

**PRODUCT DATA SHEET****WILLOWCHEM ANODIC ETCH (CONCENTRATE) 95**

Introduction

Willowchem 95 Anodic Etch solution is a mixture of acids and additives that enables thermal oxides and weld scale to be removed without the use of highly toxic products. The process is anodic (work piece is positively charged) by employing a rectifier. Results depend on the degree of surface oxides present and condition of the surface. Matt grey surrounding material and crystalline weld sites are obtainable through this process.

Willowchem 95 is a concentrated Anodic Etch solution that must be diluted with water. The method of dilution is carried out as follows:-

For every 100 litre of solution required, 20 litres of concentrate must be slowly added with 80 litres of water. Heat will be generated during the mixing process and care should be taken not to allow the solution to exceed 60°, since excessive heat could damage the plastic tank. If necessary, allow the solution to cool down before adding further concentrate.

Equipment

The product should be used with plastic resistance materials for tank construction. A cooling system and transformer rectifier with a DC output should be employed.

Further information concerning type of suitable equipment may be obtained by your local agent.

Willowchem Technologies can provide basic manual equipment and full turnkey plants that complement our electrolyte ranges.

Applications

Willowchem 95 is suitable for Anodic Etching of components manufactured from austenitic chrome-nickel-molybdenum steel.

Safety Precautions

Willowchem 95 Anodic Etch is a mixture of concentrated acids and additives. Great care must be taken when handling the product and particular attention must be given to existing official safety regulations and current legislation. Personal protective clothing (apron, gloves and goggles) must be worn at all times when handling the product.

The Health & Safety data sheet applicable to the product must be read in conjunction with this operating data sheet.

**PRODUCT DATA SHEET****WILLOWCHEM ANODIC ETCH (CONCENTRATE) 95****Environmental Issues**

The rinse waters produced when working the Anodic Etch are acidic and contain suspended heavy metals removed from the substrate when processing. The effluent is however free of hexavalent chrome. The waste waters may only be passed through a drainage system with the appropriate approvals and discharge licenses obtainable from the local water authority. Alternatively, the rinse water should be stored and removed by a licensed waste contractor.

Extraction should be employed when operating the Anodic Etch Solution to remove fumes from the operator.

The Anodic Etch is not an ozone depleting product and does not contain toxic ingredients

Sampling & Process Trials

Method of steel manufacture greatly affects the performance of the Anodic Etch Solution and therefore it is always recommended to carry out sample trials prior to performing a full scale production run.

The local agent should be able to provide and sample analysis service or alternatively supply an analysis method.

Further information and advice may be obtained from you local agent.

Pre-Treatment

Components should be free of grease and soil. The solutions life will be greatly extended by the introduction of a suitable degreasing process prior to processing.

Should and foreign matter be present, the component should be first degreased and cleaned prior to processing. Most common greases and soil may be removed in a warm dilute solution of Willowchem Cleaner 60.

Further information on Willowchem products may be obtained by your local agent.

Solution Maintenance

The scale removed during the Anodic Etching process will gradually form a sludge on the base of the tank that should be periodically removed. Should the action of the solution deteriorate, a level of regeneration is possible through additions of Willowchem 95 concentrate. Regeneration is no longer possible when the solution becomes excessively contaminated by oil, dirt and scale.

**PRODUCT DATA SHEET****WILLOWCHEM ANODIC ETCH (CONCENTRATE) 95****Anodic Etching Process Parameters**

Current Density: - Between 3 – 10 amps/dm². Actual power and current will be governed by the degree of descaling required and condition of the product.

Process Time: - Under normal condition a process time of 5 – 15 minutes is applied, depending on the degree of scale and amount of dissolved metal within the process solution.

Cooling: - The Anodic Etch Solution operates between 10 - 35 °C and due to the application of current cooling should be employed to maintain the solution below 35 °C Typically Polypropylene or PTFE cooling coils are employed.

Agitation: - Normally agitation is not required, however, it can sometimes assist the release of thermal oxides when processing and produce more uniform areas. This maybe carried out by air, pump, mechanical stirring or reciprocating flight bar

Contact Jigging Fixtures (Anode) & Cathodes

In order to pass the current through the components either insulated copper jigging fixtures or titanium racks should be employed. Titanium is not attacked by the process when anodic, although is not as conductive as copper alloys. Generally copper alloyed contacts should be replaceable as they are attacked and eroded by the process.

The distance from one component to another should be a minimum of 30 mm

Cathodes should be manufactured from chrome-nickel steel. The cathode area should not be less than 1.5 of the component area. The distance between anode and cathode should be approximately 100 mm. Auxiliary cathodes (internal cathodes) should be employed when processing hollows or recessed areas.

Post Treatment

First Rinsing: - On removal of the Anodic Etch solution the components are to be rinse in fresh water before transferring to the next process stage. Should the next stage be electropolishing, care should be taken not to drag over excessive water to the electropolishing electrolyte. Often a hot water or drying station is employed prior to the electropolishing stage.

**PRODUCT DATA SHEET****WILLOWCHEM ANODIC ETCH (CONCENTRATE) 95****Electrolyte Usage**

The solution usage is dependent upon the degree of scale present on the components. When the metal concentration increases above a level that requires a higher application of voltage between 11 – 12 volts in order to obtain the desired result the solution should be replaced with fresh.

Drag out of the electrolyte on the component is approximately 100 – 250 g/m²

Your agent will be able to advise on actual amounts to be removed according to your individual requirements.

Maintenance

The tank should be cleaned annually as a minimum, depending on the usage. Your local agent can advise the frequency of cleaning and offer service of cleaning and maintaining the process solution.

Summary of Technical Data**Type of Materials to Process**

Austenitic Chrome – Nickel – Molybdenum

Material Removal Rate: 1 - 5 um

Distance between components: 30 mm

Distance between Cathode & Anode: 100 mm

Cathode to Anode Ratio: 1.5 minimum

Temperature Range: 10 – 35 °C

Current Range: 5 – 10 Amps/dm²

Voltage Range: 3 – 10 volts

Electrolyte Drag Out: 100- 250 g/m²

***Willowchem Technology Limited,
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Finish Obtainable

Matt – Crystalline Weld Area