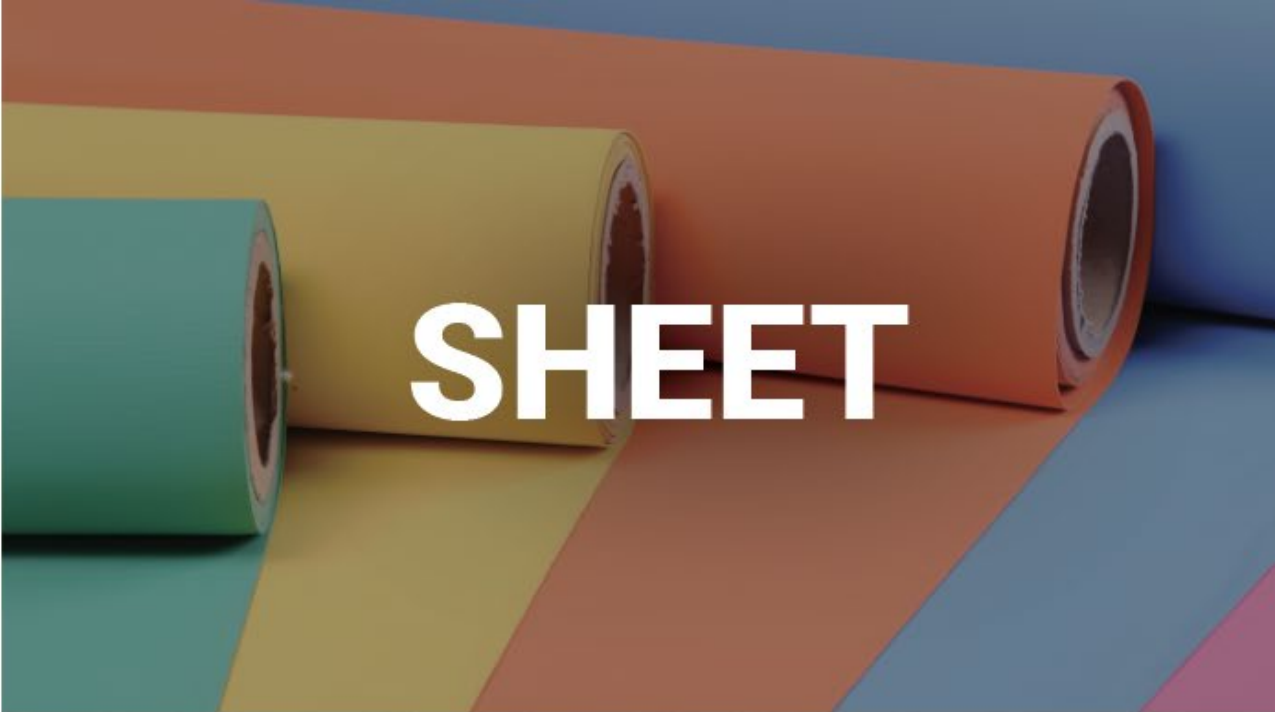


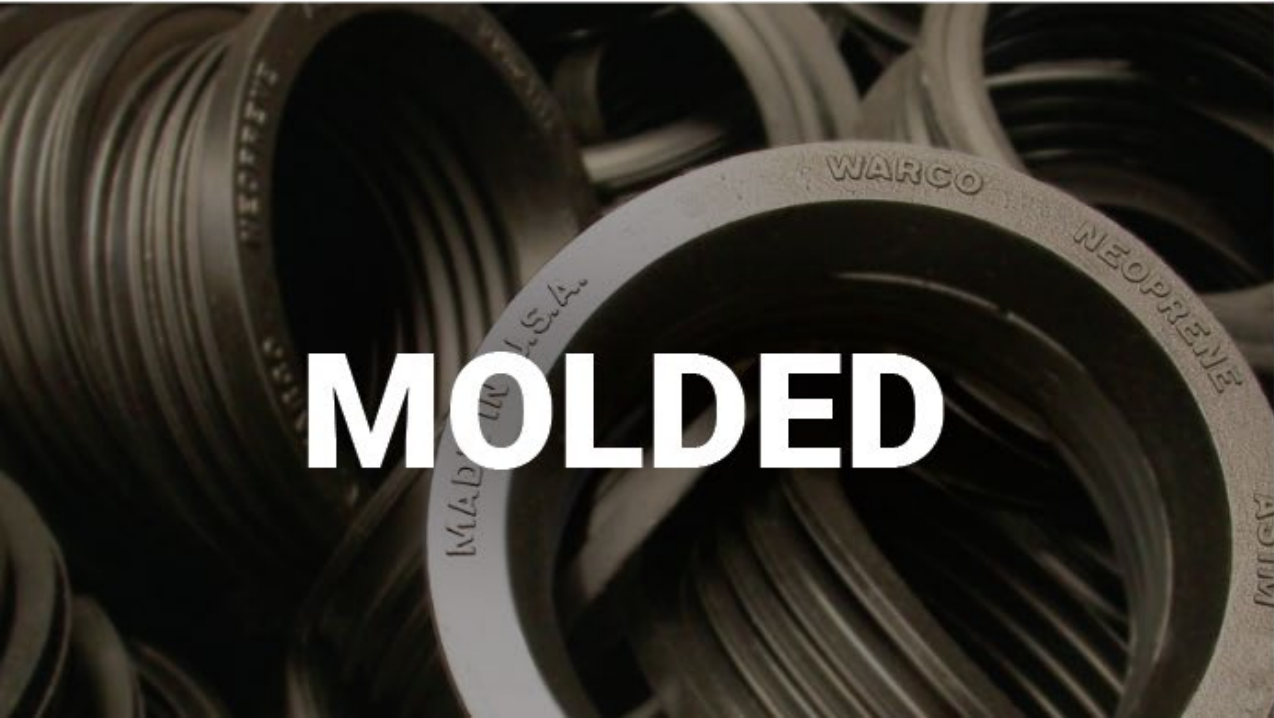
The logo features the word "WARCO" in a bold, red, sans-serif font, with a registered trademark symbol (®) to its upper right. The text is centered within a white rounded rectangle.

WARCO®

America's choice for quality rubber.™
★ Proudly manufactured in the USA since 1910. ★

A photograph showing three large rolls of rubber sheet material in teal, yellow, and orange colors, stacked diagonally on a blue surface.

SHEET

A close-up photograph of various molded rubber components, including a large circular gasket with a ribbed interior and a smaller ring. The word "WARCO" is embossed on the larger gasket, and "NEOPRENE" is visible on a smaller part.

MOLDED

A photograph showing a large quantity of white, cylindrical rubber extrusions or tubes of varying lengths and diameters, piled together.

EXTRUDED

The WARCO **Advantage**



Industry Leader



100% Domestic
Manufacturer



Full Vertical
Integration



Customized For
Your Application

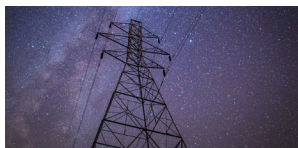
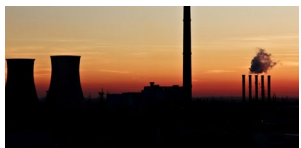
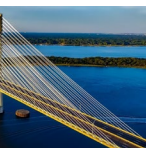
American-Made Rubber

- Our Lab & Mixing Facilities Create Uncured & Unformed Material
- 3 Forms of Rubber
 - Sheet Rubber
 - Molded Rubber
 - Extruded & Spliced Rubber



Trusted Experience in Markets Served

- Automotive, Transportation, Recreation & Utility Vehicle
- Military & Aerospace
- Construction & Mining
- Plumbing & Irrigation
- Fuel & Gas
- Medical, Healthcare & Cosmetics
- Pumps, Regulators, & Meters
- Electrical & Lighting
- Food Service & Processing
- Industrial Laundry & Appliances
- Electronics
- Chemical, Pulp & Paper Plants
- And Many More





1. Full-Service Laboratory

The background of the slide is a blurred photograph of a laboratory. A person wearing a white lab coat and a yellow nitrile glove is holding a glass Erlenmeyer flask containing a purple liquid. A pipette is positioned above the flask, with a single drop of liquid about to fall into it. The background shows various laboratory equipment and shelves, creating a professional scientific atmosphere.

Formulations | Polymers | Specifications | Specialty Grades

Full-Service Laboratory



Formulations

- Over 4,400 compounds on file
- Certified chemists on-hand

Polymers

- All major polymers readily available
 - Neoprene, Silicone, EPDM, FKM/Viton, Natural Rubber, etc.

Specifications

- Formulated to meet almost any specification

Specialty Grades

- Industry specific products designed for niche applications

Formulations

- Formulation: a list of ingredients
 - Balances cost and performance
 - Meets application physical & performance requirements (temperature resilience, outdoor resistance, vibration dampening, and more)
 - Creates processing efficiency
- Over 113 years of custom formulations
 - Over 4,400 formulations on-hand
 - Certified chemists onsite
 - Custom designed rubber for your application



Major Polymers

- Neoprene
- Nitrile (Buna-N)
- Fluroelastomer/FKM (Viton® & Fluorozone®)
- Silicone (INFINISIL®) & Fluorosilicone
- EPDM
- Butyl
- SBR
- Natural Rubber
- HNBR
- CSM (Hypalon)
- Vamac
- and more!



Fluorozone
Premium Performance FKM

INFINISIL™
Performance Silicone

We Meet Your Standard

- Compliances
 - Chemical Regulations including RoHS, REACH, & California Proposition 65
- ASTM, FDA, NSF, SAE
- AASHTO, Automotive (Toyota, Ford, GM, etc.)
- Flame Resistance (UL94, FMVSS 302, SMP 800-C, ASTM E662, etc.)
- Military (Mil-R, Mil-G, Mil-PRF, etc.)
- Aerospace (AMS, Boeing, etc.)



Specialty Grades



BIO-DIESEL NITRILE



HHP-151F
CLOTH-INSERTED SHEET



ANTI-MICROBIAL NEOPRENE



LOW SMOKE,
LOW FLAME,
LOW TOXICITY NEOPRENE



THERMOPLASTIC ELASTOMER



TRANSFORMER OIL NITRILE



RUBBER WATERSTOP



DOCK BUMPERS



AASHTO BEARING PADS

And More

2. In House Mixing

Banbury | Mill Mixing | Time & Quality Advantages

In-House Mixing

- Banbury & Mills
- All organic formulations mixed on-site
- Quality raw materials create superior products at a competitive price
- Versatile
 - Large and Small batch capability



3. Quality

Onsite Testing Facility | Process Control | ISO 9001:2015

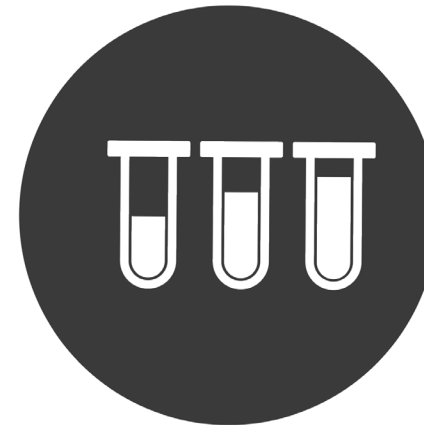
Quality Through In-House Testing

Physicals Testing

- Rheometer
- Durometer hardness
- Tensile strength
- Elongation
- Tear Resistance
- Compression Set
- Ozone Resistance
- Fluid, Fuel, & Oil Immersion
- Dielectric resistance
- Heat aging

Deliverables

- Test Reports
- Certifications
- Traceability of Manufactured Products



Vertical Integration

- Control starts and ends with WARCO
- Lower relative time and costs
- Less bottlenecks



ISO 9001

- ISO 9001 registered by NSF-ISR
- Every new formula is thoroughly tested before use
- Full traceability & QA throughout production process
- Each of our products are certified by our quality assurance department before shipping



NSF-ISR

Registered to ISO 9001

WARCO®

4. Sheet Rubber

Manufacturing Process | Capabilities | Custom Options

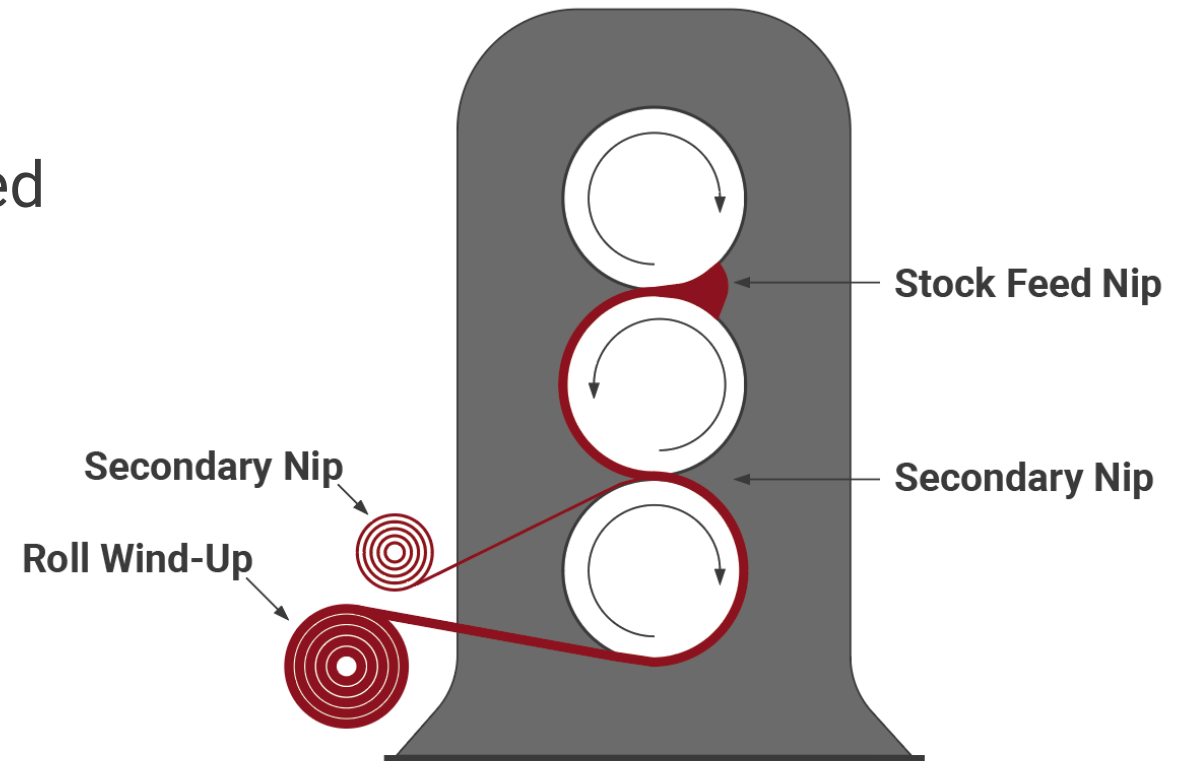
Calendered Sheet Rubber

- Thickness
 - 1/64" to 1/2"
- Widths up to 55"
 - Slit widths as narrow as 1/2"
- Surface Finishes
 - Smooth, Fabric, Paper
- Reinforced Cloth-Inserted
 - Cotton, Polyester, Nylon, Fiberglass
- Branding & Stenciling
- Thick Gauge Sheets up to 4" thick



Calender Manufacturing

- Two methods for manufacturing Sheet Rubber
- Calender Production
 - Tight Tolerance
 - Specification Grade, Cloth-Inserted & Performance Materials
- Compression Molded Sheets
 - Thicknesses up to 4 inches





5. Molded Rubber

Manufacturing Process | Capabilities | Custom Options

Molded Rubber Manufacturing

- Three methods for manufacturing

Compression

Transfer

Injection

- The type of mold depends upon the volume, geometry, material and the part's application

- Multitude of Press Sizes

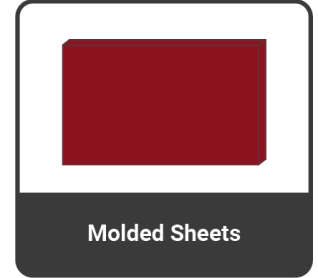
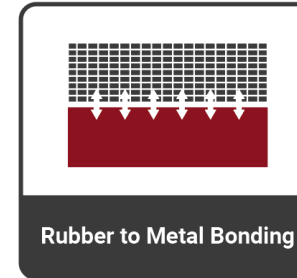
- Our engineering team aids in tooling development

- Ability to accommodate most customer's pre-existing tooling



Molded Specialty Capabilities

- Rubber to Metal Bonding
 - Can bond to a variety of metals including aluminum, brass, stainless, cast iron
- Rubber to Fabric Bonding
 - Can bond to such fabrics as ballistic nylon and fiberglass
- Molded Sheets (Slabs)
 - Heavy gauge molded sheets from ¼" up to 4"
 - 36" or 48" Square



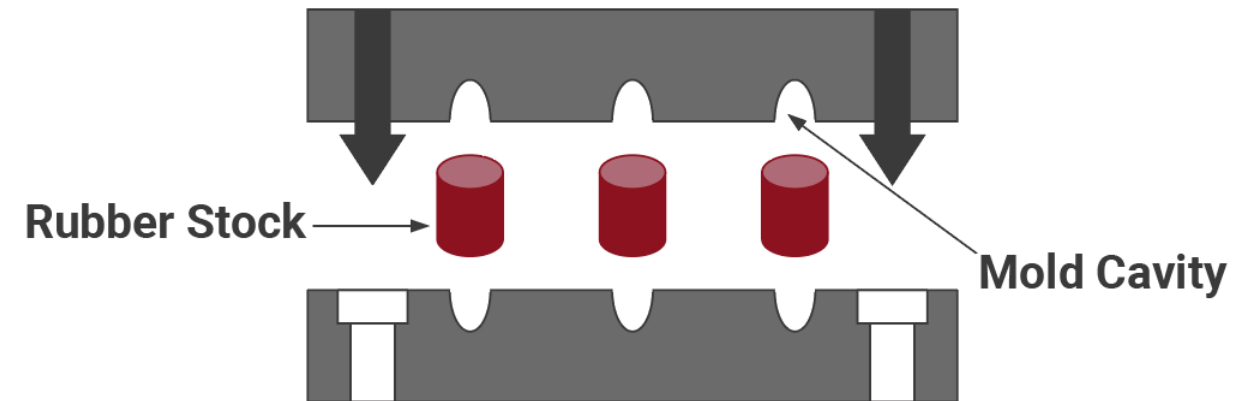
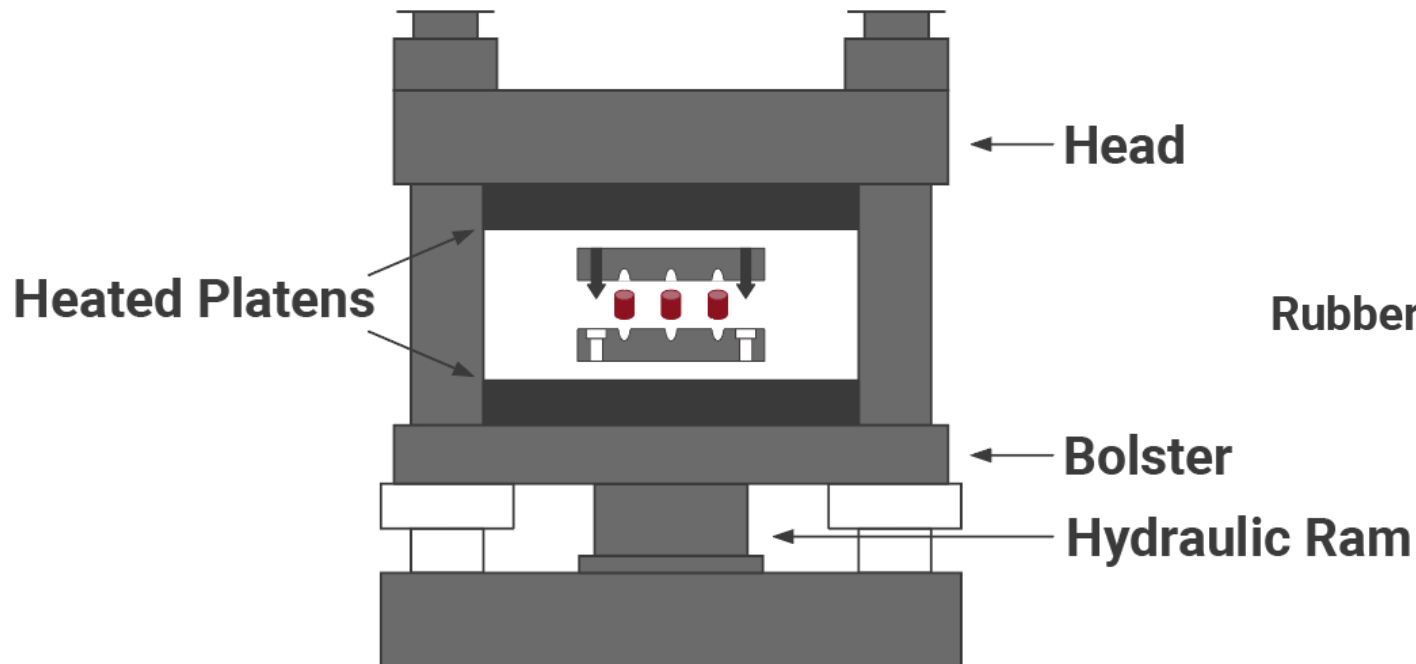
We Deliver Clean Parts

- Molded parts typically require a secondary operation
 - Cryogenic Deflashing
 - Die Cutting
 - Hand trimming
 - Cleaning



Manufacturing - Compression

- Compressing a uncured, preformed rubber stock into a shape
- Placed into the mold cavity, then subjected to heat & pressure



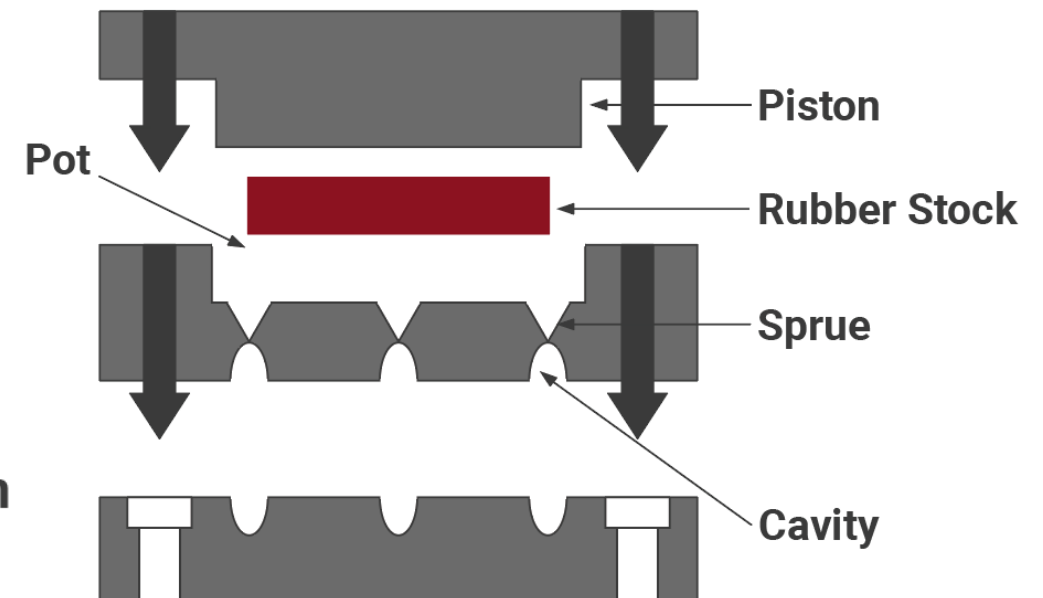
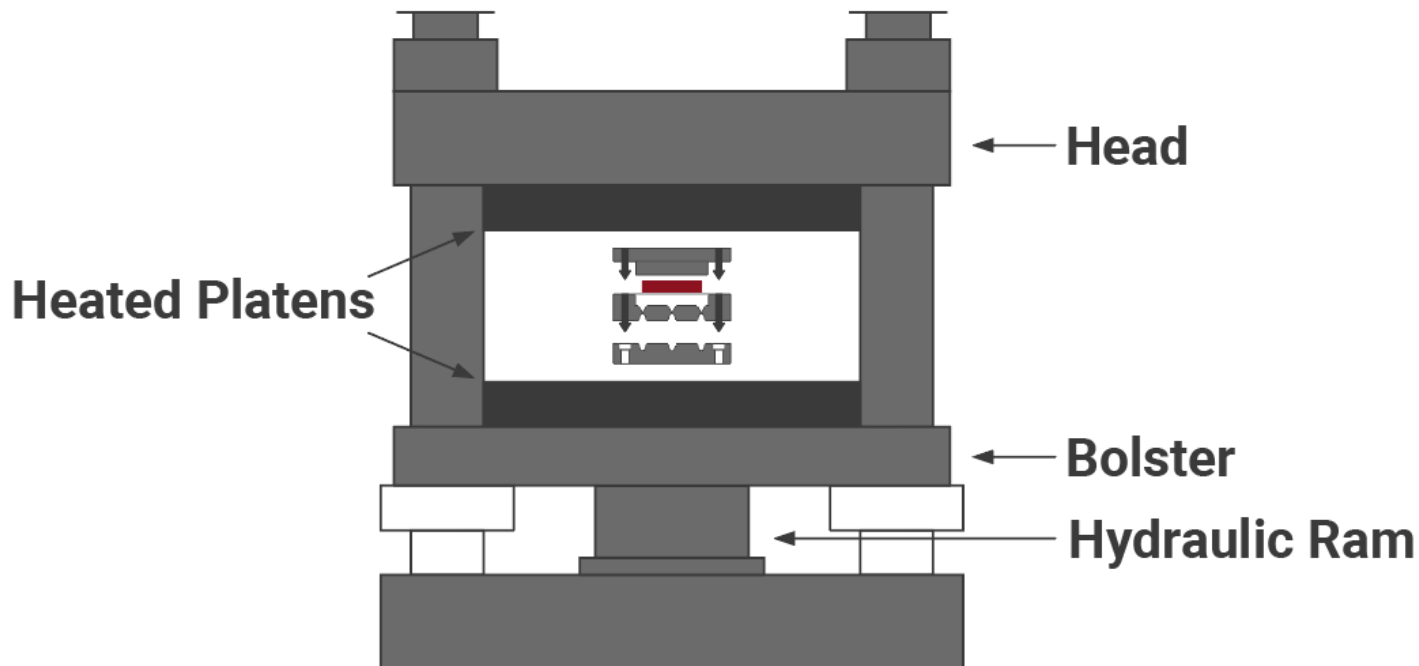
Ideal Applications - Compression

- Commercial applications where flash and tight tolerances are not critical
- Uniquely suited for parts with inserts



Manufacturing - Transfer

- Uncured rubber stock is not put directly into the mold cavity; Instead stock is put into a chamber (Transfer Pot) above the cavities, then forced through holes (sprues) into the cavities



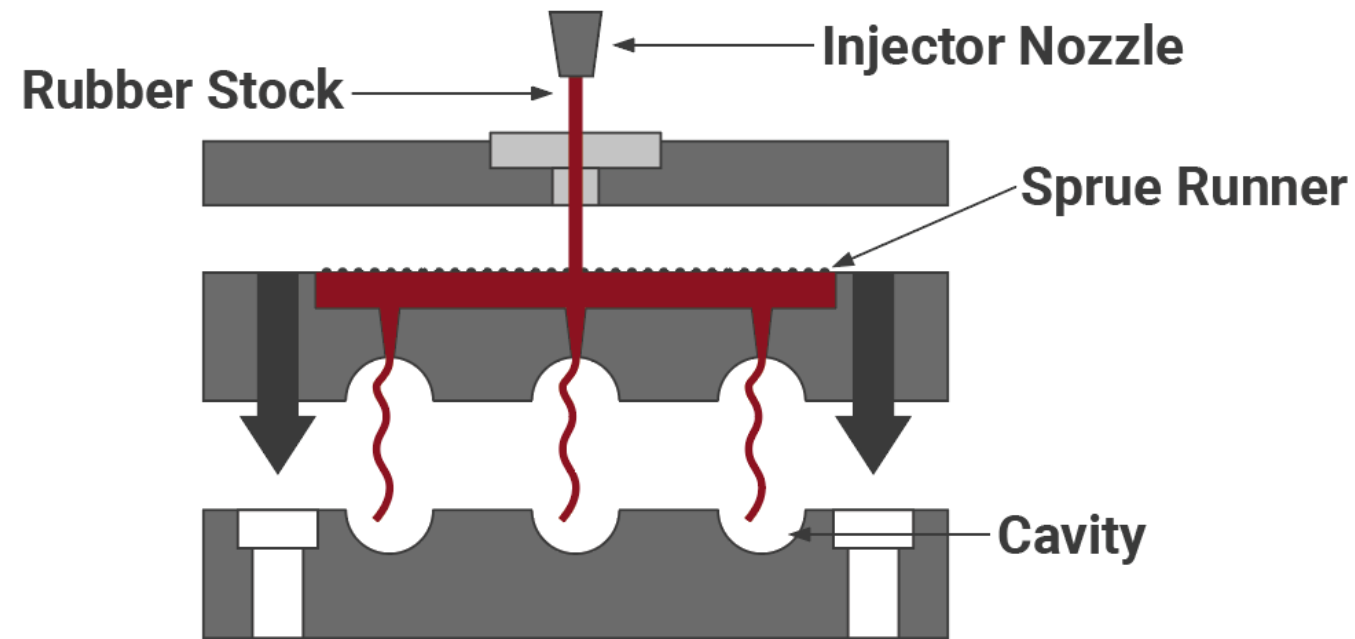
Ideal Applications - Transfer

- Less flash and better tolerance control than Compression Molding
- Best for parts with complex geometries or high cavity tooling



Manufacturing - Injection

- Uncured rubber stock is fed into the injection press where it is heated and injected into the closed mold
- Automatic process, eliminating the need for hand-loading the rubber stock into the mold
- Can accommodate tools with many cavities



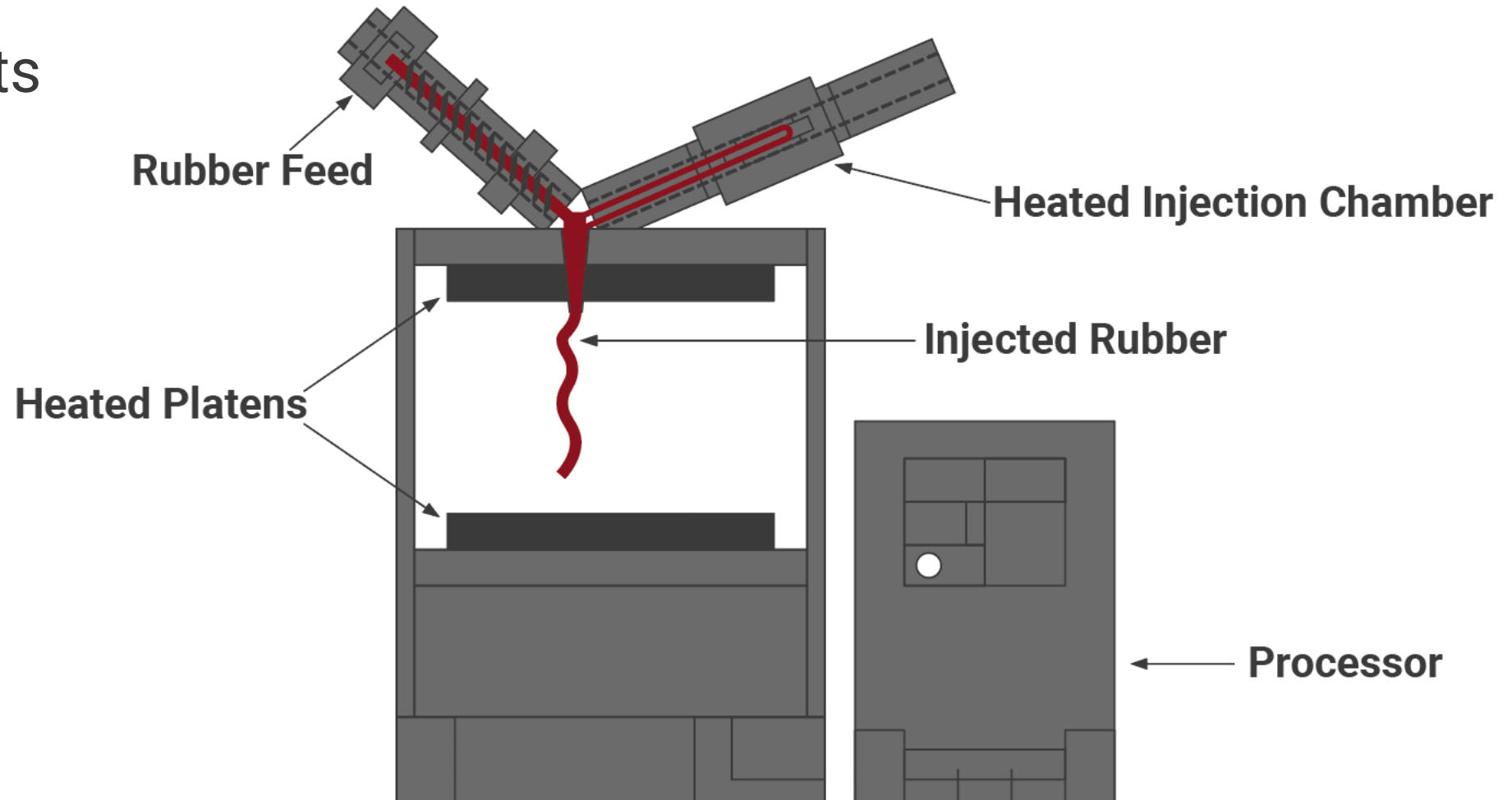
Ideal Applications - Injection

- Excellent fit for high-volume jobs that require
 - Shorter cycle time
 - Best tolerance control and least amount of flash



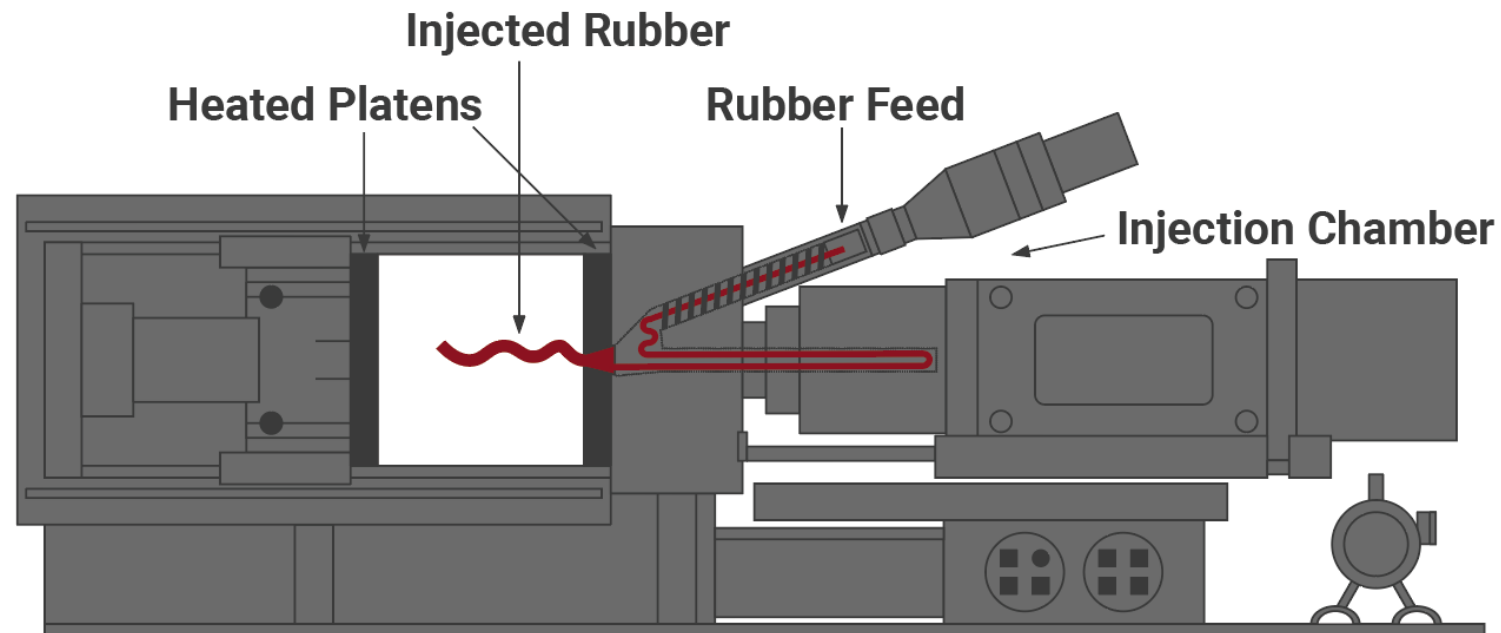
Manufacturing - Vertical Injection

- Great for parts with inserts



Manufacturing - Horizontal Injection

- Best for high production jobs
- Shortest cycle time
- More automated than vertical injection

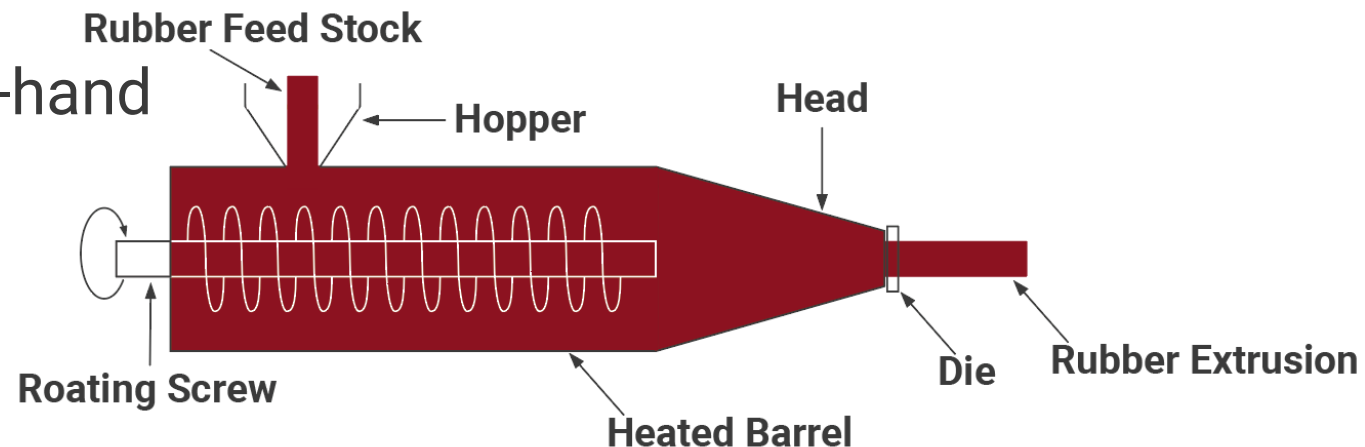


6.Extruded & Spliced Rubber

Manufacturing Process | Capabilities | Custom Options

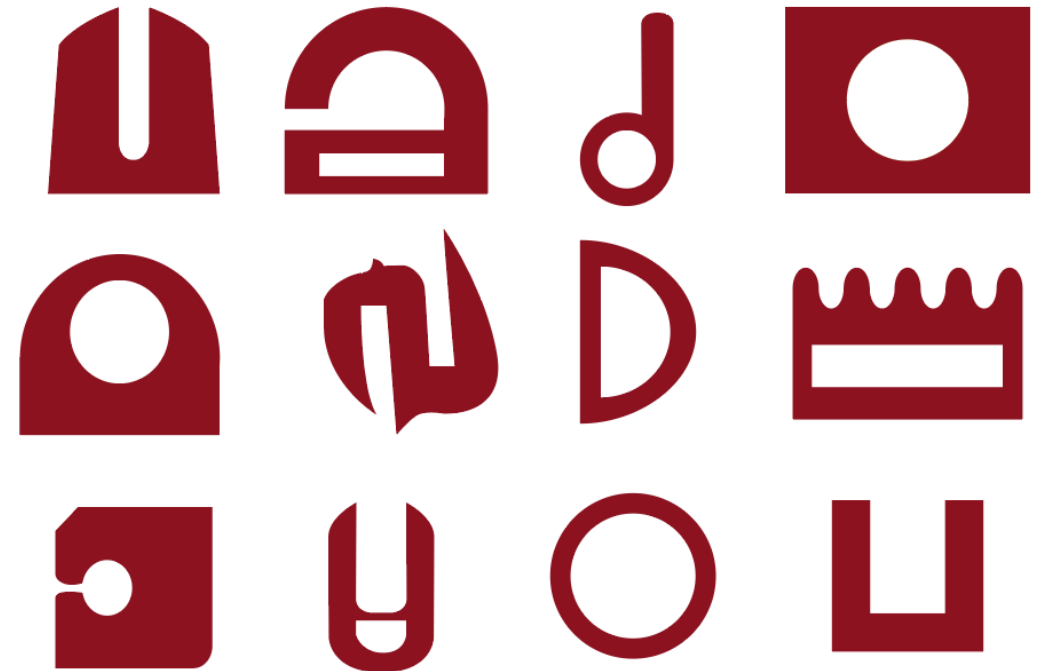
Extrusion Manufacturing

- Methods for manufacturing
 - Conventional Extruder
 - Cold Feed Extruder for FKM & Silicone
 - Dedicated Silicone Extruder with in-line Hot Box (HAV) cure
 - Continuous Microwave Cure Extruder
- Requires tooling (die)
 - Thousands of tooling dies on-hand
 - In-house tool design



Dimensions

- Smallest
 - .103" Diameter Cord
 - .032" Wall thickness (any)
 - .187" Outside Diameter (tubing)
 - .062" Inside Diameter (tubing)
- Largest
 - 6" Diameter Cord
 - 5" x 9" Profile Dimension
 - 1.5" x 13.5" Profile Dimension



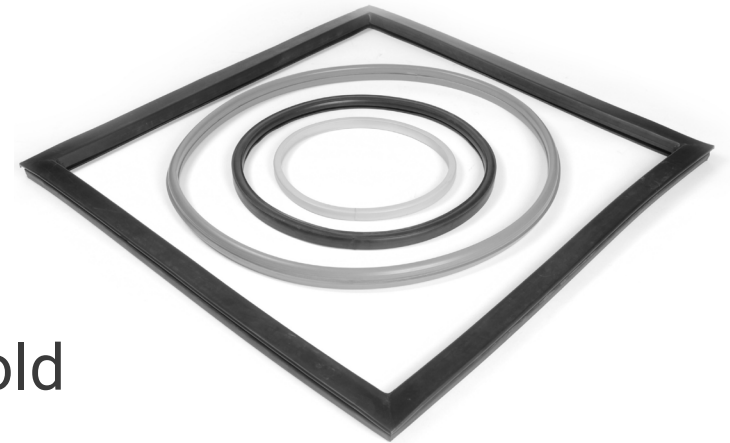
Lengths

- Continuous Lengths via Microwave extruder or Silicone Extruder
- 50' straight length autoclave cured
- 25' Pole cured tubing
- Coil cured – length determined by size



Spliced Extrusions

- Endless variety of shapes at a fraction of the cost of fully molded parts
- Hot vulcanized splice
 - Proprietary adhesive compounds for strong, long-lasting bonds
 - Does not harden and crack like adhesive-based cold bonded splices
- Eliminates the need for molded tooling
- Molded Corner Splicing



7. Next Steps

Resources | Quotation | Contact Information

WARCO®
CELEBRATING 100 YEARS

America's Choice for Quality Rubber Since 1910

Additional Resources



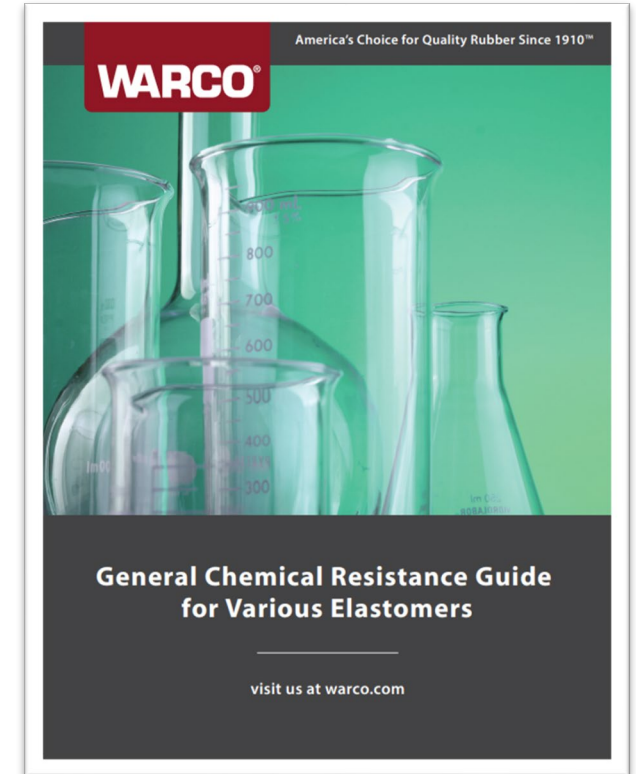
Documentation

- [Chemical Resistance Guide](#)
- [Rubber Shelf Life & Storage Conditions](#)
- Specification Sheets
- Safety Data Sheets



Tools

- [Specification Index](#)
- [Articles](#) Focused on the Rubber Industry
- [Rubber Terminology Glossary](#)





Next Steps

Oliver Hinkley, Executive Vice President of Business Development

714-532-3355, Sales@warco.com

