

Inter-Office Memo

TENNECO CHEMICALS, INC.

To	H. B. Carr	At	Burlington	Date	September 5, 1969
From	F. W. Kanzler	At	Burlington	Copy to	R. S. Cole H. H. Duhamel J. C. Fisher E. J. Hourihan C. W. Johnston N. J. Quist G. I. Rozand P. R. Scarito A. V. Wagner ✓ M. W. Williams File
Subject	Monomer Recovery System, Status Report Project No.: 70-001				
Reference:	Memo to H. B. Carr from F. W. Kanzler, dated 8/20/69				

As outlined in the referenced memo, the Analytical Control Group has initiated a program to investigate and make suggestions for corrective action in the operation of the monomer recovery system. The problem, as defined, requires answers to the following questions:

1. Are peroxides built-up in the MVC recovery system?
2. What test methods could be used?
3. If peroxides are found, what steps have to be undertaken for removal?

The following is the status of work performed thus far to answer these questions:

1. During an earlier analysis for peroxides (6/12/69), it was found that the solids from the twin basket strainer between the first stage discharge and the second stage suction in the compressor of the plastisol recovery system yielded a relatively high amount of total active oxygen (0.721%). Production was therefore requested to sample these solids at the highest frequency possible. In addition, solid built-up in the stripper and the lines to and from the compressors were also pointed out as logical points for Production to sample. Up to now samples from the twin basket strainer and from the copolymer stripper have been analyzed for active oxygen (Table I and II).

In addition to the analysis of built-up solids, recovered MVC will also be checked for peroxides.

2. Three different types of methods for peroxide analysis have been utilized.
 - a. Iodine - Sodium thiosulfate titration (analysis level: 0.05-4% active oxygen)

COLORITE 006024

September 5, 1969

- b. Potassium permanganate titration (analysis level: 0.05-4% active oxygen)
 - c. Reduced phenolphthalein colorimetric determination (analysis level 1-100 PPM active oxygen).
3. Since the evidence indicated in 1.) is that peroxides are built-up in the monomer recovery system, the effectiveness of a caustic wash in reducing these peroxides for Production's information was investigated. A 20% sodium hydroxide solution at ambient temperature with no agitation was employed, using strainer basket solids to study the reduction of peroxides as a function of time. The same time study was made with solids from the copolymer stripper. Figure 1 shows the loss of active oxygen over a given period of time in solids from the twin basket strainer and the copolymer stripper.

From the data generated thus far, the following can be concluded:

- 1. Samples of solids as well as recovered MVC should be continuously monitored for peroxide levels.
- 2. A sodium hydroxide wash of the monomer recovery system at ambient temperature with no agitation will reduce the peroxide level by 87% after two hours. As seen in Figure 1, no further reduction was evident up to 22 hours at these conditions. When heating was applied for two hours at a range of 50-65°C (122-150°F) the peroxide was completely reduced. The caustic wash should therefore be carried out at elevated temperatures as high as technically possible (60°C).
- 3. Additional work is required to identify the different types of residual peroxides in the system. As part of this, R & D is trying to obtain more information on vinyl chloride polyperoxides mentioned in a SPI special report dated 2/4/69. An attempt will be made to then identify the peroxides not reduced by the caustic wash.
- 4. A caustic wash, while beneficial, is temporary and should be considered a "shock" treatment. It is more desirable to prevent the formation of peroxides on a continuous basis.
- 5. The addition of phenol has resulted in an apparent decrease of the peroxide level at the twin basket strainer. Table II shows the results of peroxide analysis of twin basket strainer samples. This data indicates:
 - a. The addition by Production of caustic (6/15/69) and/or phenol (8/15/69) has been helpful in reducing peroxides in the twin basket strainer. If these peroxides are typical of what may be formed in the rest of the monomer recovery system, the conclusion is that these sources have also been reduced.

TABLE I

<u>Sample</u>	<u>% Active Oxygen</u>	<u>Time Washed in 20% NaOH</u>
8/20/69 T.B.S.	0.2610%	not treated with caustic
8/20/69 T.B.S.	0.1340%	5 min. agitated
8/22/69 T.B.S.	0.3128%	not treated with caustic
8/22/69 T.B.S.	0.2829%	not treated with caustic
8/22/69 T.B.S.	0.3052%	not treated with caustic
8/22/69 T.B.S.	0.0945%	45 min. not agitated
8/22/69 T.B.S.	0.0494%	2 hrs. not agitated
8/22/69 T.B.S.	0.0466%	22 hrs. not agitated
8/22/69 T.B.S.	0.0521%	22 hrs. not agitated
Stripper #2 Copoly	0.0088%	not treated with caustic
Stripper #2 Copoly	ND	1 hr. not agitated
Stripper #2 Copoly	ND	2 hrs. not agitated

T.B.S. = Twin basket strainer

ND = none detected

TABLE II

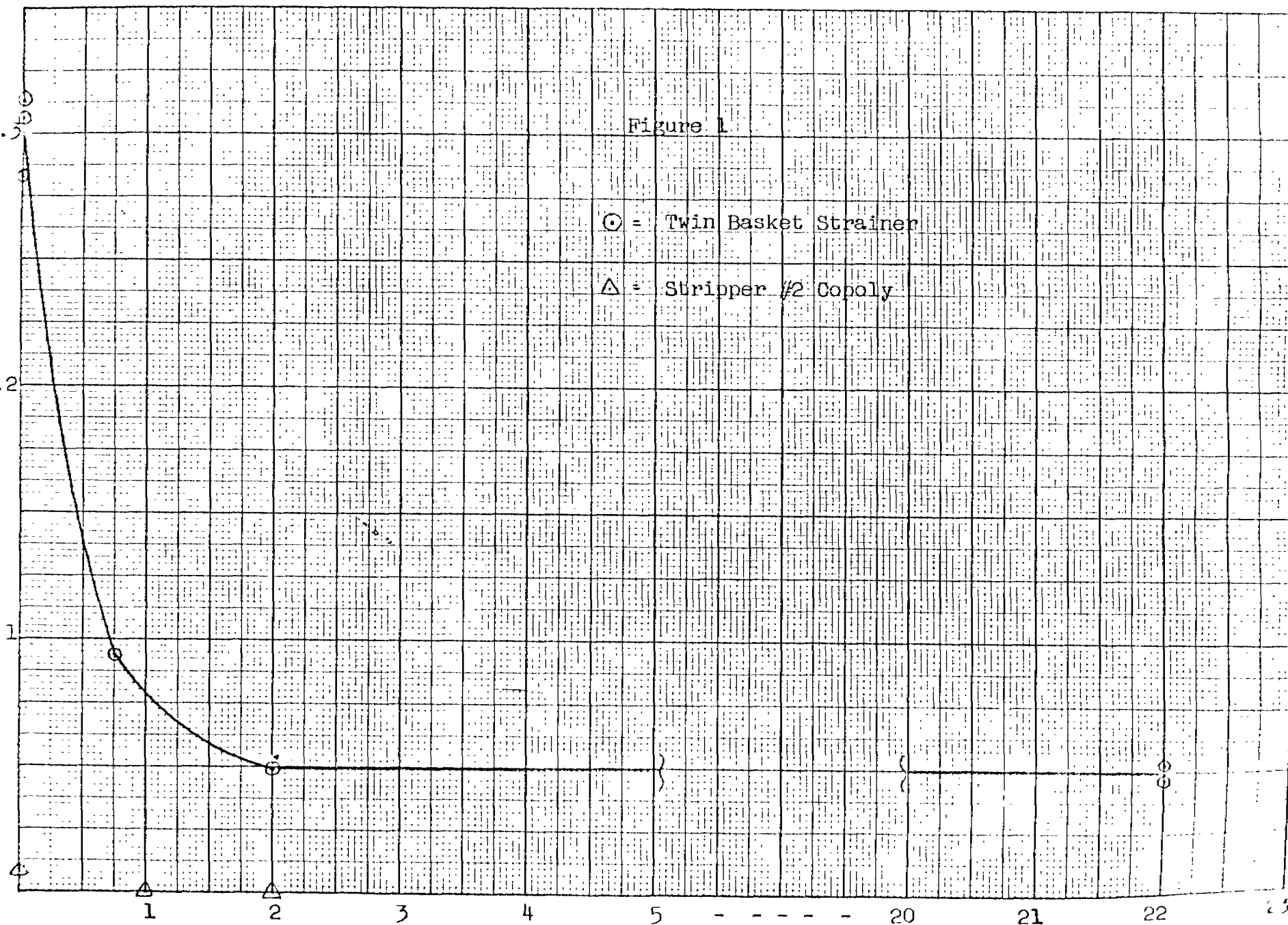
<u>Sample</u>	<u>% Active Oxygen</u>
6/12/69	0.7210%
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8/22/69	0.2829%
8/22/69	0.3052%
8/22/69	0.2863%
8/27/69	0.1814%
8/29/69	0.1398%
9/2/69	0.1580%

COLORITE 006028

Figure 1

○ = Twin Basket Strainer

△ = Stripper #2 Copoly



September 5, 1969

- b. It is interesting to note that analyses run on samples from 8/20/69 and 8/22/69 are from the time period of copolymer runs in the plastisol plant. A reduction of the peroxide level after the conclusion of the copolymer runs can be seen.
- 6. To further study the effect of inhibitors on the reduction of peroxides, a small increase of the present phenol addition level at the fume scrubber and the use of hydroquinone to better control the recovered MVA has been recommended to Production. The level of phenol and hydroquinone will be monitored to find the maximum reduction of peroxides with the minimum inhibitor level.

Fred W. Kanzler

F. W. Kanzler

FWK/rjl

Attachments

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