

# Maximizing Water-Cooled TIG Performance

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**Weld Like a Pro**  
An ARC-ZONE.COM  
Product Selection Guide

General

▶ MIG/GMAW ▶ TIG/GTAW ▶ Stick/SMAW ▶ Plasma ▶ General/Multiprocess

## Introduction

Most of us are all too familiar with TIG torch failure. However, by properly setting up your equipment, you can minimize your chances of TIG torch failure while maximizing performance and reliability.

Surprisingly, about half of the TIG torches in the field are hooked up incorrectly and water coolers are usually installed and operated with factory settings. In most cases, these settings are not ideal for TIG applications, and need adjustment to provide proper water flow and maximize torch and cable life.

Setting up and maintaining your water-cooled TIG welding system includes properly installing your torch, correct setup of the water cooler and regular preventative water cooler maintenance. By setting up your water cooled TIG torch and water cooler correctly you can improve the efficiency of your torch, which ultimately means you can keep on welding longer, and your torch will last longer too.

## #1 Use a Water Cooler

While connecting to your city water supply is an acceptable method for cooling your water-cooled TIG torch, Arc-Zone recommends using a closed loop water cooling system for optimal cooling. Plus, you'll have fewer hoses to contend with, and you'll lower the risk of contaminants or particulates clogging up your torch.

## #2 Install Your Torch Correctly

It's important to make sure the coolant flow is set up correctly, directing cool water into the torch, and returning the warm water back to the water cooler.

Connect the TIG torch water hose (small left-hand fitting) to the water cooler's water out connection, returning the water through the power cable (large left-hand fitting). You'll send cooled water to the head of the TIG torch (the heat source), and return it to the cooler via the power cable. The result is maximum reliability to all components of the torch assembly.

If you have an older TIG welding machine, do not use the solenoid in the power supply to control water flow. This can cause a pressure surge in the torch, and unnecessary wear and heat in the coolant pump. The solenoid should only be used when connecting to a city water supply.

## #3 Correctly Set up Your Water Cooler

Correct water cooler setup is important and often overlooked. All Bernard style water coolers, for example, are shipped from the factory preset at 60 psi discharge pressure. This setting is above the pressure rating for the standard vinyl hoses on TIG torches, and produces a flow rate greater than what is needed for adequate torch cooling and maximum cooler efficiency. Generally 50 psi is the recommended maximum output rate for TIG torches. Refer to your water cooler manufacturer's literature for instructions on adjusting the pressure.

Put a pressure gauge on the output of the pump. The pressure is normally set at 50 psi. A drop in pressure could indicate pump failure.

Water coolers should be connected directly into the 110-volt plug available on most TIG power supplies. That way, you're sure the cooler is running when the power supply is on. And, you're sure you're providing your TIG torch with adequate cooling at all times.

## #4 Perform Flow Tests

It's a time-consuming process to check the discharge pressure on a water cooler. Therefore, coolers are most often set by flow tests. The desired flow rate is 1 quart of water flow per minute for most TIG torches. In the case of the Micro TIG torch, the water flow should be set at 1 pint per minute, or half the rate of regular TIG torches.

A greater flow rate is unnecessary because it provides no additional cooling, and in fact, subjects the torch to high pressure reducing the efficiency of the water cooler by sending the heated water through the radiator too quickly.

## #5 Use Distilled Water

While your TIG torch is a robust tool for welding, it includes many finely engineered parts that may be sensitive to chemical additives in city water. By using distilled water, you eliminate the chances of introducing these into your TIG torch.

## #6 Do NOT Use Automotive Antifreeze

Even though you may be tempted to use automotive antifreeze in water coolers, don't do it! Automotive antifreeze includes coagulants designed to plug small leaks. This works fine in your car, but not your TIG torch. Blocking these small passages for water that cool your torch can result in overheating and ultimately torch failure.

## #7 DO Use a Coolant

Arc-Zone offers Defense brand coolant. This pre-mixed solution will provide freeze protection to 20 degrees Fahrenheit and will dramatically extend pump life.

## #8 Perform Regular Maintenance Checks

- Check for free airflow by shining a light through the radiator fins. Use an airline blow-off gun or water hose to clean the radiator. Be careful not to use too much pressure, however; the aluminum radiator fins are very fragile.
- If the radiator is very dirty, remove the hood and flush the radiator from the inside out.
- Turn on the unit and visually check the water flow. Any change can be a sign of pump failure, a crimped cooling line or a plugged water filter.
- If the radiator becomes coated with greasy welding and grinding dust, remove the radiator and soak it in a mild soap solution until it's clean.
- Clean any pump filters and strainers by rinsing with clean water.
- Clean the tank and refill it with clean distilled water and coolant for water coolers.
- Check the fan and bolts on the motor and pump, making sure they are secure.
- Blow dust out of motor. If there is excessive greasy film on the motor, flush it with an electric solvent.
- Put about 10 to 15 drops of oil in each end-bearing of the motor.
- Check and replace frayed or loosened electrical cords and worn water hoses.

## #9 Never Operate a Water Cooler Without Coolant

Always check the water level before operating the water cooler, making sure there is adequate water for proper cooling.

Operating the water cooler without fluid will cause serious damage.

## #10 Use High Quality Hoses and Connectors

To switch TIG torches easily and quickly, use a quick connect water hose coupler. They mount easily on your cooling equipment and include a hose adapter for your TIG torch. This allows you to change torches without tools!

Make sure you use high-quality hoses and fittings that provide consistent coolant flow, and make sure hoses are free of kinks that could restrict water flow.

# About ARC-ZONE.com

## Jim Watson

Jim is CEO and founder of Arc-Zone.com. He is a master fabricator with years of hands-on experience in his own shop and also as a winning motorcycle racer, car builder, and chief mechanic for a top motorsports team. He also has extensive experience in manufacturing, technical sales, and product development. Before launching Arc-Zone.com, he held leadership positions in some of the most respected companies in the welding industry.

## Arc-Zone.com

Under Jim's direction, Arc-Zone.com has led the industry in product innovation and online sales and service, becoming the world's leading supplier of high-quality, high-performance welding and metal working tools and accessories.



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