

## De-rusting metal

For some time I have been looking for a good, cheap ways of cleaning metal.

The following are details of 2 methods.

The first is rather slow and will not remove rust if it is coated in any way e.g. oil or paint etc. the part needs to be immersed in the mixture. The ingredients are Water and Molasses in a ratio of 8 to 1. I use a 25 litre steel drum, a plastic one will probably last longer. It works better at higher ambient temperatures, but not with artificial heat.

It doesn't seem to affect aluminum.

It can be used on any rusty steel, though it needs to soak, depending on the severity, up to 4 weeks. I have put a lightly rusted water-pump in overnight to find it like new the next morning.

I have an engine block in another container, which has been in there for 3 weeks and the water jackets are almost rust free. It gets into all the nooks and crannies.

Molasses can be bought from Stock feed stores. My store has it in 2 Litre bottles at \$4 each.



The down side.

~ it will not work if metal is coated in any way. e.g. oil, grease, paint & etc.

~It takes awhile.

~Smells a bit when working

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The next method involves more hardware.

### **Materials needed:**

Rubber gloves

Polyethylene or glass container

Full face shield  
12 or 24 volt battery charger  
Neck and chest protection  
Stainless steel or lead electrode/anode

Tap water  
Pool Soda Ash or Sodium Bicarbonate

**Procedure:**

1. Wear a good pair of rubber gloves and face, neck and body protection from possible base solution splash.
2. Find a sturdy polyethylene or glass container large enough to submerge your rusty work piece. The solution will become pretty nasty looking, so don't use the wife's best pans if you like warm-cooked suppers.

With the problem of a rusted interior of a steel fuel tank etc, fill the tank with the solution to clean its inner surfaces.

3. Add Sodium Bicarbonate [Base] at a ratio of one 0.5kg per 20 litres of water to your container to make the electrolyte. Add the base to the water. Never add water to the base.

4. Carefully stir the solution.

5. You will need a working 12 or 24volt battery charger to power this up. You will use a piece of stainless steel or lead as an electrode/anode

6. Attach the red (+) positive charger lead to the stainless steel electrode and make certain that it is immersed in the solution but never in direct physical contact with the rusty work piece etc. A short circuit would then occur.

7. Attach the black (-) negative lead from the charger to the rusty work piece anywhere but securely so the piece is grounded well. Immerse it into the solution.

8. Power the charger and watch for a steady stream of bubbles rising from the positive electrode. \*Proximity of the positive electrode to the work piece is important. If using a very small container for the cleaning of a small work piece, use a small electrode. If the container is too small and the + and - are too close, the heat generated can be a problem, so try to keep these leads safely APART. Avoid using a too small vessel to contain the working solution, which will heat up anyway.

9. Rust depth and the size of the object will affect how long it will need to cook. Use protective equipment and check after a few minutes by turning off the power and looking at the progress in order to estimate how much longer it will take. Some parts will need to be processed overnight.

10. When the part appears to be black and free of rust remove it from the solution. The black coloration can be removed with a wire brush, scouring pad, soap, and tap water. Dry with a cloth, and coat with oil, primer or paint. Working with chemicals can be dangerous.

## Frequently asked questions:

### *What about galvanized surfaces.*

The process will remove only the rust (iron oxide) from steel. No solid steel/metal will be lost.

### *Will the process change the colour of the metal?*

Steel will appear black when done, but don't despair. It will need some scrubbing. Be sure to coat the now freshly clean steel surface immediately so it doesn't begin to oxidize all over again. One can use petroleum based oils, wax, paint or whatever to keep the rust from again attacking.

### *Can one re-use the base solution?*

Yes, many times.

### *How long do you leave it cooking?*

Small, lightly rusted steel pieces will be done in an hour or so. I did a few rusty old wrenches in about that same amount of time the other day. I also cleaned a 5 gallon remote tank in 36 hours with a 6 amp, 12 volt charger, making it clean enough to eat out of after scrubbing it with a rag inside and hosing it out. Just glove up, turn off the charger, and pull out the piece, rinse it off in tap water or wire brush it, and examine things carefully. You'll be able to estimate how much longer it will take to remove all rust.

### *Will the process damage my part?*

The process will not remove any of the solid steel but it will remove absolutely all rust, so be patient. If there is grease, paint or something foreign preventing contact between the solution or negative electrode and the rusted steel, remove this before starting the electrolytic rust removal process.

### *How do I clean up my messy fuel tank after all rust is processed off?*

Hose it out with water and lightly use a fibre bristled brush to assist in difficult areas. If you aren't certain that you have removed all of the particles from a tank or passage, install a filter.

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So as you can see, doing it this way saves a lot of time and aggravation over conventional methods.

One thing I have noticed after several batches is that the clamps on the battery charger were getting corroded since they were in the solution. The positive one that clamped to the stainless steel bolt starts rusting immediately and attracts the rust particles. Eventually I noticed that rust removal was taking longer, even after cleaning the clamps. I cut the wires back on both cables and scraped the bare wire with sandpaper and crimped on two new clamps which fixed the problem.

The down side:

~ Concave or hollow surfaces are harder to process. The electricity is attracted to the closest surface, so these are cleaned better and further processing will erode these areas.

\*Some manipulation of the anode to conform to work shape can make this better.

~ Aspects of this procedure are dangerous.

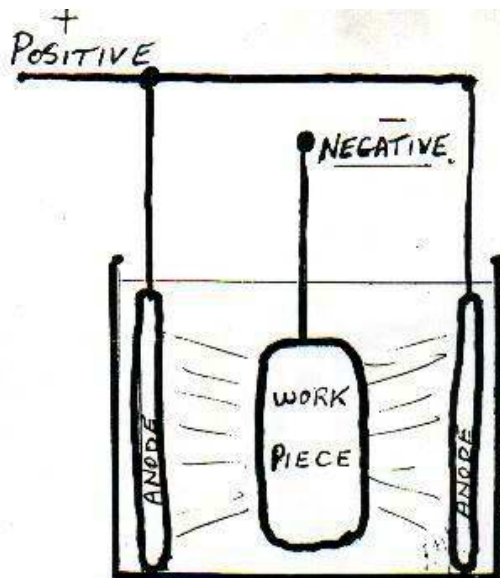
Ensure bath is in well ventilated area.

The electrical supply needs to be in good fused order.

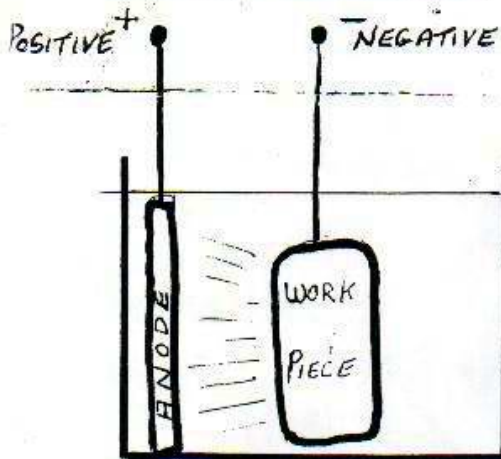
An electrical timer can be an asset, in preventing over-exposure and mixture boiling dry etc.

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www.rsmotorsport.com.au



TWO ANODE TANK



ONE ANODE TANK

TANK NON-CONDUCTIVE  
I.E. PLASTIC, FIBRE GLASS,  
WOOD ETC.

SOLUTION  
WASHING SODA.  
(SODIUM CARBONATE)  
QUANTITY APPROX.  $\frac{1}{2}$  KILO TO  
20 LITRES OF WATER.

ANODE (SACRIFICIAL)  
LEAD OR SCRAP STEEL  
MUST BE CONNECTED TO  
+ POSITIVE LEAD.

WORK PIECE (TREASURE)  
CAN BE MIXTURE OF METALS  
I.E. CAST BODY WITH BRASS  
ALUM. OR COPPER FITTINGS  
NO DAMAGE WILL OCCUR TO  
MATERIALS. WORK PIECE  
MUST BE CONNECTED TO  
- NEGATIVE LEAD

OPERATION

TURN ON POWER SUPPLY SET UP AS DIAGRAM  
NOTE AMOUNT OF DISCHARGE  
ON AMPMETER. KEEP POWER DISCHARGE TO SAFE LIMIT  
OF POWER SUPPLY BY ALTERING DISTANCE BETWEEN  
ANODE AND WORK PIECE. INCREASING DISTANCE  
BETWEEN ANODE AND WORK PIECE WILL DECREASE  
AMPERAGE PREVENTING POWER SUPPLY OVER-HEATING.  
REMOVE ANODE AND CLEAN TO KEEP ACTION OF  
TANK TO MAXIMUM PERFORMANCE.