

Interoffice Memorandum

TO (Name and Location) Mr. D. K. Mastell	DATE September 10, 1980
FROM (Name and Location) C. F. Hall	REFERENCE NO. ED80-1028-CFH

cc: J. F. Harper - W/O attach.
 J. C. Susil " "
 E. D. Reed " "
 A. D. Willbern " "

CONSTRUCTION MATERIALS SHEETS BISHOP PRODUCTS

Elmo Reed and Art Willbern have reviewed the attached product construction materials sheets. Even though the sheets are dated, most practices are still current.

We have tried to simplify the gasket, packing and seal categories. Along with generic names, we suggest keeping some manufacturers' numbers as they may be of convenient use to our customers. The suggested changes are as follows:

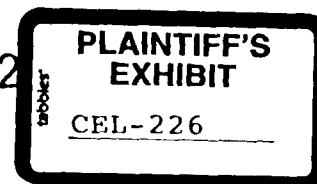
For all products except formaldehyde and the three formcel solutions:

<u>Item</u>	<u>Preferable</u>	<u>Acceptable</u>
Gaskets	White chrysotile asbestos w/nitrile binder, such as Garlock 8748.	Compressed asbestos gaskets, such as Crane 888 and Anchor 451.
Packing, Pump	Mechanical Seals	Asbestos packing with suitable binders & lubricating additives (graphite). For example, see John Crane Super Seal series of packings. TFE also alternative.
Packing, Valves	Asbestos packing w/binders and lub. additives, John Crane Super Seal.	Graphite packing rings such as Grafoil. Also, braided TFE impregnated asbestos.
Mechanical Seals	#5 carbon insert on Stellite faced 316 S/S (or cast Stellite) seal ring.	#5 carbon insert on ceramic seal ring.

For butyl, iso-butyl and methyl formcel as well as formaldehyde:

<u>Item</u>	<u>Preferable</u>	<u>Acceptable</u>
Gaskets	Teflon envelope or reinforced Teflon.	White asbestos with nitrile binder, such as Garlock 8748.
Pump Packing	Same as above.	Same as above.
Mechanical Seals	Same as above	Same as above.

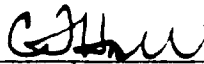
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September 10, 1980

To the methyl formcel sheet, add "may be subject to moderate pitting, not recommended for long term storage" to note 2.

Please call (ext. 4334) if you need clarification on some of these recommendations.


C. F. Hall

CFH:ds
Attachments

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CONSTRUCTION MATERIALS

ISO-BUTYL ACETATE

PAGE NO 12-20

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION

ITEM	PREFERABLE	ACCEPTABLE
Tank	Carbon Steel (1)	304 SS, Aluminum, Lined Carbon St
Piping	Carbon Steel	304 SS, Aluminum
Valves	IBBM, Carbon Steel	304 SS
Pumps	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	white Chrysotile asbestos Crane 888, Balmain 585	Anchor 451, Garlock 8748
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon impregnated asbestos
Mechanical Seal	# 5 Carbon ^{insert} running on Stellite faced 316 SS (or Cast Stellite) Seal ring	# 5 Carbon ^{insert} running on 316 SS Seal ring
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, copper alloy Carbon Steel
Hoses	Stainless, Aluminum	Neoprene, Butyl, Natural Rubber (3)
Tank Car	Carbon Steel (Standard)	304 SS, Aluminum
Tank Truck	Carbon Steel (Standard)	304 SS, Aluminum

-----Notes-----

- Carbon steel tanks should be free from rust scale.
- Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19.
- Rubber hoses should be flushed and drained after use to prevent contamination.

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n-BUTYL ACETATE

CONSTRUCTION MATERIALS

DATE _____

PAGE NO. 12-22-

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Carbon Steel ⁽¹⁾	304 SS, Aluminum, Lined Carbon Ste ⁽²⁾
Piping	Carbon Steel	304 SS, Aluminum
Valves	IBBM, Carbon Steel	304 SS
Pumps	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 585	Anchor 451, <u>Garlock 8748</u>
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon impregnated asbestos
Mechanical Seal	#5 Carbon ^{Insert} running on Stellite faced 316 SS (or cast Stellite) ^{seal ring}	#5 Carbon ^{Insert} running on 316 SS Ceramic ^{seal ring}
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, copper alloy Carbon Steel
Hoses	Stainless, Aluminum	Neoprene, Butyl, Natural Rubber ⁽³⁾
Tank Car	Carbon Steel (Standard)	304 SS, Aluminum
Tank Truck	Carbon Steel (Standard)	304 SS, Aluminum

-----Notes-----

- Carbon steel tanks should be free from rust scale.
- Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19.
- Rubber hoses should be flushed and drained after use to prevent contamination.

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1,3 BUTYLENE GLYCOL



DATE _____

PAGE NO 12-44-

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION

<u>ITEM</u>	<u>PREFERABLE</u> (1)	<u>ACCEPTABLE</u> (2)
Tank	Carbon Steel	304 SS, Aluminum, Lined carbon steel
Piping	Carbon Steel	304 SS, Aluminum
Valves	IBBM, Carbon Steel	304 SS
Pumps (4)	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 505	Anchor 451, Garlock 8748
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon impregnated asbestos
Mechanical Seal	#5 Carbon ^{insert} running on Stellite faced 316 SS (or cast stellite) seal ring	#5 Carbon ^{insert} running on 316 SS ^{seal ring}
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, copper alloy Carbon Steel
Hoses	Stainless, Aluminum	(3) Neoprene, Butyl, Natural Rubber
Tank Car	Carbon Steel (Standard)	304 SS, Aluminum
Tank Truck	Carbon Steel (Standard)	304 SS, Aluminum

-----Notes-----

1. Carbon steel tanks should be free from rust scale.
2. Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19.
3. Rubber hoses should be flushed and drained after use to prevent contamination.
4. Pumps should be designed to handle higher viscosities associated with winter temperatures.

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N-BUTANOL

CONSTRUCTION MATERIALS

DATE _____

PAGE NO 12-04-2

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Carbon Steel ⁽¹⁾	304 SS, Aluminum, Lined Carbon Steel ⁽²⁾
Piping	Carbon Steel	304 SS, Aluminum
Valves	<u>IBEM</u> , Carbon Steel	304 SS
Pumps	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 585	Anchor 451, Garlock 8748
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon Impregnated Asbestos
Mechanical Seal	* 5 Carbon ^{insert} running on Stellite faced 316 SS ^(or Cast Stellite) ^{seal ring}	* 5 Carbon ^{insert} running on 316 SS ^{ceramic} ^{seal ring}
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, Copper Alloy Carbon Steel
Hoses	Stainless, Aluminum	Neoprene, Butyl, Natural Rubber ⁽³⁾
Tank Car	Carbon Steel (Standard)	304 SS, Aluminum
Tank Truck	Carbon Steel (Standard)	304 SS, Aluminum

----- NOTES -----

1. Carbon Steel tanks should be free from rust scale.
2. Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19.
3. Rubber hoses should be flushed and drained after use to prevent contamination.

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40% iso-BUTYL FORMCEL

CONSTRUCTION MATERIALS

DATE _____

PAGE NO 10-16-2

GENERAL: CARBON STEEL IS NOT ACCEPTABLE MATERIAL OF CONSTRUCTION *OK*

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	316 SS, 304 SS 3003 or 5154 Aluminum (2)	Carbon Steel Lined (1)
Piping	316 SS, 304 SS	3003 or 6061 aluminum (2) copper alloys
Valves	Cast 304 SS or 316 SS	Aluminum
Pump	Cast 304 SS or 316 SS	Aluminum
Relief Valves	Cast 304 SS or 316 SS	Aluminum
Gaskets	<i>Teflon</i> Crane 888, Belmont 585 <i>or reinforced Teflon</i>	Anchor 451, Garlock 8748
Pump Packing	Mechanical Seal	Super Seal 5 or 6
Valve Packing	Braided Teflon	Teflon Impregnated asbestos
Mechanical Seal	<i>#5 Carbon</i> running on stellite <i>insert</i> faced 316 SS (or cast stellite) <i>seal ring</i>	<i>#5 carbon insert on</i> <i>ceramic seal ring</i>
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger:		
Product Side	316 SS	Admiralty (3)
Steam Side	Carbon Steel	
Hoses	Stainless, Aluminum	Neoprene, Butyl Rubber (4)
Tank Trucks	Stainless (Standard)	Aluminum
Tank Car	Lined Carbon Steel	Stainless, Aluminum

-----NOTES-----

1. Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19.
2. Aluminum or 304 SS is not recommended for services over 150°F or when pipe is traced.
3. Arsenical Admiralty and some other copper alloys are sometimes acceptable for this service if the Formaldehyde is air-free. A few parts per million dissolved copper will cause severe pitting in aluminum equipment. Therefore, its use should be controlled carefully.
4. Hoses should be flushed after use.

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CONSTRUCTION MATERIALS

DATE _____

PAGE NO

10-15

GENERAL: CARBON STEEL IS NOT ACCEPTABLE MATERIAL OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	316 SS, 304 SS 3003 or 5154 Aluminum (2)	Carbon Steel Lined (1)
Piping	316 SS, 304 SS	3003 or 6061 aluminum (2) copper alloys
Valves	Cast 304 SS or 316 SS	Aluminum
Pump	Cast 304 SS or 316 SS	Aluminum
Relief Valves	Cast 304 SS or 316 SS	Aluminum
Gaskets	Cast 304 SS or 316 SS Crane 888, Belmont 585	Anchor 451, Garlock 8748 <i>E. metal...</i> Super Seal 5 or 6
Pump Packing	Mechanical Seal	
Valve Packing	Braided Teflon	Teflon Impregnated asbestos
Mechanical Seal	Carbon ^{insert} running on stellite faced 316 SS (or cast stellite) <i>seal ring</i>	#5 carbon insert on Ceramic seal ring
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger: Product Side Steam Side	316 SS Carbon Steel	Admiralty (3)
Hoses	Stainless, Aluminum	Neoprene, Butyl Rubber (4)
Tank Truck	Stainless (Standard)	Aluminum
Tank Car	Lined Carbon Steel	Stainless, Aluminum

----- NOTES -----

1. Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19 or *Plasate 3066*.
2. Aluminum or 304 SS is not recommended for services over 150°F or when pipe is traced.
3. Arsenical Admiralty and some other copper alloys are sometimes acceptable for this service if the Formaldehyde is air-free. A few parts per million dissolved copper will cause severe pitting in aluminum equipment. Therefore, its use should be controlled carefully.
4. Hoses should be flushed after use.

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ISO- BUTYRALDEHYDE

CONSTRUCTION MATERIALS

DATE _____ PAGE NO 10-14-

GENERAL: CARBON STEEL, COPPER OR COPPER BEARING ALLOYS ARE NOT RECOMMENDED MATERIALS OF CONSTRUCTION. (1)

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	304 SS	Lined Carbon Steel ² Aluminum
Piping	304 SS	Aluminum, 316 SS
Valves	304 SS	Aluminum, 316 SS
Pumps	304 SS	Aluminum, 316 SS
Relief Valves	304 SS	Aluminum, 316 SS
Gaskets	Crane 888, Garlock 8748	Anchor 451 ³ Belmont 585
Pump Packing	Mechanical Seal	Garlock 234, U.S. Rubber 293 <i>braided</i>
Packing Valves	Super Seal 5 or 6	Braided Teflon
Mechanical Seals	Duraseal, John Crane 9 <i>#5-1 Carbon running on faced 316 SS seal ring</i>	#5 Carbon <i>Ceramic Running on Stellite</i> Faced 316 SS <i>Ceramic seal</i> <i>ring</i>
Pipe Thread Compound	Recommend Welded and Flanged System. If Threads are Used, Recommend Teflon Tape Thread Lubricant	
Heat Exchanger	Product Side: 304 SS Steam Side: Carbon Steel	
Hoses	Stainless, Aluminum	Hycar
Tank Trucks	Aluminum <i>Stainless</i>	Stainless <i>Aluminum</i>
Tank Cars	Aluminum	Stainless

----- NOTES -----

- Carbon steel may be used only in anhydrous service and when iron and color contamination are not objectionable.
- Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19 or *Plascite 3066*.
- Other manufacturers supply suitable materials.

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N -BUTYRALDEHYDE

CONSTRUCTION MATERIALS

DATE

PAGE NO

10-12-

GENERAL: CARBON STEEL, COPPER OR COPPER BEARING ALLOYS ARE NOT RECOMMENDED MATERIALS OF CONSTRUCTION. (1)

ITEM	PREFERABLE	ACCEPTABLE
Tank	304 SS	Lined Carbon Steel ² Aluminum
Piping	304 SS	Aluminum, 316 SS
Valves	304 SS	Aluminum, 316 SS
Pumps	304 SS	Aluminum, 316 SS
Relief Valves	304 SS	Aluminum, 316 SS
Gaskets	Crane 888, Garlock 8748	Anchor 451 ³ Debur 585
Pump Packing	Mechanical Seal	Garlock 234, U.S. Rubber 293 <i>braided Teflon</i>
Packing Valves	Super Seal 5 or 6	Braided Teflon
Mechanical Seals	Boracool, John Crane 9 <i>#5 Carbon on stellite seal ring</i>	#5 Carbon Ceramic Running on Stellite Faced 316 SS ceramic seal
Pipe Thread Compound	Recommend Welded and Flanged System. If Threads are Used, Recommend Teflon Tape Thread Lubricant	
Heat Exchanger	Product Side: 304 SS Steam Side: Carbon Steel	
Hoses	Stainless, Aluminum	Hycar
Tank Trucks	Aluminum Stainless	Stainless Aluminum
Tank Cars	Aluminum	Stainless

----- NOTES -----

- Carbon steel may be used only in anhydrous service and when iron and color contamination are not objectionable.
- Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19 or *Plascrete 3066*.
- Other manufacturers supply suitable materials.

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DIACETONE ALCOHOL

CONSTRUCTION MATERIALS

DATE _____ PAGE NO. 12-64-

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Lined Carbon Steel (1)	304 SS, Aluminum
Piping	Carbon Steel	304 SS, Aluminum
Valves	IBBM, Carbon Steel	304 SS
Pumps	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 585	Anchor 451, Garlock 8748
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon impregnated asbestos
Mechanical Seal	<i>#3</i> Carbon running on Stellite faced 316 SS (or cast stellite) <i>seal ring</i>	<i>#5</i> Carbon running on 316 SS <i>seal ring</i> <i>212-1110</i>
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger:	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, Aluminum Carbon Steel
Hoses	Stainless, Aluminum	Neoprene, Butyl, Natural Rubber (2)
Tank Car	Aluminum, C. S. lined (Standard)	304 SS
Tank Truck	Aluminum, C. S. (lined and unlined) (Standard)	304 SS

-----Notes-----

1. Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19.
2. Rubber hoses should be flushed and drained after use to prevent contamination.

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AQUEOUS FORMALDEHYDE**CONSTRUCTION MATERIALS**

DATE _____

PAGE NO 10-13-2

GENERAL: CARBON STEEL IS NOT ACCEPTABLE MATERIAL OF CONSTRUCTION *OK*

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	316 SS or 304 SS 3003 or 5154 Aluminum (2)	Carbon Steel Lined (1)
Piping	316 SS, 304 SS	3003 or 6061 aluminum (2) copper alloys
Valves	Cast 304 SS or 316 SS	Aluminum
Pump	Cast 304 SS or 316 SS	Aluminum
Relief Valves	Cast 304 SS or 316 SS	Aluminum
Gaskets	<i>Teflon envelope, or reinforced Teflon</i> <u>Crane 888, Belmont 585</u>	Anchor 451, Garlock 8748
Pump Packing	Mechanical Seal, <i>Gratite filament</i>	Super Seal 5 or 6
Valve Packing	Braided Teflon	Teflon Impregnated asbestos
Mechanical Seal	<i>#5</i> Carbon ^{ring} running on stellite faced 316 SS (or cast stellite) <i>seal ring</i>	<i>#5</i> Carbon on ceramic seal ring
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger:		
Product side	316 SS	Admiralty (3)
Steam Side	Carbon Steel	
Hoses	Stainless, Aluminum	Neoprene, Butyl Rubber (4)
Tank Trucks	Stainless (Standard)	Aluminum
Tank Car	Lined Carbon Steel	Stainless, Aluminum

----- NOTES -----

1. Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19.
2. Aluminum or 304 SS is not recommended for services over 150°F or when pipe is traced.
3. Arsenical Admiralty and some other copper alloys are sometimes acceptable for this service if the Formaldehyde is air-free. A few parts per million dissolved copper will cause severe pitting in aluminum equipment. Therefore, its use should be controlled carefully.
4. Hoses should be flushed after use.

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METHYLAL

CONSTRUCTION MATERIALS

DATE _____

PAGE NO 12-85-

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Carbon Steel	Stainless Steel or Aluminum
Piping	Carbon Steel	Stainless Steel or Aluminum
Valves	Carbon Steel	Stainless Steel or Copper Alloy
Pump	Cast Iron or Carbon Steel	Stainless Steel
Relief Valve	Cast Iron or Carbon Steel	
Gaskets	Crane 888 or Belmont 585 JM-60 or Garlock 8748	
Pump Packing	Mechanical Seal	Super Seal 5 or 6
Valve Packing	Graphited Braided Asbestos	
Mechanical Seal	#5 Carbon ^{insert} Running on Stellite Faced 316 Stainless Steel (or cast stellite) seal ring	#5 Carbon or ceramic seal ring
Pipe Thread Compound	Teflon Tape	
Heat Exchangers	Product Side: Carbon Steel Steam Side: Carbon Steel	Admiralty or Stainless Steel
Hoses	Stainless Steel or Aluminum	Neoprene (1)
Tank Truck	Carbon Steel	
Tank Car	Carbon Steel	

----- NOTES -----

1. Flush hose after each use.

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METHANOL**CONSTRUCTION MATERIALS**

DATE _____

PAGE NO. 12-01-GENERAL: ALUMINUM IS NOT ACCEPTABLE AS A MATERIAL OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Carbon Steel	304 SS, lined Carbon Steel ⁽¹⁾
Piping	Carbon Steel	304 SS, Brass or Copper ⁽²⁾
Valves	Cast Iron, IBBM	Cast Carbon Steel, 304 SS, Bronze
Pump	Carbon Steel	304 SS, Bronze
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 585 , Garlock 8748	Spiral Metal Asbestos
Packing, Pump	Mechanical Seal	John Crane 810, Garlock 234
Packing, Valves	Super Seal 5 or 6	Teflon Impregnated Asbestos John Crane 810, Braided Teflon
Mechanical Seals	<i>insert</i> #5 Carbon running on Stellite faced 316 SS (or cast Stellite) <i>seal ring</i>	#5 Carbon on Ceramic seal ring
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger:	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, Brass
Hoses	Hypalon, Butyl ⁽³⁾	Buna-N, Neoprene
Tank Cars	Carbon Steel (Standard)	Stainless
Tank Trucks	Carbon Steel (Standard)	Stainless, Aluminum

----- NOTES -----

1. The lining refers to a baked phenolic Heresite P-403 or Lithcote LC-10.
2. Copper alloy pipes and fittings may be used if the material is air-free.
3. All hoses should be flushed and drained after use to prevent contamination.

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55% METHYL FORMCEL

CONSTRUCTION MATERIALS

10-18-2

DATE

PAGE NO

GENERAL: CARBON STEEL IS NOT ACCEPTABLE MATERIAL OF CONSTRUCTION

ITEM	PREFERABLE	ACCEPTABLE
Tank	316 SS, 304 SS 3003 or 5154 Aluminum (2)	Carbon Steel Lined (1)
Piping	316 SS, 304 SS	3003 or 6061 Aluminum (2) copper alloys
Valves	Cast 304 SS or 316 SS	Aluminum
Pump	Cast 304 SS or 316 SS	Aluminum
Relief Valves	Cast 304 SS or 316 SS	Aluminum
Gaskets	<i>Teflon envelopes, reinforced Teflon</i> <u>Crane 888</u> , Belmont 585	Anchor 451, Garlock 8748
Pump Packing	Mechanical Seal <i>Frederick Graphite filament yarn</i>	Super Seal 5 or 6 <i>Braided Teflon</i>
Valve Packing	Braided Teflon	Teflon Impregnated asbestos
Mechanical Seal	<i>#5 Carbon running on stellite</i> faced 316 SS <i>(or Cast stellite)</i> <i>seal ring</i>	<i>#5 Carbon on Ceramic</i> <i>seal ring</i>
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger:		
Product Side	316 SS	Admiralty (3)
Steam Side	Carbon Steel	
Hoses	Stainless, Aluminum	Neoprene, Butyl Rubber (4)
Tank Truck	Stainless (Standard)	Aluminum
Tank Car	Lined Carbon Steel	Stainless, Aluminum

-----Notes-----

1. Lining is baked phenolic such as Heresite P-403 or Lithcote LC-19.
2. Aluminum or 304 SS is not recommended for services over 150°F or when pipe is traced.
3. Arsenical Admiralty and some other copper alloys are sometimes acceptable for this service if the Formaldehyde is air-free. A few parts per million dissolved copper will cause severe pitting in aluminum equipment. Therefore, its use should be controlled carefully.
4. Hoses should be flushed after use.

2. may be subject to moderate pitting

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PARAFORMALDEHYDE, FLAKE

CONSTRUCTION MATERIALS

DATE

10-20-2
PAGE NO

GENERAL: CARBON STEEL, BRASS, BRONZE OR COPPER ALLOYS ARE NOT ACCEPTABLE MATERIALS
OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Storage Silo	Carbon Steel Lined ⁽¹⁾	304 SS, Aluminum
Pneumatic Conveying Duct	304 SS	Aluminum
Conveyors	Neoprene, 304 SS <i>neoprene spacers (for sealing)</i>	<i>Aluminum</i>

----- NOTES -----

1. Lining refers to air dried vinyl or baked phenolic.

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PARAFORMALDEHYDE, POWDER

CONSTRUCTION MATERIALS

DATE _____

PAGE NO

10-21-

GENERAL: CARBON STEEL, BRASS, BRONZE OR COPPER ALLOYS ARE NOT ACCEPTABLE MATERIALS
OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Storage Silo	Carbon Steel Lined ⁽¹⁾	304 SS, Aluminum
Pneumatic Conveying Duct	304 SS	Aluminum
Conveyors	Neoprene, 304 SS	

Classified as neoprene lining

NOTES

1. Lining refers to air dried vinyl or baked phenolic.

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PARAFORMALDEHYDE, POWDER

CONSTRUCTION MATERIALS

DATE _____

PAGE NO

10-21-2

GENERAL: CARBON STEEL, BRASS, BRONZE OR COPPER ALLOYS ARE NOT ACCEPTABLE MATERIALS
OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Storage Silo	Carbon Steel Lined ⁽¹⁾	304 SS, Aluminum
Pneumatic Conveying Duct	304 SS	Aluminum
Conveyors	Neoprene, 304 SS	

should be light wt.

closed with neoprene springs

NOTES

1. Lining refers to air dried vinyl or baked phenolic.

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PENTAERYTHRITOL PURE CRYSTAL



DATE

PAGE NO 10-63-

GENERAL: CARBON STEEL IS NOT RECOMMENDED AS A MATERIAL OF CONSTRUCTION.

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Storage Silo	304 Stainless Steel or Aluminum	Carbon Steel Lined ⁽¹⁾
Conveying System	304 Stainless Steel	Aluminum
Conveyors	Neoprene, 304 Stainless Steel	

----- NOTES -----

1. Linings can be air dried vinyl or baked phenolic.

002444



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PENTAERYTHRITOL TECH CRYSTAL

CONSTRUCTION MATERIALS

DATE _____

PAGE NO 10-61-2

GENERAL: CARBON STEEL IS NOT RECOMMENDED AS A MATERIAL OF CONSTRUCTION. (color)

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Storage Silo	304 Stainless Steel or Aluminum	Carbon Steel Lined ⁽¹⁾
Conveying System	304 Stainless Steel	Aluminum
Conveyors	Neoprene, 304 Stainless Steel	

----- NOTES -----

1. Linings can be air dried vinyl or baked phenolic.

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n-PROPYL ACETATE

CONSTRUCTION MATERIALS

DATE _____ PAGE NO 12-21-2

GENERAL: BRASS, BRONZE OR LEAD COMPOUNDS ARE NOT ACCEPTABLE AS MATERIALS OF CONSTRUCTION

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	Carbon Steel (1)	304 SS, Aluminum, Lined ⁽²⁾ carbon steel
Piping	Carbon Steel	304 SS, Aluminum
Valves	IBBM, Carbon Steel	304 SS
Pumps	Cast Iron or Steel	304 SS
Relief Valves	Carbon Steel	304 SS
Gaskets	Crane 888, Belmont 585	Anchor 451, Garlock 8748
Packing, Pump	Mechanical Seals	Super Seal 5 or 6, Teflon
Packing, Valves	Super Seal 5 or 6	John Crane 810, Braided Teflon Teflon impregnated asbestos
Mechanical Seal	Carbon running on Stellite faced 316 SS or cast stellite	Carbon running on 316 SS Tungsten carbide
Pipe Thread Compound	Recommend welded and flanged system. If threads are used, recommend teflon tape thread lubricant.	
Heat Exchanger	Product Side: Carbon Steel Steam Side: Carbon Steel	304 SS, copper alloy Carbon Steel
Hoses	Stainless, Aluminum	Neoprene, Butyl, Natural Rubber ⁽³⁾
Tank Car	Carbon Steel (Standard)	304 SS, Aluminum
Tank Truck	Carbon Steel (Standard)	304 SS, Aluminum

-----Notes-----

- Carbon steel tanks should be free from rust scale.
- Lining refers to a baked phenolic such as Heresite P-403 or Lithcote LC-19 or *Plascrete*
366.
- Rubber hoses should be flushed and drained after use to prevent contamination.

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TRIMETHYLOLPROPANE



10-65-2

DATE

PAGE NO

GENERAL: CARBON STEEL IS NOT ACCEPTABLE AS A MATERIAL OF CONSTRUCTION. (2/15)

<u>ITEM</u>	<u>PREFERABLE</u>	<u>ACCEPTABLE</u>
Tank	304 or 316 Stainless Steel	Aluminum (1)
Piping	304 or 316 Stainless Steel	Aluminum (1)
Valves	304 or 316 Stainless Steel	Aluminum, Bronze
Pump	304 or 316 Stainless Steel	
Relief Valve	304 or 316 Stainless Steel	Copper Alloy (2)
Gaskets	Crane 888, Belmont 585 , Garlock 8748	
Pump Packing	Mechanical Seal	Super Seal 5 or 6
Valve Packing	Braided Teflon	Teflon Asbestos
Mechanical Seals	Carbon Running on Stellite Faced 316 Stainless Steel	Carbon or Ceramic
Pipe Thread Compound	Teflon Tape	
Heat Exchangers	Product Side: 304 Stainless Steam Side: Carbon Steel	Admiralty Brass (2)
Hoses	Stainless Steel or Aluminum (3)	
Tank Truck	Stainless Steel or Aluminum	
Tank Car	Stainless Steel or Aluminum	

NOTES

1. Aluminum is not recommended for temperatures above 150°F or where steam tracing is used.
2. Admiralty and other copper alloy equipment is suitable but product contamination can result.
3. No rubber hoses recommended because of high temperatures.

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