

Claude Bunnell and Bunnell Plastics

A Fluoropolymers Adventure

by *Claude A. Bunnell*

My first involvement with fluoropolymers was at Continental-Diamond Fibre Co in Newark, DE. I was Supervisor of Research for the Newark laboratory of the company. Continental-Diamond Fibre manufactured laminates of various paper and cloth materials impregnated with various thermosetting resins.

First Fluoropolymer Processor - Continental Diamond Fibre Co.

In 1949 the Director of Research wanted to develop a line of products utilizing Teflon® PTFE dispersion manufactured by the DuPont Company. There was only one problem. Up to this time, DuPont

had a policy to keep all end product development and manufacturing within the DuPont Company. Fortunately, President Norris Wright of Continental-Diamond was friendly with a VP of DuPont and was able to persuade him to let us have some of the dispersion.

Coated Glass Cloth

Within a few weeks, we had produced laboratory samples of PTFE dispersion coated glass cloth that had good electrical insulating properties. We were given space in the manufacturing area to design and build a coating tower to initiate commercial manufacturing. Concurrently, we were examining ways to improve the product. The dispersion as

supplied by DuPont had 17% solids, and it required several coats of the dispersion to make electrical grade glass tape. We developed a process to increase the solid content of the dispersion from 17% to between 30 & 40%. The higher solids dispersion allowed us to produce an electrical grade PTFE



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coated glass cloth with fewer coats. The result was a superior electrical grade product and at a substantial saving in manufacturing cost. Within a short time, Continental-Diamond Fibre was the primary supplier of electrical grade Teflon® coated glass cloth products. We developed also a number of laminates from the coated glass cloth.

Spagetti Tubing & Skived Tape

The success of the dispersion coated products at Continental-Diamond was followed by the development of Teflon® spaghetti tubing used to insulate wiring in electronic products. Our contribution to this product was in our development of purified color pigments that improved the electrical insulating properties. The spaghetti tubing product line was followed by a line of skived Teflon® products made by sintering large cylinders of PTFE and skiving into tape.



Thread Seal Tape

The next product line was unsintered Teflon® tape used to wrap electrical conductors and also threaded plumbing connections.

The fluoropolymer products of Continental-Diamond were so profitable that they accounted for 50% of the profit of the company in our third year of production. President Norris Wright gave us a free hand to develop new products and to use any plant space we needed for production.

Moving on to LNP

In 1957, I accepted a position at Liquid Nitrogen Processing Corp (LNP) as VP and Director of Research. LNP had developed a commercial process to pulverize heat sensitive materials with liquid nitrogen as a cooling agent. Initially, they pulverized acrylic resins for use in the dental industry. The founder, Richard Pederson, had been trying to develop a process to produce color-pigmented Teflon® PTFE powders suitable for molding and skiving into electrical tape. I obtained permission from Continental-Diamond to produce a line of

purified pigments and tried them in the skived tape powders. Soon, DuPont developed a line of PTFE fine powder, and the pulverized products were not needed; however, the purified color pigments were in demand and were supplied to the industry.

Reclaiming Scrap PTFE

LNP had started to develop processes to reclaim scrap from Teflon® PTFE products. Pederson had developed a method of pulverizing the scrap to make a powder that could be molded. What was needed was a process to clean the scrap and to whiten the pulverized powder. Pederson installed a laundry dry cleaner unit to remove oily residues. I developed a process to whiten the pulverized powder by controlled heating. The process required heating to a temperature just below the melting point such that impurities would be oxidized but depolymerization of the PTFE would be minimized.

Becoming a Worldwide PTFE Scrap Reprocessor

We soon were reprocessing Teflon® PTFE scrap for all the PTFE processors in the world.

I made a sales trip to Europe in 1958 and discussed our services with several of the Teflon® processors. Pampas gave me an order to reprocess their PTFE scrap, and that one order paid for all my trip expense.

Porous Sponge PTFE

At LNP, I developed a PTFE porous sponge for use in chemical filters and in electrical applications. Porosity was controlled by mixing a controlled particle size acrylic resin in fine powder TFE resin. The mixture was pressed into blocks of the desired size and then heated in an oven to decompose the acrylic particles and leave a porous PTFE sponge. One significant use was as a filter in uranium enrichment process for atomic energy. I recall a large rush order for porous filters from the Savannah River Atomic Energy Plant of the Dupont Co. in December 1960 or 1961. I worked until 2 AM Christmas eve to finish the order.

The porous sponge was also used in wave guides for radar transmission and reception. We supplied the Radar Reception Center of RCA at Cherry Hill NJ with porous PTFE sponge for their wave guides.

Formation of Bunnell Plastics

In 1964, I purchased the plastic extrusion division of US Gasket CO in Camden, NJ under the name of BUNNELL PLASTICS INC. US Gasket had built





Bunnell Factory Floor

a well designed thermoplastic extrusion facility, but felt it did not fit their product lines. At the time of purchase, the main products were the medium priced thermoplastics such as nylon, acetals, polycarbonates, etc.

from one inch to 36 inches diameter. The large diameters were used in heated drying rolls for paper making lines. Teflon® PFA heat shrinkable tubing was produced for covering hot pressure rolls in Xerox type copiers. Bunnell Plastics was the principal supplier of PFA tubing for these uses.



Bunnell Products

I started to look for business in melt fluoropolymers and soon was extruding Teflon® FEP and PFA tubing & rod. Our first significant customer was Reda Pump Co who made deep well pumps that had coils insulated with FEP. This one use netted sales up to \$500,000 per year.

Heat Shrinkable Tubing

Our next significant development was heat shrinkable Teflon® FEP tubing, and eventually we were supplying all sizes

50,000 for the PFA heat shrinkable roll cover.

Subsequently, I believe Xerox still uses a roll with this coating.

Acquisition of Shaw Mfg.

In 1979 Bunnell Plastics acquired Shaw Manufacturing Co of Marietta, GA and named it Bunnell Industries. Shaw had developed a corrosion resistant pipe which consisted of a Teflon® FEP inner tube covered with layers of wound fiberglass and epoxy resin. Originally, the pipe was made with a welded FEP liner. The FEP tubing being extruded by Bunnell Plastics made a superior liner to the welded liners. The fittings, such as elbows and tees were a problem and proved to be an unsurmountable obstacle to extensive growth.

Acquisition of Bunnell

In 1982 we were approached by Bundy Corp of Warren, MI to purchase the assets of Bunnell Plastics and all my property in the Company. We agreed upon a contract, and **I retired from Bunnell Plastics at year-end 1982.**

Coated Copier Pressure Rolls

About 1980, the research staff at Bunnell developed a process to coat the copier pressure roll with a powdered PFA. Testing at Xerox Co. found the new coating would produce over one million copies compared with about



From Left: Claude's wife, Salley; his Son, Steven; his Son, Donald; and Claude Bunnell at his Retirement Party from Bunnell Plastics in 1982.

Claude A Bunnell was one of the early pioneers in the development of fluoropolymer products.

After retirement in 1982, he concentrated his creative efforts to collect and record all available information on his ancestry. Today he has a website at www.bunnellbonnellburnellfamily.com,

which contains data on over 30,000 individuals. His son Steven has written all the computer programs for the genealogy database and for the web site. The research continues.

Claude and his wife Sally like to travel and play golf, and Claude has played over 140 different courses in the US and Scotland. They also like to attend theatre, and saw the last show Bing Crosby performed at the Palladium in London. Bing died the next week on a golf course in Spain.



Claude says, *“The development of Fluoropolymers was a significant event in the Plastics Industry and I am grateful to have had an opportunity to participate in it.”*

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