



# Surface Technologies

## TECHNICAL SERVICE BULLETIN

### NOVACOAT 12 ALUMINIUM CONVERSION COATING

- ❖ Provides a corrosion resisting chemical conversion coating on Aluminium and Aluminium Alloys.
- ❖ Room Temperature Application.
- ❖ Provides excellent corrosion protection and paint adhesion properties under both wet and powder applied paint films.
- ❖ Fast acting and easy to apply

#### A. DESCRIPTION

The **NOVACOAT 12** process provides a corrosion resisting chemical conversion coating on Aluminium and Aluminium alloys.

**NOVACOAT 12 MAKE UP** is a liquid concentrate for the initial bath make up .

**NOVACOAT 12 REPLENISHER** is a liquid product used to maintain working baths.

**NOVACOAT 12 ADDITIVE** is a liquid concentrate used in conjunction with **NOVACOAT 12 MAKE UP** and **NOVACOAT 12 REPLENISHER** to maintain bath efficiency.

Powdercoating applied over a **NOVACOAT 12** conversion coating can be expected to meet the requirements of AS 3715.

#### B. USE

C.

**NOVACOAT 12** conversion coating is an iridescent, golden coloured chromate type coating that resists corrosion. The colour varies from yellow to brown depending on coating weight and the aluminium alloy.

**NOVACOAT 12** coating provides excellent corrosion protection for either painted or unpainted aluminium.

**NOVACOAT 12** coating greatly improves adhesion for wet painted and powder coated aluminium and is recommended for all internal and external applications.

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**C. APPLICATION**

**NOVACOAT 12** is most conveniently applied by immersion from ambient to 40°C.

**D. EQUIPMENT**

Acid-resistant equipment, such as type 316 stainless steel, or PVC is recommended.

**E. DIRECTION FOR USE IN IMMERSION APPLICATIONS**

**NOVACOAT 12 MAKE UP** and **NOVACOAT 12 ADDITIVE** are added in a ratio of 12:1 for initial tank makeup **NOVACOAT 12 REPLENISHER** should be added for replenishment in conjunction with **NOVACOAT 12 ADDITIVE** at a rate of 12:1.

A typical process is as follows:

STAGE 1	<b>NOVOX LF</b> Acid Etch Cleaner
STAGE 2	Clean water rinse
STAGE 3	Clean water rinse
STAGE 4	<b>NOVACOAT 12</b> Conversion Coating
STAGE 5	Clean water rinse
STAGE 6	DI water rinse

For some applications separate inhibited alkaline cleaner and deoxidising steps may be recommended. However, an acid-etch cleaner is preferred and gives superior results.

**F. OPERATING CONDITIONS****Concentration**

Normally make up a new bath with **NOVACOAT 12 MAKE UP** at 0.5% v/v to 0.75% v/v. Titration Pointages of 7.5 mls to 10 mls are normal for an aged bath.

pH: 1.6 - 2.0

Temperature: Ambient to 40°C

Immersion Time: 30 seconds to 4 minutes

**G. CONTROL PROCEDURES****Visual Control**

The colour and weight of coatings obtained with the **NOVACOAT 12** conversion concentrate bath are dependent on a number of factors. Uniform coatings result from careful control of all of these factors. Coating weights will generally be in the range 500 mg/sqm (light gold) to 1500 mg/sqm (gold-brown).

**B. CONTROL PROCEDURES****Visual Control**

The major factors involved and how they influence the coating are as follows:

**a. Aluminium Composition**

Many different alloys may be processed in the **NOVACOAT 12** aluminium conversion coating bath. The coatings obtained with one alloy will not necessarily be identical in colour and appearance with those of other alloys processed similarly in the same bath.

**b. Pre-treatment**

It is the object of pre-treatment to obtain a uniform active surface on the aluminium as it enters the **NOVACOAT 12** bath. This is best obtained by cleaning, etching and deoxidising, in separate stages, or in a single stage using **NOVOX LF**.

**c. Time**

Coatings tend to become heavier and darker as the time of exposure to the **NOVACOAT 12** bath is prolonged.

**d. Temperature**

Chemical processes are sensitive to temperature. The recommended temperature range of **NOVACOAT 12** coating is 18°C to 40°C.

If the **NOVACOAT 12** bath temperature changes, the time of exposure should be changed accordingly, in order to obtain uniform coating results.

**e. Concentration**

Increasing the concentration of **NOVACOAT 12** concentrate will increase the coating rate.

**f. NOVACOAT 12 ADDITIVE**

The presence of **NOVACOAT 12 ADDITIVE** is necessary for good coatings inside the recommended pH range. Use the recommended proportion of one part **NOVACOAT 12 ADDITIVE** to 12 parts **NOVACOAT 12 MAKE UP** for bath make up.. Use **NOVACOAT 12 REPLENISHER** for bath replenishment at a ratio of 12:1 with **NOVACOAT 12 ADDITIVE**. Absence of the correct amount of **NOVACOAT 12 ADDITIVE** will result in soft, powdery coatings. If powdery coating is seen when other parameters are normal, particularly in an old bath, an extra addition of **NOVACOAT 12 ADDITIVE**, doubling the normal concentration, will usually correct this problem.

**G. CONTROL PROCEDURES**g. **pH**

The pH must be kept within the operating range pH 1.6 to 2.0. Good coatings will not develop above or below this range. If pH is too low, a coating will be formed quickly but may be soft. If pH is too high, coating will be slow. Adjust pH with **Toner 6** (30% Nitric Acid) or Ammonia 5%. Reactive materials such as rolled sheet may need to be treated with a high pH solution to avoid a heavy powdery coating.

h. **Fluoride**

The fluoride level is important, but usually does not need to be controlled.

Fluoride level of a 1.0% v/v Novacoat 12 solution = 500 ppm  
Minimum level in working bath = 50 ppm

In an old bath, fluoride can become depleted, resulting in very slow coating, even though other parameters are correct. Make additions of 1 litre of **NOVASEAL 30M** per 10,000 litre bath, raising fluoride by 25 ppm to correct this deficiency.

The product is formulated so that pH and fluoride levels should remain within normal range under normal working conditions. In practice however, it is always necessary to monitor both concentration and pH, and sometimes also fluoride level.

Frequent small additions of product to the bath are preferred to large, infrequent additions.

**H. CHEMICAL CONTROL PROCEDURE**

(i) To maintain the activity of a **NOVACOAT 12** bath:-

1. To a 10 ml sample, add 50 ml distilled water, 6-10 drops Ferroin Indicator solution and 10 ml 50% sulphuric acid.
2. Titrate with 0.1N Ferrous Ammonium Sulphate Solution to a blood red colour.
3. Record mls of 0.1N Ferrous Ammonium Sulphate added as A.
4. Correct titration value by multiplying A x f.
5. Maintain pointage between 7.5 to 10 mls.

Add 2 litres of **NOVACOAT 12 REPLENISHER** per 1,000 litres of bath for each 1 ml pointage less than the desired level.

**H. CHEMICAL CONTROL PROCEDURE****(ii) Standardisation of 0.1N Ferrous Ammonium Sulphate Titrating Solution.**

The strength of the 0.1N Ferrous Ammonium Sulphate Titrating Solution alters slowly with time and must be checked weekly as follows:

- (i) Pipette exactly 10.0 mls of 0.1N Potassium Dichromate solution (Titrating Solution 30) into a flask and add 50 ml distilled water, 10 ml 50% H<sub>2</sub>SO<sub>4</sub>. and 5-8 drops of Ferroin Indicator.
- (ii) Titrate with 0.1N Ferrous Ammonium Sulphate Solution until one drop changes the solution colour from grey to blood red.
- (iii) Record mls of 0.1N Ferrous Ammonium Sulphate added as B mls.
- (iv) Determine Titration Factor (f)  $= \frac{10.0}{B}$
- (v) Use this factor to determine actual corrected **NOVACOAT 12** strength.

**I. FLUORIDE MEASUREMENT**

Measure free fluoride using a fluoride selective electrode. Use dilutions of **NOVACOAT 12 MAKE UP** to make a standard calibration curve. (1% v/v **NOVACOAT 12** = 500 ppm F). Details of procedures are available from Henkel.

**J. BATH EXHAUSTION**

Periodically, the bath should be analysed for hexavalent chrome and trivalent chrome concentration. Action should be taken to replace or partially replace the bath if the level of trivalent chrome increases to the same level as hexavalent as the performance of the coating will be reduced.

Dissolved aluminium should not exceed a concentration of 1000 ppm.

Sulphate contamination (from the acid etch cleaner bath) can also give rise to poor quality coatings. Experience indicates that a concentration of 400 ppm sulphate is indicative of excessive contamination.

**K. PROPERTIES****NOVACOAT 12 MAKE UP / NOVACOAT 12 REPLENISHER**

Appearance:	Dark red liquid
Specific Gravity at 25°C:	1.24 - 1.26
pH (concentrate):	1.6 - 1.8

**NOVACOAT 12 ADDITIVE**

Appearance:	Dark yellow liquid
Specific Gravity:	1.12
pH (concentrate):	8.5

**L. STRIPPING NOVACOAT 12 COATINGS FROM ALUMINIUM**

**NOVACOAT 12** coatings can be stripped from aluminium in 50% nitric acid. Immersion for 1/2 minute at room temperature will strip fresh coatings. Cured coatings will require three minutes.

**M. WASTE DISPOSAL**

Contains chromic acid and fluorides. Contains no phosphate. The concentrate, solutions and containers must be disposed of in accordance with local waste regulations.

**CAUTION****WARNING - CAUSES BURNS, CONTAINS CHROMIC ACID****KEEP OUT OF REACH OF CHILDREN**

Use rubber or synthetic rubber gloves and goggle type eye protection when handling.

Avoid contact with skin and eyes. Avoid breathing mist. In case of contact immediately flush skin or eyes with plenty of water for at least 15 minutes. For eyes, get medical attention.

**DISCLAIMER**

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