

**PLAINTIFF'S
EXHIBIT**

MON-76

Job No. 776

Account No. 8

Spec. No. 87776 H-1

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

INSULATION SPECIFICATION

EQUIPMENT AND PIPING

66 Pages

MONSANTO CHEMICAL COMPANY

CHOCOLATE BAYOU TEXAS

AN PLANT DEPT. 30

AUTH. NO. PROJECT 39

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C 002648

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INSULATION SPECIFICATION

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		Certified	SW	WAP	
I	9/10/64	Per Client's Approval	SW	WAP	Sheet 2
DESCRIPTION			DATE		

INSULATION SPECIFICATION
EQUIPMENT AND PIPING
SECTION I
GENERAL

SCOPE OF WORK

The insulation sub-contractor shall furnish all supervision, materials, labor, tools, scaffolding, and equipment necessary to execute, construct, and finish in an expeditious, substantial and workmanlike manner all equipment and piping insulation required for this project. Any exceptions will be specifically mentioned in this specification and accompanying drawings.

DRAWINGS & SCHEDULES

The work to be done is shown on drawings included in this specification, together with piping arrangement drawings and such other drawings and data, not listed, as may be necessary in the opinion of the Badger Company to supplement information given therein.

Sub-contractor will be responsible for his material quantities. Tables contained within this specification will give sub-contractor necessary information which will enable him to make his equipment material take-off. Sub-contractor will be given a complete set of piping arrangement drawings together with a schedule showing the pipe lines that will be insulated with the thickness and type of insulation to be used. The sub-contractor will be required to make his own piping insulation take-off from the information given.

WORKMANSHIP

The intent of this specification is to secure a first-class job in all respects. The workmanship shall be of the highest quality throughout, and sub-contractor shall furnish a competent superintendent experienced in this class of work. Surfaces to be insulated shall be brushed clean by sub-contractor before applying the insulation, using wire brushes if necessary.

INSPECTION

An inspector representing the Badger Company or client, shall have the right to inspect all work and material at the factory or on the site, and any work or material found to be defective or which does not meet the requirements of this specification shall be replaced by sub-contractor at his own expense. Such inspection shall not relieve sub-contractor from full responsibility for the quality and correctness of his materials and work.

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				MONSANTO CHEMICAL COMPANY CHOCOLATE BAYOU TEXAS	
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SECTION I
GENERAL (Cont.)

SCAFFOLDS

The sub-contractor shall provide, at his own expense, all scaffolding of suitable design and as required for his work. He shall remove from the job said scaffolding on completion of the work of the subcontract.

LOCATION OF JOB SITE

A railroad siding will be available to the sub-contractor near the job site. Sub-contractor will include in his bid the necessary cost for trucking of material from the siding to the storehouse, and from the storehouse to various parts of the job.

STORAGE OF INSULATING MATERIAL

Sub-contractor shall visit the site and acquaint himself with the location and conditions of the job. The Badger Company job superintendent will allocate space for storage of materials.

If there is no building space available, the sub-contractor will include in his bid the cost of material, erecting and removal of a suitable warehouse to meet his requirements.

CLEANUP

Contractor shall conduct his portion of the work in a manner that will generate a minimum amount of debris, and this shall be removed by him to a safe location, indicated by Purchaser's Construction Superintendent, before the end of each work day. Contractor shall also clean equipment, machinery, piping, structures, floors, walls, etc., of any undue or unsightly splatter resulting from his operations each day.

WELDING

Many of the vessels and equipment in this plant are fabricated of special alloys. Many are fully stress relieved. No welding of any type shall be done on any vessel, equipment or piping for attachment of additional supports, clips, etc., without specific written approval from Badger, and this work, when approved, will be supervised by Badger.

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CHOCOLATE BAYOU TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

Sheet 4

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SECTION II MATERIALS

All materials shall be new; materials such as insulation blocks, pipe covering, cements and weatherproofing compounds shall be delivered to the job site in factory sealed containers.

Insulation shall be of the type and thickness specified herein. All accessory materials necessary to complete application of the insulation system shall be of the type specified herein. Proposals shall be based on use of these materials as specified and no substitution of materials shall be permitted in the base proposal. Alternate proposals based on the use of materials other than those specified may be made. In such alternate proposals the subcontractor shall state the physical and mechanical properties of all materials and shall furnish detailed description and drawings of methods that differ from those outlined in this specification.

1. High Temperature Block and Pipe Insulation

Owens-Corning
Owens-Corning

Kaylo, or approved equal, to 1200 F.
Kaylo 20, above 1200 F.

2. Low Temperature Block and Pipe Insulation

Pittsburgh-Corning

Foamglas, or approved equal

3. Insulating Mastic Lion Oil Company

K-Kote

4. Accessories for High Temperature Insulation

4.1 Stainless Steel Wire

Wire shall be 14&16 Ga., Type 304, cold-drawn, bright annealed stainless steel.

4.2 Stainless Steel Bands

Flat 3/4 inch x 0.020 inch, Type 304 stainless steel strap shall be used on vessels and equipment operating at 500 F., or less. A.J. Gerrard Expand-R-Strap, or an approved equal, shall be used on vessels and equipment operating above 500 F.

4.3 Insulation Filler Material

Loose insulation material for packing cavities and expansion spaces shall be Fibrofil, a diatomaceous silica with long fiber asbestos, manufactured by Johns-Manville Company.

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I	5/17/64	For Client's Approval	WAK	THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS. Sheet 5

SECTION II
MATERIALS (Cont.)

4.4 Caulking Mastic

Material used to smooth depressions and minor voids in the finished insulation surfaces shall be caulking compound, Eagle-Picher, "One-Coat", OCF No. 110, or approved equal.

4.5 Reinforcing Membrane

Membrane used to distribute stresses and reduce the weather coating on vessels or surfaces not covered by protective jacketing shall be 20 x 20 mesh, asphalt impregnated glass fabric.

4.6 Weather Coating

Material used as weather coating on surfaces not covered by protective jacketing shall be Lion Oil Company Fire Retardant Seal Perm.

4.7 Protective Jacketing & Piping in Battery Limits

Protective jacketing for insulated equipment and piping inside battery limits shall be 0.016 in. thick, type 5052 aluminum, with a factory-applied moisture barrier as manufactured by Childers Manufacturing Co., or an approved equal. Piping 45° and 90° elbows shall be protected with pre-formed Type 1100 or 5052 aluminum with a factory-applied moisture barrier.

4.8 Protective Jacketing off Battery Limits

Material used for protective jacket to insulated piping off battery limits shall be 45 pound asbestos roofing felt, as manufactured by Johns-Manville Company, or approved equal material.

5. Accessories for Low Temperature Insulation

5.1 Vapor Barrier

Lion Oil Company

Seal Kote Fire Retardant No Flash, Spray or Trowel Grade.

5.2 Reinforcing Membrane

Perma-Glar Company

No.105 Non-impregnated Glass Fiber
20 x 10 Mesh, or approved equal.

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CAMBRIDGE 42, MASS.

Sheet 6

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SECTION II
MATERIALS (Cont.)

5.3 Joint Sealer

Lion Oil Company

Seal Kote Fire Retardant No Flash,
Trowel Grade

5.4 Adhesive

Lion Oil Company

Low Temp, Trowel Grade

5.5 Caulking Mastic

Lion Oil Company

Seal Kote Fire Retardant No Flash,
Trowel Grade

5.6 Stainless Steel Bands

A.J. Gerrard Company,
or approved equal

3/4" x .020" Type 304, for vessels and
equipment,
1/2" x .015" Type 304, for Pipe covering

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CAMBRIDGE 42, MASS.

Sheet 7

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SECTION III

APPLICATION

Insulation for piping and equipment shall be applied as designated on the schedules and detail drawings included in this specification.

1. Hot Service

Vessels, exchangers and general equipment, up to and including 30 inches in diameter shall be insulated with pipe covering. Over 30 inches in diameter use mitred lags cut from flat blocks. Curved blocks may be used if economical and available.

Manholes, flanges and stiffener rings on vessels and exchangers will not be insulated unless specifically designated on schedules or detail drawings. Name plates shall not be covered.

Valves and flanges shall be insulated only in live steam lines, steam traced lines and lines operating over 300 F.

When insulation is specified for personnel protection, it shall be applied only where lines are less than 7'-6" above or three feet from the edge of a platform or walkway.

Where insulation passes over pipe supports, sub-contractor will be required to do the necessary cutting and weatherproofing of insulation. On high vertical risers sub-contractor will provide insulation supports in the form of bar clamps made from 1 x 1 1/4" steel with the necessary bolts. Bar clamps will be required for every 20'-0" of vertical rise. No bar clamp will be required unless the rise is at least 20'-0".

Allow for expansion on the following equipment:

<u>M.C.C.</u>	<u>Badger</u>	<u>Circumferential</u>	<u>Space required between blocks</u>
<u>Item No.</u>	<u>Item No.</u>	<u>Expansion</u>	<u>and shell for expansion</u>
RI-1 thru RI-6	MR-101A-F	-3	7/16"

Austenitic Stainless Steel Surfaces of equipment listed below shall be protected with a moisture barrier of Lion Oil Co. "Seal Kote" prior to insulation. Insulation contractor shall apply a brush or spray coat of light or medium grade mastic, 1/16" minimum dry film thickness, to a clean, dry surface.

MS-303
TI-119-Bonnet
AS-102

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C 002655

IV	7/28/64	ADDED AS-102	SW	H-66	MONSANTO CHEMICAL COMPANY CHOCOLATE BAYOU TEXAS THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS.	
II	5/18/64	Added Austenitic St.Stl. Approved by Client.		OKP		
I	3/17/64	Certified For Client's Approval	SW	W-1-P		
		DESCRIPTION	CHG'S	APPR.	CERT DATE	SPT76 H-1

SECTION III

APPLICATION (Cont.)

Cold Service

Low temperature equipment and piping shall be insulated with *foamglas*. Use pipe covering on piping and equipment up to and including 30 inches in diameter. Standard curved segments or mitered lags shall be used on larger sizes.

All valves, fittings and flanges in cold lines shall be insulated. Supports or attachments which project through insulation shall be insulated for a distance equal to four times the insulation thickness where possible. Manholes, flanged ends of exchangers, and other points of equipment access shall be protected with built-up insulation covering as described on detail drawings in this specification.

3. Steam Tracing

Steam tracer lines from mains to process lines and from process lines to traps and condensate returns are to be insulated. Complete insulation of piping, fittings and valves is required except for the sections at traps from and including strainers to and including unions below traps. Condensate lines downstream from traps discharging to sewers or grade shall be insulated only where required for personnel protection.

For complete information on steam tracing see "Specifications for Steam Tracing" SPP76 C16. Insulation contractor shall furnish aluminum foil and Thermom where specified.

4. Insulated Instrument Lines

Instrument lead lines shall be insulated as shown on instrument piping drawings. Pressure gage piping, control valves, flow indicators, etc., when installed in lines that are insulated, or traced and insulated, shall be insulated.

5. General

Care shall be taken that insulation does not interfere with the operation or visibility of instruments such as gage glasses, sight ports, level indicators, etc., or the operation of mechanical or electrical equipment. Nameplates on cold equipment shall be covered over with removable plugs of insulation or wood that extend 1" beyond the insulation and sealed with mastic. Application sketches included in this specification are typical. Any piece of equipment not specifically described on the sketches shall be insulated like the equipment it most resembles.

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				MONSANTO CHEMICAL COMPANY CHOCOLATE BAYOU TEXAS	
II	12/1/64	SPP76 C16 WAS C-6	GW	JH	THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS. Sheet 9
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Insulation on head same thickness as on shell
Secure blocks with 3/4"x.020" T-304 St.Stl. insulation.
Straps & seals spaced 12" apart on circumference.
Trowel on a 3/8" thick coat of caulking mastic and weatherproof.

For method of weatherproofing vessel heads see Sht. 12

For type & thickness of shell insulation see Schedule

Insulation supports by vessel fabricator. For detail see Sheet 14

3/4"x.020" Type 304 St.Stl. insul. straps & seals spaced 12" o.c. over block insulation

Fit metal jacket as close as possible around projections. Seal with heat resistant mastic.
Use staggered joint construction. Seal cracks & voids with caulking mastic.

Allow 1" space for expansion joint under each support. For detail see Sheet 13

Flash & Seal

Fireproofing by Badger For Detail see Sht. 16

Two layer insulation shall be applied with joints staggered longitudinally and circumferentially. Each layer shall be secured as shown for single layer

Nozzle insulation when required to be included in piping insulation

For detail of floating ring see Sheet 2

.016" thick corrugated aluminum jacketing with moisture barrier attached.

Laps in jacket to be 4" on vertical seams & 3" on horizontal seams.

Apply jacket with No. 8 x 1/2" long aluminum alloy sheet metal screws spaced 6" on centers on vertical seams.

3/4"x.020" T-304 St.Stl. insul. straps & seals at circumferential seams. For detail of "S" clips see Sheet 13

Manholes & Stiffener rings will not be insulated except where specified.

Stiffener rings shall be encased with aluminum flashing.

Insulate & finish bottom head same as top head. For list of manholes & stiffener rings see Sheet (later)

Top of foundation.

INSULATION DETAILS
Vertical Vessels
Hot Service

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MORGANTHO, CHEMICAL COMPANY
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THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS. Sheet 10

II	5/17/64	Approved by Client Certified	GW	WKK
I	9/17/64	For Client's Approval	GW	WKK

Surfaces to be insulated shall be clean, dry, and free from frost, rust, etc.

Cement blocks to vessel surface with a coating of low temp adhesive.

Foamable curved blocks or beveled spgs shall be laid up with all butt edges and ends of outer layer (or single layer) coated with joint sealer.

For type & thickness of insulation see schedule. provide contraction joints below insulation supports by packing tightly with Lion Oil Co. K-Kote. Add a layer of insulation over outer layer at supports.

Joint sealer slip joint

Use staggered joint construction.

Nozzles shall be insulated per piping insul. schedule.

3/4"x .020" st. stl. straps & seals spaced 9" O.C. to secure each layer of insulation.

Vessel skirts, legs or lugs shall be insulated for a distance equal to four times the thickness of insulation or a minimum of 12" where possible.

Fireproofing by Badger

Provide type 304 stainless steel floating ring where required to secure straps. For detail see sheet.

Apply a 1/16" thick (wet) coat of Seal Kote over the insulation. While still wet wipe in a layer of reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/8" thick (wet), of Seal Kote. Finish shall present a smooth, unbroken surface and completely hide the glass cloth.

Manholes & handholes shall be protected with built up insulation covering, so installed that it is removable and replaceable with minimum damage to the insulation.

For list of manholes see sheet.

Seal with Seal Kote and glass cloth.

Insulate & finish bottom head same as top head.

**INSULATION DETAILS
VERTICAL VESSELS OVER 36" DIAM.
COLD SERVICE**

C 002658

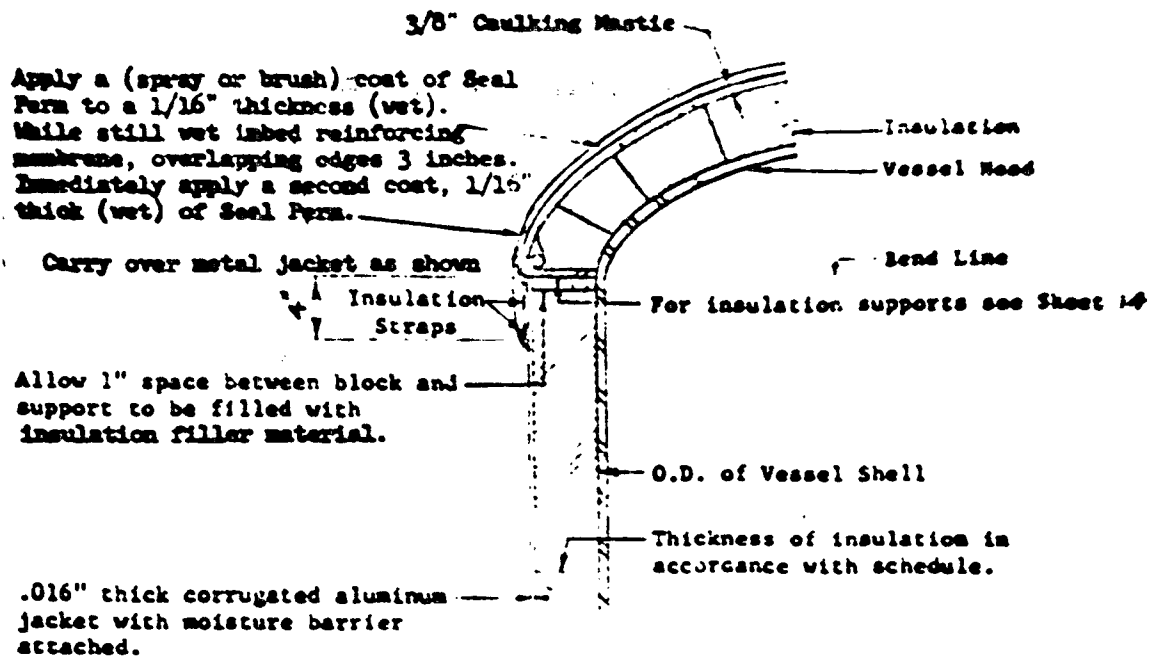
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CHOCOLATE MOUNTAIN TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

Sheet 11

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		Approved by Client		
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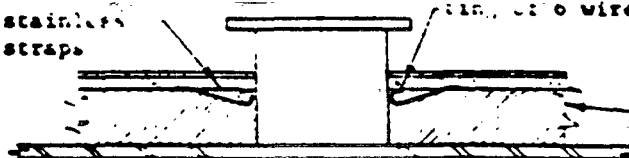
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INSULATION DETAIL AT VESSEL HEADS - HOT SERVICE

3/4" x .020" stainless steel insul. straps

Floating ring to be fabricated from 16 ga. T-304 St. Stl. the wire consisting of 6 wires twisted together.



For type and thickness of insulation see schedule.

DETAIL OF FLOATING RING

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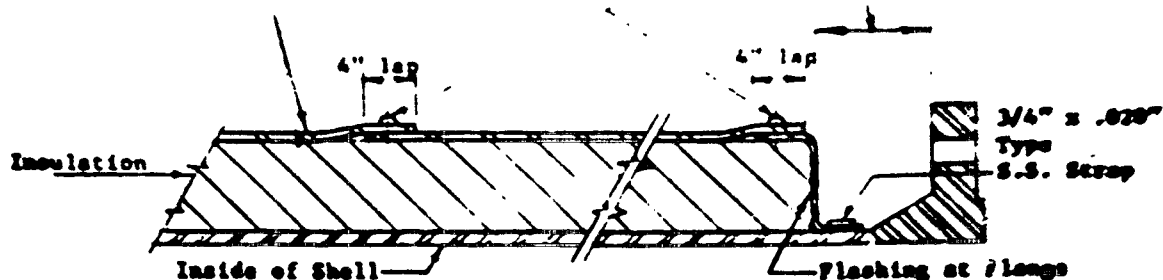
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CHOCOLATE BAYOU, TEXAS

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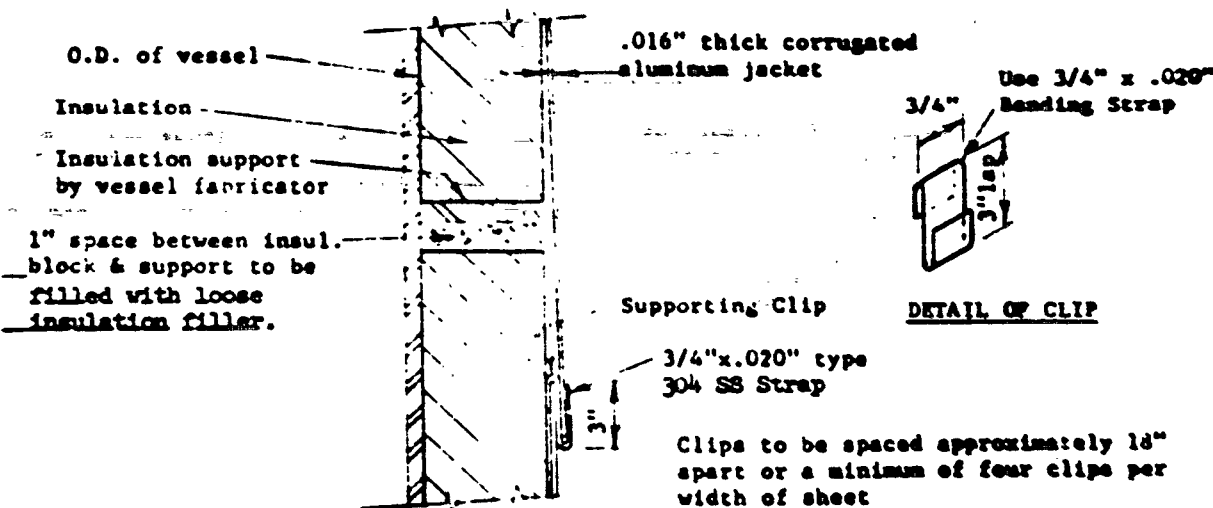
.016" thick corrugated
aluminum sheet with
moisture barrier

68 dia. x 1/2" long
aluminum alloy sheet
Metal screws 1/2" O.C.

—Allow clearance for
bolt removal



CIRCUMFERENTIAL SEAM DETAILS
HORIZONTAL VESSELS
HOT SERVICE



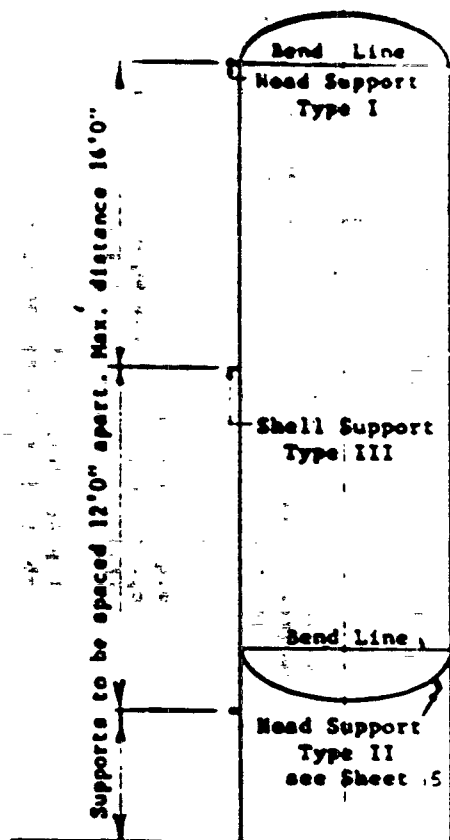
HORIZONTAL SEAM DETAILS
VERTICAL VESSELS
HOT SERVICE

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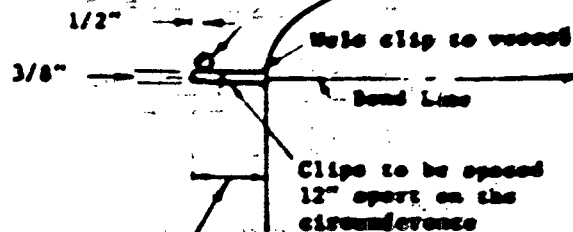
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I	8/17/66	For Client's Approval	W.K.G.	THE BADGER COMPANY, Inc. CAMBRIDGE 22, MASS.
DATE	DATE	DESCRIPTION	DATE	DATE

Sheet 13

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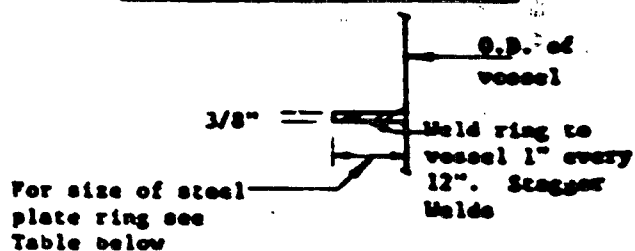


3/8" dia. Rod extending entire circumference-



For size of steel plate clip see Table below.

DETAIL OF HEAD SUPPORT TYPE I



For size of steel plate ring see Table below

DETAIL OF SHELL SUPPORT TYPE III

INSULATION SUPPORTS		
Table of Dimensions		
Insulation Thickness	Support Type I Size Plate Clip	Support Type III Width Plate Ring
1"	1" x 1"	1"
1 1/2"	1 1/2" x 1 1/2"	1"
2"	2" x 2"	1 1/2"
2 1/2"	2 1/2" x 2 1/2"	2"
3"	3" x 3"	2 1/2"
3 1/2"	3 1/2" x 3 1/2"	3"
4"	4" x 4"	3 1/2"

NOTE: Insulation Supports by Vessel Fabricator.

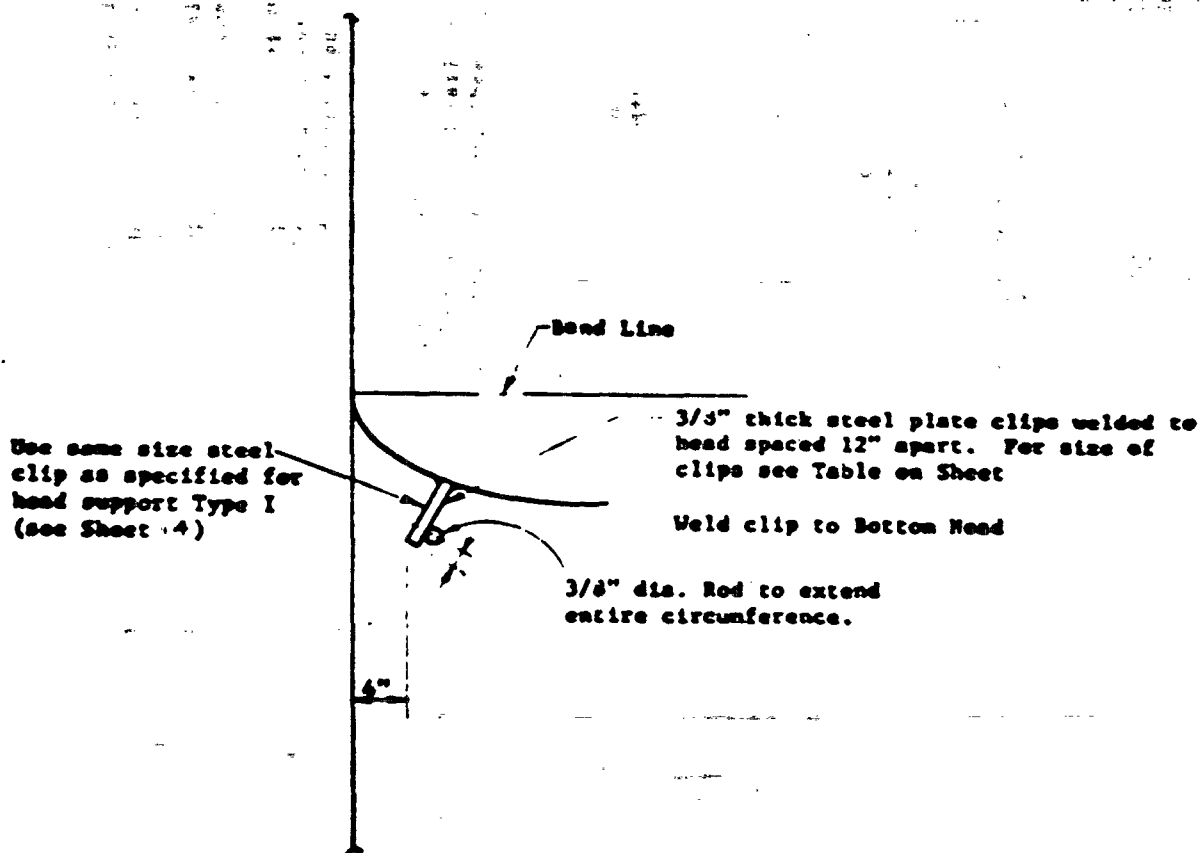
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MONSIEUR CHEMICAL COMPANY
THE CHOCOLATE BAYOU TEXAS

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I	5/7/64	For Client's Approval	W	USA	
NOTE	DATE	APPROVED BY	COMP.	APP.	

SHEET 5-1

DETAIL OF HEAD SUPPORT TYPE II

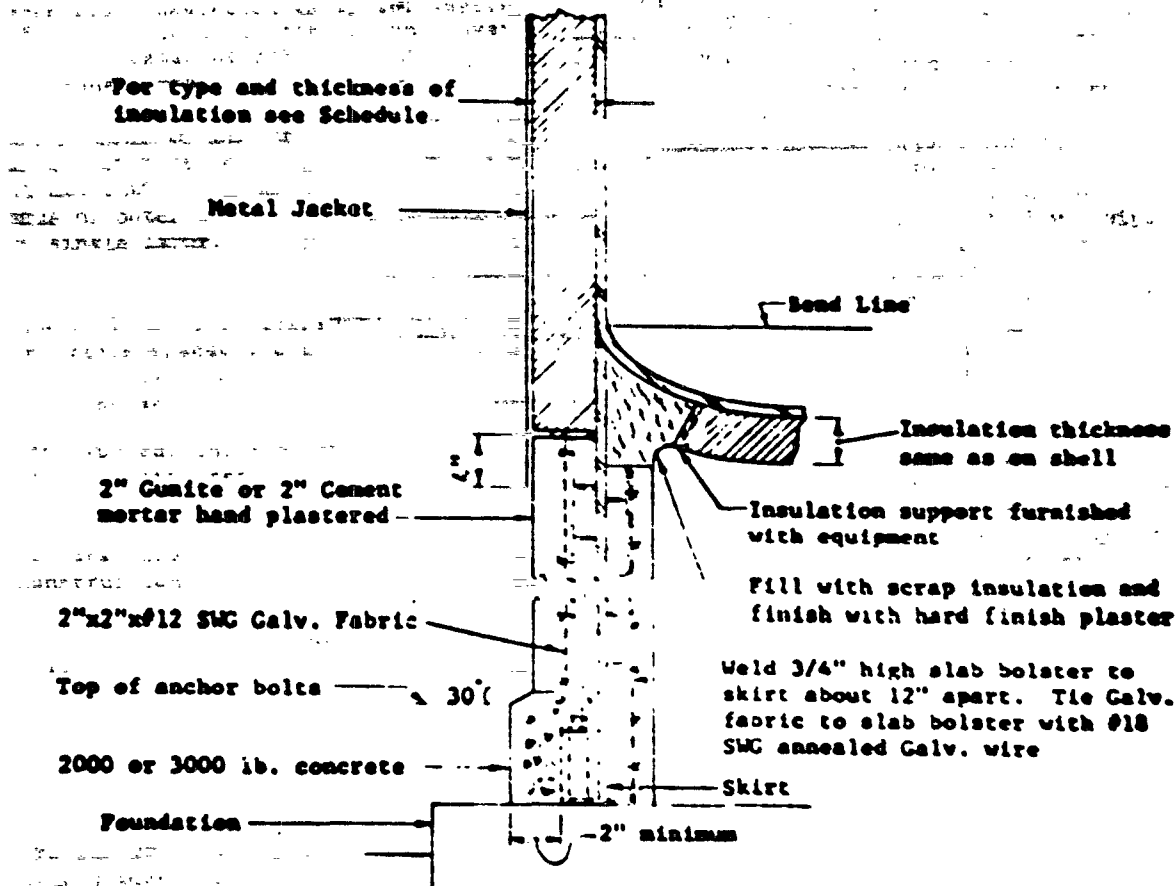


NOTE: Insulation Supports by
Vessel Fabricator

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II	5/10/64	Approved by Client Certified	2W	100%	MORRIS CHEMICAL COMPANY CHOCOLATE MOUNTAIN TEXAS THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS.	
I	9/17/64	For Client's Approval	SW	100%		
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						Sheet 15
						Sheet 1-1

DETAIL OF SKIRT FIREPROOFING
HOT SERVICE



NOTE:

Fireproofing of skirts of vessels by Badger. Skirts 4'-0" O.D. and smaller will be fireproofed outside only.

C 002663

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CAMBRIDGE 42, MASS.

Sheet 16

SEPT 16 1963

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Insulation on heads shall be same thickness as on shell.
Secure blocks with 3/16" gauge Type 304 St. Steel wire spaced 12" apart on circumference.
Trowel on a 3/8" thick coat of quick setting finishing cement and weatherproof.

For method of weatherproofing, vessel heads see Sheet 12

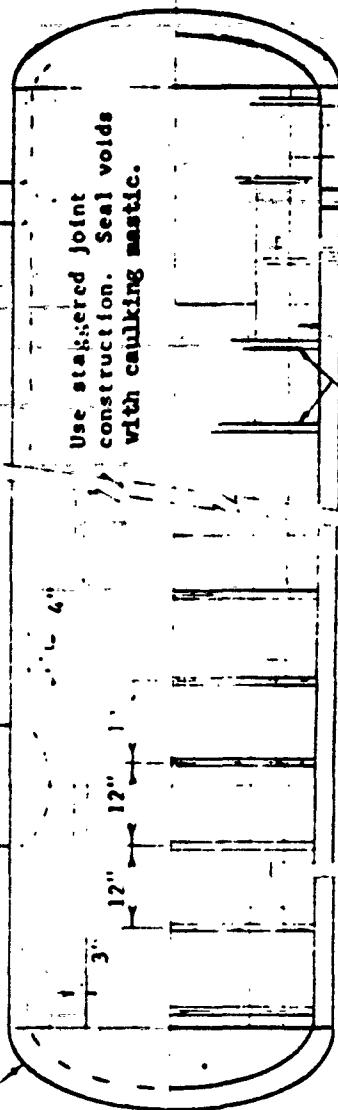
Over shell insulation apply .016" thick corrugated aluminum jacket with moisture barrier attached.

Laps in jacket shall be 4" on vertical seams and 3" on horizontal seams.

Apply jacket with No. 8 x 1/2" long aluminum alloy sheet metal screws spaced 6" apart on both horizontal and vertical laps.

Nozzle insulation, when required, to be included in piping insulation

Manholes will not be insulated. For detail of floating ring see Sheet 12



Supports not insulated

3/4" x .020" st. sl. type 304 insulation straps and seals spaced 12" apart over block insulation.

Fit metal jacket as close as possible around all projections. Seal with heat resistant mastic.

For type and thickness of insulation, see Schedule

Two layer insulation shall be applied with joints staggered longitudinally and circumferentially. Each layer shall be secured as shown for single layer.

INSULATION DETAILS

HORIZONTAL TANKS OVER 30" DIA.

HOT SERVICE

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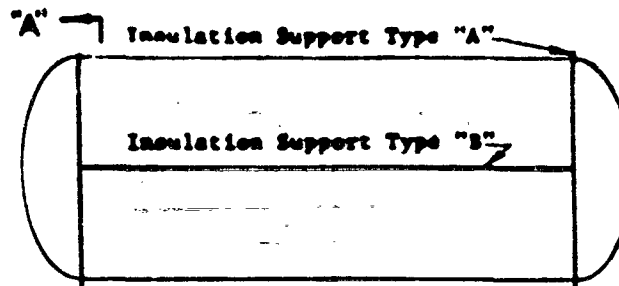
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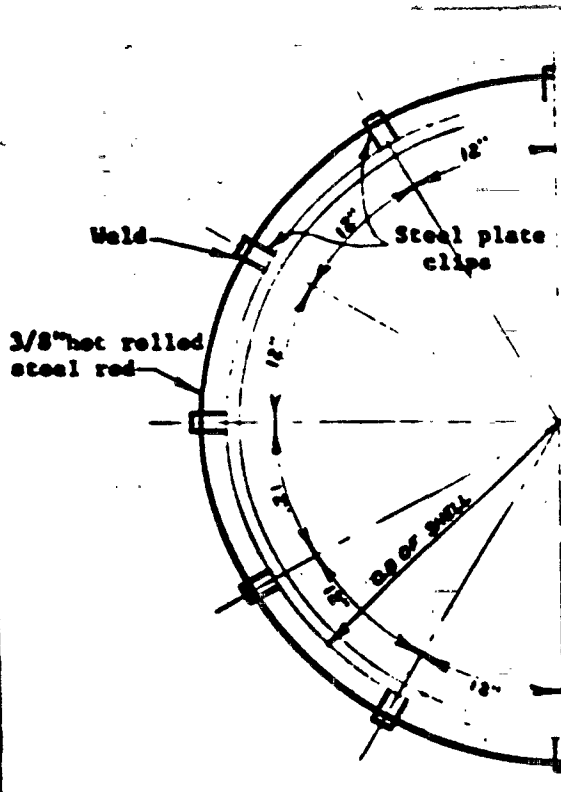
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Sheet 17

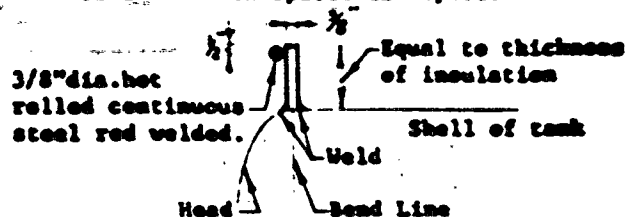


PLAN OF LOCATION - INSULATION SUPPORTS

Steel Plate Clips width equal to thick. of insulation spaced 12" apart.

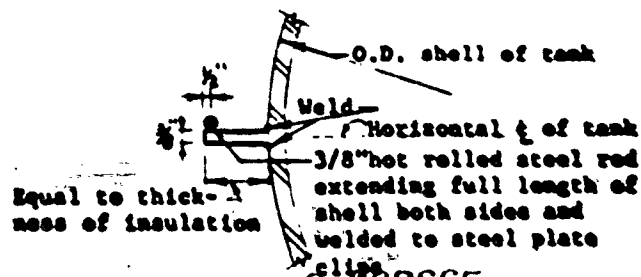


SECTION "A-A"



DETAIL OF INSUL. SUPPORT TYPE "A"

Steel plate clips width equal to thick. of insulation spaced 12" apart



DETAIL OF INSUL. SUPPORT TYPE "B"

MONSANTO CHEMICAL COMPANY
CHOCOLATE MOUNTAIN TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

Sheet 18

SEP 16 E-1

885118

Surfaces to be insulated shall be clean, dry and free from frost, rust, etc.
 Cement blocks to vessel surface with a coating of low temp adhesive.

Nozzles shall be insulated per piping insulation schedule.

Manholes shall be protected with built up insulation so installed that it is removable & replaceable with minimum damage to the insulation.

* Over roof insulation apply two layers of 15 lb. saturated felt and one layer of 55 lb. asbestos felt roofing in asphalt mopping.

Provide Type 302 St. Stl. floating ring at manholes, attachments, etc., where required to secure straps

Block shall be laid up using joint sealer on all butt edges and ends of outer layer or single layer.

3/4"x.020"st.stl.straps and seals spaced 9"o.c. shall be used to secure each course.

For type and thickness of insulation see schedule

Use staggered joint construction.

Projections through the insulation shall be insulated for a distance equal to four times the thickness of insulation or a minimum of 12 inches where possible.

Apply a 1/16" thick (wet) coat of Seal Kote over the insulation. While still wet wipe in a layer of reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/3" thick (wet), of Seal Kote. Finish shall present a smooth, unbroken surface and completely hide the glass cloth.

For list of manholes see Sheet

For number and size of nozzles, see piping drawings.

Seal with joint sealer.

Foundation

Provide contraction joints below insul. supports by packing tightly with Lion Oil Co. K-Kote.

**INSULATION DETAILS
 STORAGE TANK
 COLD SERVICE**

* Roofing felt is to be applied over the vapor seal. Asphalt mopping material must be compatible with the vapor seal.

C 002666

MONSANTO CHEMICAL COMPANY
 CHOCOLATE BAYOU TEXAS

THE BADGER COMPANY, Inc.
 CAMBRIDGE 42, MASS.

Sheet 19

II	5/12/66	Rev. per Client's Comments		WJK
		Approved by Client.		
		Certified	EW	
I	5/17/66	For Client's Approval		WJK

8876 E-1

Jacket shall be cut to fit at
nozzles & projections-seal
with heat resistant mastic

For detail of flashing
at flanges see Sht. 13

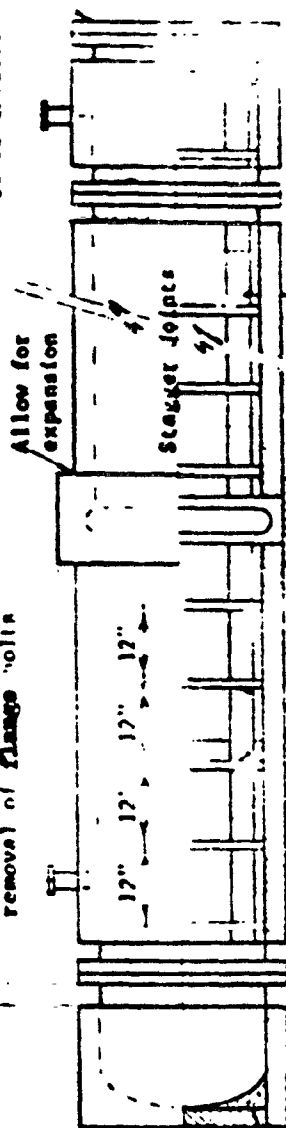
Over shell insulation apply .016" thick
corrugated aluminum jacket with moisture
barrier attached.

Laps in jacket to be 4" on vertical
seams & 3" on horizontal seams

Apply jacket with No. 8 x 1/2" long aluminum
alloy sheet metal screws spaced 6" o.c. on
all seams.

Flanges are not
to be insulated.

Allow clearance for
removal of flange bolts



Fill with
loose insulating
material

Thickness equal to
that used on shell.

Use pipe covering up to 30" dia.
for size & thickness see Schedule.

over insulation.

Furnish 20 gauge aluminum
jacketing with attached
moisture barrier for
insulated removable ends,
outdoors.

Nozzles when required shall
be insulated per piping
schedule.

Seal cracks & voids with
caulking mastic.

NOTE: Exchangers over 30" in dia. shall
be insulated with beveled lags or curved
blocks. Head insulation shall follow
contour of the head.

INSULATION DETAILS

EXCHANGERS

NOT SERVICE

C 002657

11	5/1/64	Rev. per Client's comments Approved by Client. Certified	EW	WPK
1	5/1/64	Rev. per Client's comments Approved by Client. Certified	EW	WPK

MORGANTHO CHEMICAL COMPANY CHOCOLATE HAYOU TEXAS	
THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS.	
Sheet	

NET 16 E-1

Jacket shall be cut to fit at all nozzles and projections. Seal with heat resistant mastic.

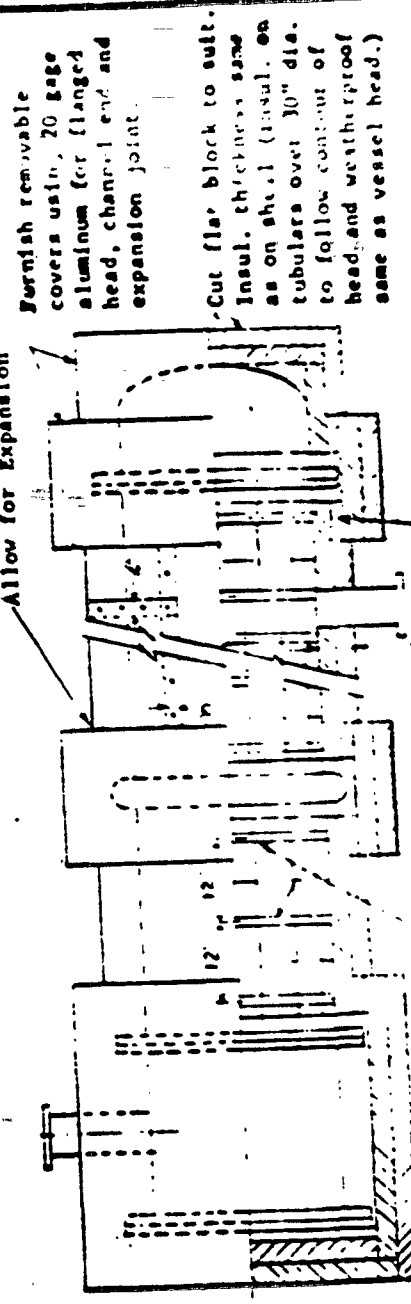
Nozzle insulation when required, to be included in piping insulation.

Over shell insulation apply .016" thick corrugated aluminum jacket with moisture barrier attached.

Laps in jacket shall be 4" on vertical seams and 3" on horizontal seams.

Apply jacket with No. 6 x 1/2" long aluminum alloy sheet metal screws spaced 6" apart on both horizontal and vertical laps.

Allow for Expansion



Allow clearance for removal of flange bolts

Use staggered joint construction. Seal voids and cracks with caulking mastic on outer layer only.

3/4" x .020" St. Steel Insulation T-304 straps and seals spaced 12" apart over block insulation.

Build up with insulation to suit.

For type and thickness of insulation, see schedule

Use double layer insulation, each layer to be strapped on separately and all joints to be staggered.

INSULATION DETAILS

EXCHANGERS OPERATING AT BUOY AND ABOVE

C 002668

MORGANTHO MEDICAL COMPANY
CHOCOTATE MAYOU TEXAS

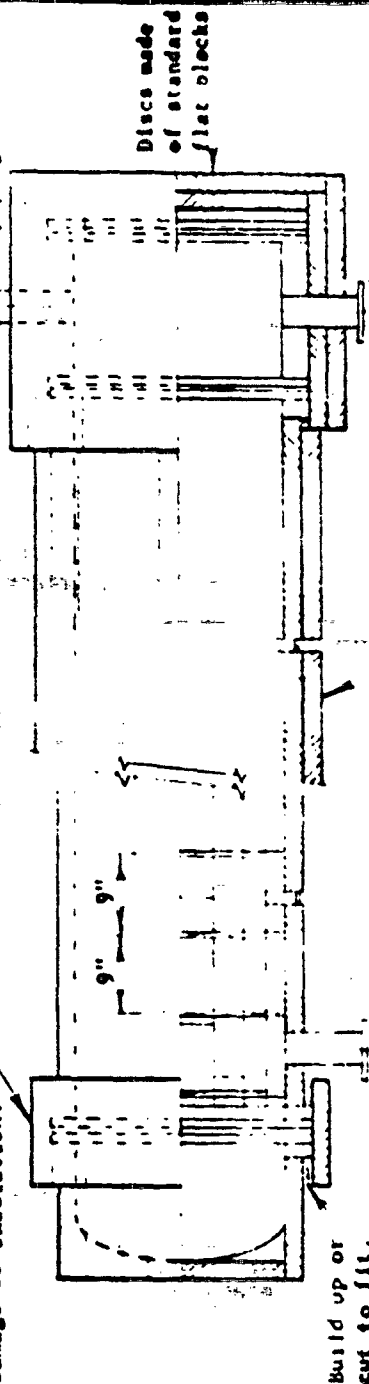
THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

11	5/18/64	Approved by Client Certified	RM	OK
12	5/17/64	For Client's Approval	RM	OK

Sheet
8776 2-1

Surfaces to be insulated shall be clean, dry and free from frost, rust, etc.
 Coat all butt edges and ends of outer layer (or single layer) of insulation with mastic joint sealer. Cement in place with a coating of low temp. adhesive.

Covering for flanged ends shall be removable and replaceable with minimum damage to insulation.
 Secure insulation with 3/4" x .020" stainless steel bands & seals 9" on centers.



Molded pipe covering up to 36" Dia. Use beveled lugs on larger sizes.

Apply a 1/16" thick (wet) coat of Seal Kote over the insulation. While still wet, embed spirally wound reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/8" thick (wet), of Seal Kote.

Vapor barrier and membrane shall be carried onto metal shell, supports, etc., at ends of insulated sections to insure a complete seal.

Attachments & projections shall be insulated for a distance equal to four times the thickness of insulation or a minimum of 12" where possible.

INSULATION DETAILS

EXCHANGERS

COLD SERVICE

C 002669

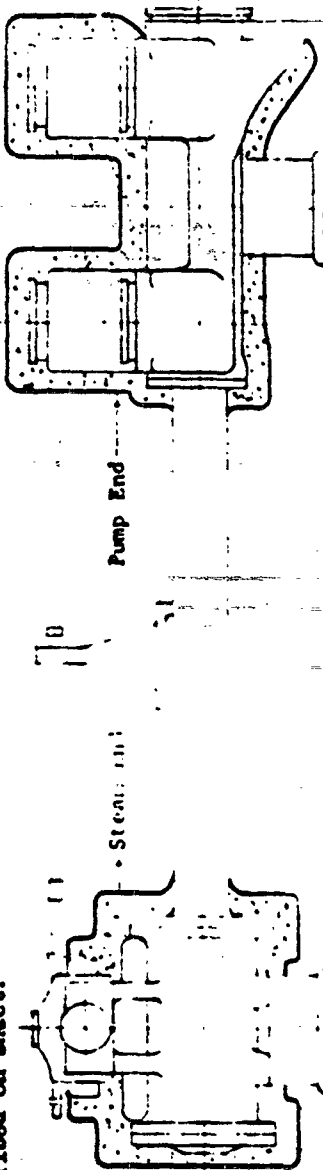
II	5/18/64	Rev. per Client's comments Approved by Client. Certified	WEL
I	9/17/64	For Client's Approval	WEL

MORRIS & CHEMICAL COMPANY CROOKLE BAYOU TEXAS	
THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS.	
Sheet 22	

SEP76 5-1

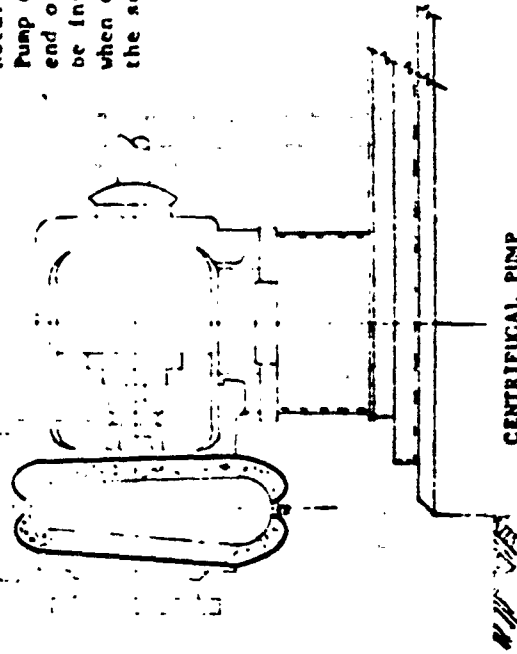
Insulating cement to be applied in layers not greater than 3/4" thick with a layer of 1" hex mesh #20 gauge galv. wire netting between layers. Each layer shall be dry before proceeding with the next.

Over insulation apply a 3/8" thick layer of hard finish plaster consisting of 4 parts finish cement to one part Portland cement. Weatherproof with reinforcing membrane and seal per as described on sheet.

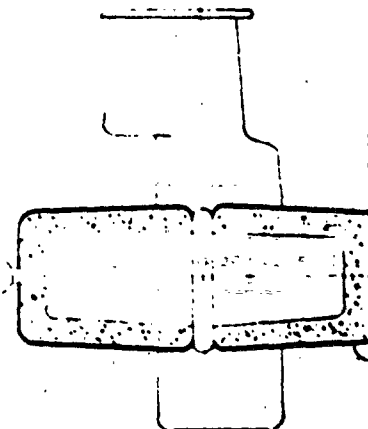


RECIPROCATING PUMP

NOTE:
Pump end or steam end of pump shall be insulated only when called for in the schedule.



CENTRIFUGAL PUMP



TURBINE

INSULATION DETAILS - HOT PUMPS AND TURBINES

C 002670

MONSANTO CHEMICAL COMPANY
CHOCOLATE MOUNTAIN TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

Sheet 23

II	5/18/40	Approved by Client. Certified	W	484
I	5/17/40	For Client's Approval	W	484
DATE	5/17/40	BY	W	484

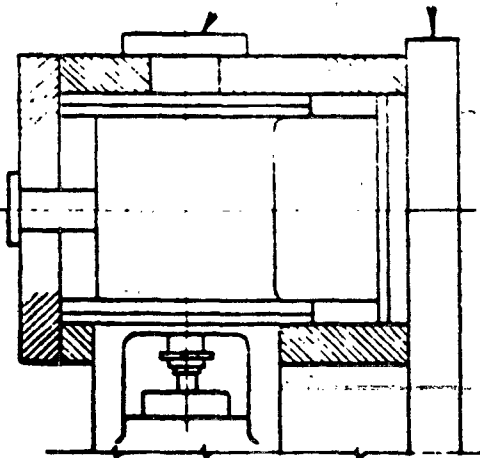
SETP 1-1

Apply a 1/16" thick (wet) coat of Seal Kote over the insulation. While still wet wipe in a layer of reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/8" thick (wet), of Seal Kote.

Lay up 2" thick Fosmaglas Blocks coating all butt edges and ends of blocks with a buttered layer of joint sealer,

Bed blocks in place with 3/4" x .020" stainless steel bends & seals 9" O.C.

Centerline of discharge

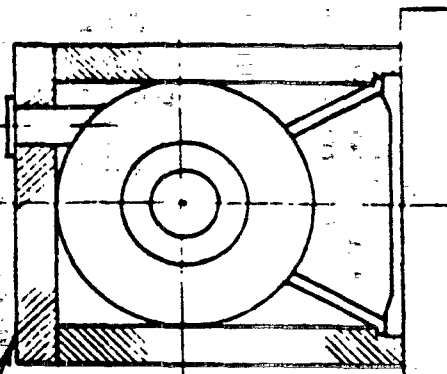


SIDE ELEVATION

Centerline of suction

Nozzle insulation to be provided under piping insulation schedule

Base plate not insulated



END ELEVATION

DETAILS OF COLD PUMP INSULATION
NO SCALE

C 002671

Sheet

II	5/18/64	Approved by Client. Certified	WEL	MOESANTO CHEMICAL COMPANY CHOCOLATE BAYOU TEXAS THE BADGER COMPANY, Inc. CAMBRIDGE 42, MASS. Sheet 24
I	5/17/64	For Client's Approval	WEL	
DATE	DATE	APPROVED BY	DATE	DATE

SP76 E-1

insulated only for
steam and steam return
lines, and where indicated
in the Line Table

On valves 2" and smaller
use insulating cement of
proper thickness and finish
as specified below.

On valves 2½" and larger use
molded pipe insulation of proper
size and thickness.

Fill in with
caulking mastic

Build up with
insulation to suit

2 loops of wire

2" lap

For piping insulation,
wire, jacket, etc., see
piping insulation details.

Wire on insulation and
jacket with a minimum of
6 loops. Use same gage
wire as specified for ad-
joining piping.

Over insulation apply a ½" thick coat
of hard finish cement and weather-
proof with Seal Perm. On sizes 2"
& larger reinforce the weatherproofing
with a layer of reinforcing membrane.

TYPICAL VALVE INSULATION

HOT SERVICE

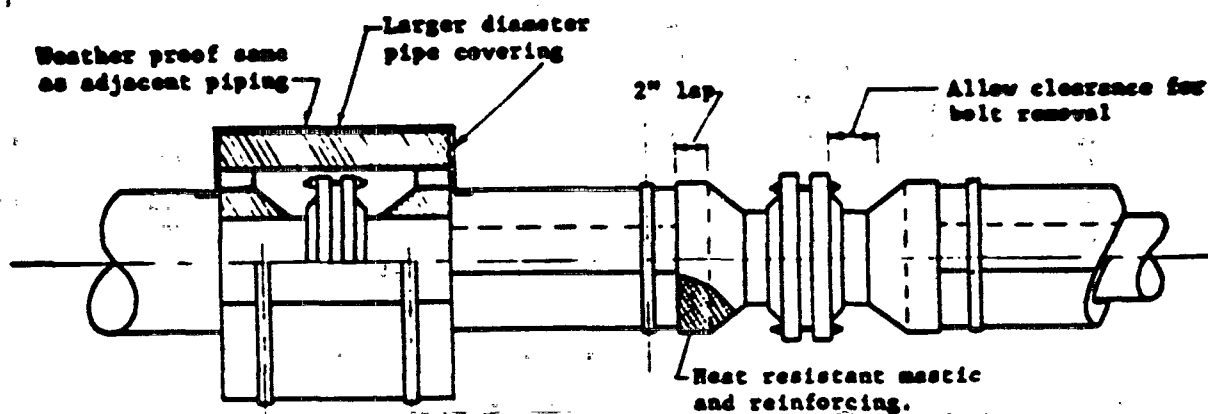
C 002672

MOBILTO CHEMICAL COMPANY
CHOCOLATE MOUNTAIN TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 43, MASS.

II	5/12/44	Approved by Client. Certified	EV	R&K,
I	5/17/44	For Client's Approval	EV	R&K,

NOTE: Flanges are not to be insulated except in live steam and steam traced lines and where indicated in the Line Table.



INSULATED FLANGES

For piping insulation, wire, jacket, etc., see piping insulation details.

UNINSULATED FLANGES

INSULATION DETAILS
FLANGES
HOT SERVICE

C 002673

MORGANTO CHEMICAL COMPANY
CHOCOLATE MOUNTAIN TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

11	9/17/64	Rev. per Client's comments Approved by Client Certified	GW	WEX?
12	9/17/64	For Client's Approval	GW	WEX?

6007
6008

Sheet 26

PIPE INSULATION

Where factory applied curves is not furnished apply 6 oz. canvas lapped 3" each way and secured with lagging adhesive

PIPE OUTDOORS (7" Battery Limits)
Jacket straight pipe insulation with .006" corrugated aluminum sheet with moisture barrier attached. All laps to be at least 2".

Thickness of insulation in accordance with schedule

Secure pipe covering with 16 Ga. St. Std. wire Type 304 on insul. 12" OD. & under; 14 Ga. St. Std. wire Type 304 on insul. over 12" OD.

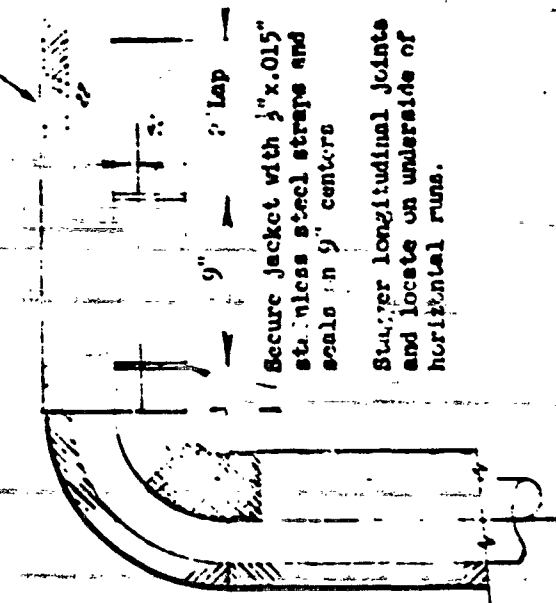
FITTINGS OUTDOORS
45° and 90° elbows shall be protected with prefabricated aluminum fitting covers.

FITTINGS INDOORS
Finish over insulation with 1/2" thick insul. cement hardened with Portland Cement. Trowel smooth.

On fittings 4" and larger use molded pipe covering cut to fit of proper thickness.

On fittings under 4" build up with insulating cement to proper thickness.

Prefabricated fitting covers are acceptable for all sizes.



Secure jacket with 3/8" x .015" stainless steel straps and seals in 9" centers

Stagger longitudinal joints and locate on underside of horizontal runs.

On Battery Limits insulated piping shall be jacketed with 45 pound asbestos roofing felt.

TYPICAL PIPING INSULATION

NOT SERVICE

G 002674

II	5/10/44	Approved by Client	OK
	5/17/44	Certified	OK

MOOREHEAD CHEMICAL COMPANY
CHOCOLA, ARIZONA TEXAS

THE BADGER COMPANY, Inc.
CHOCOLA, ARIZONA MADE

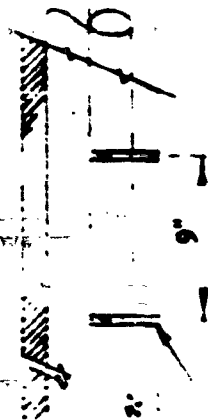
Sheet 27

Insulation contractor shall remove oil, grease, dirt, moisture and other contaminants from surfaces before applying insulation.

Insulation for fittings, valves, flanges etc., shall be prefabricated using same material and thickness as adjacent piping.

Install fitting covers before pipe insulation. Seal joints with Seal Note Joint Sealer.

Over insulation apply a 1/8" thick (wet) coat of Seal Note Vapor Barrier. While still wet, embed spirally wound reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/8" thick (wet) of Seal Note Vapor Barrier. Finish shall present a smooth uniform surface, completely hiding the glass cloth.



Secure pipe covering with 1/2" x .015" Type 304 Stainless Steel bands and seals 9" o.c.

Mastic and glass cloth to overlap 3 inches at fittings

Coat all butt edges and ends of outer layer (or single layer) with joint sealer.

Fabrication shall be in accordance with TYPICAL PIPING INSULATION with FOAMGLAS Fitting Fabrication Manual.

COND SERVICE

* C 002675

MEMORANDUM TO GENERAL COMPANY
CHOCOLATE BAYOU TEXAS

THE BADGER COMPANY, Inc.
CHOCOLATE BAYOU TEXAS

As per Client's comments
Approved by Client.

Approved by

11

10/64

10/64

FOR PIPES

THICKNESS IN INCHES

Temperature Range °F.	151 to 450	451 to 600	601 to 750	751 to 900	901 to 1050	1051 to 1200
1" & Under	1"	1"	1½"	2"	2"	2½"
1½"	1"	1½"	1½"	2"	2"	2½"
2"	1"	1½"	1½"	2"	2½"	2½"
3"	1"	1½"	1½"	2"	2½"	3"
4"	1½"	1½"	2"	2"	2½"	3"
6"	1½"	2"	2"	2½"	3"	3"
8"	1½"	2"	2"	2½"	3"	3½"
10"	1½"	2"	2½"	2½"	3"	3½"
12"	1½"	2"	2½"	2½"	3"	3½"
14"	1½"	2"	2½"	2½"	3"	3½"
16"	1½"	2"	2½"	3"	3"	3½"
18"	1½"	2"	2½"	3"	3"	3½"
20"	1½"	2"	2½"	3"	3"	3½"
24"	1½"	2"	2½"	3"	3"	4"

Over 24" as specified in Line Table

SINGLE LAYER

DOUBLE LAYER

HOT VESSEL & EQUIPMENT INSULATION

Temperature Range	200 & Below	201 to 300	301 to 400	401 to 500	501 to 600	601 to 900	901 to 1000	1001 to 1100	1101 to 1200
Thickness Single Layer	1"	1½"	2"	2½"	3"				
Thickness Double Layer						3"	3½"	4"	4½"

C 002676

MONSANTO CHEMICAL COMPANY
CHOCOLATE BATON TEXAS

THE BADGER COMPANY, Inc.

CHOCOLATE BATON TEXAS Sheet 20

11 5/11/66 Approved by Client.
12 5/11/66 Insulated by Client.
13 5/11/66 Insulated by Client.

TABLE 1

Thickness	1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"	7 1/2"	8"	8 1/2"	9"	9 1/2"	10"
1/2"	45	30	-25	-45	-75	-140	-275	-300	-325										
3/4"	30	25	-20	-25	-70	-135	-225	-235	-300										
1"	30	25	-20	-25	-70	-130	-180	-235	-300										
1 1/4"	30	30	15	-15	-45	-100	-120	-185	-235										
1 1/2"	30	30	15	-15	-45	-90	-120	-175	-225	-290									
1 3/4"	30	30	15	-10	-35	-60	-105	-135	-175	-235	-290								
2"	30	30	20	0	-30	-55	-85	-135	-160	-205	-235	-300							
2 1/4"	30	41	26	0	-25	-45	-70	-105	-125	-160	-195	-240	-290						
2 1/2"		41	26	0	-15	-35	-60	-85	-115	-145	-175	-225	-235	-295					
2 3/4"		41	26	10	-10	-25	-50	-70	-105	-125	-150	-185	-235	-245	-300				
3"		41	26	15	-5	-25	-45	-65	-95	-115	-140	-175	-185	-245	-300				
3 1/4"		41	26	15	0	-25	-40	-55	-80	-105	-130	-160	-190	-225	-285				
3 1/2"		41	26	20	0	-25	-35	-55	-75	-105	-125	-150	-180	-220	-280				
3 3/4"		41	26	20	0	-25	-35	-50	-70	-105	-115	-140	-175	-200	-265				
4"		41	26	20	0	-25	-35	-45	-65	-95	-110	-130	-165	-190	-255				
4 1/4"		41	26	20	0	-25	-35	-45	-65	-85	-105	-130	-155	-180	-245				
4 1/2"		41	26	20	5	-10	-25	-40	-60	-75	-105	-120	-140	-170	-190				
4 3/4"		41	26	20	10	-5	-25	-40	-55	-75	-105	-115	-135	-160	-185				

Vessel
O.D.

48"	41	26	20	10	-5	-20	-35	-50	-70	-90	-110	-125	-145	-170					
60"	41	26	20	10	-5	-20	-30	-50	-65	-85	-105	-125	-140	-165					
72"	41	26	20	10	0	-15	-30	-50	-65	-80	-105	-115	-135	-155					
96"	41	26	20	10	0	-15	-30	-45	-65	-80	-105	-115	-130	-150					
120"	41	26	20	10	0	-15	-30	-45	-60	-75	-105	-110	-130	-145					
144"	41	26	20	10	0	-15	-30	-45	-60	-75	-95	-110	-125	-145					
Over 144"	to	41	26	20	15	0	-10	-25	-40	-55	-65	-80	-105	-115	-130				

SINGLE LAYER

MULTIPLE LAYER

Figures in table are Degrees Fahrenheit and are minimum temperatures for thickness stated.

002677

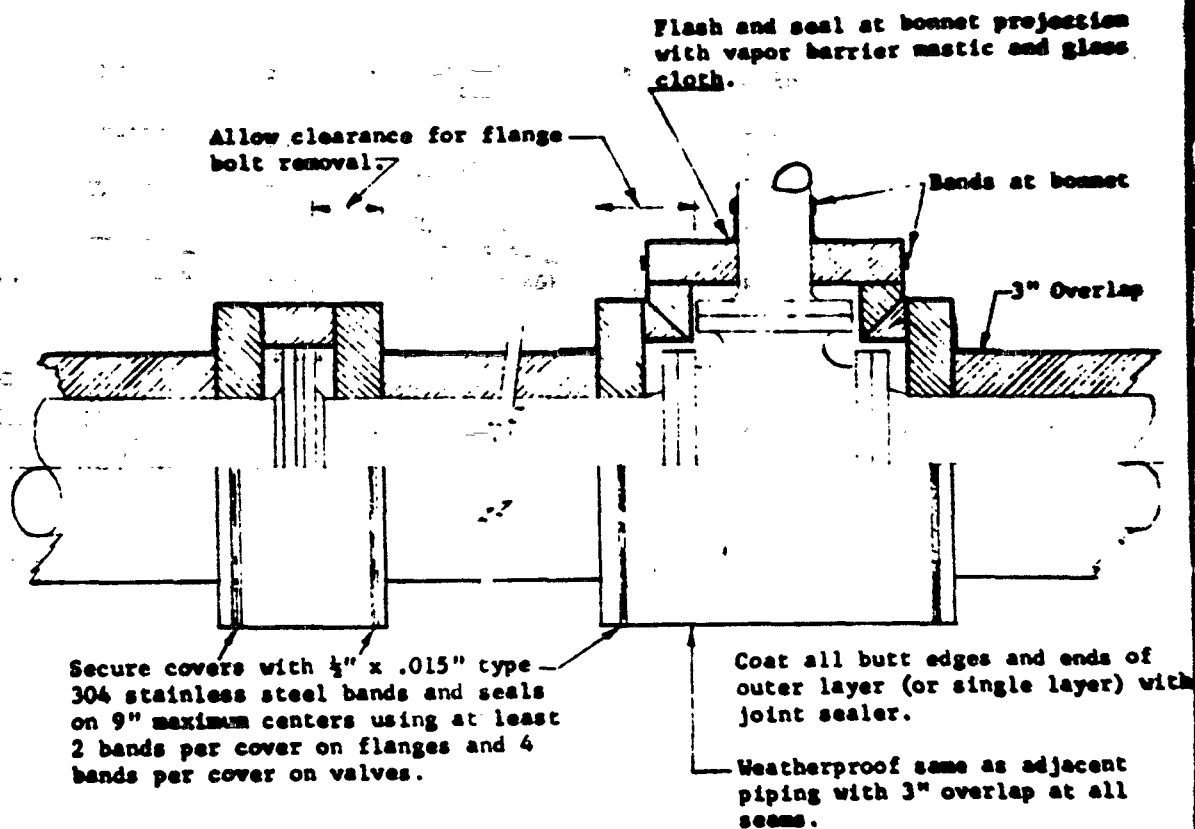
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CHOCOLAT, CHOCOLAT

5/2/60 Revised to agree with 5/1/60
5/2/60

Insulation for Fittings, Valves, Flanges, etc., shall be prefabricated using same material and thickness as adjacent piping. Fabrication shall be in accordance with Foamglas Fitting Fabrication Manual.

Install covers before pipe insulation.

Seal joints with joint sealer.



**INSULATION DETAILS
VALVES AND FLANGES
COLD SERVICE**

C 002678

MONSANTO CHEMICAL COMPANY
CHOCOLATE MOUNTAIN, TEXAS

THE BADGER COMPANY, Inc.

II 5/13/44
Added per Client's
comment, approved by
Client, 5/13/44

Sheet 31

CENTRAL FILE

Item	MCC	Dwg.	No.	Insul.	Dimensions		
	No.	No.	Req.	Thick.	A	B	C
AS-101	30Q1	11A	1	1½" Prot.	For Dimensions see Sheet 34		
AS-102	30D1	12A	1	1½"	4'0½"	40'0"	12"
AS-103	30D2	13A	1	1½" FG	12'1"	110'0"	3'0"
AS-104	30D3	14A	1	1½"	For Dimensions see Sheet 32		
AS-105	30D4	15A	1	1½"	9'7"	127'2"	2'6"
AS-106	30D5	16A	1	1"	4'7½"	80'6"	13"
AS-107	30D6	17A	1	1"	5'7"	103'0"	17"
AS-108	30D7	18A	1	1"	7'1"	88'6"	1'9"
AS-109	30D8	19A	1	1½"	3'0-5/8"	46'6"	9"
MR-101	30R1	41A	6	3"	12'1½"	49'0"	6'1"
A thru F	Thru-R6			(2-Layers)			
MS-102A&B	30T1&2	42A	2	1½" Prot.	For Dimensions see Sheet 31		
MS-103	30S1	43A	1	2½"	9'3-5/8"	25'0"	2'3"
MS-105							
Stm. Traced	30T4	45A	1	2"	6'0"	6'0"	-
MS-112							
Stm. Traced	30T6	45A	1	2"	6'0"	6'0"	-
MS-126	30T20	49A	1	1" FG	4'6"	6'0"	-
MS-127	30S7	67A	1	1½" Prot.	2'6"	4'0"	5"
MF-128	30T13	68A	1	1½" FG	12'0"	20'0"	12"
MS-129	30S8	69A	1	1½" Prot.	4'6"	11'0"	10"
MS-131	30S15	76A	1	1½" FG	5'2"	21'0"	15"
MS-132	30S16	75A	1	3" FG	5'6"	6'0"	11"
MS-133, 134	30T22,	52A	3	1½" Prot.	2'0"	2'10"	4"
& 135	T23, T24						
MS-136	30S17	77A	1	1½" FG	3'1-1/8"	4'0"	9"
MS-137	30S20	79A	1	1½" Prot.	2'6-5/8"	8'0"	7½"
MS-139	30T28	81A	1	2" FG	5'1-1/4"	19'0"	15"
MS-140	30T29	81A	1	1½" FG	5'1-1/4"	19'0"	15"
MS-303	30T1	71A	1	1"	3'0"	6'6"	6"
MS-304	30S12	72A	1	1½" Prot.	For Dimensions see Sheet		
MF-405	320T305	66A	1	1½" FG	For Dimensions see Sheet		
MS-411	320S302	46A	1	1½" FG	2'-6'5/8"	4'0"	5"

* = Allow for circumferential expansion. See Sheet 8.

PG = Pongias

C 002679

THE BADGER COMPANY, Inc.

**MONSANTO CHEMICAL COMPANY
CHOCOLATE BAYOU TEXAS**

CAMBRIDGE 42. MASS. Sheet 36

EQUIPMENT SCHEDULE

Item	MCC No.	Dwg. No.	No. Req'd.	Insul. Thick.	Dimens		
					A	B	C
TT-101A-F	30E1-1-6	D'Town EN-950	6	3" (2-Layers)	For Dimensions see Sh		
TT-102A-F	30E2-1-6	D'Town EN-950	6	2½"	For Dimensions see Sh		
TT-106	30E6	H/T 1333	1	2" FG	45½"	25'2"	2
TT-107	30E7	H/T 1334	1	2" FG	44½"	25'2"	2
TT-108A&B	30E8-1&2	H/T 1335A&B	2	2" FG	38"	18'4"	3
TT-112A&B	30E11-1&2	H/T 1338A&B	2	1½"	27"	20'7"	2
TT-114	30E12	H/T 1340	1	2"	14"	17'7"	2
TT-119	30E16	D'Town EN-943	1	2"	49"	8'0"	24
TT-120	30E17	EPCO 12951	1	1½" FG	28-3/4"	12'0"	23
TT-121	30E18	H/T 1342	1	1½" FG	20"	16'4"	24
TT-123	30E20	D'Town EN-944	1	1½" FG	18"	4'0"	10
TT-124	30E21	D'Town EN-945	1	2"	49"	12'0"	25
TT-126A&B	30E23-1&2	D'Town EN-946	2	2"	49"	12'0"	3'
TT-128	30E25	D'Town EN-947	1	1½" FG	16"	4'0"	6'
TT-139A&B	30E37-1&2	H/T 1345A&B	2	2½" FG	60½"	25'6"	2'

CENTRAL FILE

MONSANTO CHEMICAL COMPANY
CHOCOLATE BAYOU TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS. Sheet 37

C 002680

LIST OF MANHOLES AND STIFFENER RINGS

C	No.			
	Req'd.	Manholes	Stiffener Rings	Insulation
Q1	1	1-24" 150 Lb.	4-6x3x3/8"	
		2-18" 150 Lb.		
D1	1	3-18" 150 Lb.	4-3x2x5/16"	-
D2	1	8-18" 150 Lb.	7-5x3x7/16"	1 1/2" Foamglas
D3	1	8-18" 150 Lb.	4-3x2x3/8"	-
			6-5x3x5/16"	-
D4	1	7-18" 150 Lb.	10-4x3x3/8"	-
D5	1	6-18" 150 Lb.	-	-
D6	1	6-18" 150 Lb.	3-4x4x5/16"	-
			10-3x3x3/8"	-
D7	1	6-18" 150 Lb.	10-4x4x3/8"	-
D8	1	3-18" 150 Lb.	3-2x2x1/4"	-
D9	6	2-24" 150 Lb.	2-6x1 1/4"	2" Kaylo
		1-48" 175 Lb.	-	2" Kaylo
D1-1,2	2	2-18" 150 Lb.	4-6x4x3/4"	-
D1	1	1-24" 300 Lb.	-	-
D7	1	1-18" 150 Lb.	-	-
D13	1	2-20" Special	-	1 1/2" Foamglas
D8	1	1-18" 150 Lb.	-	-
D15	1	1-18" 150 Lb.	-	1 1/2" Foamglas
D16	1	1-18" 150 Lb.	-	3" Foamglas
D17	1	1-18" 300 Lb.	-	1 1/2" Foamglas
D20	1	1-18" 150 Lb.	1-3/8x2"	-
D28	1	1-18" 300 Lb.	-	2" Foamglas
D29	1	1-18" 300 Lb.	-	1 1/2" Foamglas
D16	1	1-18" 150 Lb.	-	-
D16	1	1-18" 300 Lb.	-	2" Foamglas
D7	1	1-18" 300 Lb.	-	2" Foamglas
D37-1,2	2	1-18" 300 Lb.	-	2 1/2" Foamglas
D20T305	1	2-20" 300 Lb.	-	1 1/2" Foamglas
D20T305	1	1-18" 150 Lb.	-	1 1/2" Foamglas

101A-F shall be insulated with removable metal jacketed (20 Ga. Type 304

) covers. Covers shall be readily removable and replaceable.

on MR-101A-F and AS-103 shall be insulated & weatherproofed. Other stiffener

be insulated but shall be boxed in with aluminum.

mglas insulated vessels shall be insulated as described on application sketches.

PUMP SCHEDULE

<u>Item</u>	<u>MCC No.</u>	<u>No. Req.</u>	<u>Type & Size</u>	<u>Insul. Thick.</u>	<u>Manufacturer</u>
PP-102A, B, C	P1-1-3	3	Centrifugal 12 x 17 HVC	1 1/2" Prot.	Pacific Pumps
* PP-106A&B	P3-1&2	2	Centrifugal 1 1/2 x 1 x 6/46	1 1/2"	Duriron Co.
PP-114A&B	P11-1&2	2	Centrifugal 8 x 10 x 20 PR	1 1/2" FG	Peerless Pump
* PP-119	P16	1	Centrifugal 1 1/2 x 1 x 6/44	1 1/2"	Duriron Co.
PP-141A&B	P35-1&2	2	Centrifugal 10 x 17 DS	1 1/2" FG	Pacific Pumps
PP-147	P40	1	Centrifugal 1 1/2 x 1 x 6/43	1 1/2" FG	Duriron Co.
PP-408A&B	320P308- 1&2	2	Centrifugal	2 1/2" FG	

* = Steam Traced

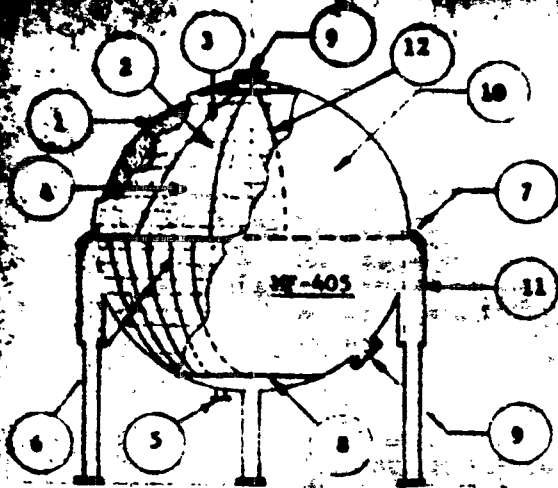
C 002682

LEVEL GAUGES

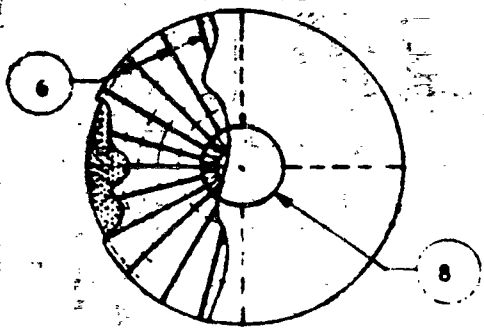
No. Req.	Location	No.	Type	Dim. "A"	Insul. Thick.	Remarks
-4	MS-103	30S1	T	57"	2 1/4"	For details see Sheet 43
-4	MS-103	30S1	T	42-7/8"	2 1/4"	
-7	MS-105	30T4	R	57"	2"	
-16	AS-102	30D1	R	42-7/8"	1 1/4"	
-20	AS-103	30D2 (Bot.)	R	42-7/8"	1 1/4" FG	
-22	AS-103	30D2 (Top)	R	28-3/4"	1 1/4" FG	
-28	AS-104	30D3	R	42-7/8"	1 1/4"	
-35	AS-105	30D4	R	57"	1 1/4"	
-39	AS-106	30D5	R	42-7/8"	1 1/4"	
-46	AS-107	30D6	R	42-7/8"	1 1/4"	
-50	AS-108	30D7	R	42-7/8"	1 1/4"	
-54	AS-109	30D8	R	42-7/8"	1 1/4"	
-63	MS-126	30T20	R	57"	1 1/4" FG	
-66	MS-133	30T22	T	28-3/4"	1 1/4"	
-67	MS-134	30T23	T	28-3/4"	1 1/4"	
-68	MS-135	30T24	T	28-3/4"	1 1/4"	
-74	MS-132	30S16	R	42-7/8"	1 1/4" FG	
-75	MS-136	30S17	R	28-3/4"	1 1/4" FG	
-79	MS-131	30S15	R	57"	1 1/4" FG	
-28	AS-104	30D3	R	57"	1 1/4"	

LEVEL CONTROLLERS

IC-9	1	AS-101	30Q1	38"	1 1/4"	For details see Sheet 44
IC-15	1	AS-102	30D1	38"	1 1/4"	
IC-19	1	AS-103	30D2	38"	1 1/4" FG	
IC-21	1	AS-103	30D2	20"	1 1/4" FG	
IC-27	1	AS-104	30D3	126"	1 1/4"	
IC-34	1	AS-105	30D4	102"	1 1/4"	
IC-38	1	AS-106	30D5	38"	1 1/4"	
IC-45	1	AS-107	30D6	38"	1 1/4"	
IC-49	1	AS-108	30D7	38"	1 1/4"	
IC-53	1	AS-109	30D8	38"	1 1/4"	
IC-62	1	MS-133	30T22	20"	1 1/4"	
IC-64	1	MS-134	30T23	20"	1 1/4"	
IC-65	1	MS-135	30T24	20"	1 1/4"	
I -78	1	MS-131	30S15	198"	1 1/4" FG	C 002683
2 -88	1	MS-131	30S15	198"	1 1/4"	
2 -88	1	MS-131	30S15	198"	1 1/4"	



ELEVATION



BOTTOM VIEW
54'-9" I.D. SPHERE

INSULATION SCHEDULE
COLD SURFACE

1. Surfaces to be insulated shall be clean, dry, free from frost, rust, etc.
2. Coat all butt edges and ends of Douglas blocks with joint sealer.
3. Cement blocks to surface of sphere with a coating of low temp. adhesive.
4. Use staggered joint construction. Fill minor voids with caulking mastic.
5. Manholes shall be insulated per piping insulation schedule.
6. 3/4" x .020" stainless steel straps and seals spaced 2'-0" apart around support ring at equator and attached to 8'-0" diameter floating ring at bottom of sphere.
7. For detail at support ring see Sheet 42
8. 8'-0" diameter floating ring of 1/2" stainless steel rod. Support insulation within ring by criss-crossing 3/4 x .020" bands.
9. Manholes shall be insulated with prefabricated cover, so installed that it is removable and replaceable with minimum damage to the insulation.
10. Apply a 1/16" thick (wet) coat of Seal Kote over the insulation. While still wet wipe in a layer of reinforcing membrane with not less than 3" overlap at all seams. Remove all wrinkles and air bubbles. Immediately spray or brush over the membrane a second coat, 1/8" thick (wet), of Seal Kote. Finish shall present a smooth, unbroken surface and completely hide the glass cloth.
11. For insulation of supports see Sheet 42
12. 3/4" x .020" stainless steel straps and seals spaced not more than 6'-0" apart at equator and attached to floating ring at top of sphere.

CENTRAL FILE

C 002684

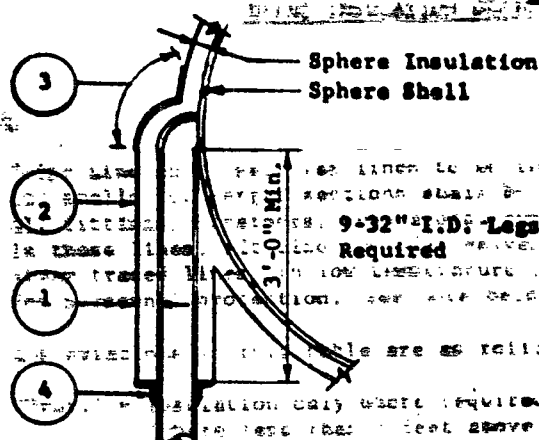
MONSANTO CHEMICAL COMPANY
CHOCOLATE BATON TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 48, MASS.

Rev. Para. 6, added 12		
Minor Revisions		
Added & Corrected		

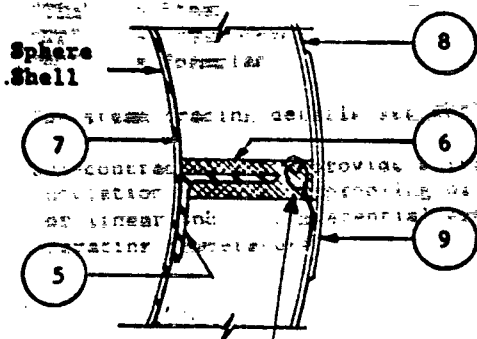
Sheet 41

**INSULATION DETAILS
ANTONIA STORAGE TANK - COLD SERVICE
HW-405**

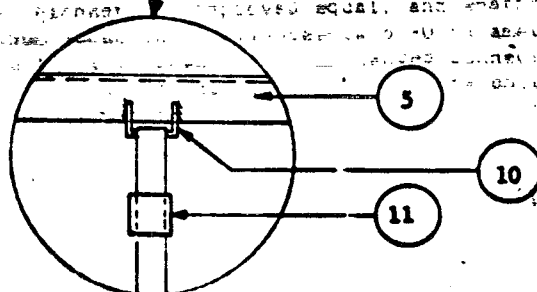


1. Leg insulation same thickness as on shell.
2. Seal Kote and membrane finish as specified for sphere.
3. Additional layer of finish.
4. Flash finish to angle ring supports. Supports by sphere erectors.
5. 1" x 1" x 1/4" angle ring at equator by sphere erectors.
6. Expansion joint to be packed with resilient glass fiber fill.

LEG INSULATION DETAIL



7. Low temp. adhesive.
8. Finish as specified.
9. Additional layer of finish, 12" minimum width.
10. 1/4" steel bars welded to angle by insulation contractor to attach insulation straps.
11. 3/4" x .020" stainless steel straps and seals.



SUPPORT ANGLE DETAIL

CENTRAL FILE

C 002685

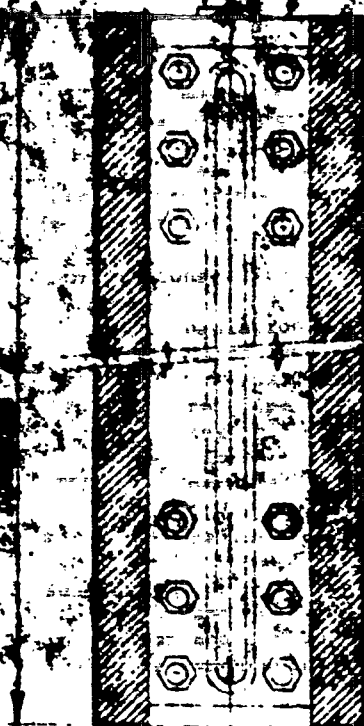
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CAMBRIDGE 42, MASS.

Sheet 42

V	Added No. & Size of Legs	Tw	Added
IV	Added & Certified	Tw	Added
DESCRIPTION			

HW-405 N-1



Top of level gage not insulated



SECTION THROUGH TRANSPARENT OR "T" LEVEL GAGE

Pipe conn. Bottom of level gage not insulated

INSULATION DETAIL FOR LEVEL GAGES

C 002686

Space between level gage and pipe shall be insulated.

For piping to level gages see piping drawings.

For schedule of level gages see sheet 40.

Level gages shall be installed in accordance with the piping drawings. The insulation shall be installed in accordance with the piping drawings.

Level Gage	Location	Notes
1	...	...
2	...	...
3	...	...
4	...	...
5	...	...
6	...	...
7	...	...
8	...	...
9	...	...
10	...	...

Fill with flash cement and weatherproof

For thickness of insulation see schedule

See nearest commercial size pipe covering cut to fit if necessary. Then insulation in place using No. 16 ga. st. wld. tie wire. Weatherproof same as adjacent equipment

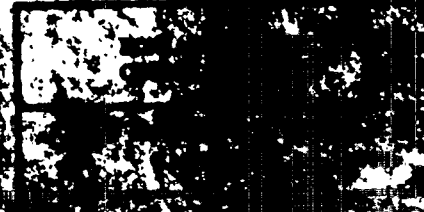


Fill with flash cement and weatherproof

Piping between level controller and vessel shall be insulated.

For piping connections see piping drawings.

INSULATION DETAILS PIPE CONNECTION



PIPING INSULATION DESIGNATION TABLE

NOTES:

1. "Pipe Line No." specifies lines to be insulated. All branches and smaller or larger sections shall be insulated. This includes all fittings, strainers, separators, expansion joints, etc., in these lines. It also includes valves and flanges in steam and steam traced lines, in low temperature lines and where required for personnel protection. See note below.

2. Abbreviations in this table are as follows:

"Prot." - Insulation only where required for personnel protection.
(where less than 7 feet above or 3 feet from the edge
of a platform or walkway.)

"IPS" - Iron Pipe Size

"STM" - Steam

"ST" - Steam Traced

"TC" - Foamglas

3. For steam tracing details see SP776-C66 and piping drawings.

4. Sub-contractor shall provide suitable expansion joints in the insulation and weatherproofing of hot pipe and fittings to allow for linear and circumferential expansion where warranted by the operating temperature.

NOTE:

No. GY-104 (Z2) silencer in Line P-3 shall be insulated with J-M No. 102 Banroc blanket, or approved equal, and weatherproofed with .016" thick aluminum jacketing. Silencer is 6'-0" diameter by 13'-6" B.L. to B.L. with elliptical heads and 30" flanged connections. Insulate approximately 3'-0" long top connection and 6'-0" long bottom connection. For details see Piping Dwg. No. P76-214F.

CENTRAL FILE

Monsanto Chemical Co.
CHOCOLATE BAYOU, TEXAS

THE BADGER COMPANY, Inc.
CAMBRIDGE 42, MASS.

Sheet 43

C 002688