

# EXPANSION JOINT PRODUCTION

## A STEP-BY-STEP GUIDE



Preparation



Construction



Completion

Hand built products take over where stock production stops. These designs are engineered specifically to the application, so each is more dependable and long lasting.

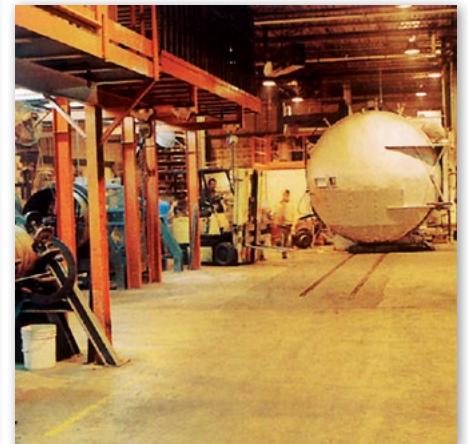
Molded expansion joints are limited in size, shape, materials and function to repeat applications where demand justifies the cost of molds. Industrial needs are seldom so cut and dried as the parameters of the application usually determines size, shape, and material preference. More often than not, the engineer's only option is to customize. And that's where Mercer Rubber excels.

We build expansion joints, duct connectors, and hoses in a broad range of shapes, sizes and configurations. Custom units include rounds; squares; rectangles; concentric and eccentric

reducers; 30°, 45° and 90° elbows; offset connectors and even tees. Flanges can be created to match any design configuration, and ends may also be slip-on and built-in threaded or welded nipples. At Mercer, size is not an obstacle. We can build pieces from 3/4" to 17" in diameter, and we can build them in virtually every type of reinforcement fabric and steam cured polymer or over Teflon™ liners.

Mercer's engineering team is always on-site to lend their expertise at the design stage, and their guidance during production.

This brochure will demonstrate the dedication and the effort we put forth to create a single, customized product. Our customers appreciate that. We know you will too.



Our new facility was put on line in 1992. As you will see, considerable time and effort are built into every custom piece. Mercer products take shape one step, and one station at a time. During each phase of production, there's a highly trained technician geared to a specific task, and dedicated to his or her job specialty.

At Mercer, we've always known that a hand built product is a better product. With the right equipment, the right engineering guidance and the right personnel, a one-of-a-kind custom piece

can be created without incurring excessive startup or retraining costs. It takes experience, and a willingness to venture into uncharted waters. Mercer is one of the few manufacturers that welcomes the challenge. We've built our reputation on solving problems that others thought unsolvable or unprofitable.

We put ourselves to the test every day. That's why we continue to grow. And that's why our future looks brighter than ever.

## PREPARATION

Raw material is carefully mixed, processed and cut into reinforced fabrics and sheets.

1. Rubber compounds are comprised of polymers, reinforcing fillers, antioxidants, antiozonants, etc. Each ingredient is meticulously weighed to assure uniformity.



2. Each rubber batch is carefully mixed for a specific time at controlled temperatures in our automatic mixer.



3. The mixed composite is discharged in clumps, which are then transferred to a mill to create a more workable material.



4. The cure is added to the rubber on a powerful 60" mill, which completes the mixing before the material is cut into rough sheets and prepared for the calender.



5. The calender process is the most critical phase of fabric preparation.



6. Large steel rollers force rubber into the nylon, polyester or Kevlar® tire cord reinforcement or into smooth rubber sheets. Thickness tolerances are maintained to thousandths of an inch.



7. Milled rubber may also pass through an extruder that discharges uncured rubber strips in geometric shapes. These strips are used to smooth transition contours in arches and flanges and as fillers.



8. The bias cutter allows the technician to cut fabrics at precise angles specified by engineering to control swell, elongation and burst in designated products.



9. Every product design specifies materials to be used in each layer. Here, flange reinforcement is stamped to size on a "clicker" press.



10. A production foreman cross-checks spec lists and supervises material cutting before kits are assembled and moved to the production floor.



## CONSTRUCTION

Step by step, and layer after layer, the basic form begins to take shape.

1. Expansion joint arches are formed over removable rubber inserts. If arches are very small or oversized, we use plaster arch forms that can be broken out after the expansion joint is cured.



2. When the expansion joint nears completion, the exterior sheath is pulled up to form the cover on the back of the flange.



3. Before the steel flange forms can be bolted or clamped in position, the perimeter is carefully trimmed.

4. Products are formed on a mandrel. Its shape fits the inside contour of the product. Concentric reducers are built with the small and large diameters on opposite ends, joined by a cone-shaped transition section.



5. Steel hoops are locked into the base of the arch by back wrapping the reinforcing fabric.



6. To prevent swelling, large diameter expansion joints are generally reinforced with high-tensile wire or steel hoops. This process requires precise application of both wire and uncured rubber fillers.

7. Cover application is the final stage of reducer body building.



9. Once assembled, products are cured in large pressurized steam chambers called autoclaves. To prevent rubber from expanding and changing shape, the entire carcass is wrapped with layers of strong nylon tape.

8. Building eccentric reducers becomes more difficult because the mandrel rotates off center. This varies the working distance between the product and the assembler, and requires exceptional coordination.

11. Hose construction is simpler when there's no arch to build over. Generally, sections are longer and require more layers of longitudinal reinforcement to minimize elongation.

10. When the nylon body wrap is finished, the steel mold plates that form the rubber flanges are bolted in place to retain the flanges during the curing process.

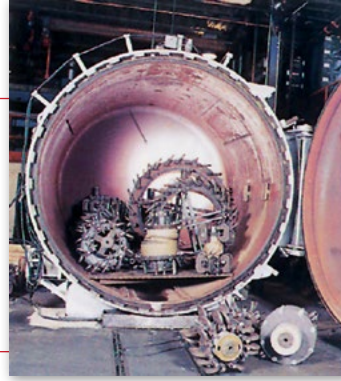


12. Virtually every pressure and suction hose is wire reinforced to prevent swelling or collapse.

## COMPLETION

The material is cured, the steel is drilled and finished, and a new expansion joint is readied for delivery.

1. Although every assembly follows similar procedures, the complexity of each job varies with its shape, size and pressure requirements. Shown here are 96" diameter joints under construction.



2. Like other manufacturers, we build each product with uncured rubber. Unlike other manufacturers, we vulcanize every finished piece in our customized autoclaves. Pressurized steam curing is far superior to baking, and we can accommodate pieces up to 18 ft in diameter.

3. Our manufacturing facility is self-sufficient. This enables us to turn orders around quickly and economically. Our heavy equipment includes oxyacetylene and plasma burning tables; iron workers punch and drill presses; automatic band saws and welding equipment. We manufacture our own tooling, steel backup rings, reinforcing hoops and control rod assemblies.



4. Our radial drill presses can drill holes as large as 3" in diameter. Here, backup rings are tacked together in stacks to assure that drilling is uniform.

5. Every flange hole is located and marked with steel templates, and then drilled straight and clean with hollow drill cutters.



6. During final inspection, all rubber parts are trimmed, cleaned and painted. Finally, ductile iron or steel backup rings are attached to the flanges and checked for hole alignment.



7. Hydro testing is another phase and all products undergo one final quality control evaluation before shipment. Once approved, large expansion joints are packed securely in wood spool crates for added protection on their journey.

Our workforce creates quality on the line everyday.  
We care about the products we make and it shows.