified in the materials specifications.

Apply sealer at joints and openings in the jacket for complete weatherproofing for both indoor and outdoor service.

3.4.3 Vessels

- a. Cylindrical Sections Pre-cut the metal sheets to fit snugly around protrusion and fittings. Apply the jacket to the insulated surface to obtain a snug smooth fit. Circumferential and longitudinal metal joints shall be lapped a minimum of 2". Metal laps over the mastic membrane barrier shall be lapped a minimum of 4". Position the laps to provide maximum protection against wind, blowing rain and water cleaning operations. For vertical vessels where three or more sheets are unsupported, use "Z" clips spaced at 3" centers around the perimeter. Secure the jacket in place with 3/4" strapping at a maximum spacing of 12".
- b. Vessel Heads Apply the mastic barrier to insulated vessel heads and other insulated surfaces as specified. Apply a uniform film of mastic to the surface and embed reinforcement cloth into the wet mastic. Apply additional mastic to the entire membrane surface to make a smooth wrinkle free surface. Provide a 2" minimum lap at joints. The minimum dry-film thickness of the mastic barrier shall be as specified in the materials specifications. Application details are shown in K11.4 STD 80.

Apply sealer at joints and openings in the jacket for complete weatherproofing in outdoor and indoor service.

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END OF SPEC 15K-5

1.0 GENERAL

- 1.1 Scope - This specification covers the installation of Rigid Mineral Fiber insulation including the barrier application, to piping vessels and equipment.
- 1.2 Application - This specification is limited, in that it only covers the application of the insulation; it is therefore to be used with the Project Specification 15K-1.

2.0 PRODUCTS

- 2.1 General - Materials used in this specification are specified in Part 2 of the Project Spec 15K-1, and the specified system is described in K11.2 STD 9.

3.0 EXECUTION

- 3.1 General - Information and instructions contained in Part 3, Execution, of the Project Specification 15K-1 are applicable to each type of insulation specified herein.

3.2 Pipe Application

- 3.2.1 Piping Apply the pipe insulation directly to the pipe surface of the thickness shown in the drawings and schedule. Secure insulation to the surface with joint construction butted tightly together. Application methods are shown in K11.4 STD 10, Insulation Construction Details.
- 3.2.2 Components Components shall be insulated except as noted in the drawings and schedule. Mitered insulation pieces shall be butted tightly together and secure to the pipe component with wire. Insulation cement shall be used to fill voids, surface breaks and irregularities to form a smooth configuration.

3.3 Vessel and Equipment Insulation

- 3.3.1 General Apply insulation directly to the surface with tightly fitted joints. Where applicable use curved segments, or pipe covering sections to obtain tight joint construction. Application methods are shown in K11.4 STD 10.
- 3.3.2 Cylindrical Surfaces Apply directly to the surface. Serrate outer surface no greater than half of the insulation thickness, if necessary, to make the insulation conform to the surface. Secure the insulation in place with 3/4" strapping on 12" centers.

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- 3.3.3 Flat Surfaces Apply directly to surface with joints butted tightly together. Secure insulation to surface with wire attached to studs or with support pins.
- 3.3.4 Vessel Heads Fit insulation in place and butt joints tightly together. Secure insulation in place with 3/4" strapping spaced at 12" centers around the head perimeter. A small quantity of wire may be used to secure the insulation where strapping is impractical.

Fill voids, depressions and irregularities in the insulation surface with insulation cement.

Apply insulation to nozzles, manholes, legs and skirt as shown in K11.4 STD 10.

3.4 Ductwork

- 3.4.1 Round Duct Cut insulation to fit and apply directly to the surface with tightly butted joints. Secure insulation with 3/4" strapping, spaced at 12" centers. Seal all joints with tape.

Secure the jacket in place with 3/4" strapping at a maximum spacing of 12".

- 3.4.2 Flat Surfaces and Transitions Install support pins at a rate not to exceed one pin per 2 sq. ft. of surface. Insulation shall be cut to fit surface and shall be secured to ductwork by impaling insulation on support pins. Joints shall be tightly butted and secure insulation to surface with pin washer.

Insulation shall be cut to fit access doors, for removal, and replacement of door without disruption to insulation.

3.5 Barrier Application - Piping, Vessels and Equipment

- 3.5.1 Metal Jacketing (System 9 MC)

- 3.5.2 Field Applied Cut jacketing to suit outside diameter and provide a 2" minimum lap at all joints. Position the laps to provide maximum protection against wind, blowing rain and water cleaning operations. Secure the jacket in place with wire or strapping. Use wire ties at a maximum spacing of 6" for insulation outside diameter to 6". Use 1/2" strapping at a maximum spacing of 9" for insulation diameter greater than 6" and up to 24". Use 3/4" strapping at a maximum spacing of 12" for insulation diameter greater than 24".

- 3.5.3 Components Apply membrane reinforced mastic to in-line pipe components, pumps, instruments and special fittings. Installation of mastic barrier shall be uniform with reinforcement cloth embedded into wet mastic. Provide a 2" minimum lap at joints. The minimum dry-film thickness of the mastic barrier shall be as specified in the materials specifications.

Apply sealer at joints and openings in the jacket for complete weatherproofing in outdoor and indoor service.

- 3.5.4 Vessels Pre-cut the metal sheets to fit snugly around protrusion and fittings. Apply the jacket to the insulated surface to obtain a snug smooth fit. Circumferential and longitudinal metal joints shall be lapped a minimum of 2". Metal laps over the mastic membrane barrier shall be lapped a minimum of 4". Position the laps to provide maximum protection against wind, blowing rain and water cleaning operations. For vertical vessels where three or more sheets are unsupported, use "Z" clips spaced at 3' centers around the perimeter. Secure the jacket in place with 3/4" strapping maximum spacing of 12".

Apply the mastic barrier to insulated vessel heads and other insulated surfaces as specified. Apply a uniform film of mastic to the surface and embed reinforcement cloth into the wet mastic. Apply additional mastic to the entire membrane surface to make a smooth wrinkle free surface. Provide a 2" minimum lap at joints. The minimum dry-film thickness of the mastic barrier shall be as specified in the materials specifications. Application details are shown in K11.4 STD 80.

Apply sealer at joints and openings in the jacket for complete weatherproofing in outdoor and indoor service.

END OF SPEC 15K-9

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