

OEM SOLUTIONS

CUSTOM RUBBER TUBING



CRUSHPROOF TUBING CO

WWW.CRUSHPROOF.COM • 800.654.6858 • McCOMB, OH, U.S.A.

- Free Custom Samples
- Low Order Minimums
- No Tooling Costs



Crushproof factory in McComb, OH

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HISTORY

Over a half century ago, Crushproof Tubing Company was founded in McComb, Ohio with the idea of making high quality, crush-proof, rubber garage exhaust hose, and we have become North America's leading manufacturer in that industry. It was not long before we realized that we could make more than just exhaust tubing, and developed a number of patented processes that we still use today to make everything from farm tubes to space shuttle breathing tubes. We manufacture compressible, stretchable, and fixed length varieties of tubing that are more flexible and durable than most plastics, less expensive than designer compounds, and have stood the test of time underground, underwater, in the air, and in outer space.

So what does it take to get a project going with Crushproof? Not much, besides some basic dimensions and a little imagination! With our expert designers and years of experience, we can go from a sketch on a napkin to a CAD drawing in one business day, and about one week later you will have a custom, production quality sample in hand. Why settle for rough connections when you could have custom cuffs that provide an air tight seal? We can make custom runs with NO TOOLING CHARGES and NO MOLDING COSTS for lots as small as 100 pieces. Larger volume orders will cost less per piece, but we are consistently competitive quoting against stock parts and reels of hose, even on our smallest lots. We are diverse in our abilities, quick to market, and responsive to customer demands. Give us a call to get your free samples started today!

FLEXIBILITY TO FIT YOUR

Rubber Blend Options:

What does your project demand? We have a blend for almost any need. **EPDM, Butyl, Nitrile, Neoprene, Flame Retardant, other specialty blends, and colors are available.**

CRUSHPROOF ANATOMY

Pitch:

Distance from A to B. Our tubes come in "stretch" or "spaced" style. This one is "spaced" because the convolutions don't touch each other.



Wall Thickness:

The thickness of the rubber, measured in 64ths of an inch. Available from 3/64" to 12/64", depending on hose style.

Inside Diameter (I.D.):

The space between the convolutions. Can be 3/8" to 6"

Bend Radius:

As low as 0"!!!

Laser Codes:

We can put a date, part number, company logo, or just about anything you can think of on the cuff.



Oval Shape:

We can make 3/4", 7/8", 1", and 1 1/8" ID tubes in oval shape as well as round.

Cuff:

That smooth attachment point on either end of the tube. Can be almost any length and as large or larger than the overall I.D.

Convolutions:

The ridges that give our tubes their strength. They can be spiral or annular (see page 4 for options).

NEEDS AND BUDGET!

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TUBE STYLES

ANNULAR

This tube style can be made with either spaced or stretch convolutions which are like a series of rings fused together. The spaced is shown at the top. It has distinct peaks and valleys and is very flexible. It can be compressed up to half of its relaxed length, depending on the wall thickness you choose. The second tube shown is a stretch style, and it can be expanded up to 4 times its compressed length, depending on the wall thickness used (thicker walls mean less stretch). The third picture shows how the convolutions allow a stretch tube to expand, making it look like a spaced tube. Annular tubes are available with inside diameters from 3/8" to 3" and are commonly used in breathing, bellows, boot, and farm applications.



SPIRAL

Tubes with spiral convolutions drain fluids and handle air very well. In simple terms, these tubes are made of a helix of one long convolution, just like the threads on a screw. The top picture shows the spiral stretch style of tubing. Just like its annular cousin, it has up to a 4:1 stretch ratio, but tends to torque slightly when fully extended due to the corkscrew nature of its convolutions. The lower picture shows a spiral spaced tube, recognized by its clear peaks and valleys. Spiral tubes are popular for air intake, drain, sleeve, and breathing applications and are also available in inside diameters between 3/8" and 3".



CORDED

Corded tubes are the heavyweights of our product line. They have thicker walls and require a different manufacturing process than our annular and spiral tubes. The result is a stiffer and more rugged tube with virtually no stretch or compression. They can be made with inside diameters from 1" to 6" and can have cuffs as well. They are not quite as flexible as the other styles, but can still take some tight bends, depending on the ID and wall chosen. Corded tubes are ideal for air intake, drain, fluid transfer, boot, vacuum, and exhaust applications.



ALL TUBE STYLES ARE AVAILABLE IN ALL RUBBER BLENDS.

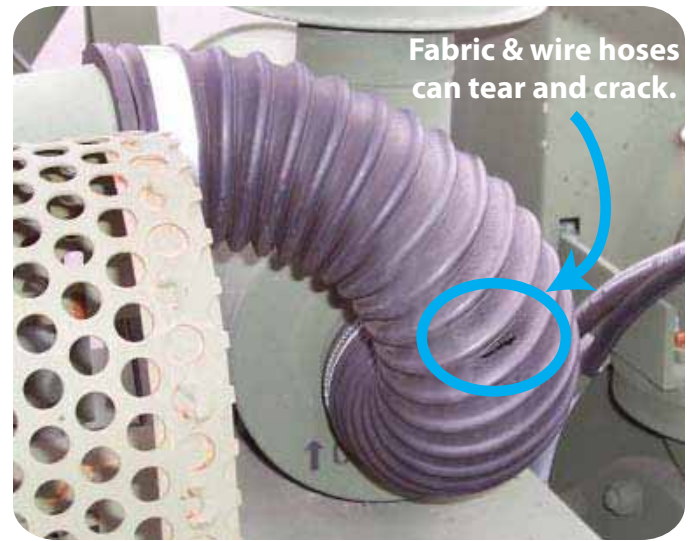
Crushproof offers custom air intake solutions in many shapes and sizes. Custom cuffs mean that we will fit better than the competition, especially against reels of traditional fabric and wire hose where you are trying to clamp over the wire.

In addition to construction, rubber has many advantages over plastic or fabric and wire hose as a material because it has excellent heat, chemical, impact, abrasion, UV, and weather resistance. The diverse manufacturing and compound options that we offer mean that we can solve air intake and exhaust solutions that ordinary hose simply cannot. For example, the photo on the upper right shows a Duetz pump, used by our military to pump fuel and water on the front lines, with a fabric and wire hose that developed a crack in it due to poor weathering properties. This problem was all too common for our troops, and our tubes solved the problem with better weathering, smooth cuffs for attachment, and better flexibility to make the tough corkscrew bend required by the pump.

We also supply air intake tubes for everything from golf carts and street paving equipment to corn stoves because our tubes fit inside almost any compartment. That is exactly what got us the business at a scissor lift manufacturer (lower picture). They were having trouble with their old air intake tubes coming loose when the engine was swung out for servicing and attachment was difficult due to odd cuff size requirements. They needed something that was flexible, compressable, and that had custom cuffs. We solved their problem with a tube that would move with the engine instead of fighting back and that installed faster and tighter. Their custom design solution had no R&D or tooling costs, and the new parts are almost the same price as the old ones that did not work, before labor savings!

Air intakes are only one side of the air moving equation when it comes to engine ventilation. Where there's combustion there must be exhaust, and our tubes will handle exhaust temperatures up to 600°F with proper air flow and fans in place, and are safe to use with a wide range of chemicals and gases. Those are just some of the reasons why Crushproof is North America's #1 manufacturer of garage exhaust hose.

What really makes us different from "ordinary" hoses? The secret lies in the patented Crushproof process that takes the advantages of rubber and adds to it by making the hoses cost-effective, crush-proof, and extremely flexible. In addition, we can typically get you from concept to free, custom samples in about a week...often faster. Our experienced sales team can help with specs and drawings too! With speed and service like that, why not try us today?



AIR INTAKE & EXHAUST

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BELLOWS

What do you need to cover? We can probably help.

With our diverse rubber blend options and custom cuff capabilities, our bellows can solve all kinds of design dilemmas. We offer stretch ratios of up to four times the compressed length in material and construction that is far more durable than fabric, rubber-coated (dipped) fabric, or plastic bellows. That means Crushproof bellows can survive conditions that would destroy other products, and all for a fraction of the price in many cases.

Most of the bellows on the market today are a combination of fabric, rubber, plastic, and wire and have higher stretch ratios than our parts, but this added stretch comes with a hefty price tag. In that sense, it is important that you only pay for as much stretch as the project demands. For example, similar items from a competitor commonly sell for 10 times that of a Crushproof brand bellows. If you only need a 3:1 stretch ratio, why pay extra for a bellows with an 8:1 ratio?

The top photo shows a Crushproof brand stretchable rubber bellows inside of a Bixby Energy Systems biomass stove. Bixby came to us after being frustrated by the high prices that their old bellows supplier was charging and was looking for something more cost-effective. Within a few days we had a working sample out to them, and a few weeks and a couple of design changes later they found a perfect fit at a quarter of the cost. The Crushproof brand bellows does not stretch as much as their old one did, but they did not need it to. Bixby Energy's call to Crushproof allowed them to trade in the extra stretch for some extra profit instead. Our solution worked so well for them that they they signed up for an air intake solution as well (page 5, middle photo). The flexibility and custom cuffing allowed them to improve performance and save on installation costs.

A British manufacturer needed 100 pieces of a long 'gator', as they call them over the pond, to cover a piston on a heavy piece of equipment (see lower photos). We found them some samples from our bone yard to show them what we could do and they liked what they saw. After a CAD drawing was done they approved the design and we made them a custom run of 'gators'. The parts worked as planned, and their design problem was solved.

Crushproof bellows cover joints, rods, wiring, and pistons, just to name a few. We can handle much higher temperatures than plastics and many dipped fabrics, we have blends for oil, acid, lubricant, or UV exposure, and will survive freeze-thaw cycles easily. Put our capabilities, free samples, and industry expertise to work on your next project or to replace your current part. Could your company save as well? Call us and find out.



Crushproof boots and sleeves are used on everything from robotic arms to oil wells and protect moving parts, sensitive equipment, and wires. Our wide range of rubber blends allows us to meet many difficult specifications, and the different construction methods offer you options between a very stretchy and flexible boot or sleeve to one that is stiff and fixed length. This allows our tubes to be used in small spaces with tight bends as well as on heavy equipment where tough and rugged boots are a must.

A gas fireplace manufacturer contacted us when they needed to have a heat and flame resistant sleeve to protect a bundle of wires leading into the fire box. Traditional plastic sleeves would have melted in this application, so we offered them free, custom samples in our flame retardant EPDM blend to best protect their tubes from the extreme heat. Our low cost solution to their problem worked, and Crushproof tubes are now being used in fireplaces all over America.

In addition to flame retardant blends, we also have materials resistant to petro-chemicals, nerve agents, acids, and thousands of other common chemicals and environmental concerns. With the diversity of resistances that our blends can offer, we should have something that fits your needs and budget as well.

Laser equipment manufacturers use our protective sleeves to keep dust and dirt out of sensitive areas, but our tubes are also effective for exhaust fume removal on cutting lasers as seen in the middle picture. We can post-cure our tubes to help eliminate the amount of off-gassing that normally occurs with rubber tubing, and that seems to help in this as well as a number of other applications where even minute amounts of particulate can be a problem.

Are you looking for a heavy duty boot? A car wash equipment manufacturer was, until they found us. They had a need for some joint covering boots that could handle all of the detergent, heat, dirt, grime, and freeze-thaw cycles that their products are subjected to. Due to their small production runs, our low order minimums were a perfect alternative to having something molded. We managed to solve their first design problem so well that they brought us two more to work on, and we fixed those too! All that was at no cost to our customer for samples or tooling, and those samples were made in about a week.

Crushproof Tubing Company's hassel free, no cost sample program is a great way to get your next project started, and our speedy response means you will be quicker to market--and making money ahead of your competition. With all that we offer, why not give us a shot today?



BOOTS & SLEEVES

- Free Custom Samples
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- No Tooling Costs

FARM DRILL & SEED

Crushproof Tubing Company has a half century of experience producing quality farm drill and seed tubes. Our 100% first-run EPDM rubber tubes have stood the test of time and are used by all the major farm equipment manufacturers. Our custom options and 4:1 stretch ratio have allowed us to meet nearly every application in the fields. We also offer a large amount of in-stock farm replacement parts that will fit almost any machine.

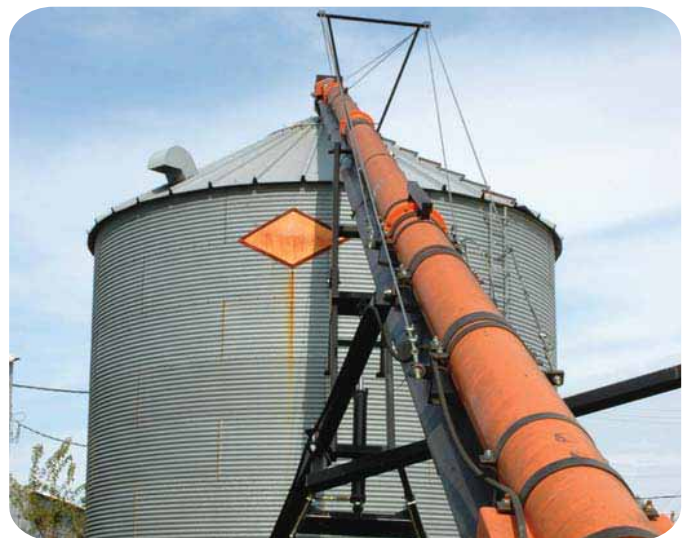
Our EPDM rubber tubes are specially designed for seed and fertilizer applications due to their excellent UV and freeze-thaw resistances. Those properties help to eliminate stress or thermal cracking, and bellows-style convolutions allow for the hose to stretch when necessary. All of our EPDM rubber blends have excellent tear, abrasion and ozone resistance as well. We offer two durometers, 60 and 75, as well, so you can choose between a softer or firmer blend.

Not only do we serve the biggest of the agricultural equipment manufacturers, we also take pride in helping the 10, 20, and 50 man outfits around America who build and service these machines. Our ability to make small runs of custom parts allows them to compete and keep their inventory costs down.

In addition to drill and seed tubes, we also make auger drop tubes, air intake hoses, boots, bellows, and protective sleeves. On augurs, like the one in the middle picture to the right, we provide flexible, rugged, and weather resistant drop tubes that out perform and out last plastic or stiffer rubber tubes. Our air intake hoses can handle the heat and grime associated with a big diesel engine, and our boots, bellows, and sleeves come in handy on all sorts of places inside tractors and combines.

We recently solved an air intake application for a customer that was up against a time deadline. They had originally decided to use a flexible steel tube for their air intake, but when it came time to build their five prototype machines the flexible steel was not up to the task. The customer had a deadline of three days to finish the prototypes. We met the challenge and got them the hoses they required to their exact specifications within the three days. The custom Crushproof Tubing solution was not only fast, but also provided a cost savings to our customer. They were able to get their project done faster *and* cheaper, a rare combination indeed.

Day after day, we receive calls from manufactures with a design problem that nobody else could answer. Our decades of expertise and knowledge allow for us to provide solutions others cannot. Why try and tackle a tough job alone when you have a supplier like Crushproof just a phone call away?



Do you need to effectively and safely move fluid from one area to another? Crushproof Tubing Company has been supplying drain tubes for many of the biggest names in the floor cleaning and washing machine industries for decades, and that track record of success as a supplier is a great demonstration of our value and service. Our drain and fluid transfer hoses are used on heavy equipment and in the petroleum industries as well, due to the flexibility and durability of our products.

Whether it is for petroleum products, fresh water, waste water, or harsh chemicals of all types, we have rubber compounds and hose styles to fit the most demanding applications. We have tubes that are safe to use with oils, kerosene, soap and detergent, hot liquids up to +500F, corrosive chemicals, and acid solutions, and will survive years of freeze-thaw cycles. For example, we manufacture diesel fuel transfer tubes for fire trucks that connect the refueling port to the fuel tank. This is a testament to the petroleum resistance of our nitrile blend. Plastic hoses cannot offer this range of protection and flexibility, not to mention the quick lead times and custom cuffing options available with a rubber Crushproof tube.

The sizes and styles of drain and fluid transfer hoses available from Crushproof are almost limitless. We even offer drain cap and plug assemblies like those shown on the lower right. These caps have ¼ turn removal and are securely glued into the end of the tube. We can put the caps in any style of tube as long as one cuff is 1.5" ID, and because we can make cuffs larger than the tube itself, 1" to 1.5" ID tubes can be capped.

The spiral convolution is the most popular form for drain hoses because of the ease with which fluids travel through the hose. We can make the spiral form in stretch or spaced style, allowing our tubes to fit many different applications. Annular convolutions work well for many jobs, but can collect liquid inside the convolutions (see page 4 for style options).

While the functional differences are great, the real strength of Crushproof is the experience of the people you will be working with. We know our tubes and we share our expertise openly with our customers to ensure that their design problems are solved quickly and effectively. With custom cuffing we can fit a wide variety of nozzles, connectors, couplings, and hose barsbs without the need for expensive custom fittings for attachment. This will simplify your design, give you a cleaner look, and save you money. At the end of the day, that is what we do here at Crushproof Tubing. Give us a chance to prove our value to your company at absolutely no cost to you. We take great pride in earning our customers' business. Let us try and earn yours.



DRAIN TUBES

- Free Custom Samples
- Low Order Minimums
- No Tooling Costs

BREATHING/DIVING

Crushproof Tubing Company has been a leading supplier of breathing hoses to most of North America's safety respiration and diving equipment manufacturers for decades. What makes us so successful is our ability to make extremely flexible, durable, and diverse styles of hose with short lead times, no molding or tooling costs, and consistent quality.

Since breathing safety is truly a life-or-death application, the number one goal is to protect the user of the equipment. With that in mind, it makes sense to use rubber instead of plastic for its superior UV, heat, cold, chemical, oil, and flame resistance. At Crushproof Tubing we are able to make all of our breathing hose styles out of any of our custom compounds, which allows us to meet very specific and challenging specifications. Standard EPDM rubber works for most applications, our butyl rubber has passed numerous nerve agent tests, and we also have a flame retardant blend that can withstand 12 seconds of methane torch contact and then self-extinguish.

Rebreather and BC equipment manufacturers the world over have looked to Crushproof Tubing for custom solutions to their design problems for over half a century. We are very well versed in what types of hose and material make these systems work best for the divers who use them. Our custom cuffing options make the connections as clean and safe as possible because we can enlarge one or both cuffs to an inside diameter much larger than that of the tube itself. Combining our custom cuffs with an oval tube shape can allow for a lower profile, less obtrusive hose with tight, smooth seals. For those reasons our oval tubes are very popular with BC manufacturers looking for a more durable alternative to the cheaper imported tubes we compete with.

The lower photo shows our tubes on two different models of rebreather. Titan Rebreather's Tomar Gross (right) has taken advantage of our sample program numerous times during the design process on his new product. He needed to quickly change the cuff size, ID, and length at different times before finding the perfect fit. Our process saved him thousands and our tubes work great for his rebreather!

Part of what makes working with Crushproof different is the personal attention and great overall value that we give to every customer, regardless of their size. We do not require you to spend \$3,000 on a prototype or \$40,000 on a mold, because our samples are free and we do not use molds to make our hoses. As long as you are willing to spend around \$1000 (which usually gets you a couple hundred parts), even if you only buy once, we can make your custom hoses at prices close to off-the-shelf goods.



Crushproof tubes are found in many different places in the medical and military worlds, but breathing and air transfer are the most common because our tubes really are crush-proof and the near-zero bend radius and ease of movement are far superior to other styles of hose. Multiple forms of rubber are available as well, allowing us to offer a tube that is compatible with almost any gas, chemical, or environment. Our hoses are also static dissipative, which is important in many sensitive applications.

Beyond breathing tubes, we also supply rubber convoluted boots, bellows, and sleeves that are used on numerous pieces of medical equipment, including wheelchairs and hospital beds for safety and aesthetic purposes. They cover wires, joints, springs and piston rods that would not only be unsightly, but potentially harmful to patients and hospital staff alike. Our anesthesia tubes, like the black one shown on the right, are used in the veterinary industry as well.

In today's terrorist filled world, mustard and sarin gas are unfortunate realities, and our butyl rubber blend helps to keep our troops safe from these hazards. It has excellent permeation resistance and flexibility, making it ideal for chemical safety suits*. While butyl is becoming more and more popular, EPDM breathing hoses are still the most common type that we make due to its excellent durability and overall protective properties.

Just like with medical equipment, we make much more than just breathing tubes for our troops. Our boots, bellows, and air intake tubes have solved problems on fluid pumps, helicopters, and portable satellites (pictured lower right), just to name a few. The inflatable satellite manufacturer needed to have a rugged tube that could collapse down when not in use, seal easily on their fittings, was very flexible, and was available in small production quantities. We found a solution to all those challenges, and now their product makes it easier to communicate in remote locations all over the world.

Day after day, we receive calls from medical and military equipment manufacturers and suppliers who need solutions to complex design problems. They come to us with questions and leave with answers...fast! Our decades of tube design and know how have made us experts and a supplier of choice. Put our skill and experience to work on your project and get a free, custom sample in about a week! With speed and service like that, why not try us today?

**We do not test, warrant, or certify our tubes for any application. Customer is responsible for all testing and certifications.*



MEDICAL/MILITARY

AIR INTAKE

BELLOWS

BC TUBES

SEED TUBE

REBREATHER

DUST COVER

WASTE WATER DRAIN TUBE

CONTAINMENT BOOT

FIREMAN SAFETY HOSE

PISTON ROD COVER

ANESTHESIA TUBE

DRIVE SHAFT COVER

FILL TUBE

SPACE SHUTTLE BREATHING HOSE

WIRE SLEEVE

SAFETY RESPIRATION TUBE

VACUUM HOSE

FLEXIBLE DUCTING

FUME EXHAUST

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