

Technical Information

senotherm® -Paint



Product series:
1111

PROCESSING INSTRUCTION

1. STORAGE AND PREPARATION OF COATING PROCESS

1.1 QUALITY CONTROL OF MATERIALS ON RECEIPT

New supplies should be controlled with respect to the following parameter:

- a) Actual quantity supplied should correspond to the quantity indicated on the delivery note.
- b) Packaging supplied should be checked visually, so as to ensure that they were not damaged during transport.
- c) Supply viscosity should be conform to the values indicated in the according technical data sheet.

1.2 STORAGE

Material should preferably be stored at temperatures between 15° C and 25° C. The warehouse should meet official regulations regarding storage. Storage should further be organised according to the principle *first in -first out*, so that older batches are processed first.

When planning coating jobs, it should be taken into consideration that colour and degree of gloss of different batches may vary slightly. For this reason coating of diverse parts of one product should - if possible - only be coated with lacquer out of one batch.

If shelf life of the coating to be processed has already expired (we grant 6 months from manufacturing date), it should be verified in time whether lacquer is still in good condition and allows further processing. The same applies for supplies that have been exposed to extreme temperatures (<5° C or >40° C) during transport. Respective criteria are: viscosity, a smooth and homogeneous surface as well as colour of a trial coating. It should be ensured that material is homogenised thoroughly!

1.3 PREPARATIONS FOR COATING PROCESS

Prior to processing material must be brought to room temperature and stirred thoroughly. High-speed stirrers are to be preferred. Slowly running stirrers - integrated in many pressure tanks - are not suitable for homogenisation, in particular in case of sedimentation. Adjustment to application viscosity (for spray coating generally between 25 and 30 secs/4 mm/DIN 53 211 at 20° C) should be made after material has reached room temperature, as temperature changes influence viscosity and thus processing properties of the lacquer.

In general, an adjustment of viscosity is not necessary, as material is supplied at application viscosity. In order to obtain high-quality surfaces, material should - prior to application - be filtered through a sieve with size of 250-300 µm (60-52 Mesh) in order to remove possibly dried coating particles out of the lacquer. If the application system used is equipped with a pre-filter, this step can be left out.

Any appliance or device used for application of this material should not be used for other coating materials, as this may lead to film defects as e.g. craters or fish eyes !

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2. COATING LINES

senotherm® coatings of series -1111- can be successfully applied by means of a variety of application methods. However, in general, this coating is applied via spray lines with conventional high-pressure air atomization or via HVLP-systems respectively via air-assist electrostatic spray. Depending on the geometry of the items or desired throughput /passage, it is also possible to apply material via customary air-assist electrostatic systems. However, as not all products are adjusted for ESTA spray, it would be reasonable to inform us on this particular requirement prior to placing the order, so as to avoid any processing problems. Our technical data sheet for the respective product indicates whether this quality is adjusted for ESTA-application an application by means of brush, dip and flow coating is - because of the poor surface quality that would be achieved - generally not suitable. If airless or airmix lines are used, it is most important that maximum film thicknesses are strictly observed! The same applies for hot spray lines. Standard types are also available in spray cans. All parts carrying the lacquer, as e.g. pipes, seals etc. must offer sufficient resistance against aromatic hydrocarbons as e.g. Xylene. Prior to application of another system, the line should be cleaned with thinner 00-9597-100066 or another suitable quality.

Any appliance or device used for application of this material should not be used for other coating materials, as this may lead to film defects as e.g. craters of fish eyes!
As a rule, series -1111- should be processed in separate lines in order to avoid these problems!

3. SUBSTRATES

This coating material allows use of the following substrates: aluminium, steel, stainless steel, ceramic as well as temperature-resistant combined materials e.g. aluminised steel, chromized steel and Galvalumes. As is the case with most coating processes, the kind and quality of pretreatment has a considerable influence on the quality of the final finish and hence its durability. The enclosed list indicates possible combinations of substrates and pretreatments. As a rule abrasive pretreatments lead to better mechanical properties, however, minimum necessity is at any rate a clean, metallically pure substrate that is further free from grease. Corrosion products (layers of rust or mill scale etc.) must be completely removed prior to application.

As the requirements, depending on the end use, vary considerably, each new material and processing combination should be tested with respect to its suitability for the respective application prior to use. As a rule, substrates should - after pretreatment - be coated as soon as possible in order to avoid belated contamination, the formation of oxide layers and the addition of humidity. If an intermediate storage is necessary, items should be stored in tempered rooms with only insignificant temperature changes, to avoid the formation of water of condensation.

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4. PROCESSING

If possible, application should be made under constant conditions as e.g. temperature and atmospheric humidity. As this is hardly fully feasible in practice, viscosity of the coating material must be adjusted under consideration of the changed conditions. It may, for instance, be necessary to dilute material slightly if it is to be processed at 15° C, whereas material can be processed at supply viscosity at a temperature of 25° C. At the same time wet film thicknesses applied must be adjusted in dependency to the quantities of solvent added before. For instance, if 5 % thinner are added, wet film thickness to be applied must be raised by 5 % compared to the original value indicated in the data sheet, in order to obtain the recommended dry film thickness. For conventional high-pressure atomisation nozzle sizes of 1 - 2 mm with atomizing pressures of 2 - 5 bar (30-70 Psi) can be used. In practice nozzle sizes of 1,3 - 1,5 mm and atomizing pressures of 2,5 - 4 bar at an efflux time of 25-30 secs/4 mm at 20° C have proven to be advantageous. Apart from spraying, material also allows application by means of brush or roller coating. If these methods are used, particular attention should be paid to even application. Dip or flow coating may in single cases be used, however, in general, these processes are not advisable due to uneven distribution of film thicknesses.

In general, particular attention should be paid to the fact that maximum film thicknesses are not exceeded. This is possible due to the high solids content of subject series. Apart from raised material cost, this may otherwise further cause quality problems as e.g. heavier formation of fumes and unpleasant smells when being heated up for the first time, cracking or even peeling off if subjected to alternating temperatures.

5. CURE

senotherm® paints of series -1111- can be airdried and stoved.

However, films that have only been airdried offer apparently lower mechanical strengths.

Subject films only obtain full resistances after first charge at temperatures from 200° C. In order to immediately achieve full hardening and hence optimal strength of the finish, coating is - after flash-off for 15 minutes at room temperature - to be cured at 250° C object temperature. This procedure further offers the advantage that unpleasant smells that appear when the finished article is first put into operation are minimized. The process of flash-off or cure can be done in chamber furnaces or via in-line stoves, of course only on condition that these meet official regulations. Flash-off should be for 15-15 minutes at recirculated air temperatures of 20° up to a maximum of 100° C. As inflammable solvents evaporate during this process, ventilation should be adjusted to the quantity of solvents evaporating (see EN 1539 dryers and stoves where flammable substances are exposed) in order to avoid the formation of an explosive solvent mixture. For achieving optimal properties of the coating system, actual cure takes place at a metal temperature of 250° C for 30 minutes. Again, a good ventilation is necessary, in order to remove fission and reaction products of the binders contained.

The operation instruction - in particular for airdried appliances - should give hint to the fact that fumes and unpleasant smells may incur when item is first put into operation. This implies that good ventilation during this first heating period is of utmost importance. Pregnant women, allergic persons and small children, as well as domestic animals - especially birds - should not unnecessarily stay in subjected areas.

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6. QUALITY AND APTITUDE TESTS

Due to the broad field of application, a great number of test methods for quality and aptitude tests exists. The below table provides a survey on customary tests, however, does not claim to be complete.

Test	Standard	Differing Conditions
Non-volatile substances	DIN EN ISO 2811	-
Determination of efflux time (viscosity)	DIN 53 211	4 mm cup at 23°C
Measuring of film thickness	DIN 50 981; DIN 50 982	
Cross-hatch test	ISO 2409	
Water of condensation Constant climate	DIN 50 017 KK	
Temperature charge	ST 029	
Salt spray test	DIN 50 021 SS	

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7. SUBSTRATES

Substrate	Pretreatment	Suitability	Remarks
Sheet metal	degrease	conditional suitability	At temperatures exceeding approx. 200 ° C an oxide layer forms that can lead to a loss of coating's adhesion. Low carbon (that can be enamelled) steels show better results.
	degrease & phosphatization	conditional suitability	
	degrease & sandblasting	suitable	
Cast iron	degrease & sandblasting	suitable	see sheet steel
	degrease & phosphatization	conditional suitability	
TFS (chromated sheet steel)	degrease	suitable	Due to max. material thickness of 0,7 mm, it is almost exclusively used for coil coating. From 370° C strength alters.
	degrease & chromatization	suitable	
Aluminised steel	degrease	conditional suitability	Suitable up to approx. 500° C. Higher temperatures lead to alu dipping. The change of volume involved may cause adhesion problems
	degrease & chromatization	conditional suitability	
Hot dip, Sendzimir and galvanized steel	degrease	conditional suitability	Risk of loss of adhesion if exposed to vapours. The restructuring of the zinc layer at temperatures exceeding 200° C may lead to peeling off
Galvan (hot-dip galvanized steel, however Zn, 95 % + 5 % Al)			
Galvalum (hot-dip galvanized steel, however 45 % Zn+ 55 % Al)	degrease	suitable	
	degrease & chromatization	suitable	
Rolled aluminium e.g. Al 99,5	degrease	suitable	Structural changes of the aluminium from temperatures exceeding 200° C. This leads to changes in stability. Corrosion resistance and adhesion considerably depend on the alloy used.
	degrease & chromatization	suitable	
	degrease & caustic wash	suitable	
	degrease & sandblasting (corundum)	well suited	
Cast aluminium	degrease & polishing	suitable	See rolled aluminium. A high silicon content (from approx. 11 %) can lead to non-homogeneous alloys and hence to different properties on the item
	degrease & sandblasting (corundum)	well suited	
Stainless steel	degrease	conditional suitability	
	degrease & chromatization	conditional suitability	
	degrease & sandblasting (corundum)	well suited	
Non-glazed ceramics fireclay	degrease	conditional suitability	Visual appearance heavily depends on absorbency.

AS A RULE, EVERY MATERIAL COMBINATION HAS - PRIOR TO APPLICATION - BE TESTED WITH RESPECT TO ITS SUITABILITY.

The above indications were determined under lab conditions and in practice as being reference values. They correspond to today's developments in technique. Application equipment and application technique are beyond our influence. This information is given to the best of our knowledge, however, no liability or obligation whatsoever is assumed in connection with it.

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