DSM Desotech

Optical Fiber & Cable News

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In 1977, DSM Desotech (then DeSoto, Inc.) was supplying UV-curable coatings for graphic arts, vinyl flooring and appliances when one of its chemists attended his first conference on "Fiber Optics Communications." He was investigating new business opportunities for the technology—was there a need for UV-curable coatings for glass optical fiber?

The answer was yes. At the conference, speakers and attendees alike spoke of slow production speeds and poor fiber strength resulting from the lacquers and thermally cured silicone coatings being used at the time. While some experimentation had been done with UV technology, there was as yet no success in this area. After the conference, several fiber manufacturers were invited to DeSoto's research center to discuss the possibility of new development programs.

That was 25 years ago this year. In this issue of Optical Fiber and Cable News, DSM Desotech celebrates a quarter century of DeSolite® fiber coatings by taking a look back at some of the highlights of its development...

DeSolite® turns 25

1978: DeSolite fiber coatings are used commercially for the first time by several leading U.S. fiber manufacturers. It's the result of development which began just one year earlier. Initial processing speeds are 1-2 meters per second with pulsed xenon lamps.

1978-80: DeSolite processing speeds quickly increase to 5-10 meters per second as product improvements are made and multiple Fusion Systems lamps are introduced to the industry. In 1980, DeSoto presents its first technical paper on DeSolite coatings. First marketing presentations are made later that year at the International Optical Fiber Conference.

(continued on page 2)

Unlimited. DSM

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1978

Early 1980s:

By the early 80s, U.S. telecommunications companies are using DeSolite-coated optical fiber for their long-haul applications. These early cables are primarily loose-tube designs.

DeSolite exhibits good adhesion, fast cure (now 12-15 meters per second) and durability. It has been designed to meet the industry specified lifespan of 30 years. Because of its low hydrogen generation, it is also being used for the production of fiber for submarine cable.

During this period, interest in DeSolite is growing outside of the U.S. In Europe, fiber manufacturers determine that their silicone coatings are emitting hydrogen gas, resulting in fiber attenuation/signal loss. DeSolite is free of this problem. In 1982, Synres of Hoek van Holland is contracted to manufacture and distribute DeSolite in Europe.

Synres of Hoek van Holland (later purchased by DSM) is contracted to manufacture and distribute DeSolite® in Europe. That same year, Japan Fine Coatings Co. is also formed to begin supplying DeSolite to the Japanese fiber market.

1982

Japanese fiber producers—most of whom are also using silicones—take note and, that same year, a joint venture company is formed with JSR to supply DeSolite to Japan.

Mid 1980s:

Development of next-generation DeSolite coatings begins as the industry begins to move from loose tube configurations for long-haul applications to higher-count ribbon cable for subscriber loop applications.

Performance requirements for fiber coatings are now much more complex as fibers are exposed to more severe elements during connectorization. DeSolite next-generation coatings are optimized for improved strippability, chemical, heat and humidity resistance, low water sensitivity, low microbending, greater durability and enhanced fatigue resistance.

Late 80s-early 90s:

A high degree of coating development takes place during this period as the number of fiber applications continues to explode. The desire for increased bandwidth is growing and the industry focuses on maximizing fiber transmission. Microbend resistance becomes a key performance requirement for DeSolite coatings.

Fiber manufacturing is taking off in Asia-Pacific and DeSolite® begins being supplied into that region.

1992

Fiber manufacturing is now taking off throughout Asia-Pacific and DeSolite begins being supplied into that region. Processing speeds for the coating are now more than 20 meters per second (10-20 times faster than when first introduced).

During this period, Desotech also begins development work on the first DeSolite colored secondary coatings, which may be used as an alternative to fiber inking.

Mid to Late 1990s

The fiber industry moves to even higher count cables using ribbon structures which require fiber to perform at very tight specifications. Coating development during this period is focused on achieving even lower attenuation in difficult conditions (85°C/85% R.H.).

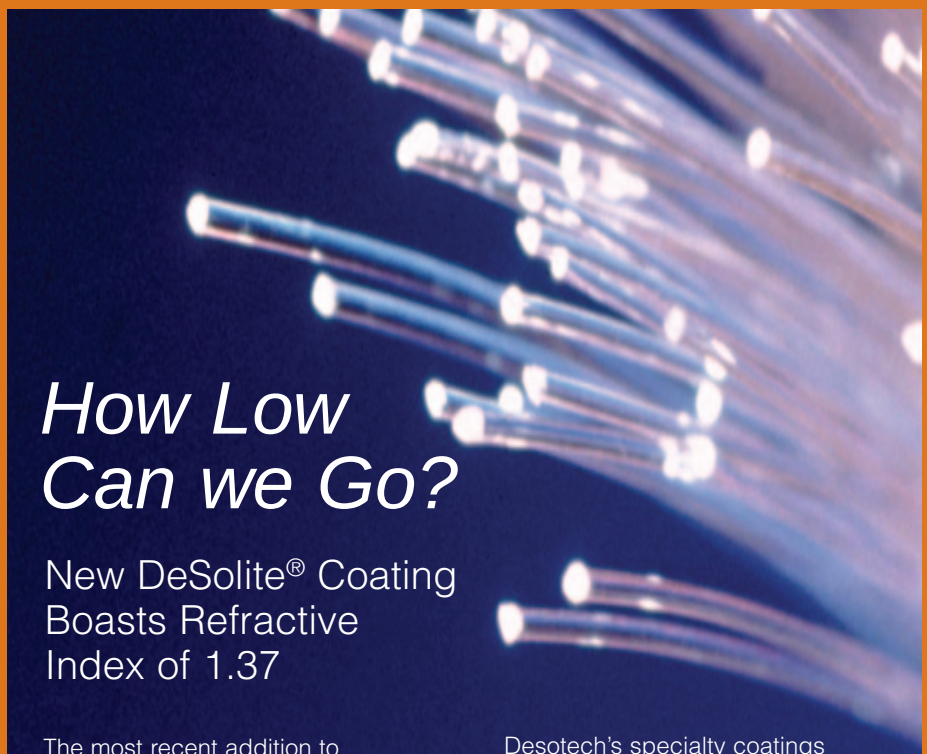
DeSolite performance attributes now include microbend resistance at temperatures as low as -40°C and a smoother coating surface for improved handling. Processing speeds reach 25+ meters per second.

Early 2000s:

Due to economic downturn in the industry, cost becomes an increasingly important success factor for new coatings development. At the same time, performance requirements remain high.

Microbend resistance is key and development efforts target lower-modulus primary coatings, especially for multimode fiber. As processing speeds now reach 30+ meters per second, the relationship between speed and specific performance properties must be carefully managed.

Specialty fiber applications for photonic components are also on the rise. Focus turns to the development of very low refractive index DeSolite coatings for these applications.



How Low Can we Go?

New DeSolite® Coating Boasts Refractive Index of 1.37

The most recent addition to the DeSolite product line is DeSolite 9D3-599—our lowest refractive index coating (1.37 when cured) to date.

DeSolite 9D3-599 is designed for use as a cladding material for hard-clad silica optical fibers or power transmitting fibers where high numerical aperture values are desired.

"Fiber lasers are quickly gaining acceptance as a serious alternative to solid-state lasers for telecom, military and industrial applications," says Desotech Regional Sales Manager Jim Reese. "The technology behind many of these lasers is based on double clad pumping in which the laser's power depends on the efficient energy transfer between the cladding and the core. This requires a high numerical aperture (NA), which is where low-refractive index materials come in."

Polymer clad silica core fibers can achieve very high numerical apertures (and acceptance angles) when a low refractive index cladding material such as DeSolite 9D3-599 is used. Developed recently by Desotech's specialty coatings group specifically for this purpose, the optically clear coating processes similarly to conventional fiber coatings and has been successfully run at line speeds of more than 600 m/min.

DeSolite® 9D3-599

Viscosity (cps, 25°C)	5000
Density (g/cm^3)	1.373
Cured Film Refractive Index (589 nm, 25°C)	1.373
Hardness (Shore A)	80
Secant Modulus (MPa)	15
Elongation (%)	30

DeSolite 9D3-599 is currently available for sampling and scheduled for full commercialization later this fall. To find out more, contact your Desotech account representative or email us at: info.desotech@dsm.com.

2003

DSM Desotech Takes Patent Action In Belgium Court Against Herkula

In early July, DSM Desotech announced the filing of a descriptive seizure proceeding against Farbwerke Herkula St. Vith S.A. with Liege Court in Belgium. The suit will investigate potential patent-related infringements involving Herkula UV-curable fiber optic inks. Samples collected by a court-appointed expert are currently being examined by an independent laboratory in the Netherlands.

"This action is very important for the protection of DSM Desotech's intellectual property rights," says Desotech VP of Fiber Optic Materials Patrick Niels. "As the industry leader in UV-curable fiber optic materials development, it is critical for DSM—and the customers who rely on our products—that we protect our innovations by actively enforcing our global patent position."

DSM Acquisition of Roche to Finalize by Fourth Quarter

DSM N.V. announced recently that its acquisition of Roche's vitamins, carotenoids and fine chemicals business is expected to finalize by the end of the third quarter 2003.

The acquisition, which will cost DSM approximately EUR 1,750 million in both cash and stock, was first announced earlier this year. A contract was signed by both companies in February.

Since pioneering the industrial synthesis of vitamin C in 1934, Roche has been the world's leading manufacturer of vitamins. Today, its Vitamins and Fine Chemicals Division offers a wide range of products to help improve nutrition and prevent and treat disease. The division researches, produces, markets and supplies vitamins, carotenoids, citric acid and other fine chemicals for animal feed, food, pharmaceutical and cosmetics industries. It employs approximately 7,300 people.

DSM Managing Board Chairman Peter Elverding called the acquisition "a very significant strategic step in DSM's ongoing transformation into a specialties company."

To learn more about DSM's activities worldwide, visit www.dsm.com.

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DSM Desotech Optical Fiber & Cable News is published as an information resource for the optical fiber industry. Reader inquiries and suggestions for content are welcomed and should be directed to the editor at:

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