



INTER-OFFICE CORRESPONDENCE

TO R. Yang UTC DATE March 31, 1969
 (OFFICE)
 FROM A. Cochrane ICL NUMBER
 (OFFICE) SUBJECT JL-6284

Notes of a Conversation with Mr. M. Clark on the Materials of Construction for Area 100 of the Monsanto Styrene Plant on 27/28 March 1969.

1. PumpsGA-101/GA-102/GA-103

Worthite 20 (20 Cr; 25/27 Ni; 3 Mo, Cu) should be considered as an alternative cheaper material to Hastelloy B (70 Ni; 26/30 Mo; 4/7 Fe). We should ask Monsanto if they have tested Worthite 20 or similar. Hastelloy B can be considered as being very safe.

GA-104/GA-105/GA-107/GA-108

Chlorimet 2 (High Si Iron; 2 1/3 Mo) is best material for these pumps in contact with 7 to 25% AlCl₃ and hydrochloric acid. Durichlor may be an acceptable alternate but only where ferric chloride is absent. Duriron is not an acceptable material.

We propose to use Chlorimet 2.

GA-109/GA-110/GA-111/GA-112/GA-113/GA-114/GA-115/GA-116

These pumps which ^{are} all in contact with water or caustic solutions should be constructed in carbon steel. Cast iron is not a suitable alternate in the presence of organics.

2. Alkylation Reaction Section2.1 Alkylater (EJ-101)

Again, Hastelloy B is a very safe but expensive material. We should ask Monsanto if they have tested either 316 or 317. However, the latter materials are not permissible if the system is "wet" - i.e., more than 10% water. We must examine the problem of how much and for how long water could exist in the system.

LAM026166

SC 17921

TO: R. Yang

March 31, 1969

The orifice plates in any case should be constructed in Hastelloy B. If the piping is to be in Hastelloy B, then we may use loose ring (Van Stone) C. S. flanges - Hastelloy B is a fairly ductile material.

2.2 Dealkylation Surge Drum (FA-101)

The baffles and shell of this drum could also be in 316 or 317 for the same reasons expressed in Section 2.1 above. There is obviously a fair saving to be made in this case.

2.3 Piping Gaskets (General service)

Teflon filled asbestos gaskets should be used. The straight graphite filled gasket is not good when contacted with this range of aromatics.

2.4 Piping

This was originally glass lined C. S. At last meeting with G. Small, a large proportion of the piping was changed to Hastelloy B. This change was not challenged.

2.5 FEB & Water Scrubbers (DA-101/DA-102)

Haveg 41 is an acceptable material even with FEB at 300°F.

The Haveg Corp. also manufacture distributors and support plates in Haveg 41 (a phenolic resin - fibreglass combination).

3. Catalyst Preparation Area

3.1 $AlCl_3$ Reactor/Dissolver (DC-101)

Carpenter 20 (20/24 Cr; 30 Ni; 1 1/2 Cu; 3% Mo, Cu) should be considered as an alternative material to Hastelloy B. Ask Monsanto if they have tested Carpenter 20.

3.2 Cartridge Filters (FD-101)

These may be castings of Durimet-2 or Durichlor depending on availability.

4. Catalyst Disposal Area

4.1 Orifice Extruder (RJ-102)

'Scope' shows teflon lined C. S. pipe which is O.K. and teflon covered orifice plates in 304 which is not at all suitable. Orifice plates should be in Hastelloy B.

SC 17922

LAM026167

TO: R. Yang

March 31, 1969

4.2 Hydrolyse- Flash Separator (FA-105)

"Scope" shows this vessel as being glass lined C. S. which is probably best material on the grounds of the higher velocity of the feed. Impingement might wear down other plastic coatings.

4.3 Hydrolyse- Flash Separator (FA-106)

"Scope" shows glass lined C. S. May use baked phenolic coating, i. e. Heresite or Lithcote. Lithcote is preferred.

4.4 Organics Accumulates (FA-107)

Use Lithcote in preference to the glass lined C. S. shown in the "Scope".

4.5 AlCl₃ Solution Storage Tanks (FB-101 & FB-102)

The "Scope" material of Atlas 382 is not a suitable material for chlorinated HC's. While these compounds would be present only in very small concentrations, it seems that we should use a better material if possible.

Again, the baked phenolic or phenolic-epoxy resins (Lithcote covers this range) should be used as a lining on carbon steel.

5. A.L. Wash Section

5.1 A.L./AlCl₃ Solution Separator

This is a glass lined C. S. vessel (and there is no proposal to alter this) but has various internals. The break plate and its supports (inserted through the feed nozzle) should be of teflon lined carbon steel construction. Teflon itself has poor structural qualities. The vortex breakers should also be constructed of teflon lined C. S.

AC:mr
cc: M. Clark

A. Cochran

SC 17923

LAM026168



FILE COPY

INTER-OFFICE CORRESPONDENCE

TO G. E. Small/Monsanto

(OFFICE)

FROM R. Yang

ITC

(OFFICE)

DATE April 2, 1969 T.C.

NUMBER ~~100-1~~

SUBJECT JL-6284

Attached herewith please find a copy of notes taken by Mr. A. Cochrane on discussions with our ITC Metallurgist, Mr. M. Clark, of materials of Construction for Area 100.

Please review and advise us.

R. Yang
R. Yang

RY:fmr

cc: H. H. Geissler (2)

M. Clark

E. S. Beebe

K. Chinnery

A. Cochrane

J. O'Donnell

Attachment

SC 17924

LAM026169



INTER-OFFICE CORRESPONDENCE

TO: R. Yang LTC
FROM: A. Cochrane LCL
DATE: March 31, 1969
NUMBER:
SUBJECT: JL-6254

Notes of a Conversation with Mr. M. Clark on the Materials of Construction for Area 100 of the Monsanto Styrene Plant on 27/28 March 1969.

1. Pumps

GA-101/GA-102/GA-103

Worthite 20 (20 Cr; 25/27 Ni; 3 Mo, Cu) should be considered as an alternative cheaper material to Hastelloy B (70 Ni; 26/30 Mo; 4/7 Fe). We should ask Monsanto if they have tested Worthite 20 or similar. Hastelloy B can be considered as being very safe.

GA-104/GA-105/GA-107/GA-108

Chlorimet 2 (High Si Iron; 2 1/3 Mo) is best material for these pumps in contact with 7 to 25% AlCl₃ and hydrochloric acid. Durichlor may be an acceptable alternate but only where ferric chloride is absent. Duriron is not an acceptable material.

We propose to use Chlorimet 2.

GA-109/GA-110/GA-111/GA-112/GA-113/GA-114/GA-115/GA-116

These pumps which ^{are} all in contact with water or caustic solutions should be constructed in carbon steel. Cast iron is not a suitable alternate in the presence of organics.

2. Alkylation Reaction Section

2.1 Alkylator (HJ-101)

Again, Hastelloy B is a very safe but expensive material. We should ask Monsanto if they have tested either 315 or 317. However, the latter materials are not permissible if the system is "wet" - i.e., more than 10 ppm. We must examine the problem of how much and for how long water could exist in the system.

SC 17925

LAM026170

TO: R. Yang

-2-

March 31, 1969

The orifice plates in any case should be constructed in Hastelloy B. If the piping is to be in Hastelloy B, then we may use loose ring (Van Stone) C. S. flanges - Hastelloy B is a fairly ductile material.

2.2 Dealkylation Surge Drum (FA-101)

The baffles and shell of this drum could also be in 316 or 317 for the same reasons expressed in Section 2.1 above. There is obviously a fair saving to be made in this case.

2.3 Piping Gaskets (General service)

Teflon filled asbestos gaskets should be used. The straight graphite filled gasket is not good when contacted with this range of aromatics.

2.4 Piping

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2.5 PEB & Water Scrubbers (DA-101/DA-102)

Haveg 41 is an acceptable material even with PEB at 300°F.

The Haveg Corp. also manufacture distributors and support plates in Haveg 41 (a phenolic resin - fibreglass combination).

3. Catalyst Preparation Area

3.1 AlCl₃ Reactor/Dissolver (DC-101)

Carpenter 20 (20/24 Cr; 30 Ni; 1½ Cb; 3% Mo, Cu) should be considered as an alternative material to Hastelloy B. Ask Monsanto if they have tested Carpenter 20.

3.2 Cartridge Filters (FD-101)

These may be castings of Durimet 2 or Durichlor depending on availability.

Catalyst Disposal Area

4.1 Orifice Emitter (RJ-102)

'Scope' shows teflon lined C. S. pipe which is O.K. and teflon covered orifice plates in 304 which is not at all suitable. Orifice plates should be in Hastelloy B.

SC 17926

LAM026171

TO: R. Yang

3-

March 31, 1969

4.2 Hydrolyser Flash Separator (FA-105)

"Scope" shows this vessel as being glass lined C. S. which is probably best material on the grounds of the higher velocity of the feed. Impingement might wear down other plastic coatings.

4.3 Hydrolyser Flash Separator (FA-106)

"Scope" shows glass lined C. S. May use baked phenolic coating, i. e. Heresite or Lithcote. Lithcote is preferred.

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Use Lithcote in preference to the glass lined C. S. shown in the "Scope".

4.5 $AlCl_3$ Solution Storage Tanks (FB-101 & FB-102)

The "Scope" material of Atlac 382 is not a suitable material for chlorinated HC's. While these compounds would be present only in very small concentrations, it seems that we should use a better material if possible.

Again, the baked phenolic or phenolic-epoxy resins (Lithcote covers this range) should be used as a lining on carbon steel.

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A. Cochran

AC:fmr

cc: M. Clark

SC 17927

LAM026172

E-30 DESIGN DATA AREA 100 AIRCRAFT
Materials of Construction 3, 10.

SC 17920

LAM026165