

Welcome from the Managing Director

Thank you for your interest in our innovative product. During the early years when we were developing Puncturesafe, our research revealed that there was a need for a good quality puncture prevention treatment for very high-speed vehicles that would provide a permanent seal and would last for the lifetime of the tire, but at that time there was no such product available. We believed that the sealants on the market were only suitable for slow moving construction industry vehicles and large trucks because large wheeled, low speed vehicles do not generate heat, stress or centrifugal forces that will eventually cause most tire sealants to break down or pull apart. We looked worldwide at the tire sealant industry that had developed over the years and after exhaustive testing we found that the large majority of tire sealants available did not work satisfactorily, indeed many caused other problems inside the tire. We did not find a tire sealant with the unique abilities and attributes that we currently find in Puncturesafe, but more alarmingly we discovered that many tire sealants contained Ethylene Glycol as an anti-freeze which even in miniscule amounts is lethal to humans and animals. Many tire sealant manufacturers worldwide are still using old technology and outdated polymers developed many years ago, still mixing their ingredients in a food industry mixer like a giant yogurt recipe without the application of heat. It is our opinion that a quality permanent puncture prevention treatment cannot be made without the application of heat and the principles of chemistry, for in order to incorporate all the attributes necessary for a good product, we believe the ingredients cannot be mixed cold.

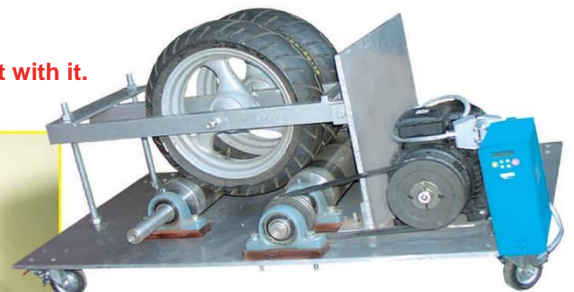
I had worked extensively in the laboratory for several years with the many specialty polymers that were being developed for industry. As such my experience with heat resistant polymers led me to believe that we could overcome the difficult task ahead and develop a high-performance permanent puncture prevention treatment that would be both fit for purpose and able to survive the hostile environment inside a high speed tire. We are a responsible company, conscious of health, safety and the welfare of all things living so therefore our puncture prevention would also have to be formulated with a nontoxic anti-freeze that would be just as effective as a Glycol. After a decade of development and exhaustive testing we successfully managed to achieve all our goals. With 21st century polymers, manufactured by ourselves from selectively chosen raw materials and cutting edge chemistry, in a proprietary process developed exclusively in the UK, we now manufacture a premier high performance permanent puncture prevention treatment. The most challenging part of formulating for high speed vehicles was to incorporate the ability of the sealant to thinly cover more of the inner tire "with increasing speed" instead of being driven by centrifugal forces in a very narrow band down the center of the inner tread area. Using "chemical nanotechnology", we invented a polymer gel that we trademarked "FlexxaGel™" that had an extraordinary ability to cling to rubber, even at speeds of 250 kph. Incorporation of FlexxaGel™ into the process also gave the finished sealant incredible elastic properties enabling it to stretch and flex at the higher speeds. FlexxaGel™ is exclusively manufactured at our Devon facility and is one of our most closely guarded trade secrets.

Our proprietary formulation has evolved far beyond that which is commonly known as a tire sealant - Puncturesafe is a tire safety system that is outstanding at permanently sealing punctures and a true tire life extender. The complexity of the formula, the proprietary polymers processed in-house and the high tech chemically engineered processing equipment required for manufacturing such a product means that no other company has yet managed to duplicate, or get close to what we have accomplished.



We manufacture 4 different grades which are packaged comprehensively for all markets. It has been the combination of an excellent product, consumer friendly packaging, informative point of sale material, and full back-up support and equipment that has given us so much success. As head of Research & Development and with very extensive knowledge of advanced polymer chemistry, I will ensure Puncturesafe remains the world's "number one" high performance permanent puncture prevention treatment for high and low speed vehicles well into the future.

It is a unique chemistry, be in your element with it.



The dynamometer above was used during the development stage to test Puncturesafe to the limit.

The wheels are capable of reaching speeds of 250kph on the rollers, with high loadings to simulate any type of vehicle in use.



The Puncturesafe Research & Development team (above) in our laboratory.



The difference at a glance

Will seal punctures permanently and for the life of the tire.

Will give you a controlled deflation if the integrity of the tire has been compromised.

Will evenly cover the whole of the inside of the tire “at all speeds” to prevent porosity in the tire and stop bead leaks -
Requires advanced chemistry.

Will not pile up in a narrow band down the center of the crown area owing to centrifugal forces - This is a common problem with many sealants and the advanced chemistry required to prevent this is our most closely guarded secret.

Will seal punctures over “the whole of the crown area” owing to Puncturesafe’s “total inner tire coverage.”

Will not seal punctures in the thin & flexing sidewall but **will** give a tell-tale sign with a controlled and slow deflation.

Will help extend tire life because of a much cooler inner tire because heat build-up is removed, by conduction away from the inner crown area, via the polymer gels sidewall coverage, to the wheel rim.
Plus, cold tires are less susceptible to punctures. (Rubber is a poor conductor of heat)

Will help extend tire life as the coverage over the “whole inner tire” eliminates porosity giving optimised tire pressures, with the added benefit of improved fuel economy and safer vehicle handling.

“**Will be manufactured using heat**” in an intricate process with over 15 polymers to give a solids content of 80% but only 20% liquid - rather than 80% liquid and only 20% solids which is common with sealants mixed cold with as little as one or two polymers - You cannot achieve the attributes you find in Puncturesafe with only one or two polymers or without applying heat and the principles of chemistry during the manufacturing process.

Will cure in the puncture to a **firm and flexible rubbery plug**, as opposed to something resembling modeling clay or something sticky and common with tire sealants formulated with just one or two polymers. These basic sealants initially seal punctures, but then fail as the plug dries and shrinks because of heat. This is because basic tire sealants with a high-water content that can bind fibre and rubber particles will, whilst still in their liquid state, initially seal a puncture in a tire, but fail as the plug dries and shrinks.

Will be water based for quick and easy clean out from the tire.

Will not vapourise or steam in a warm tire causing the tire pressure to increase to a dangerous level
- Requires advanced chemistry to achieve a complex azeotropic liquid base that increases the boiling point of liquids to prevent steaming. Similarly, when water binds the polymer chains via hydrogen bonding it increases the surface area, which causes the water to evaporate out of a polymer at the slightest increase in temperature.
Our unique chemistry prevents this from happening.

Will not over any length of time, break down or dry up inside a high-speed tire.

Will not over time lose any viscosity in the tire.

When heat and stress is applied to water based polymers inside a high speed tire, the polymers rapidly thin within a few thousand miles in a process called hydrolysis (decomposition of the polymer chains owing to a chemical reaction with water, during which molecules of water are split into hydrogen cations)
Our unique chemistry prevents this from happening.

Will not ball up inside the tire. Owing to the large difference in specific density between the heavy liquid polymer and the significantly lighter fibre and rubber particle solids, centrifugal forces normally cause these lighter particles to be forced in a reverse direction and collect on the inner surface of the polymer in clumps.
Our unique chemistry prevents this from happening.

Will not run to the bottom of the tire in a stationary vehicle.

Will be thermally stable at speeds of up to 250 kph - Very rare.

Will not rust or corrode rims.

Will condition the inner tire.

Will not void tire manufacturers’ warranties.

Will not contain Ethylene Glycol, an extremely toxic anti-freeze.

Will be non toxic - A result of years of Research & Development.

Will not contain Propylene Glycol, a non toxic alternative anti-freeze used by the food industry, but in our opinion a useless alternative in a tire sealant.

Will always comply with Health and Safety regulations in all countries.



FlexxaGel and The 80/20 syndrome

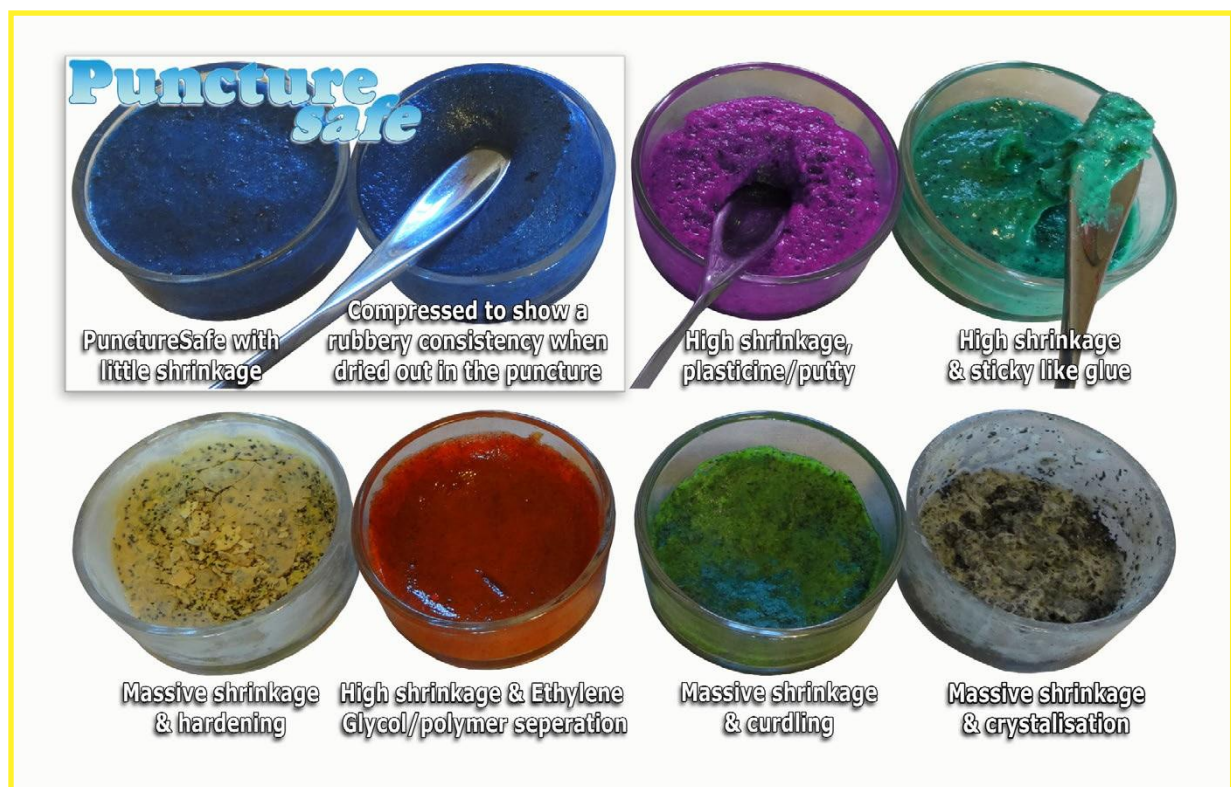
The seal is permanent because of two very important attributes of PunctureSafe:-

A/...there is no shrinkage of the drying polymer in the puncture because the gel is 80% polymer and only 20% liquid because we do not use cheap ingredients that bind huge amounts of water. It is common for similar products to be the other way round with 20% polymer and 80% liquid.

B/...The gel dries and cures to a firm, flexible and rubber consistency which means the seal will flex with the puncture causing no air loss over time.

It is a fact that any viscous wet compound containing fillers such as fibers and rubber particles will initially seal a puncture whilst in the wet state because wet compounds will flex with the tire in the puncture, but the problems arise in many of these "so called" similar products when the liquid escapes out of the puncture into the atmosphere causing the compound in the puncture to dry back to the original ingredients. When dried out these "so called" similar products will vary in looks and texture because of the vast difference with ingredients used in these tire sealants to such as:- Biscuit, Plasticine, Putty, Paper, Crystalline, Flour, Sticky pritstick, Bluetack, cement, clay etc. The descriptions and looks of many of these dried out products are never-ending, but it is a fact that in the wet state these gloopy tire sealants all look very similar, except in color, but that is where the similarity ends. Many of these compounds that have usually been formulated by people without any knowledge of chemistry whatsoever, once dried out in the puncture will eventually fail, resulting in a flat tire, sometimes within days or just weeks after the initial puncture.

The eight images directly below are of PunctureSafe and six "so called" similar products that have been allowed to dry out in a laboratory oven at 50 degrees C for 24 hours. When fully dry PunctureSafe has very little shrinkage and is flexible and firm which is the attributes required of a dried-out tire sealant in the puncture to permanently seal the puncture, and especially in the low speed market were punctures can be caused by puncturing objects up to 30 mm in diameter. It is our trademarked secret ingredient "FlexxaGel™" that gives PunctureSafe so many of its quality attributes.



The key features of Puncturesafe

Positive sealing capabilities: - A Puncturesafe seal is positive and secure thereby transforming any tire into a self-sealing tire. Puncturesafe High Speed Grade is capable of sealing tread area punctures caused by puncturing objects up to 6mm in diameter, HD Grade - 15mm and XHD Grade - 20mm as long as the puncturing object has not severely damaged or weakened the tire's structural integrity. Puncturesafe cannot create a secure seal in any tire that has major internal damage, regardless of the puncturing object's diameter. The sealing capabilities of Puncturesafe are unequalled by any other tire sealant in the world.

Eliminates most flats and blow-outs: - The majority of flats and blow-outs are a result of driver negligence. The number one cause being excessive heat generated from under-inflation as the overheated, under-inflated tire becomes soft and can be easily punctured. However under inflation also creates additional problems such as tread and ply separations - all primarily caused by porosity (natural air migration) which exists in all tires to some degree. Puncturesafe eliminates air migration and prevents the majority of damage caused by under inflation.

Extends tire life: - Puncturesafe helps maintain air pressure, reduces heat build-up and thereby increases the life of the tire. The added conditioners also help to retard pre-ageing within the casing.

Protects against under-inflation: - Puncturesafe has the ability to eliminate porosity, air migration and seepage and allows the tire to maintain proper air pressure. This in turn prevents rolling resistance and heat build-up which is the biggest cause of high fuel consumption and tire failure.

Heat reduction (Heat is the number one cause of damage to tires):- Puncturesafe contains specific ingredients which, helps conduction of additional heat away from the tire to the rim, the tire's natural heat sink. This results in a cooler running tire for any type of vehicle or equipment - regardless of use.

Safety factor:- Puncturesafe is specifically formulated to allow any serious and potentially dangerous puncture in a tire to deflate slowly and in a controlled manner. This attribute provides additional safety and aids to alleviate the hazards usually associated with blow-outs. Irrespective of the diameter of the puncturing object, Puncturesafe will not create a secure seal in a tire that has suffered major internal damage because Puncturesafe needs rubber recovery in order to work effectively. Cords play a vital part in rubber recovery, however Puncturesafe and air will bleed slowly out of a punctured tire that has suffered damaged cords, giving the driver a controlled deflation.

Lasts the life of the tire:- Puncturesafe's unique thermal properties, manufactured in a proprietary process, protects the polymers against heat and provides the ability to overcome the centrifugal force of a rotating tire. Puncturesafe's ability & performance does not diminish with speed, distance or time.

Protects the entire inner surface of the tire:- Puncturesafe provides a coating of approximately 3 to 4mm thick that clings to the entire inner surface of the tire, thereby providing protection at all times. The sidewall of a tire is very thin and flexes considerably, therefore any puncture in this area will not be positively sealed by Puncturesafe and the tire will deflate in a slow and controlled manner thus maintaining stability.

Water soluble:- In its liquid state Puncturesafe is completely water-soluble (for easy clean out) and when rinsed with water does not leave any residue, however once Puncturesafe has dried to a rubbery plug within a puncture it will not return to its liquid state. Standard repairing procedures can be utilised as normal.

Protection against rust and corrosion:- Puncturesafe contains a complete rust and corrosion inhibiting system that not only protects steel and alloy wheels, but will also protect steel belts in the tire once a puncture has occurred. Puncturesafe prevents outside contaminants from leaching back into the puncture which would cause the steel belts to rust or ply to separate.

Retards pre-ageing of tire casing:- Because Puncturesafe contains specific conditioners it has the ability to inhibit ageing from within the tire, thereby increasing the life of any tubeless tire casing.

Will not void any tire manufacturer's warranty:- Puncturesafe's unique polymer composition is completely compatible with every component in any tire and therefore will not void any tire manufacturer's warranty. It is also a fact that tire manufacturers can- not void a manufacturers warrant simply because a puncture prevention treatment is in a tire. They must establish first if the addition of a sealant to a tire caused such damage.





The main safety features of Puncturesafe, High-Performance, High-Speed Grade

Only seals punctures that are safe to seal

Puncturesafe does not have any of the failings that are inherent in many previous and most of the current products available on the market today. Traditional tire sealants contain large chunks of rubber particles that are incapable of sealing small holes in a tire, yet they will readily seal a large and dangerous hole or gash. Conversely, Puncturesafe contains only small rubber granules and synthetic fibres that when interlocked in a puncture are extremely strong. Puncturesafe will only seal punctures in the tread area that is safe to seal and which have been caused by puncturing objects no larger than 6mm in diameter and only if the hole is shrinking in size because neither excessive tire rubber has been lost or cord damage has occurred. These small punctures account for 90% of today's punctures in high speed vehicles. Any larger, either with or without cord damage and Puncturesafe will just slowly bleed through the hole giving a controlled deflation. In these circumstances air pressure loss in the tire will either stop or slow down at the lower pressures of 10 to 15 PSI, dependent on the severity of the puncture. This slower loss of air pressure prevents damaged rims and enables the driver/rider to maintain control and possible continuation of the journey, thereby removing the vehicle from a potentially dangerous location. Puncturesafe will not seal a puncture in the sidewall because the sidewall is much thinner and more flexible, therefore in the event of sidewall punctures a controlled deflation will usually occur.



Full and even coverage throughout the whole inner tire



Common with tire sealants is their inability to give complete crown coverage in a high speed tire, at best they usually only cover 60%, which becomes less as the vehicle increases in speed because more of the tire sealant is driven to the centre of the crown area creating a mound that can cause vibration at the higher speeds. One of the components of Puncturesafe is a polymer gel (**FlexxaGel™**) which has an ability to adhere to rubber even in a vehicle moving at very high speed. Although **FlexxaGel™** behaves like a glue and has properties similar to glue, it is not a glue. When the lateral movement of a vehicle throws the excess Puncturesafe over the whole of the crown area and sideways up the inner sidewalls of the tire, the properties of **FlexxaGel™** allows Puncturesafe to cling evenly over the whole inner tire surface at all speeds. This maintained crown and shoulder area coverage gives added heat dispersion to the rim via sidewall coverage due to conduction. Heat dispersion to the rim allows a cooler inner tire and cool tires are less susceptible to punctures. The gel's ability to seal porosity leaks over the whole inner tire helps maintain tire pressure, the tire becomes much safer and with extended tire life. Incorporation of **FlexxaGel™** into the process also gave the finished sealant incredible elastic properties enabling it to stretch and flex, uniformly covering the whole inner tire with increasing speed. **FlexxaGel™** is exclusively manufactured at our Devon facility and is one of our most closely guarded trade secrets.

Withstands the heat and stress in a high speed tire

Unlike most tire sealants, Puncturesafe's concentrated polymer gel formulation containing over a 15 polymers, rubber and fibre fillers, will not separate, ball or dry up, thereby withstanding the extreme heat and centrifugal forces that can be created in the hostile environment of a very high speed tire. In a closely guarded proprietary process, Puncturesafe is manufactured to stay liquid in a high speed tire for the entire lifetime of the tire, irrespective of its use. Compared with most tire sealants, the Thixotropic properties of the Puncturesafe polymers allow change from a very viscous gel to a thin liquid when the vehicle is at speed, yet returning immediately to a viscous gel when the vehicle comes to rest, and it is this feature that helps stabilise the polymers from eventual breakdown. The less viscous thixotropic polymers allows Puncturesafe to find a puncture immediately a puncture occurs in a tire. Most tire sealants pool on the bottom of a tire in a stationary vehicle causing vibration with each forward movement, but Puncturesafe stays firmly coated over the whole inner tire at all times. Puncturesafe's ability and performance is not diminished with speed, distance or time.

Outstanding at sealing punctures

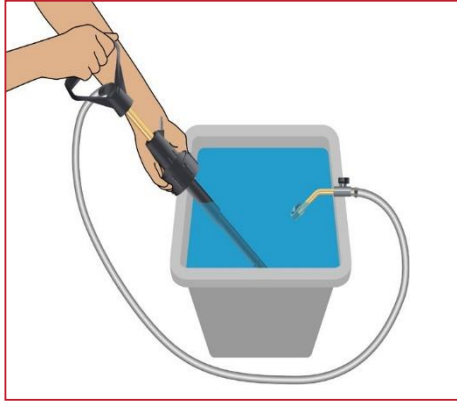
Puncturesafe's makeup is 80% polymer and 20% liquid which means its very high solids content dries to a flexible rubbery plug in the puncture without any shrinkage. The polymer gel suspends a special mix of highly fibrillated fibres and granulated rubber fillers which contribute to Puncturesafe's sealing abilities, so once the seal is in place it is permanent and will not fail at a later date which can happen with a conventional patch. **It is a fact that a tire treated with a quality puncture prevention treatment is a far safer tire than one without.**



Puncturesafe - in a league of its own

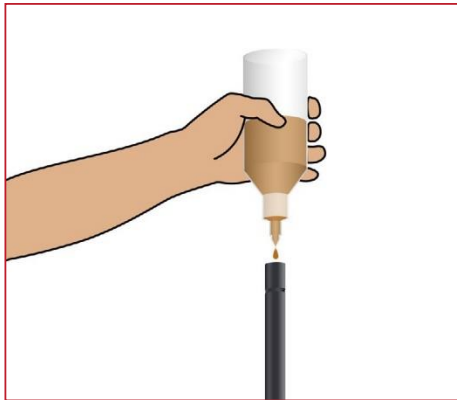


PUMP MAINTENANCE



1 Every 2 months place the pump suction end into a bucket of clean cold water and work the handle up and down whilst holding the pump body until the water runs clear. Usually for about 30 to 60 seconds. This will clear the ball valves of fibers that could cause the pump to malfunction.

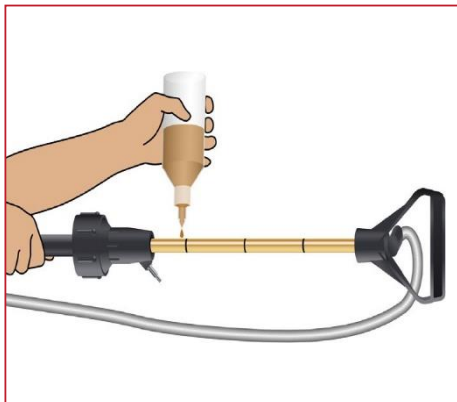
To clear the pump of excess water, remove from the bucket and pump. It is not necessary to remove all the water from the pump system.



2 Turn the pump upside down and apply a liberal amount of mineral/vegetable/3 in 1 oil to pass over the ball bearing and reach the oil seal located at the upper part of the pump body.

Activate the pump until it is smooth and easy to operate.

turn upright and allow excess oil to drain away, but it is OK to leave a little oil in the pump body because it will be absorbed by the sealant and will not affect the ability of the sealant.



3 Apply a few drops of the same oil to the brass shaft and activate the pump to spread the lubricant.

If during service the pump gets harder to work, doing all of these 3 service procedures will bring it back to life.



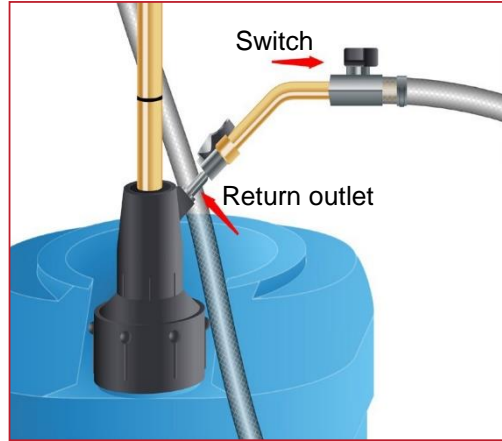
INSTALLATION GUIDE & PUMP MAINTENANCE

For more information on Pump maintenance and installation contact:
info@puncturesafecanada.ca

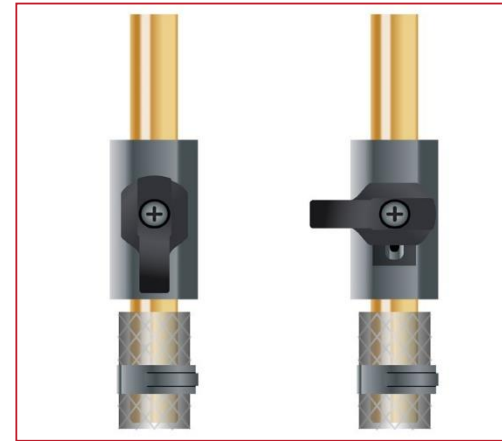


Place the pump into the 20 ltr container and twist the threaded socket clockwise onto the container thread until hand tight.

The pump is calibrated to inject 4 units of sealant for each complete downward stroke. There are 34 units in one liter.



Clip the dispensing end of the flexible tube onto the return outlet fitted to the pump body and open the ON/OFF switch.

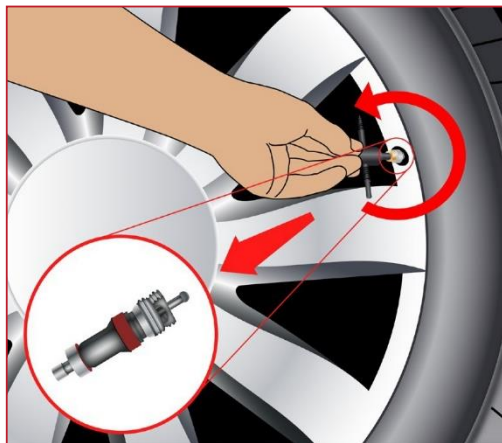


Switch open Switch closed



To prepare a new or clean pump, work the handle up and down several times until the flexible tube fills with sealant. Excess sealant will return to the 20 liter container via the return outlet.

Close the ON/OFF switch.



With the dispensing clip ready to fit onto the valve, remove the valve core by turning anti-clockwise using the valve core remover tool supplied with each pump.



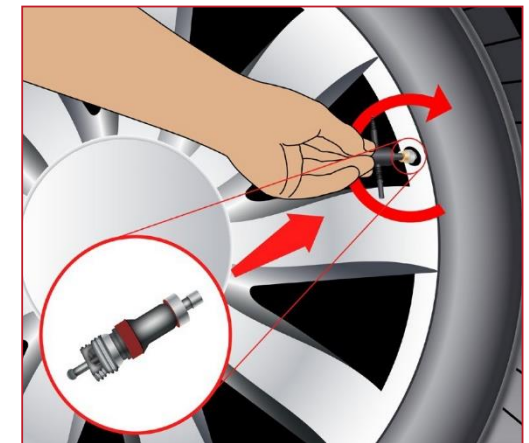
Once the valve core is removed, quickly clip the dispensing end over the valve to stop any further air loss and open the ON/OFF switch.

The pump will inject sealant against air pressures up to 90 PSI, so no need to deflate the tire.



Depress the pump handle to apply the correct amount of sealant for that particular tire, according to the downloadable installation charts located on the technical page of the website.

The pump is calibrated to inject 4 units of sealant for each complete downward stroke.



Once the installation is complete, close the ON/OFF switch and remove the dispensing end. Quickly replace the valve core to stop any further air loss.

Re-inflate the tire to the correct air pressure.