BUSINESS CONFIDENTIAL

PROJECT REPORT

RECEIVED
MAY 10 1974
UCC-CALIDRIA
NIAGARA FALLS, N.Y.

PLAINTIFF'S EXHIBIT
UC-378

QUARTERLY REPORT
APPLICATION DEVELOPMENT
RUBBER CHEMICALS MARKET AREA

Author:	D. D. Berry	Date:	May 2, 1974
Work Done By:	D. D. Berry R. V. Girardi A. M. Pagliughi	Project Nos.:	950S65 332V10 950T33 332S50 950V15
Supervisor:	L. G. Krauskopf	File No.:	P-74-78

SUMMARY

The long-term programs on LDPE homopolymers and EVA copolymers as additives to NR and SBR shoe sole formulations have resulted in a well-grounded base for UCC in this technology. In addition, work done on EVA compounded, crosslinked microcellular (closed cell) sponge has complimented the above and customer acceptance of our efforts has manifested itself in large volume orders of our material.

The acceptance by the rubber industry of UCAR Fume Silica has been excellent. Production evaluations in the last six months have validated the expected results in rubber compounding as shown on the TSB. The A.C.S. Division of Rubber Chemistry and Technology has accepted the paper written around UCC's efforts in collecting this efflux filler and the application of same to rubber technology.

UNION CARBIDE CORPORATION – CHEMICALS AND PLASTICS
RESEARCH AND DEVELOPMENT DEPARTMENT
TARRYTOWN, NEW YORK

RECEIVED
MAY 14 1974

Published by AsbestosClaims.Law
asbestosclaims.law/library/15627/1

DISCUSSION

Low Density Polyethylene

We are continuing to advise customers on the technology of using DNPA-3130 (reinforcing LDPE) in both solid and closed-cell sponge rubber shoe sole applications. The basic reason for using this material, i.e. as a replacement for up to 50% of the loading of high styrene SBR resin to obtain greatly increased low temperature Ross Flex results has been accepted by the industry. Demand has expanded with the rapidly depleting supply of SBR resin resulting from an announcement by the two major manufacturers that production would cease in the first quarter. We have been able to assist the industry in investigations to replace all of the SBR resin in rubber formulations by recommending compound changes that we have worked on in the past.

The first system is DNPA-3130/CALIDRIA HPP Asbestos with an increase in the ppt. silica filler plus the addition of resorcinol and hexamethylene tetramine. The second system is DNPA-3130/BRPA-8048 (two-step thermosetting phenolic resin). A third method is a combination of DNPA-3130/EVA-506 or 507 utilizing a tandem curing system of peroxide free radicals and conventional sulfur. All of the above are new to the industry and will require considerable reformulation expertise, laboratory and production trials and field performance tests.

The evaluations of a 2X larger particle size reinforcing LDPE (DNPA-3130) to replace the standard DNPA-3130 have been completed. Recommendations to convert to DNPA-3130 have been issued. This will allow an $\sim$50% increase in production grinding throughput of this material and extend our ability to satisfy rapidly increasing customer requirements.

Initial laboratory work to determine a replacement for the stirred reactor semi-reinforcing LDPE DNDA-0917 has been successful. Evaluation of a tubed reactor version of DXM-202 feedstock (non-hot processed) run as DYNT in July 1973 has shown this material to be a mirror image of DNDA-0917 in rheological characteristics and physical properties. It has been recommended that a large-scale run of a tubed reactor product to DXM-202 specifications be scheduled. This will be reevaluated in both SBR solid and sponged rubber compounds as well as EVA microcellular slab stock. It is our intent that the 1 MM lbs. 1974 requirement for Goodyear, Windsor, Vt. be converted from DNDA-0917 (SP) to DYNT (TA) for internal operational considerations and cost savings from non-hot processing.

EVA and EEA Copolymers

Initial evaluations of a stirred reactor version of EVA-507 made by irradiating DEX-5101 and 5100 (33 and 35 M.I. respectively) feedstock to a blend average of 4.8 M.I. have been completed. Trials were against the standard 5 M.I. EVA-507 in a designed, filled, sponged, crosslinked EVA slab stock formulation. Results indicate that the stirred reactor

feedstocks are not directly interchangeable with the tubed reactor counterpart DXM-196. The critical hardness and tear results were low, as was the density. While the latter is in the right direction for customer cost considerations, it can not be attained at the expense of physical properties. Work will continue to determine the cause of the differences observed.

DXMD-5879 EEA copolymer (20 M.I., 22 wt. % EA) has been evaluated in microcellular shoe sole slab stock formulations. Previous factorial analysis of the standard EEA copolymers DPD-6169 and 9169, as reported last quarter, had shown the need for a high wt. % EA specie with a M.I. < 20. DXMD-5879 trials confirmed the predictions and the results showed promise for further evaluation. The hardness and tear were greatly improved over previous examinations and at densities ranging from .158 to .213 gm/cc. Tests in progress show that a M.I. of 10-15 would be ideal and are indicating confirmation of the requirements for a 25-28 wt. % EA.

EVA copolymer sales to the rubber industry using EVA-506 and 507 have expanded exponentially in the first quarter. Visits to Goodyear, Windsor, Vt.; Vulcan, Clarksville, Tenn.; and Monarch, Baltimore, Md. have been made to update these customers on our most recent R&D technology. Original use of EVA as a base for microcellular shoe sole applications has evolved into using EVA as a direct additive to NR and SBR formulations. In this case, a modified peroxide mechanism is used in conjunction with a standard sulfur system, the former for crosslinking the EVA to obtain higher load bearing characteristics as well as hardness. The previously outlined work on stirred reactor EVA and higher wt. % comonomer EEA is geared to provide us with a continued firm base for materials and technology in this growing market.

CALIDRIA Asbestos

Evaluation of CALIDRIA RG-600 (HPP asbestos coated with ~9 wt. % dimethylol para-tertiary butyl phenol coupling agent) was completed during this quarter. Both precoated species and "in-situ" (Banbury coating of HPP during mixing) runs showed no reinforcing values due to coupling of the filler to the NR and EPDM polymers used. Results were inferior to standard HPP effects as a rubber reinforcing filler. It is felt that the DMTBP, while it does react with the filler surface, effectively blocks the normal interaction of HPP with elastomer backbones. The presence of tertiary butyl at the filler-DMTBP/polymer interface presents a blocked site for reaction with a crosslinking mechanism. RG-600 will not be recommended for use in rubber. The more reactive dimethylol para-isopropyl phenol coated on HPP plus sufficient monomer for "in-situ" trials has been received and will be evaluated.

UCAR Silica

First quarter activities in this area have centered around assisting the distributor, Harwick Chemical Co., Akron, Ohio in customer contacts. Visits were made with Harwick personnel to General Tire Co. and Goodyear Tire Co., Akron,Ohio to discuss the technical parameters surrounding the use of UCAR Silica in tire carcass and tubeless butyl liner formulations.

Our paper, "The Collection of Efflux SiO_2 and Its Use As a Filler in Rubber" has been accepted by the ACS Division of Rubber Chemistry and Technology and will be presented at the Ecology Symposium at the Spring Meeting in Toronto in May.

Mandrel Lube

Y-7320 (corrosion resistant UCON 50 HB-5100) featuring the same inhibiting system as Y-7312 (corrosion resistant PM-4792) has been sampled to Gates Rubber Co., Denver, Colorado for evaluation. Either "Y" number is totally effective as a corrosion resistant mandrel lube release and is recommended where corrosion is a problem when using either UCON 50 HB-5100 or the competitive material Dow "Ambiflow" M-1000.

Band Ply Lubes

The formulation for Y-7254 water base BPL concentrate has been revised eliminating formalin and including $NaNO_2$ for corrosion resistance and MEA for pH control. "Cellosize" QP-40 has been retained to obtain a low viscosity final mix of water and mica. Laboratory comparison to DC - Q-23026 (competitive water base BPL) is favorable regarding low viscosity and wt. % solids. Tests show that our stability is superior when made up to the conventional BPL formulation and due to the presence of "Hyamine" 1622 as a bacteriostat in our material, we have not observed the growth of bacteria that is characteristic of the competive BPL. We intend to sample Goodyear, Akron, Ohio with Y-7254 (revised) this month.

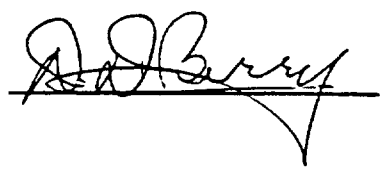
NOTEBOOK REFERENCES

775, 899, 1152, 1206

PATENTABLE FEATURES

Patentable features on all of the above technologies will be referred to the Legal Department when appropriate.

D. D. Berry/et



DATE WRITTEN: April 18, 1974

DATE APPROVED: April 25, 1974

DATE TYPED: May 2, 1974