

Acrylate

SUMMER 2005

Quality Assured—*Daily*

At Esschem, “quality” is more than a slogan or motto. It is a fact that is tested, measured and proven every day in our Quality Control (QC) laboratory. Raw materials coming into the plant and samples from every production batch are analyzed to be certain they meet specific and exacting standards.

The reactions that yield specific polymers depend on a precise set of ingredients and conditions. Therefore, it is crucial to verify the purity of the materials entering Esschem’s production stream. That job falls to the QC team. Every day, technicians follow a detailed protocol that defines what tests are performed for each incoming raw material to ensure it measures up to Esschem’s specifications. These may include analyzing its refractive index, inhibitor content, specific gravity and matching its color within a preset range.

Establishing the quality of the components going into production helps ensure the quality of the output—but it isn’t a guarantee. That is why every batch we

manufacture is then tested, whether it is a stock material or a highly-customized proprietary polymer made especially for one customer.

According to Diane Smith, the Manager of Esschem’s QC lab, there are specific tests used to verify the elements and properties of each product produced. Residual and added benzoyl peroxide (BPO) is measured using an automated titration system. Molecular weights are determined by calculating the relative viscosity of a polymer then deriving the molecular weights using a conversion formula. Polymer particle size is measured using a sophisticated laser light scattering technology. Other characteristics including moisture and pH value may also be evaluated at the customer’s request.

Additional tests replicate “real world” conditions. Cure, “dough” and work times are determined by using the materials the same way our customers would. The principal difference is that Esschem’s QC technicians carefully document the precise moment a material cures/exotherms (i.e. loses its

malleability). Technicians will even cut open a thick block of cured dental resin in half to check for porosity, which is a sign of weakness.

Esschem’s QC technicians are responsible for producing the Certificate of Analysis (COA) that is sent with each customer’s order. The COA that accompanies each Esschem product attests to its quality—and the people in the QC lab take their role very seriously. As Diane Smith says, “QC technicians



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are the gatekeepers. Customers trust our quality because we certify what we sell. Each COA we produce

is essentially a promise that the product we deliver meets its specifications." It is exacting work

that requires a high attention to detail. Customers expect it—and Esschem's reputation depends on it.

Esschem gives back

by investing in the future



Being a good corporate citizen is an integral part of Esschem's philosophy. It is more than good business—it is the right thing to do. Over the years, Esschem has supported a variety of philanthropic endeavors in an effort to give back to the community. One stands out: Pennsylvania Free Enterprise Week (PFEW).

Each summer, sophomore and junior high school students from across Pennsylvania learn the ropes of running a business first hand. They form companies and compete against each other and computer-simulated market forces for the

grand prize of being named "The Top Company." Along the way, they have fun, make friends and gain valuable experiences that will help shape their futures.

In addition to funding scholarships for PFEW students, Esschem executives have gotten involved as "Company Advisors." Company Advisors are business people who spend a full week with a "company" sharing their experience and expertise. They help the students make sound decisions without actually making those decisions for them.

Recent Esschem volunteers include Mike Norquist, Esschem's President, and Jon Sechler, Justi Group's Controller. According to Mike, it is both rewarding and worthwhile. He was challenged by the students in their effort to understand the business process. For some of these teens, PFEW is their first introduction to economic leadership. Working with the students also brought new perspectives to the demands of running a real company.

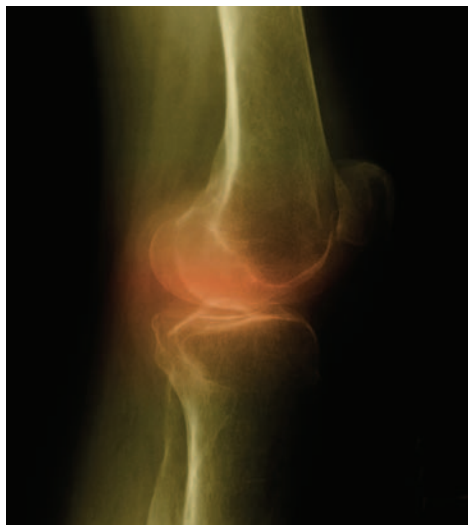
John Trombetta, President of PFEW, is very appreciative of the contribution that Esschem and other companies make for the program.

"These days, the gift of time is frequently the most difficult for any busy businessperson to make. We cannot begin to express how grateful we are for the weeks that Esschem's representatives have spent with our youngsters and us. The student evaluations this year are a reflection of the efforts that you and your fellow Advisors made to make this experience truly special and meaningful for all the participants."

Judging by the dozens of thank you letters Esschem receives from grateful graduates, PFEW is exceeding its objectives. When their week ends, students head home excited and enthusiastic about all that is possible in our free enterprise system. While not every participant pursues a career in business, they all have a greater appreciation for the value of hard work and a job well done. Esschem is proud to be a part of such a valuable and positive program. For more information about PFEW, visit their website at www.pfew.org

Pure. Performance.

Esschem Custom Acrylics for Bone Cement Applications*



The most trusted source for high-grade acrylics for dental, cosmetic and biomedical applications is equally accomplished in the production of polymer substrates and monomers for orthopedic bone cement systems. For the past 30 years, manufacturers of bone cement products have relied on Esschem for their key compounds, including:

- Polymethylmethacrylate (PMMA) homopolymer
- MMA/Styrene copolymers
- MMA/Methyl Acrylate copolymers
- Precisely formulated monomers

Formulations for bone cement can vary greatly. The different devices marketed to deliver the cement at the surgical site must meet any number of specifications for viscosity, curing time, and more. Over the past quarter-century, we have partnered with bio-medical companies to develop products that perform precisely and reliably under the most exacting circumstances. Today, our compounds are being used in cardiac and cranial implants as well as orthopedic applications.

Computer-controlled reactions and special sifters are employed to produce polymers of precise particle size. Esschem is also able to accurately control the addition of benzoyl peroxide or other catalysts and/or radio-opaque materials such as barium sulfate. Monomers are shipped in dedicated stainless steel drums to assure purity in transit.

The Esschem Advantage is Consistent Quality

The science of acrylic polymer production is well known. What sets Esschem's products apart is their purity and batch-to-batch consistency. This is achieved through the use of state-of-the-art technology and vigilant adherence to the most stringent quality standards.

Esschem embraces the practices and principals endorsed by the International Organization for Standardization (ISO) and holds ISO 9001:2000 and ISO 13485:2003 certifications. Although ISO 13485:2003 is not required for bulk suppliers, Esschem chose to take this extra step to assist customers whose products must comply with the Medical Device Directive of the European Common Market and require the CE mark.

Every batch manufactured at Esschem's FDA-inspected production facility undergoes a full QC analysis before shipping. A Certificate of Analysis documents the findings and is sent with every order. Esschem archives a product sample with the corresponding production record for traceability during the life of the medical device.

Custom Chemical Synthesis

Esschem has a long history of collaborating with customers to develop proprietary formulations. Our contract R&D services feature full-service lab facilities staffed by professionals who specialize in the science of acrylics. Bring your ideas or specifications and work with a team dedicated to providing solutions. Our pilot plant allows you to scale up production for more thorough evaluation of promising products.

For more information about Esschem bone cement materials—or any customized polymer or monomer, call us today at 1-800-POLYMER or e-mail polymers@esschem.com.

*Esschem is a supplier of components and raw materials only. Purchasers of Esschem's materials for bone cement or related applications must make themselves aware of any and all applicable product requirements and regulations including those promulgated by the Federal Food and Drug Administration, and assume all responsibility for compliance therewith and the risk of noncompliance.



Key Contacts

Two-way communication is essential for building quality customer relationships. At Esschem, we encourage your input and inquiries. To help you reach the right person to assist you, we've prepared the following reference list. Call or e-mail us at any time—we are at your service!

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