White Paper

The Roofer's Soldering Iron

Contents

The time to repair the roof
is when the sun is shining.

John F. Kennedy
(State of the Union Address, January 11, 1962)

OPULAR culture would have us believe that, for a long time, people lived in caves.
In reality, it seems that they lived mostly outdoors, occasionally seeking protection in natural rock shelters when they could.
They rapidly sought to improve their living conditions and began to build shelters to shield themselves from the elements. As the centuries went by, knowledge and skills were developed empirically.
In France, in the Middle Ages, many of these shelters had a roof made of wooden tiles known as '*bardeaux*' (shingles). Skills gradually improved and the activity of roof building was closely linked to the appearance of the carpentry trade, while craftsmen who built roofs covered in sheets of lead ('*plomb*') rapidly became part of the guild of plumbers ('*plombiers*').
It was not until the thirteenth century that a regulation concerning roofing trades appeared for the first time, which made a distinction between '*couvreurs*', who built new roofs, and '*recouvreurs*', who carried out repairs.
At the time, all worked under the authority of the '*Charpentier royal*' (King's carpenter). It is interesting to note that their apprenticeship lasted for six years and that a '*maître couvreur*' (master roofer) could only take on one apprentice at a time.
1328 : Roofers finally form their own separate guild. With the arrival of slate in the sixteenth century, the profession of roofer became well and truly established.
1556 : an edict institutionalized the profession and gave roofers an exclusive right to carry out roofing work, at the expense of masons, while forbidding carpenters from building wooden shingle roofs.

◀ **Father Soubise**
Carpenter and founder of the Compagnons passant du Devoir for roofers and plasterers
955 BCE

The dangerousness of the profession was also taken into account, as apprentices were no longer allowed to access roofs until they had completed at least three years of their apprenticeship.
This granting of access at the beginning of their fourth year of apprenticeship became the first rite of passage into the profession.
It was at this time that work sites had to be marked out, in order to inform passers-by that work was being carried out. Many signs were used, differing from region to region, such as a cross decorated with a brightly coloured cloth, a tile placed high up, or a stick visible from a distance.
In the nineteenth century, beggars were often tasked with performing this function, sometimes positioned around the site perimeter to warn passers-by of danger.
Lastly, roofers, with pride for their work, also took to adding their personal signature.
To do this, more often than not, they used the tools and materials at hand. With slate, they cut and assembled pieces to give them form.
Many of the signatures of the sixteenth century included symbols of the profession, such as the roofer's hammer, compasses, anvil and ladder.
Some literate roofers even added their initials, such as Jehan de Varennes, who used the outlines of a roof and hammer to represent the first two letters of his surname: V A.

Jehan de Varennes ▲
Roofer's signatures on slate roofs

▲ **Eighteenth-century roof**
Roofers at work

With the Industrial Revolution, the profession changed and labour (already) started to become scarce.
So, in *1887*, the *Chambre syndicale des entrepreneurs de couverture, plomberie, eau, gaz, assainissement et hygiène de la ville de Paris* opened a training centre: *L'École des métiers*.
It provided training in the theory and practice of roofing, as well as general education, for all those who wanted to join the profession. Future roofers received instruction in French, mathematics and physical education, as well as in the basics of technical subjects, such as geometry, technology and drawing. This was interspersed with practical exercises carried out in workshops or on school work sites.
Other training centres, based on this model, were rapidly created, such as *L'École Supérieure de Couverture en ardoise d'Angers*.
In *1926*, more than 20 years after Guilbert Express was founded, the CAP (*Certificat d'Aptitude Professionnelle*), a vocational training qualification awarded following a three-year apprenticeship, was created. In the first year, 57 roofers, 67 sheet metal workers and 116 plumbers graduated with a qualification.
The profession had succeeded in providing structure and the development of new tools began.

Early soldering iron ▶
Roofer's soldering iron from 1864

Petrol-fuelled roofer's soldering iron ▶

The first roofer's soldering irons, which appeared in the second half of the eighteenth century, were very basic indeed.
They came along with the development of zinc and copper roofs, which required the welding together of metal sheets.
They were comprised of a simple wooden handle, to which a block of metal and, soon after, copper was attached.
The block was heated beforehand in a brazier to raise the temperature of the soldering iron and melt the tin, which was generally used to join zinc sheets together. These early soldering irons were usually used in pairs, with one remaining in the fire while the other was used.This basic roof soldering method is actually still used today by some American craftsmen.
It is interesting to note that a mystique surrounding roofers rapidly grew in popular culture, and they often featured in the literature of the late nineteenth century, such as Émile Coupeau in Émile Zola's famous novel L'*Assommoir*, which was published in , in serial form, in the newspaper *Le Bien Public*.

However, this early system was rather inconvenient, as a worker (often a young apprentice) had to be assigned to the task of carrying the tools back and forth between the fire and wherever the work was being carried out.
It was not long before an alternative to this system was sought, by generating heat at the tip of the tool using a portable energy source.
With the use of petroleum first, and then petrol in the *1910s*, these early soldering irons began to approach something resembling portability.
The procedure required to start up the tool was, however, troublesome. Once the soldering iron's tank had been filled with petrol, alcohol had to be poured into a small dish under the burner and lit, in order to heat the burner to a temperature that would allow the tool to produce a relatively constant output.
In *1934*, the company Liotard invented and sold the first Butane gas bottle, via its subsidiary Primagaz, but it was not until the mid-1940s that industrial use of LPG (Liquefied Petroleum Gas) began. The major advantage of LPG is that it is very easy to store and transport.
This new storage method would enable significant developments in very many areas, including soldering irons.
Petrol became a thing of the past as the first, easily transportable, gas bottles were welcomed in as a fuel supply for soldering irons.
For roofers, this was nothing short of a revolution, which would lastingly change decades-long work habits.
From this time on, roofer's soldering irons could be operated with Butane-type gas and, soon after, expanded gas such as Propane[1].

[1] Note that most commercial gases (butane and propane) are actually mixtures. This means that commercial propane often contains some butane and vice versa. It depends greatly on the refinery that produces it and the country in which it is produced.

Butane / Propane

What are the differences?

Firstly, their boiling point, i.e. the temperature at which the gas vaporizes and leaves its container. The boiling point of butane is around 0°C, while for propane it is around -44 °C.
In other words, a bottle of butane gas requires a temperature of above
0°C to obtain an optimal gas flow rate. A bottle of propane gas, on the other hand, can be used at temperatures of up to -40 °C.
In both cases, the higher the temperature, the greater the potential flow rate. At 0 °C, butane will have a very weak flow rate (and low pressure), while, at 20 °C, it will deliver a significant flow rate, at higher pressure.
For roofers who work in all seasons, especially outdoors, using LPG, propane offers a clear advantage!

The modern roofer soldering iron was born and, with it, a new way for roofers to go about their work.

Refillable work-site ▶
gas cylinder

◀ **Hoseless roofer soldering iron**
with gas cartridge

Roofer soldering irons today

Many brands in France and around the world now sell high-quality roofer soldering irons, in various shapes and sizes. Similarly to the very first soldering irons, portable roofer soldering irons are «hoseless», as they carry their fuel with them, in a gas cartridge that generally clips into a specially provided slot in the tool. It provides operating time of around 90 minutes, which varies according to usage and weather conditions. It is generally the tool used by foremen, who carry it with them at all times in order to check soldering work carried out or quickly perform minor repairs on materials such as zinc, copper, stainless steel, pre-weathered zinc and lead. Ideally, it should be lightweight (usually less than 1 kg with a recharge), so it can easily be taken to any kind of work site. Offering equivalent performance levels to roofer soldering irons with a hose, it is very simple to operate, usually featuring an automatic «*piezo*[2]» ignition, so no lighter is required.

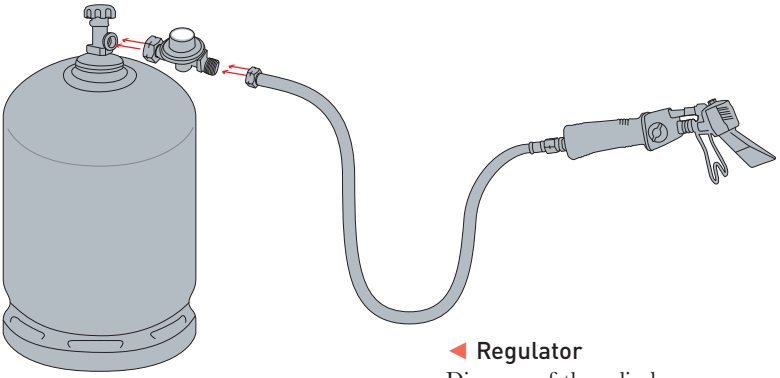
[2] The manual pressure exerted by the user on the soldering iron's ignition button produces an electrical voltage that is suddenly discharged in the form of sparks: these sparks light the gas in the burner, which then heats the copper tip.

The most sophisticated models include **self-maintenance** features, which enable the operator to change the main parts, such as the piezo ignition and nozzle, in a matter of seconds and with no tools required.
Its heating temperature (*around 600 °C*) is usually reached rapidly, depending on the quality of the gas cartridge, which should ideally contain a gas mixture such as propylene, butane and propane.
It should be easy and intuitive for roofers to operate. Operation is generally made much easier when the copper tip can be swivelled and tilted.
The quality of the copper tip is also a very important factor to take into account when choosing a hoseless roofer soldering iron.
The tool's excellence depends on the tip. This part should ideally be made of copper that is 99.99% pure, a level of purity that can only be achieved by an electrolytic process.
Hoseless roofer soldering irons can be found for around €200 at professional distributors, which are often the only channel that can provide after-sales services for the product in conjunction with the manufacturer.
When technology enabled gas to be stored in a cylinder, at the end of the 1940s, it became possible to develop roofer soldering iron ranges where the fuel was transported by a gas hose connecting the cylinder to the tool.
The modern roofer soldering iron was born.
Meanwhile, in order to ensure stable combustion, manufacturers naturally turned to **propane gas**.

▲ **Hoseless soldering iron**
A professional roofer working with a hoseless soldering iron

2-bar ▶
regulator for roofer soldering iron

The use of propane gas requires the fitting of a regulator[3] on the propane cylinder outlet, in order to regulate the output pressure to that of the roofer soldering iron's working pressure. Working pressure is generally around two bar.
This part is clearly very important and it deserves the roofer's attention when purchasing a tool and performing maintenance.
There are currently two main types of roofer soldering irons with a hose available.
Those with an «open flame» and those with an «enclosed flame».



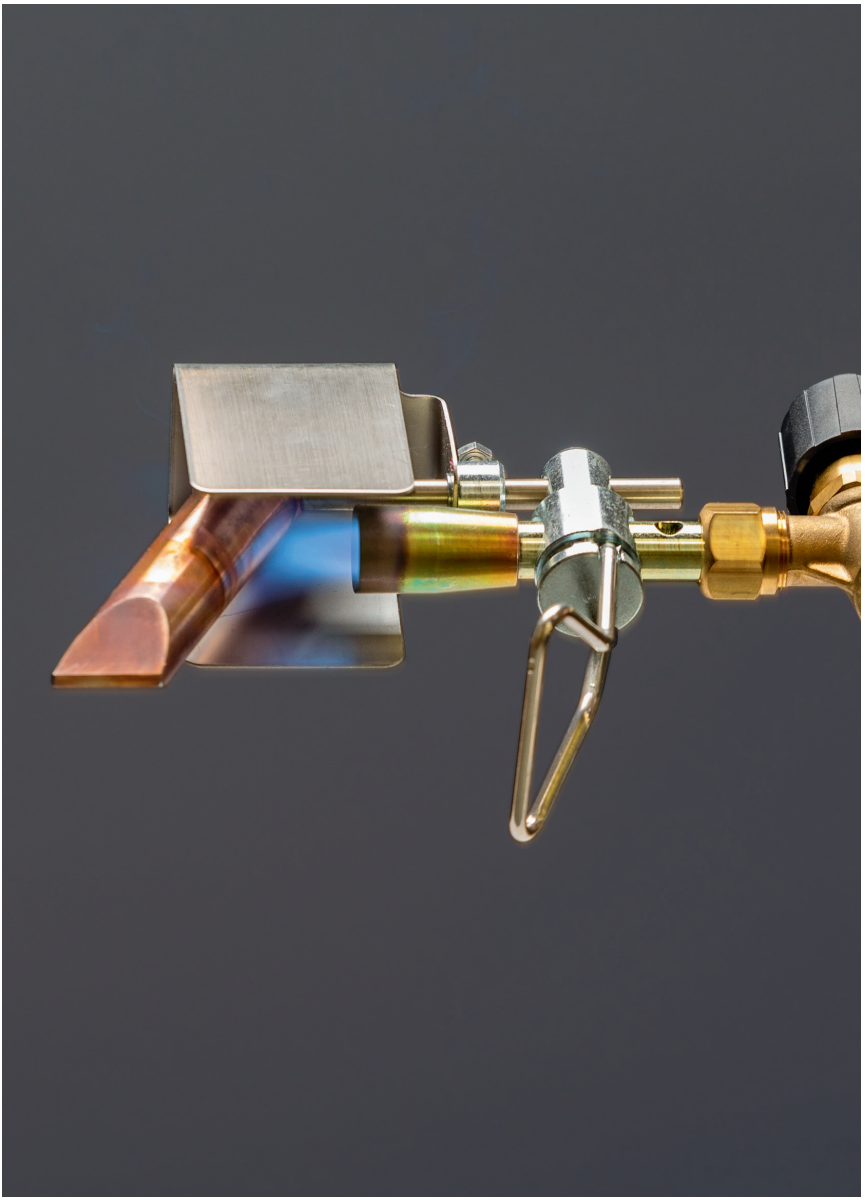
◀ **Regulator**
Diagram of the cylinder-regulator connection

[3] A regulator is a mechanism positioned at the outlet of the gas cylinder. It reduces the high pressure of the gas cylinder (7-8 bar for a propane cylinder) to a level that allows the gas to be used safely.

Open flame

As mentioned previously, the aim of the gas combustion is to feed a flame that heats a copper tip. This heat transfer can take place outside (where the flame is visible) or inside the tool (where the flame is enclosed).
There is no difference in the way they function; it is rather a question of the cost price and, therefore, sale price, as well as performance.
A roofer soldering iron with an open flame is more sensitive to variations in weather conditions and temperature, as even when it is fitted with guards designed *to protect* the flame, its quality can be affected by the wind and cold. This is why a roofer soldering iron with an open flame will usually be preferred for preparation work in the workshop.
It is interesting to note that this type of soldering iron is still very popular in Northern European countries.
In short, it is a basic tool, often used as a spare soldering iron by experienced roofers, who will not hesitate to give it to their apprentices to use in order to hone their soldering skills.
The price of an open-flame roofer soldering iron is generally lower than €80.

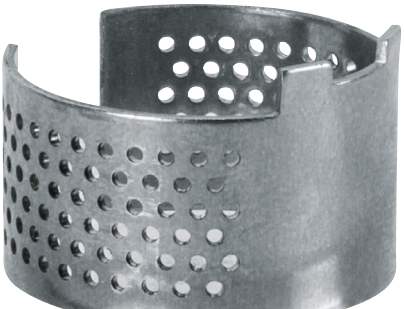
Open-flame roofer soldering iron ▶
Operating principle of an open-flame roofer soldering iron



Another popular technology

Roofer soldering irons with an enclosed flame

The vast majority of roofer soldering irons today have an enclosed flame, regardless of the manufacturer. These soldering irons provide greater control when used outdoors and are, therefore, more reliable.
The principle remains the same, i.e. internal combustion produces a flame that is directed at a copper tip, rapidly heating it to its operating temperature.
As with the hoseless roofer soldering iron, the normal operating temperature of an enclosed-flame roofer soldering iron is of the order of 600 °C.
Modern roofer soldering irons usually have a knob to adjust the temperature, with a good deal of precision.
The same factors are important for both enclosed-flame soldering irons and hoseless soldering irons.
The quality of the tip, reliability of the **regulator** and precision of the **nozzle**, as well as an ergonomic, lightweight and sturdy design, are factors that must be taken into account by professional roofers when choosing a tool.
Some of the more modern roofer soldering irons also use sophisticated technology to achieve more precise and efficient combustion than with an ordinary soldering iron.



◀ **Grille**
for roofer soldering iron

Roofer soldering iron ▶
with enclosed flame

It is *a grille designed for roofer soldering irons*, placed in the burner, which acts as a «regulator» by spreading the flame more evenly in the burner. Thanks to this technology, only the tip receives the flame, enabling more precise heating and greater efficiency.
This grille should always be carefully inspected, as often, due to a lack of maintenance or too sudden cooling of the soldering iron, it can dilate or move slightly in its slot, preventing it from properly carrying out its function.
With this in mind, major brands often sell ready-to-use packs containing all of the accessories needed to use the roofer soldering iron immediately.
They include the soldering iron itself, as well as a rubber hose (at least 4.75 metres long) and a regulator for use with propane gas.

◀ **Roofer soldering iron carrying case**

Hose ▶
for pre-fitted roofer soldering iron

The quality of the **rubber hose** is also essential, both in terms of reliability and safety.
It is a spare part that has to be replaced because, depending on how the tool is used, it will become worn and is often damaged at the connection with the soldering iron.
Roofers need to pay careful attention to this part, which must meet very strict standards, such as NF EN ISO 3821.
While it is usually sold pre-fitted and with connectors, for basic products it is sometimes supplied alone.
In any event, compliance with the applicable standards is very important when choosing a hose, whatever the price.
In the case of a hose supplied alone, roofers should use suitable connection kits, bearing in mind that the threads on gas products are always in the opposite direction from traditional nuts.
Furthermore, certain older roofer soldering irons use hoses with a diameter of 8 mm, while modern soldering irons use hoses with a diameter of 6.3 mm.
Great care is required to make sure the correct connection kits are used.

◀ Kit
with 2 nipple connectors for hose
with 3/8" left-hand-thread nut

Gas must always be used in accordance with the manufacturer's instructions, in order to avoid accidents, which can sometimes be very serious.
In order to prevent premature wear of the hose, some manufacturers supply swivel connectors, sometimes even with an elbow.
A swivel connector will slow down wear of the hose (in conditions of normal use) and prevent it from becoming tangled, making the soldering iron much easier to handle for the user.
This type of connector is sometimes integrated directly on handles that are sold alone by manufacturers.
They make working much more pleasant and ensure the durability of the hoses they are attached to.
As with any sophisticated tool, the usable life of a roofer soldering iron will depend greatly on how it is used and how well it is looked after.

▼ **Handle**
with an elbow swivel connector

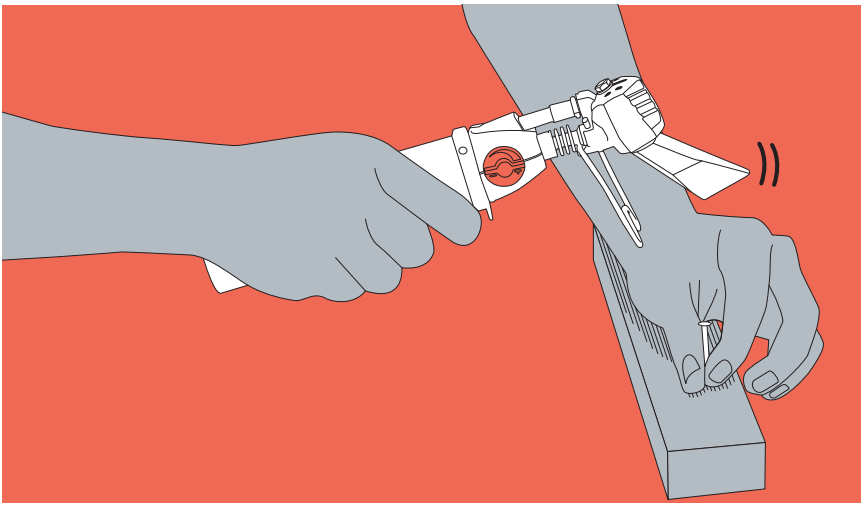
Choosing the right roofer soldering iron

While most manufacturers that sell this type of product are serious companies that have been operating in the sector for a long time, sometimes more than a century, both production and design quality can be issues that affect product lifetime.
This is why it is advisable, when choosing a roofer soldering iron, to take into account both the manufacturer's reputation and its ability to provide decent after-sales service.
The availability of spare parts is also an important point that roofers need to pay attention to when equipping themselves, as certain retailers do not want the bother of selling spare parts for a few euros.
With this in mind, it is a good idea to go for a brand that offers spare parts for sale online.
Certain manufacturers in the Far East and Eastern Europe offer only *attractive prices* as sales arguments, and roofers who run into problems with their equipment when on the job will, all too late, appreciate the truth in the phrase '*you get what you pay for*'.
When it comes to brands with a well-established reputation, sometimes very little is required (i.e. a little bit of care for the tool) for the roofer soldering iron, whatever its type, to provide the service that users deserve.

1905 | 2020

◀ **Guilbert Express**
serving roofers since 1905...

▼ **A roofer soldering iron**
is not a hammer!



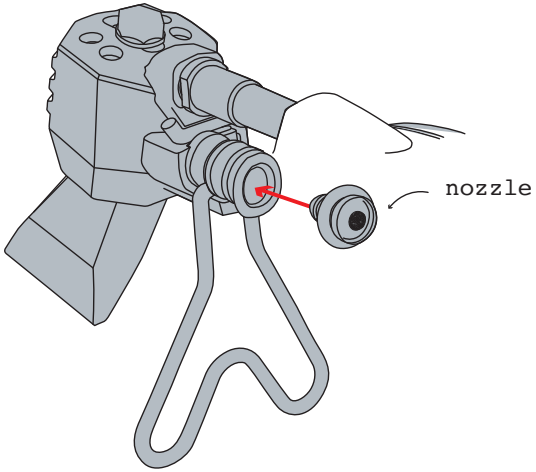
It is all too common on work sites to see tools thrown around or used for purposes that they were not designed for.
It is important to remember that a roofer soldering iron is neither a hammer nor a lever, and that its hose should never be used as a rope to lift a bucket full of tools!
You may smile, but these are examples of commonly observed work-site behaviour. Sometimes it is no surprise when a tool doesn't work properly!
As with any technological tool, a roofer soldering iron should be used for its intended purpose and rapidly stored away in a safe place following use.
It should be cleaned with a soft cloth and it is recommended to store it in its carrying case when it is not being used. Its maintenance involves more than this, however.
It is advisable to regularly perform maintenance for the various parts and test the tool to see if it is working properly before bringing it on a job!

Among the main points to pay attention to

the nozzle

The primary function of the **nozzle** is to ensure that the fuel is properly sprayed into the burner.
It can sometimes get clogged up with impurities in the gas cylinder or from the work site itself.
It should therefore be regularly inspected and cleaned.
Its diameter is designed for optimal transfer of the gas mixture. It is, therefore, advisable to never use a needle or any other object that could widen its diameter, such as a drill, so as not to affect its performance.
It should be cleaned in the following manner. Remove the nozzle manually.
Never use pliers on the outer edge, to avoid damaging the seal and preventing the roofer soldering iron from working properly.
It should be cleaned with a suitable gentle solvent (the manufacturer should be able to recommend a type to use), which will not damage its coating.
It should then be blown with compressed air, always in the opposite direction of the gas flow.

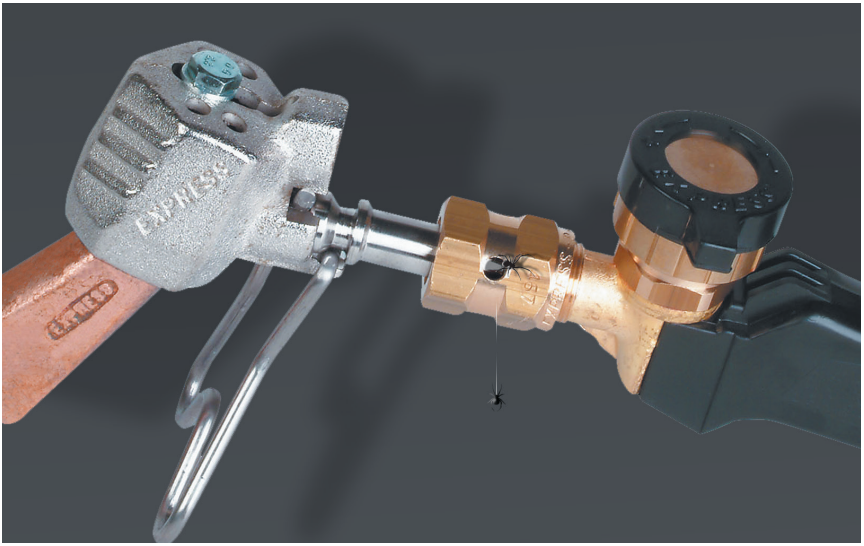
Nozzle ▶
for piezo roofer soldering iron



This is because, if any impurities have entered the nozzle, it will be easier to remove them in this direction; otherwise there would be a risk of pushing them further up the nozzle.
The front of the nozzle should also be carefully cleaned with a cloth.
A file or sandpaper should of course never be used. Doing so could block or deform the nozzle orifice.
If you are in any doubt, do not hesitate to simply replace the nozzle with a new one.
Note that each roofer soldering iron brand has its own models.
Always make sure that you use the nozzle recommended for your roofer soldering iron model by the manufacturer.

The venturi

Another roofer soldering iron part that requires regular maintenance is the venturi. This metal part narrows the diameter between the combustion orifice and the nozzle, causing the gas flow to accelerate and, therefore, improving combustion, without it being necessary to change the gas output pressure.
Over time, however, rust can accumulate around the neck and air suction holes, which can also cause the roofer soldering iron to malfunction.
It is also not rare to find cobwebs or muck in the venturi, from previous work sites or even one in progress.
You will need to remove the nozzle, push the nut forward, unscrew the venturi, take out the nut, clean the venturi using a metal or nylon bottle brush, and then reassemble the parts by doing the same in reverse.
In any event, it is always best to protect a roofer soldering iron as soon as it is no longer in use and when it is in storage.



The gas hose

The gas hose is a key part of a roofer soldering iron set, as it performs the function of transporting the gas from the cylinder to the soldering iron.
Its maintenance is therefore of crucial importance, both for the proper functioning of the tool and the user's safety.
It is sometimes said that the gas hose does not require care as it would be too difficult for the user to perform any maintenance.
Nothing could be further from the truth.
Beyond the initial choice of hose, which determines its intrinsic qualities (hence the importance of checking that it complies with applicable standards when purchasing), it is mainly by inspecting the hose that users will be able to detect any risks it may present.
According to the French association for manufacturing technologies (*Syndicat des Machines et Technologies de Production* – SYMOP), flexible hoses should be replaced if a visual inspection reveals any damage.
Damage may be caused by the hose being torn out on a work site or through contact with a sharp object.

A hose should also be replaced at the latest once every three years, in the event of intensive use, and, in any case, five years following its first use. Many details should alert users to the need to change their hose, such as **the presence of a bend, a fold or abnormal local deformation.**
Attention is required in the event of insufficient rigidity in a section of the hose (due to bursting of the braid, for example) or a bulge.
The same is true in the event that **fine cracks** or visible ageing of the hose is observed. In addition, users should not hesitate to change their hose **if it is impossible to determine its origin** due to a lack of clear identification or **illegible marking**.
If the hose changes colour, this is also a sign that the user needs to change it.
Similarly, in the event of **excessive rigidity**, which could potentially cause the hose to break, or various materials adhering to the hose (tar, asphalt, glue, mortar, cement, etc.), it should simply be discarded and immediately replaced.
Even when all the necessary precautions are taken, however, a roofer soldering iron may sometimes not work as it should do.
Generally well designed, **a roofer soldering iron sold by a reputable brand very rarely breaks down** to the extent that it cannot be simply fixed on the spot by its owner.
Below are some tips and checks that should be carried out before returning a product to its manufacturer.

A hose that can no longer be used ▶
is often visible to the naked eye

No gas is coming out

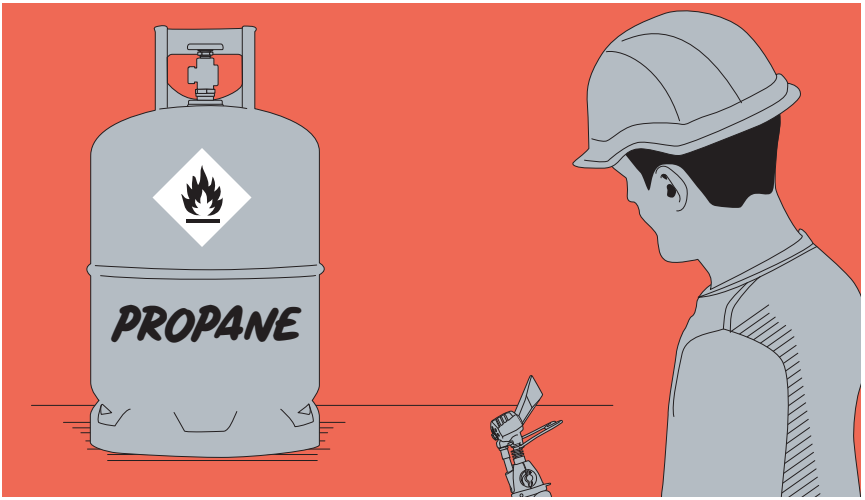
A very common problem encountered when using a roofer soldering iron is that no gas is coming out, which is often simply because the **cylinder valve is not open**!
This happens more often than one might think, even to experienced users. The solution in this case is obviously to **open the gas cylinder valve**!
However, this problem could also be caused by **the regulator not being reactivated**. Open the gas cylinder valve and reactivate the regulator by pressing on the button for 3 seconds.
If still nothing happens, **it could simply be because the nozzle is blocked**.
In this case, refer to the section of this white paper that deals with the nozzle, in order to unblock it, by carrying out a standard maintenance operation, or simply change it as a precaution.

Turn on the gas ▶
it's easy to forget…

The tool lacks power

It may be that **the operating pressure is not compliant with the pressure recommended by the manufacturer.** Check that the operating pressure meets the specified pressure for the tool, which is generally 2 bar.
Once again, if this problem is encountered, it could be **that the nozzle is the cause** and is partially blocked, for example by dust on the work site.
In this case, the previously mentioned procedure should be carried out in order to remove any impurities and return it to proper working order.
If the tool lacks power and the temperature outdoors is near 0 °C, **it may be because the gas used is not propane** but butane, which does not perform well in sub-zero temperatures.
Roofer soldering irons will not be able to operate in such temperatures with butane gas.
Only propane is recommended in cold weather.
In this case, change the butane gas cylinder for a propane gas cylinder.
A roofer soldering iron may also lack power if the **operating pressure is not compliant with the manufacturer's recommendations.**
Bear in mind that, in the majority of cases, the pressure recommended by manufacturers is 2 bar.
If it is not compliant, the user must adjust to the recommended pressure and the roofer soldering iron should return to its normal power.

Propane ▼
is *the* gas for roofers



Pressure can be checked on the pressure gauge ▲
if the regulator is equipped with one

Flame outside or too large

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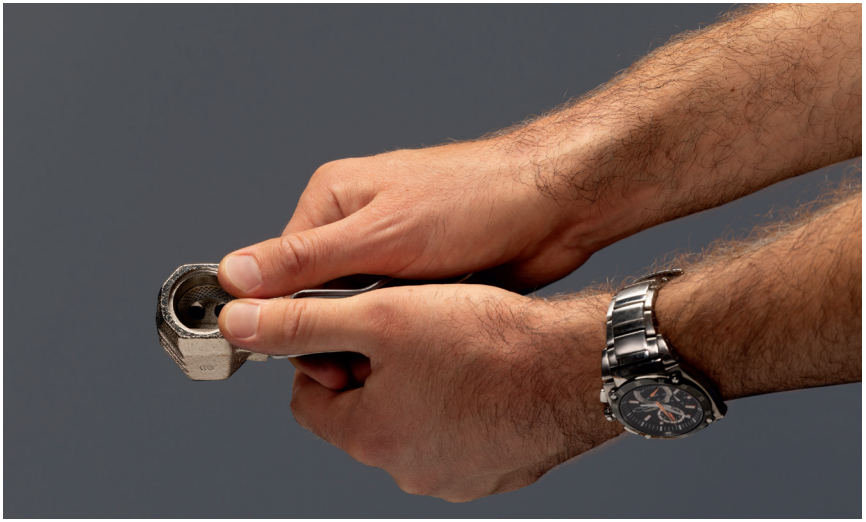

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Often seen on work sites, this malfunction can be caused by **the absence of a nozzle**.
If, after checking, the nozzle is indeed missing, the roofer soldering iron will need to be fitted with this part, which is essential for it to work properly.
If there is a nozzle in the soldering iron, **it may simply be loose or poorly positioned**.
The user should then **tighten or correctly position the nozzle** in its slot.
If the user sees that **the nozzle has been modified, filed or re-drilled**, it is very probable that this alteration (most likely poorly executed) is affecting the roofer soldering iron's ability to function as it should.
The solution in this case is to **discard the nozzle and replace it with a new one**.
This problem may also be caused by a **loose venturi**.
Once again, to ensure proper functioning of the roofer soldering iron, **tighten the venturi**, taking care not to apply too much torque.
The role played by a **roofer soldering iron grille** was discussed above.
The problem of a flame outside that is too large is often due to the absence of a grille on the roofer soldering iron.
In this case, **a new grille** should be correctly positioned in its slot, in order to ensure that the roofer soldering iron works properly and regularly.
Before closing the head of the roofer soldering iron again, it is important to check that the new grille is correctly positioned, otherwise it will not perform its function properly and the problem will persist.
The problem dealt with in this section may also occur **when the roofer soldering iron's grille or venturi are rusted**.
This is one of the reasons why it is advisable to always protect your roofer soldering iron when it is not in use.
If traces of rust do appear on the grille or venturi, however, they should be carefully cleaned.
Following this, the same care should be taken to ensure that the cleaned parts are correctly put back in place.

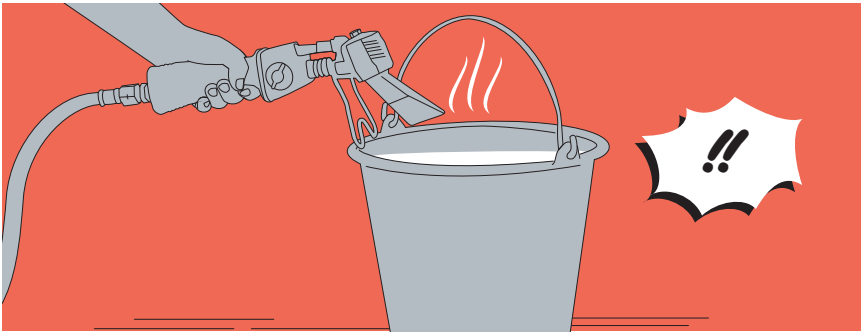
◀▲ A yellow flame that is too high is the sign of a malfunction

◀▼ Replacing the grille

A yellow flame is visible
above the head of the roofer soldering iron

This is often a sign that the nozzle is either missing, loose or poorly positioned.
In any case, the user should immediately reposition, or change if necessary, the nozzle in the roofer soldering iron.
Once again, a rusty nozzle or venturi can cause a yellow flame to be produced.
The same procedure as above should be followed to address this problem.
Once again, faced with this type of situation, the user should pay particular attention to the supply pressure of the roofer soldering iron.
Insufficient supply pressure may also cause a yellow flame to be produced.

To conclude this white paper on the roofer soldering iron, we have seen how much it has evolved since its beginnings to become a reliable and essential tool for professional roofers today.
We have also seen that it is a technological tool that should be used and looked after with great care, bearing in mind that, as with any tool powered by gas, its use may involve risks, which will be kept to a minimum if the manufacturer's recommendations are scrupulously followed.
Users should also be guided by common sense, which is sometimes a rare commodity!
A roofer soldering iron is not designed to be put in the microwave, frozen or disinfected in boiling water... We are not making any of these examples up.
So, in keeping with common sense, a roofer soldering iron should be used for soldering and nothing else!
This is why a roofer soldering iron is always supplied with instructions that apply specifically to the model purchased by the roofer.
While instructions for these types of product may be the last thing we want to look at, common sense tells us that they must be carefully read before using the product, given the potential hazard of a gas-powered tool.
Whether you are a professional roofer, a construction company, or an experienced DIY enthusiast, you must never skip the instructions.
Reading them will save you precious time when working with your roofer soldering iron, which, for a long time, will give you all the satisfaction a buyer of a high-precision technological tool is entitled to expect.



▲ **Even if you are in a hurry**
never cool down your soldering iron in a bucket of water

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