

Success Story:

PROBLEM:

Insufficient temperature maintenance inside DEF dispensers results in fluid freezing in units installed throughout northern United States and Canada.

SOLUTION:

Upgrade dispenser insulation using custom fabricated parts made with Ensolite IV1, selected for required fuel resistance, processability, and R-value.

Company Profile:

CGR Products

About:

Custom Fabricator of Flexible Materials

Founded in 1963

ISO 9001:2008 certified

Locations:

Greensboro, NC

Decatur, AL

Waukesha, WI

Serving Markets:

MRO Applications

Industrial OEMs – Automotive, Appliance, Electrical, Small Engine, Military and Government



Cold Climate Solution from CGR Products Keeps Diesel Exhaust Fluid (DEF) Flowing Freely

For nearly 50 years CGR Products has provided custom rubber solutions for some of the biggest names in the automotive, small engine, appliance, electrical and heavy equipment industries. These solutions run the gamut from simple gaskets on everyday products to deeply engineered parts that play a critical role in the functionality of equipment backed by millions of dollars in research, development and production. In 2014 one such solution helped put an end to interruption in service at fueling stations located throughout Canada and the northern United States.

The issues were the result of diesel exhaust fluid (DEF) freezing inside newly installed fueling dispensers at fueling stations in areas hit with polar vortexes exceeding expectations. The dispensers were designed by a leading fuel tank manufacturer as an all-in-one diesel fuel and DEF self-serve unit. They were intended to help commercial truck drivers conveniently meet the latest EPA requirements and help fueling station owners conserve precious space at the pump. Truck drivers could quickly and easily dispense both fuel and DEF from a single pump – eliminating the need to manually dispense DEF from containers purchased inside the station. It seemed like a perfect solution – that is until the mercury started to drop.

The Big Chill

DEF is a urea-based solution that consists of approximately 33% automotive-grade urea and 67% de-ionized water. When injected into vehicles with Selective Catalytic Reduction



Ensolite roll material



Engineered For Success.

systems (SCR), DEF becomes part of a reaction that reduces tailpipe nitrogen oxide emissions. Commercial truckers have widely adopted SCR and the use of DEF since January 2010 when the US Environmental Protection Agency (EPA) began requiring diesel vehicles to reduce nitrogen oxide emissions.

Unfortunately, DEF begins to crystallize and freeze at 12.5°F, making it impossible to dispense. That is exactly what happened during a bitter cold snap that hit northern United States and Canada in 2012, putting thousands of DEF/fuel dispensers out of commission. Although the tanks were designed with internal heaters and some degree of insulation, it was not enough to withstand the harsh winter that followed their introduction into the field.

“The problem caused many sites to be without service at the peak of the polar vortexes,” said Alan Johnson, Director of Sales and Marketing at CGR Products.



Applying adhesive backing to rolls

The manufacturer, a longtime client of CGR, was forced to initiate a major redesign of the diesel fuel/DEF dispensers. CGR was asked to collaborate on the design and implementation of a new and improved insulation system.

The Right Stuff – Ensolite IV1

The manufacturer wanted to maintain a 68°F interior cabinet temperature at an outdoor temperature of -40°F. This not only meant upgrading the internal heater but redesigning the insulation. The latter was a complex process, challenging CGR in both material selection and production. Some of the larger sections of the dispensers could be insulated with fiberglass, but other areas required a compressible foam material, one that could be precisely cut using custom dies that CGR would also make. The foam had to have good fuel resistance, sufficient R-value, and deliver a super-clean cut for a seamless fit. Ideally, the material would be supplied in continuous rolls to facilitate manufacturing.

Since thousands of existing units would have to be retrofitted in the field, any design flaws or production errors could have devastating consequences.

After a meticulous search, the fuel pump manufacturer and CGR concluded that Ensolite® IV1, a closed-cell PVC/NBR/CR rubber product made by Armacell in Conover, NC, was the best material for the job. CGR had worked extensively with Ensolite in the past and knew that it cut cleanly and processed well. CGR technicians worked closely with Armacell technical managers to make sure that it met all of the additional requirements.

“It was fortunate for us that Armacell has so much expertise in insulation – an area that is not typically such a high priority in the products we manufacture.

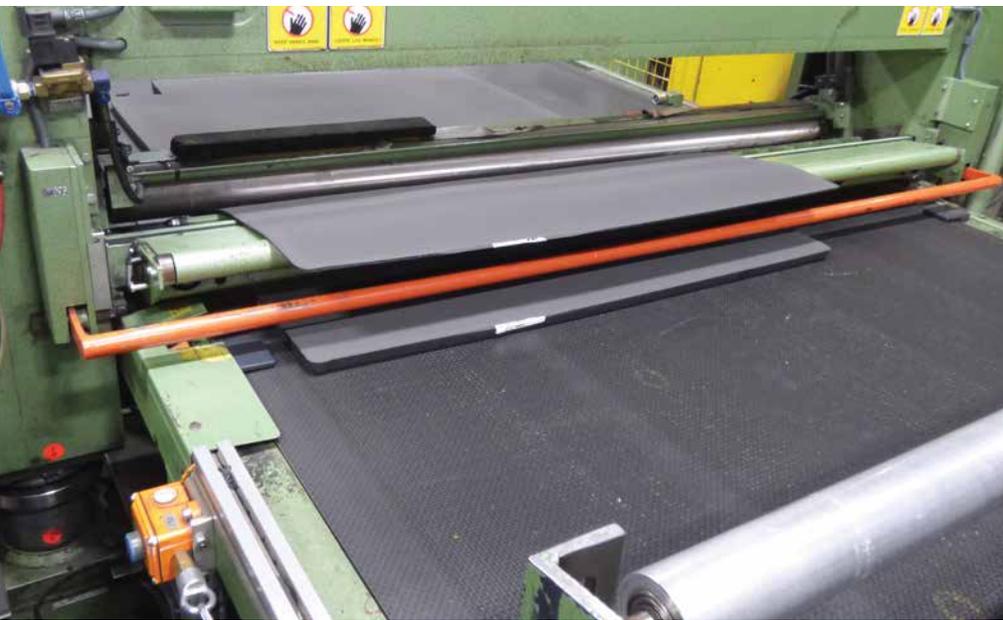
CGR Products: Proud to Be ‘Part’ of Many Solutions

As a custom fabricator of flexible, non-metallic materials, CGR Products fills gaps – both literally and figuratively.

Since opening in 1963, CGR Products has artfully positioned itself between material suppliers (e.g. Armacell) and a multitude of manufacturers whose brands are known worldwide. The “parts” that CGR produces in its North Carolina, Alabama, and Wisconsin manufacturing facilities improve the functionality of products used and made by the automotive, pharmaceutical, appliance and countless other industries. Without CGR solutions, many well-known brands would not exist as we know them today.

Based in North Carolina, CGR Products has manufacturing facilities in Greensboro, Decatur, Alabama and Waukesha, Wisconsin. Plant operators in each of these locations collectively use over 100 pieces of quality equipment, including splitters, die cutters, laminators and more.

This extensive machining capability, coupled with over a half-century of custom fabrication expertise, has made CGR a go-to source for long-term, high-volume product solutions.



Splitting roll material

In this case it happened to be extremely important so it was great that we could rely on Armacell for that information,” said Calvin Dean, Account Manager for CGR Products.

Material selection was only half the battle. CGR Products and the fuel dispenser manufacturer spent eight months tweaking and testing the individual foam parts, all the while simulating operating conditions in a lab. Dies were designed and redesigned and foam thicknesses were adjusted, as the final product was fine-tuned to perfection.

After each modification, the client tested the product in a lab, exposing it to sub-zero temperatures and measuring its performance.

“We would cut the parts and they would install them on an actual dispenser and then test it in an environmental chamber to make sure that we had enough R-value in each part.

This went on for several months and involved a lot of collaboration between us, the client, and also Armacell,” said Dean.

Not As Simple As It Looks

Nearly every bit of CGR’s machining technology was used to create four deceptively simple looking foam parts required to help correct this multi-million dollar problem, including:

- A loop splitter to split the Ensolite rolls into the appropriate thicknesses.
- A heated platen laminator to laminate the adhesive to the split foam so that it could be securely applied to the dispenser cabinet.
- A machine press to die cut the individual foam parts

CGR provided these parts to the client in fully packaged retrofit kits ready for immediate dispatch and installation on tanks where freezing had been a problem. Additionally, the same parts were integrated into all new DEF/fuel dispensers made by CGR’s client.



Die cut parts for DEF fuel pump

“The products look so simple, but really they represent a tremendous amount of expertise and capability—not to mention the fact that they are helping a valued client save millions of dollars,” said Alan Johnson.

Custom foam and rubber fabricators like CGR Products are often the unsung heroes in many OEM product innovations. Armacell has supplied a variety of Elastomeric Component Foams (ECF) and Polyolefin Component Foams (PCF) to fabricators who have used them to develop groundbreaking solutions.

“It’s tremendously gratifying to see what companies like CGR Products do with our products,” said Jeff Lippy, Armacell Business Director-Component Foam. “We produce a huge variety of foam products every day, but these companies take those materials and re-fashion them in ways that have a huge impact on the world we live in.”



Die-cut parts and custom dies

ARMACELL LLC

TEL: 1 800 866-5638

FAX: 919 304-3847

E-MAIL: info.us@armacell.com

INTERNET: www.armacell.us



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