

Chromating METAPAS C black CA

The Chromating METAPAS C black CA is a process for chromating of electroplated zinc surfaces. METAPAS C black CA forms deep black chromate layers regardless if they are deposited from acidic-, alkaline-, cyanide-free or cyanidic electrolytes. METAPAS C black CA is a one-step process which is suitable for both rack- and barrel application without an additional post-treatment. Even at longer drying times where drop formations on rack parts may occur, there's no significant difference in the colour between the water marked- and remaining surface.

The demands on corrosion protection according to DIN 50961 are fulfilled if operated correctly.

The information in this data sheet is based on laboratory as well as practical experience. Figures quoted for operating limits and replenishment quantities are for guidance. Actual values necessary will depend on the components being plated (material and geometry), their application and plating plant conditions.

Important:

Please read this instruction carefully prior to the use of the process and carefully follow all the parameters that have a direct influence on the operation. We reserve the right to make technical changes. In the interest of safety, please pay attention to the hazard warnings on the labels of the containers. The minimum shelf life of the products is included on the labels and is also available in the appropriate Quality Assurance (QA03).

The current IMDS number of the layer deposited from the process is available on the internet at www.schloetter.com/downloads.

For the storage of chemical products the TRGS 510 must be followed.

If the additives used in this process contain a SVHC-substance, then this will be specified in the corresponding Material Safety Data Sheet, section 15.



1.0 TECHNICAL INFORMATION AND EQUIPMENT REQUIREMENTS

Tanks:	steel with chromic acid resistant lining or suitable plastic tanks
Local Exhaust Ventilation:	required
Part-/Electrolyte Agitation:	required, air agitation is recommended in order to optimize movement of solution around the parts; for a carefully treatment of bulk articles the barrel rotation should be interrupted in intervals
Heating/Cooling:	immersion heaters with porcelain coating

2.0 MAKE-UP AND OPERATING CONDITIONS

2.1 Product names

List of products required		
Product name	Article no. (AN)	SG
METAPAS Salt C black CA	091591	--
METAPAS Acid C black	090405	1.08
METAPAS Agens	090200	1.04
Sodium hydroxide 50 % (765 g/l aqueous)	supplied by user*	1.52
Sulphuric acid 10 % (107 g/l aqueous)	supplied by user*	1.07
Sodium hydroxide 10 % (110 g/l aqueous)	supplied by user*	1.10

* Product quality specifications recommended by us can be found on the internet at www.schloetter.com/downloads.

2.2 Requirements for a 100 litre bath

Product name	AN	SG	Quantity	
METAPAS Salt C black CA	091591	--	7	kg
METAPAS Acid C black	090405	1.07	12	ltr.
METAPAS Agens	090200	1.04	0.8 - 1.0	ltr.
Sodium hydroxide 50 % (765 g/l aqueous)	--	1.52	approx. 3.5	ltr.



2.3 Make-up sequence for a 100 litre bath

New unused tanks, filtration equipment etc. or tanks and equipment must be thoroughly cleaned prior to use.

- fill 70 litres of deionised water into the tank
- add with constant stirring 7 kg of METAPAS Salt C black CA in compliance with the valid safety measures
- add 12 litres of METAPAS Acid C black
- mix thoroughly
- adjust pH value with approx. 3.5 litre of sodium hydroxide, (50 %) and constant stirring to 1.5
- mix thoroughly
- add 1 litre of METAPAS Agent
- check pH value with pH meter and if necessary adjust again to pH 1.5 with constant stirring
- make up with water to final volume with deionised water
- mix thoroughly
- check pH value with pH meter; if the pH value is below 1.5, so it has to be adjusted to 1.5 - 1.8 again

The electrolyte is ready for use when the operating temperature has been reached.

NB

It's absolutely necessary to observe the safety measures applicable to make-up and handling of the chromating (protective clothing, goggles, rubber gloves).

NB

Tap water may not be used otherwise an increase in the consumption of METAPAS Agent must be expected.

At previous sequence Chromating METAPAS C black CA contains 25 g/l of Cr(VI).

2.4 Concentrations and operating conditions

	Range	Optimum	
METAPAS Salt C black CA	50 - 100	70	g/l
METAPAS Agent	8.0 - 10.0	--	ml/l
pH value	1.5 - 1.8	1.6	
Treatment time	75 - 120	--	sec.
Temperature range	20 - 25	--	°C

raise pH value ↑ : Sodium hydroxide 50 % (765 g/l aqueous)

decrease pH value ↓ : Sulphuric acid 10 % (107 g/l aqueous)



2.5 Consumption

The consumption of the additives is also due to the part geometry and surface condition caused more or less by drag-out.

NB

Under usual operating conditions the zinc content in the chromating rises to > 12 g/l after a throughput of approx. 1.5 m²/l. At this zinc content a new make-up has to be considered respectively is required.

3.0 PROCESS SEQUENCE

Our technical field service and service department would be pleased to provide you with suitable process sequences and methods as well as on products of our pre-treatment programme.

3.1 Pre-treatment

A perfectly plated and sufficiently thick (at least 5 µm) zinc coating is essential for a good chromating. Preferably fresh zinc plated and thoroughly rinsed parts should be used for chromating. The usual pre-dipping in diluted nitric acid (5 - 10 ml/l) is accepted if the parts are plated in alkaline electrolytes and a good subsequent rinsing is possible. It should be taken care on thorough rinsing especially if parts in the previous operating step are treated in electrolytes with a high chloride concentration. Drag-in of chloride in the Chromating METAPAS C black CA results in a strong excess consumption of METAPAS Agent.

3.2 Chromating

The parts respectively the solution has to be agitated during chromating the way that there's an equal flow all over the surface of the parts. In large-size installations this can be achieved by air agitation and/or by part agitation. The immersion time is usually 75 - 120 seconds. Too short immersion times result in light iridescent surfaces. Long immersion times result in too strong chromating films which are possibly dull matt or in an extreme case show a bad adhesion.

In wet condition the wipe resistance of the chromate film isn't yet sufficient. Therefore, bulk articles have to be agitated carefully. If the chromating is applied in barrels, it's advantageous to stop the barrel rotation already during the barrel is lifted out of the chromating solution respectively turn at intervals.



3.3 Process sequence

alkaline or cyanidic zinc electrolytes:

- zinc plating
- rinsing
- activating in diluted nitric acid
- rinsing
- chromating
- rinsing
- drying

acidic zinc electrolytes:

- zinc plating
- rinsing

optionally:

- activating in diluted hydrochloric acid
- rinsing
- chromating
- rinsing
- drying

3.4 Post-treatment

The chromated parts are rinsed in cold water and then dried immediately, best in warm air respectively in a centrifuge. During the drying process the temperature on the parts shouldn't exceed 70 °C in order to avoid crack formation of the chromate layer and therefore decreasing of the protection effect.

A pre-dipping in warm water for the purpose of rapid drying is detrimental and causes bleaching of the chromate films. Since water residues also cause bleaching of the chromate films, especially scooping parts have to be treated with suitable measures in order to remove them from water residues before they are put in the drying oven like e.g. multiple turning around or blowing-off with compressed air. Also the drying with so-called water displacement liquids is less advisable, since the deep black colouration decreases and grey haze may occur.

4.0 MAINTENANCE AND FUNCTION OF THE INDIVIDUAL BATH COMPONENTS

4.1 METAPAS Salt C black CA

The METAPAS Salt C black CA contains all the chromium(VI) components necessary for make-up of the chromating. Since METAPAS Salt C black CA contains chromic acid, at make-up a correction of the pH value with sodium hydroxide 50 % (765 g/l aqueous) is necessary.

METAPAS Salt C black CA has a relatively broad operating range between 50 and 100 g/l, optimum 70 g/l. Too low concentrations lead to unequal and only moderately formed chromate layers.

The content of METAPAS Salt C black CA can be determined analytically and has to be replenished accordingly. Afterwards the pH value must be measured and if necessary adjusted again with sodium hydroxide 10 % (110 g/l aqueous). We're pleased to provide you with suitable analysis methods upon request.



4.2 METAPAS Acid C black

A lack of METAPAS Acid C black is indicated by dull-matt chromate layers that will be received despite of a correct pH adjustment. In this case 5 - 20 ml/l of METAPAS Acid C black are added. Overdoses are less critical.

Therefore, the acid addition for continuous maintenance can be combined with the addition of METAPAS Salt C black CA in approx. the same ratio provided that no big salt corrections are required and so the addition of 10 ml/l of METAPAS Acid C black will not be exceeded. Please note, that the pH value must be measured and if necessary adjusted again with diluted sodium hydroxide 10 % (110 g/l aqueous).

4.3 METAPAS Agent

METAPAS Agent contains silver compounds in order to develop the black chromate film. Lack of METAPAS Agent is indicated by a less black colouration and/or iridescent films on the chromated parts. Mostly an addition of 1 - 3 ml/l METAPAS Agent is sufficient to solve the problem.

A system-related precipitation occurs when METAPAS Agent is added. This may not be removed by filtration or similar. It's recommended to mix the chromating thoroughly before starting work.

Drag-in of chloride (e.g. by the use of tap water or insufficient rinsing after zinc plating in acidic electrolytes) results in a strong consumption of METAPAS Agent.

4.4 pH value

The pH value has to be maintained in the operating range of 1.5 - 1.8. Due to a relatively strong inherent colouration of the chromating solution the pH value should be measured with a pH meter since a correct measurement with pH measuring strips is simply too difficult. Corrections must be made carefully by an addition of sulphuric acid 10 % (107 g/l aqueous). Accidentally too low adjusted pH values can be raised again with sodium hydroxide 10 % (110 g/l aqueous).

A too high pH value will form an insufficiently chromate film which results in iridescent chrome coatings. Too low pH values result in dull-matt coatings.

By the addition of METAPAS Salt C black CA a correction of the pH value with sodium hydroxide 50 % (765 g/l aqueous) may become necessary.

5.0 TROUBLE SHOOTING

No information available at present.



6.0 EFFLUENT

Legal regulations must be observed for disposal of the Chromating METAPAS C black CA. Different regulations normally apply for the additives and the ready-made electrolyte. Please refer to section **13** of the appropriate Material Safety Data Sheet for disposal code and recommendations.

The following detoxification sequence is only considered to be an aid:

Chromating METAPAS C black CA contains Cr(VI). Resulting rinse waters or spent chromating solutions are fed to the usual chrome reduction with subsequent precipitation of heavy metal.

7.0 SAFETY

Reasonable care is required when handling Schlötter chemical products. Only personnel specially trained on working with chemicals should be deployed with their handling.

EC Material Safety Data Sheets must be made available to all personnel dealing with the chemicals to ensure they have all required information about product composition, hazards identification, first-aid measures, handling and storage, exposure controls, toxicological and ecological information, etc. It is required to ensure the supply and use of suitable protective clothing and -equipment.

The user must verify the designated purpose of the electrolyte. Previous experience has shown that not all metal surfaces are suitable for a trouble-free electroplating.

The above mentioned data are made according to our best knowledge. Consistent operation of the working solution requires appropriate maintenance. Chromating METAPAS C black CA is a process of Dr.-Ing. Max Schlötter GmbH & Co KG. It can only be operated with the products described in this technical data sheet. Use of other chemicals (also partly) will impair quality and invalidates our service- and quality commitments (quality assurance).

