



TURCOFORM[®] ETCHANT 9H

CAUSTIC ALUMINUM ETCHANT

DESCRIPTION:

TURCOFORM ETCHANT 9H is a specially compounded etchant for use on most of aluminum alloys. When used as recommended, TURCOFORM ETCHANT 9H will produce smoothly etched surfaces, free from pits or other evidence of irregular etching action.

PROPERTIES:

Appearance:	Yellow flakes
Composition	Modified Sodium Hydroxide
Heat generated in dissolving 1 lb of aluminum	7000 BTU
Hydrogen generated per pound of aluminum dissolved	20 cu. ft
Etch rate (Depending on bath condition, temperature and alloy.)	1 mil/side/minute

HOW TO USE TURCOFORM ETCHANT 9H:

1. **EQUIPMENT**

Tanks - Tanks and associated equipment may be fabricated from mild steel. No lining is required. A tank cover is recommended to reduce heat loss during periods of non-use. Agitation is required only during addition of chemical, or water, or while heating the solution to operating temperature. Continuous agitation should be avoided since it has a deteriorative effect on the etchant. An oil-free compressed air source is required. Use mild steel pipe. The tank must be equipped with a heater and thermostat capable of maintaining the temperature at 75° to 105°C.

2. **INITIAL CHARGE:** For 1000 liters; N₁ = 12 N₂ = 4 (See Chemical Control for definition of N₁ and N₂)

TURCOFORM ETCHANT 9H	105 kg
TURCOFORM ETCHANT ADDITIVE #3	1400 ml
(or TURCOFORM ETCHANT ADDITIVE #3B	1900 ml)
TURCOFORM ALKETCH INHIBITOR L	115 liters
WATER	<u>Balance</u>
Total Charge	1000 liters

Fill the etch tank with water to approximately two-thirds of the normal operating level. With continuous, vigorous agitation, slowly add the required amount of TURCOFORM ETCHANT 9H. Continue agitation until dissolved. Add the TFE ADD. #3 (or #3B) and ALKETCH INHIBITOR L while

mixing. Heat to operating temperature and add water until the operating level has been reached. For optimum line definition and etch factor uniformity, The N_2 factor must be controlled at the proper level.

3. **PRECLEANING:** All parts must be chemically cleaned before etching to insure the best results. Your TURCO Sales Engineer can recommend suitable cleaners based on your production needs.
4. **RACKING:** Suspend parts vertically or horizontally depending on part configuration. Rotate in the vertical plane every 30 minutes or as often as necessary to avoid tapering.
5. **ETCHING:** The etch rate at the recommended concentration and temperature is approximately 1 mil/side/minute.
6. **RINSING:** Immediately after etching rinse parts in cold water and remove smut in TURCO SMUT-GO solution followed by a final water rinse.

CHEMICAL CONTROL:

Aluminum is dissolved and caustic is consumed during the etching operation. This causes an increase in the aluminum content of the solution, as sodium aluminate, and a decrease in alkalinity, which is a measure of the strength of the etchant solution. To maintain concentration of chemicals at the proper level, it is necessary to make periodic additions of TURCOFORM ETCHANT 9H. No further additions of TURCOFORM ALKETCH INHIBITOR L are required after the initial charge.

N_1 is the volume in ml of 1 N H_2SO_4 required to neutralize the free sodium hydroxide in a 5 ml sample and is a measure of the alkalinity of the solution. N_2 is the volume in ml of 1 N H_2SO_4 required to neutralize the free sodium aluminate in a 5 ml sample and is a measure of the aluminum content of the solution. A fresh bath will have an $N_1 = 12$ and an $N_2 = 4$. To increase N_1 by 1 ml add approximately 9.6 kg of TURCOFORM ETCHANT 9H per 1000 liters of etchant solution. To determine the amount of dissolved aluminum in grams/liter, multiply the N_2 value by 4.8. A portion (25-75%) of the etchant solution should be discarded when the N_2 value reaches the top of the recommended range. When the tank is dumped or recharged do not clean or remove the black smut that forms on the tank walls.

A fresh 1000 liter solution should have an N_1 of 12.0 and an N_2 of 4.0. Parts are then etched until about 14 Kg of aluminum has been dissolved in this solution. The N_1 would then be about 9.4 and the N_2 about 7.0. The bath is rejuvenated by adding 40 Kg of TURCOFORM ETCHANT 9H changing N_1 to 13.4 (the N_2 value remains essentially unchanged). This maintenance process is repeated on a regular basis to keep the N_1 and N_2 values in the proper range.

Eventually N_2 , a measure of the dissolved aluminum concentration, will reach the top of the desired range. At that point parts are etched until the bath ceases to work efficiently. The bath may then be rejuvenated by dumping approximately 50% of the solution and making the tank up to operating level with water. This reduces the values of both N_1 and N_2 by half.

DISPOSAL INFORMATION:

Dispose of spent material per local, state and regional regulations. Refer to TURCO MATERIAL SAFETY DATA SHEET for additional disposal information.

DANGER! Contact may cause burns to skin or eyes.

TURCOFORM ETCHANT 9H contains sodium hydroxide and sulfides. Avoid contact with eyes, skin and clothing. Do not take internally. Use with adequate (equivalent to outdoor) ventilation.

Protective clothing, such as a chemical face shield or goggles, gloves, boots and apron made of chemically resistant materials should be worn when handling and using this product. A dust mask should be worn when handling dry product.

Before using this product refer to container label and TURCO MATERIAL SAFETY DATA SHEET for additional precautionary, handling and first aid information.

NOTICE:

The above information and recommendations concerning this product are based upon our laboratory tests and field use experience with this or similar products. However, since conditions of actual use are beyond our control, any recommendations or suggestions are made without warranty, express or implied. Manufacturer's and seller's sole obligation shall be to replace that portion of the product shown to be defective. Neither shall be liable for any loss, damage, or injury, direct or consequential, arising out of the use of this product.

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