Monsanto

FROM (NAME & LOCATION) W. R. Richard - T3A

CONTENTS DESCRIPTION

DATE January 7, 1972 CC

SUBJECT MONTHLY SUMMARY - DECEMBER 1971
SPECIALTY PRODUCTS - RESEARCH

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1. ~~JJR~~ — copy 3
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Attached is our December, 1971, Monthly Summary for Specialty Products - Research.

W. R. Richard

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Attach.

DEPOSITION EXHIBIT
Papageorge
89
PENGAD-Bayonne, N. J.

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SPECIALTY PRODUCTS RESEARCH

AVIATION

Skydrol

BOAC is convinced that sticking of the shaft seal is caused by swelling of O-rings and that Skydrol 500C causes more problems than 500B. We are measuring the swelling characteristics and sticking tendency of O-rings cured with sulfur and peroxide for Skydrol 500C and 500B and will report results to BOAC.

We submitted the erosion test valves to McDonnell-Douglas for metallurgical studies and determination of valve clearances. We agreed to run valve erosion tests on Douglas fluids FFP-414 and FFP-415.

We plan to use Acryloid VI improvers in tributyl phosphate for both Skydrol LD and 500C series, cutting the inventory in half.

Coolanol

OS-59A made by the silica tetra chloride route is approved for internal use to make Coolanol 45, OS-45 Type IV and Coolanol 40. It is not approved for sale as OS-59. Coolanol 45 - Acryloid MD 3802S is no longer available. Substitute products, Acryloid 144, PL-10190 and PL 12149, are deficient in low temperature viscosity when blended into Coolanol 45. Rohm & Haas is to send HF-834, W-1600 and HF-855 to us for trial.

Hughes Aircraft and McDonnell-Douglas are proposing a new specification for Coolanol 25 which contains a requirement for 1×10^{11} ohm. cm. resistivity. We will require upgrading by absorption treatment to meet this new requirement.

Santomelt

Blend sheets for conversion of 990CR Santomelt Concentrate to 990CR were issued. We are working with DMF versions of Santomelt.

DIELECTRIC FLUIDS

merchandise to justify price increase #0.015/lb overseas

Life tests on small capacitors, both paper and film, in our test facility showed that Aroclor 1016 is superior to the standard Aroclor 1242. Seven of eight capacitors survived all tests and had no early failures. Normally 3-4 failures occur at the highest test temperature--100°C. and 1,000 volts.

Two experimental fluids were found to be equal or superior to Aroclor 1242. These were MCS 1238 and MCS 1239. One experimental fluid, MCS 1240, was almost as good as Aroclor 1242.

What are these ?

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Monsanto Europe reports BICC is working on new systems for 400 volt capacitors and want controlled swelling of the polypropylene film. It seems possible that swelling of the polypropylene film could be adjusted in the MCS 1238 system.

EVCl

Plant Start-up

Latex B, hydrolyzed, and Latex E, 0 Tg, were both demonstrated in the plant at Texas City during the last two weeks. The screen filter problem was resolved. We found vacuum on the screens when there should have been none. This has been corrected by a change in design. Seals on the autoclaves remain a design and an operational problem. Vinyl chloride analysis by XRF has given erratic results. This is still to be resolved.

Crosslinking

We can report some progress in increase in the crosslinkability of EVCl above 70% by using combinations of two monomers. We likewise have some encouragement that the hand of nonwoven fabric is as good with crosslinked material as it is with uncrosslinked EVCl. Our problem is to increase the polymerization rate with the crosslinked monomers at a pH greater than 5 and to find means of curing above 70%.

Heat Stability

Ethylene vinyl chloride untreated latex is not as good as Geon PVC/acrylate latices. EVCl treated with trisodium pyrophosphate is about equal to the Geon product. Melamine increases the heat stability but not the UV stability of EVCl. Zinc oxide accelerates degradation.

Carpets

Distribution of EVCl latex has a major effect on jute lamination strength, minor effect on tuft lock strength. The latex has to strike well into the jute for good lamination. This effect may explain some of the laboratory-to-mill correlation problems. A trial at James Carpets with EVCl had variations in fire resistance across the carpet and from carpet to carpet. A tank car trial at Advance Finishing is underway.

Barrier Coatings

EVCl with $PVCl_2$ improves the flexibility and preserves the moisture barrier resistance of $PVCl_2$ on flexing.

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Polyblends

30°C. Tg EVCl and Neoprene had interesting properties. A high tensile strength above both EVCl and Neoprene, low creep and high impact. It might have utility in luggage construction as made by Texon.

Sackner Problem - Nonwovens for Auto Door Panels

EVCl is to be used to bond a nonwoven fabric pad to a vinyl outer covering. The bonding must be rapid at 325°F. and the final bond must pass a tensile strength test at 185°F. EVCl does not have good strength at 185°F. Crosslinkable EVCl and EVCl crosslinked with Scriptite show some promise. Biggest problem is to increase bonding strength to the PVC covering.

United Wallpaper

We solved the poor and non-uniform wetting problems in previous trials by raising the viscosity of the coating latex; but in the most recent trial a mottle developed in the pattern at the air knife. We may need more water retention of the EVCl base colors.

HEAT TRANSFER

A high AIT liquid greater than 1000°F. could be blended from a combination of biphenyl, diphenyl ether, Santowax OM and phenoxy biphenyl. Blends have melting points below 25°C. with a minimum at -2°C. The temperature range for 1 atmosphere pressure boiling point is between 526 and 600°F. for these blends. Manufacturing costs with 37¢/lb. diphenyl ether at equal weight of components diphenyl ether, Santowax OM and phenoxy biphenyl are approximately 27¢/lb. With the cost of diphenyl ether at 12¢/lb., manufacturing costs drop to 18¢/lb. for the same composition. The immediate problem is to find a place to manufacture phenoxy biphenyl for 33¢/lb. or less.

Dowtherm G

Dowtherm G precipitates crystals of o-phenoxy biphenyl. These are not all redissolved at 23°C.

Tetraphenyl silicate or a blend of phenyl and resorcinol silicates (Santotherm TAS-190) might be reconsidered as a high AIT fluid. This was manufactured up until last year at MCL.

INDUSTRIAL FLUIDS

Santotrac

We blended 50 gallons of Santotrac 70 and 40 gallons of Santotrac 30 for field trials and to fill a backlog of customer

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sample requests. The Navy still wants to replace gelling Versilube 50 in the Lycoming CSD. MCS 1164 will be tested by the Navy at reduced loading. We are seeking a way around the metal fatigue problem encountered in previous trials. MCS 1218 at Northrup in gyro bearings rapidly develops a thick lubricant film. The speed of development and the film thickness are reported to be outstanding.

Phosphate Esters

N_2CP was run reasonably successfully in EE-Bldg. Product quality was good. Yields were 7% below design. Tentative process was issued for blending Pydraul 30E, 50E, 65E, 90E and 115E. Pydraul 30E and 50E successfully completed the electrohydraulic rig test at General Electric.

Phosphate Ester/Oil

Phosphate ester/oil blends will initially pass the Factory Mutual spray test, but we are having some problems with retaining adequate fire resistance after sheardown of the fluid in a hydraulic pump. We are seeking ways to minimize the sheardown and reach the fire resistance equal to Stauffer's Fyrquel 90 which has recently received FM approval.

Phosphate ester/oil blends are not favored for recycle and recovery of hydraulic fluids. We are working with Findett on the cost calculations and rennovation process.

Pydraul 150 and 150A

Replacements are required for Pydraul 150 and Pydraul 150A. Pydraul 29E LT, our best candidate, is having some problems passing FM spray test and may have to be marketed without FM approval.

Johnson Motors

We recommended water effluent clean-up to prevent phenolic materials from showing up in the effluent samples. Johnson Motors plans to trial Pydraul 50E.

Turbine Lubes

Blends of N_2CP look equivalent to NCP for compressor lubrication. Samples will be submitted to Westinghouse, Canada, for evaluation prior to field tests.

Lubrication Phosphate Esters

The lubricity of phosphate esters on soft steels as measured by the LFW bench test is giving us problems. Some lots are OK, others are not. Lubrication additives may be required to overcome this variable quality.

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PAPER CHEMICALS

Wet End Sizing

Environmental and competitive pressures indicate the need for a neutral pH rosin sizing system. RPC 1600 can be used to replace part of the alum, raising the pH to 6.5, for a rosin sizing system, but costs are increased by $1/ton and, therefore, this is not competitive with TFL or Newphor 100. However, when the system is used at very low levels with combinations of Scripset 520 surface sizing, the cost factor approaches that of TFL. Wet end rosin sizing enhances the Scripset 520 response.

Wet Strength

Sanitary Tissue - We have a new wet strength candidate, RPC 1110, to meet the fast-cure and efficiency requirements for the tissue market, $16M. The cure rate of RPC 1110 and RPC 1108 can be increased by caustic pretreatment. Both resins will respond to low levels of Dequest 2006 to improve dry strength, which is another requirement.

Liner Board

RPC 1108 is a back-up candidate for RPC 1103 (Santo-Rez 23). We expect a heavy trial period with Santo-Rez 23 in the first quarter of 1972 after FDA approval.

Scripset

PCW-10 - Weyerhaeuser has had difficulty in dissolving PCW-10 causing rejection of this material. We demonstrated preparation procedures which reduced the level of insolubles, but we need to work further with Weyerhaeuser in monitoring and controlling the insoluble particle counts.

Scripset 101 Odor - The formaldehyde odor of Scripset 101 can be decreased by adding isopropanol or preferably urea.

RPC-110 - RPC 110 used as a base coat can increase the hold-out for silicone release agents. This information was presented to Weyerhaeuser. Domtar may employ RPC 110 for hold-out in electrofax base sheet.

Dry Ammoniated Scripset 520 - RPC 1016 - We urgently need this product for competitive reasons. Trials of NH_4OH addition to styrene/maleic anhydride in the Turbolizer at Scott-Strong were not successful. Ammonia gas and ammonium carbonate are to be tried as alternating sources of ammonia in equipment at Everett.

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Scripset 520 at Montreal - This project is being held up by failure of the laboratory at Montreal to duplicate the St. Louis process. Montreal gets foaming in the steaming step. Parent visited us to see the demonstrated run. We had no problems. Montreal raw materials are being sent to us to see if this is the cause of the problem.

High Viscosity Styrene/Maleic Anhydride - We have prepared styrene/maleic anhydride polymers with higher viscosity than Scripset by the solvent/non-solvent process. This was accomplished by changing solvent and using lower temperature catalyst. Specific viscosities range from 2 to 8 (1% in DMF).

PENTACHLOROPHENOL

Provalent 4A spray on pentachlorophenol prills at .25 to .35% retards sublimation. Trial shipments have been made without caking problems. Alkylate H-230, wax, Armoflo 67 and Certrex 50C are alternate additives.

A GLC method was developed to monitor water in Penta. We can now tell whether water entered the chlorinator or was added to the additive-prilling cycle. This should be very helpful in analyzing plant process problems.

Scrubber Liquor - Scrubber liquor used to go to Santobrite manufacture. Research proposes that this solution be upgraded in solids with scrap Penta, neutralized and sold as 30% Santobrite solution.

PROCESS FLUIDS

Encapsulant Solvents - NCR

A 5,000 pound order of MCS 1175 was shipped to NCR-Portage. Material was produced in Building 00. Quality is similar to pilot plant MCS 1175 as judged by GLC and print speed.

Nashua

Nashua desires a solvent which will increase dyes intensity through 4 sheets of paper. We have two candidates which are superior to HB-30

Competition

USA - We continued work on naphthalene alkylates.

Europe - We shipped 10 gallons of Monsanto dibenzyl toluene for evaluation at Wiggins-Teape.

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CONTRACTS

Franklin Institute asked Monsanto write a proposal in response to U. S. Airforce RFP F33615 "Influene of LHD Lubrication on Life and Operation of Turbine Engine Ball Bearings", as a subcontractor to them. We submitted a proposal.

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