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Silicone: Past, Present & Future

Silicone softeners have a firm place in final finishing for a very important reason. A piece of fabric which has been subjected to pretreatment, dyeing and fixing processes is almost impossible to be appealing to any.

Silicone have wide spread applications in the textile industry from fiber, yarn and fabric production to final product finishing. A variety of silicone technologies have application in the textile industry. They include,

- **Polydimethyl siloxanes.**
- **Amido, Amino Functional Silicones.**
- **Methyl Hydrogen Silicones.**
- **Epoxy Functional Silicones.**
- **Hydroxy functional Silicones.**
- **Silicone Polyethers.**
- **Epoxy Polyether Silicones.**

Silicones are the organo metallic polymers derived from the abundant raw material on earth, sand. Because of their Inorganic - Organic structure and the flexibility of the silicone bonds, silicones have some unique properties including thermal oxidative stability , low temperature flow ability, low viscosity change vs. temperature, high compressibility, low surface tension, hydrophobicity, good electric properties and low fire hazard.

Cotton knits that were meant only for sportswear have gained acceptance with India's urban youth as casual wear, worn along with cotton trousers or denim. In the past, T-shirts were considered only as menswear hence very little attention was paid to their colour or finish. But with more women participating in all spheres of life, T-shirts have gained popularity among Indian women as a choice of casual wear. As a result, more attention is now given to the shade, appearance, feel and wearing comfort, since women are more discerning than men.

Softer hand and brightness of hue, which were once considered feminine, have become the in-thing. Knits for kids wear are also becoming popular, with soft feel and eye catching colours, since kids wear and woman's wear fetch better prices, newer and more shades and better and better finishes are being introduced in these categories.

Instead of traditional finishing with cationic softeners, by the exhaust method, modern dye houses are now finishing cotton knits in open-width form by the padding method. This has opened up avenues for silicone finishes and other finishing chemicals, which, due to their low or no affinity and poor shear stability, could not be applied on soft flow machines. Thus, in the initial years, silicone finishing with conventional poly finishing with conventional poly dimethyl siloxane (PDMS) replaced traditional cationic softeners.



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However, the novelty soon wore off. PMDS-based silicone softeners certainly gave better hand feel (e.g. MF 800, MF 500, MF 8001, MF 105 etc) , which is fast to home laundering compared to conventional cationic softeners, but they are also hydrophobic like cationic softeners. End users who were ready to pay more for soft hand feel with comfort properties forced chemicals manufacturers to look for new formulations, based on hydrophilic softeners that are fast to home laundering. Another problem that the finishers faced was dulling of the shade or yellowing of whites during or after finishing, due to softeners.

Non Volatile PDMS fluid is essentially insoluble in water. These materials become a minor component of the sludge in the treatment plant. If the sludge is incinerated, the silicone content converts to amorphous silica, water and carbon dioxide. Silicone materials are highly resistant to bio degradation by micro organisms, but they undergo very effective degradation via natural chemical process such as catalyzed hydrolysis and oxidation. PDMS breaks down into siloxanols and silanols. PDMS is ecologically inert and has been found to have no effect on aerobic or anaerobic bacteria. It does not inhibit the biological process by which waste water is treated. In the world of eco friendly chemicals in the processing, silicones can offer the best solution to cater the multi dimension demands of the customers.

Hydrophilic anionic and non-ionic silicone softeners (e.g MF WET, McCoy HP 23 etc) could offer both, i.e. hydrophilicity to the finished cotton knits as well non-yellowing finish; but these could not confer the same amount of softness. It is more apt to these call as finishing chemicals rather than softeners.

We at McCoy R&D studied this problem in detail. First we tackled the problem of yellowing. It is a well known fact that products containing free amino groups have a tendency to oxidize on storage or at acidic pH and high temperature for example, the yellowing of wool or yellowing of nylon. Thus, if the yellowing problem could be isolated to free the amine group in a softener, it could be solved by eliminating that free amine group by suitably blocking it or using a formulation where the amine group cannot be easily protonated. Initial experiments yielded encouraging results and soon we were able to launch, for first time in India, McCoy Finish NYSS; a Zero-Yellowing' silicone softener.

Simultaneously, efforts were made to introduce economical organic softeners, and a reasonable good way of doing so in using the virgin Amino fluids with a higher yield content .This research supported for the launch of evolutionary product range of McCoy Finish .As each emulsion in McCoy Finish range is a formulation of virgin oils (i.e. New Generation Silicone Softeners) so offers some key advantages over the other silicone Softeners, some of them can be tabulated as below:

- **Almost Zero yellowing**
- **Higher Yield , so less silicone content for a desired finish**
- **High exhaustion rate**
- **Eco Friendly, as the silicon content required is low in the effluent so is less liable to chock the decomposition process**
- **More stable**



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To match up with the evaluation, the textile industry has to move towards these quality driven eco friendly products in future.

McCoy Group in India established in the silicones business & providing products & services to the Indian Industry over 2 decades. We are a \$ 20 million USD organization, spread across south East Asia. **McCoy Group** has come a long way from trading to private label & now manufacturing & joint ventures.

McCoy
SODAL

McCoy Soudal is a 50:50 joint venture company between the McCoy Group of India and Soudal Group of Belgium. **It is one of the largest manufacturers of Sealants, Adhesives and Polyurethane (PU) Foams in the World.** Now with eleven manufacturing plants, operations spread in more than 35 countries and product availability in more than 120 countries, we are the largest company globally in our field. **McCoy Soudal** has today 9 regional offices across the country and is making its presence felt throughout the industry in India & SAARC countries. We have invested approximately INR 500 million to build one of Asia's finest and largest sealants & adhesives manufacturing plants in Bawal, Haryana.



Our production plant is situated in the beautiful HSIIDC area in Bawal, Haryana, built on a 200,000 sq. ft. area and is equipped with state-of-the-art fully automatic machines and equipments from Europe. At initial stage we will be able to produce 15 million units (cartridges, sausages and tubes) of sealants & adhesives which will be further scaled-up to 30 million units in phase II in 2014.

McCoy
FLY SCREEN

McCoy Group is driven by innovation and creativity. We thrive on technology and have always bridged the gap between market needs and desires with innovative products and technologies. India's fast growing urbanization also brings with itself loads of worries and environmental issues. McCoy Realized there was a need for wellness and protection of our families against serious elements like insects, mosquitoes, pollen and pollutants. With cooperation from an Italian giant **McCoy has introduced McCoy Fly Screens – first time in India with proven technology and accessories since last 35 years globally.** These unique and technology driven products are available through a chain of approx 100 stores all across India making sure the best technology and service is available for our consumers and end users. In addition a special purpose vehicle company **McCoy Fly Screen Pvt. Ltd.** has been formed to steer this enterprise.

A Team of techno commercial experts and support teams across India are set up to make sure the best technology and protection is available to our customers.



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High Quality Futuristic Building Hardware & Accessories for Doors, Windows & Curtain Walls.

McCoy Group's experience and reach into the door, window and curtain wall industry led us to this division being formed McCoy 8M. McCoy 8M offers a unique range of products for doors, windows and curtain walls ranging from all types of fiction hinges from 8 to 30 inches to door and window handles to cater to the lowest cost housing to the most upscale projects. Since the inception McCoy 8M has today over 120 business partners across the country catered from our 9 offices with an excellent techno commercial man power and most importantly stocks and products available in large quantities to cater to projects of all scale size and volume. McCoy 8M is now since our hard work of the last 4 – 5 years a well-known and established used brand across most developments and building houses from the likes of DLF, Unitech, Parasnath, Prestige, Raheja, Gujrat Ambuja, to almost all others in India. With over 120 different products and various colors there is no doubt that we are now the largest available range of building hardware for doors, windows and curtain walls.

This division of McCoy Group is responsible for the McCoy Automotive Range of Sealants Adhesives and Specialty OEM products for the auto, bus & coach and industry. McCoy has built a nationwide network of customers and distributors to cater to the needs of the auto, OEM, railway, bus and coach sector in India. Names like TATA, TATA Marcopolo, Ashok Leyland, Tata motors, Fiat Automobiles (Cars), JCB, JCBL and Volvo are attached to these products and command not only a large market share but also a lot of customer respect as we run a training academy and have trained over 50,000 applicators in India. McCoy Totalseal sets a very high standard of sales and service in the Indian industry. A true icon & India's largest & leading range of PU Totalseal sealants & adhesives/mastics for professional bus & coach, automotive OEM & industry.

McCoy Group is serving you with the world best quality products. Our products will be continuously upgraded to the increasing & changing needs and requirements of the fast growing industry.

We value your business and look forward to continue to serve you in the future.

Let's think different and achieve one common goal.