



Anodal[®] SH-2 Liquid

Sealing with **Anodal SH-2 Liquid** at 82-90°C

Anodal SH-2 Liquid

- is very suitable for the smudge-free sealing of anodically produced oxide coatings; excellent sealing quality is achieved with this product.
- has been developed by Clariant and patent applications for this product have been filed in all important industrialized countries.

In conventional sealing, which must be carried out at a temperature of over 96°C, the sealing operation is considerably hampered by the steam produced in the plant finishing section. Energy costs are also high. Another problem is that at such temperatures it is often no longer possible to apply power-heat combinations, so that in most cases the sealing operation must have its own energy supply.

Anodal SH-2 Liquid can appreciably reduce both these disadvantages.

1. Properties

Appearance	clear, slightly yellowish, aqueous solution
Storage stability	at least 3 years in closed original containers at 0-40°C
Dilutability	dilutable with water in any proportion
Ecotoxicological data	see Safety Data Sheet.

2. Scope of application

Anodal SH-2 Liquid is used as an addition to the sealing bath for clear anodized, integral colour anodized and electrolytically dyed aluminium and prevents the formation of sealing smudge.

Anodal SH-2 Liquid can also be used for the smudge-free sealing of coatings which are adsorptively dyed with organic dyes or of combination dyeings such as those produced with **Aluminium** and **Sanodal®** dyes. In this case two-stage sealing is recommended, i.e. presealing with **Sealing Salt ASL** and then sealing with water and an addition of **Anodal SH-2 Liquid**.

3. Application conditions

Substrate	anodically produced oxide coatings on aluminium or its alloys.
Applicable amounts	2-3 ml/l The applicable amount depends on the water quality and type of anodized coating. It is preferable to use deionized water.
Sealing temperature	86-90°C for exterior architectural use 82-85°C for other uses
Sealing time	2 min/µm 3 min/µm for maximum requirements
pH	6.0 ± 0.3

Anodal SH-2 Liquid has a buffering effect. However, to ensure the optimum sealing conditions, it is recommended to check the pH when preparing the solution and during its use, if necessary correcting it with dilute caustic soda solution, ammonia or acetic acid.

4. Sealing quality

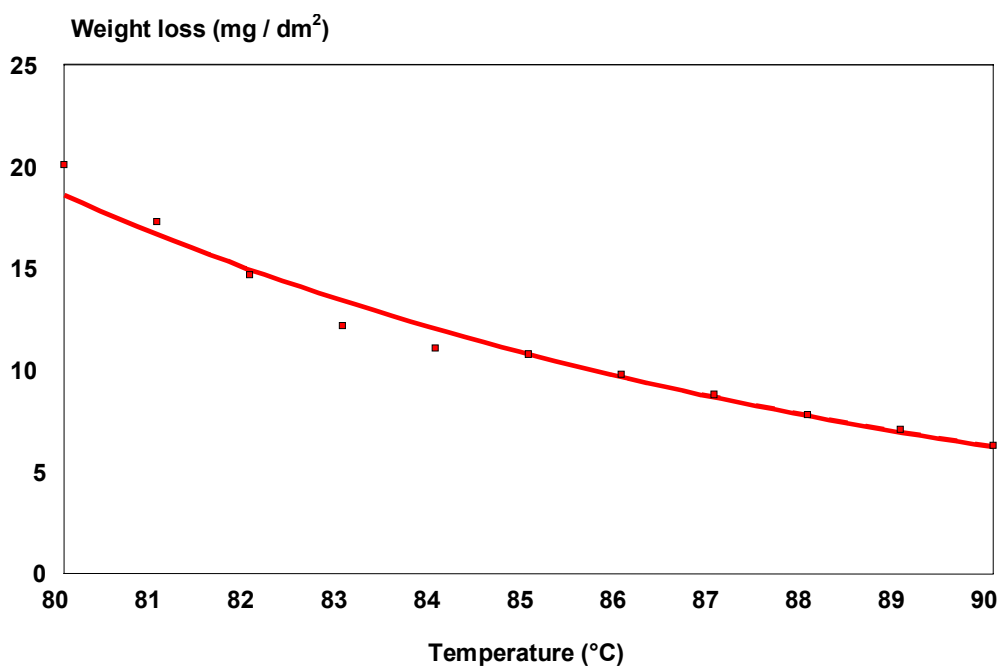
The values of the accelerated tests given below were determined under the following conditions:

Material	AlMg 1
Anodization	D.C. process, 190 ± 5 g/l H ₂ SO ₄ , 5-10 g/l Al, 19°C, 1.5 A/dm ² Oxide layer 12 - 15 µm or 20 - 23 µm
Dyeing	electrolytic, (SnSO ₄) black
Sealing	Anodal SH-2 2 ml/l, 3 min/µm, pH 6.0, deionized water, temperature: 82 - 88°C

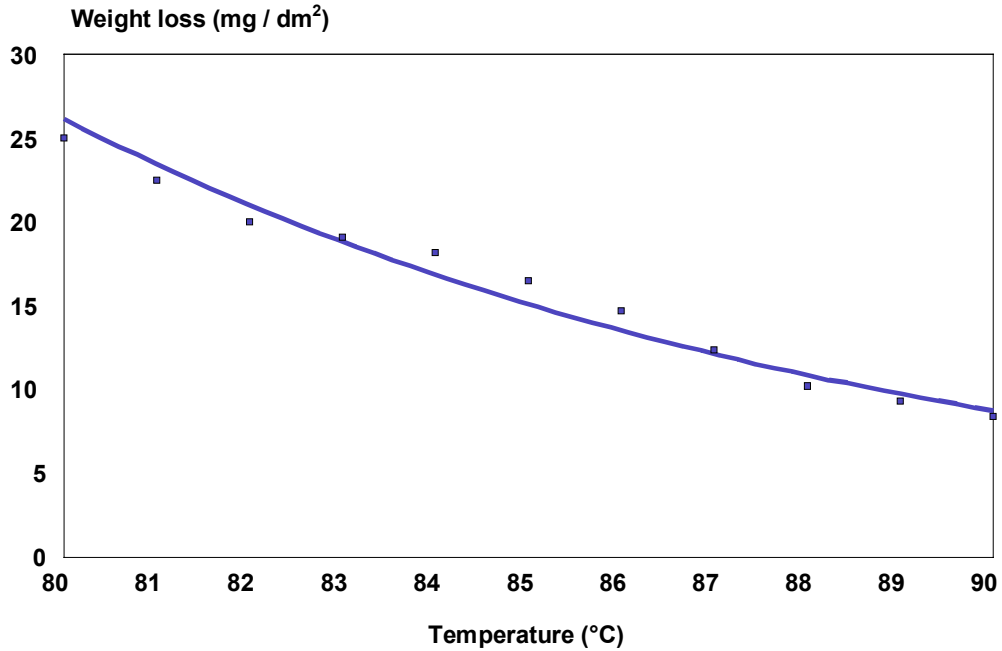
Weight loss after immersion in chromic-phosphoric acid with nitric acid pre-dip (ISO 3210)

	Temperature	Weight loss, mg/dm ²			
		Clear anodized		Elektrolytic Black	
		12 - 15 µm	20 - 23 µm	12 - 15 µm	20 - 23 µm
Anodal SH - 2	82 °C	19,0	13,6	24,2	14,7
	85 °C	15,1	9,7	16,0	11,8
	88 °C	12,2	7,0	13,1	7,1

CLEAR ANODIZED OXIDE LAYER 20 - 23 µm



ELECTROLYTIC BLACK
OXIDE LAYER 20 - 23 µm



**Dye spot test with prior acid treatment : "Estimation of loss of absorptive power"
 (ISO 2143)**

	Temperature	Intensity of the stain	
		12 -15 µm	20 - 23 µm
Anodal SH-2	82 ° C	0 - (1)	0 - (1)
	85 ° C	0	0
	88 ° C	0	0

Admittance Y₂₀ (ISO 2931)

	Temperature	Y ₂₀ , µs	
		12 -15 µm	20 - 23 µm
Anodal SH-2	82 ° C	23,0	24,0
	85 ° C	20,0	20.5
	88 ° C	19,5	20.0

Corrosion by SO₂ (Kesternich Test, according to DIN 50018, SFW 2.0 S, 6 cycles)

Coating thickness: 20-23 µm
Sealing temperature: 86°C

	Corrosion (Note * : 0 - 5)	
	Clear anodized	Electrolytic Black
Anodal SH-2	1 - (2) very slight attack	1 -2 very slight attack

* 0 = unchanged, 5 = total attack

Corrosion by spraying with common salt solution (Cass Test according to ISO 3770 "Metallic coatings - Copper accelerated acetic acid salt spray test", 24h)

Coating thickness: 20-23 µm
Sealing temperature: 86°C

	Corrosion (Note * : 1 - 10)	
	Clear anodized	Electrolytic Black
Anodal SH-2	9 - 10	9 -10

* acc. to ISO 4540: Metallic coatings - Coatings cathodic to the substrate - Rating of electroplated test specimens subjected to corrosion test"

5. Overdosage

As with all smudge suppressants, heavy overdosage can result in higher weight loss values after immersion in chromic-phosphoric acid with nitric acid pre-dip (ISO 3210).

In the case of **Anodal SH-2 Liquid** however, these higher values are still acceptable up to an overdose of 10 ml/l.

Weight loss after immersion in chromic-phosphoric acid with nitric acid pre-dip (ISO 3210)

Clear anodized, coating thickness 20-23 µm

Anodal SH - 2	ml/l	1,5	2	3	5	8	10
		Weight loss, mg/dm ²					
	82 °C	12,2	13,6	16,1	21,3	24,5	25,5
	85 °C	8,5	9,7	14,9	16,3	17,1	20,1
	88 °C	6,1	7,0	8,8	13,1	15,0	15,2

Electrolytic Black, coating thickness 20-23 µm

Anodal SH - 2	ml/l	1,5	2	3	5	8	10
		Weight loss, mg/dm ²					
	82 °C	13,2	15,1	17,1	20	22,5	25,7
	85 °C	9,8	11,8	14,3	15,4	17,9	18,8
	88 °C	8,0	7,1	9,5	12,5	14,3	16,4

Although most of these values lie within the tolerance of the ISO standard, overdosing the product should be avoided.

6. Suitability for two-stage sealing

Anodal SH-2 Liquid is suited for two-stage sealing with **Sealing Salt AS** or **ASL** (see technical information). It is used in the second (main) sealing stage.

We would recommend for dyeings with organic dyes to apply the two-stage sealing process.

Anodal SH-2 is particularly recommended for hot water treatment after cold sealing with **Anodal CS-2/CS-2A** or **Anodal CS-3A** (see technical information).

7. Spectrophotometric determination of Anodal SH-2 Liquid in sealing baths

Principle

The extinction value at 237 nm of a bath sample is compared with that of an **Anodal SH-2 Liquid** solution of known concentration.

Reagents

Use only distilled or demineralized water to prepared the solutions. Mix the solutions well.

Solution A

Dissolve 2.0 g ammonium acetate ($\text{NH}_4\text{COOCH}_3$) in water and fill up to 1000 ml in a measuring flask.

Comparative solution

Place 2 g **Anodal SH-2 Liquid** in a 1000 ml measuring flask and fill up with water to 1000 ml. Place 5 ml of this solution in a 100 ml measuring flask and fill up with solution A to 100 ml.

Seal bath solution

Place 5 ml bath solution in a 100 ml measuring flask and fill up with Solution A to 100 ml.

Analyse

- Calibration of the spectrophotometer with Solution A. Extinction value = 0.
- Determine the extinction value E_0 at a wave length of 237 nm of the *comparative solution*.
- Determine the extinction value E at wave length 237 nm of the *seal bath solution*.

Since at approximately the same dilution the extinction values vary in proportion to the concentration of **Anodal SH-2 Liquid** the following equation is obtained:

$$\frac{C}{E} = \frac{C_0}{E_0}$$

$$C_0 = 2 \text{ ml/l}$$

$$\text{Concentration Anodal SH-2 liquid ml/l} = 2 \frac{E}{E_0}$$

This equation can be used to calculate the bath concentration C in ml/l **Anodal SH-1 Liquid**.

Many of their dyestuffs, pigments and chemicals are patented by Clariant in numerous industrial countries.

® Trademark of Clariant registered in numerous countries.

®* Trademark registered in numerous countries and licensed to Clariant.

®+ Other Manufacturer's registered trade mark

The signs ®, ®* and ®+ appear only at the first mention of the product.

The information and recommendations presented here were compiled with the utmost care, but cannot be extended to cover every possible case. They are intended to serve as non-binding guidelines and must be adapted to the prevailing conditions.