

## Technical Information

### PROCESSING INSTRUCTION

# senotherm<sup>®</sup> Paint



Product series:  
**-1666-**

#### 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:

- Actual quantity supplied should correspond to the quantity indicated on the delivery note.
- 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 (59 and 77 °F)**. 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. Respective criteria are: viscosity, a smooth and homogeneous surface as well as colour of a trial coating.

##### 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 15 and 25 secs/4 mm/DIN 53 211/20° C) should be made after material has reached room temperature, as temperature changes influence viscosity and thus processing properties of the lacquer.

In order to obtain high-quality surfaces, material should - prior to application - be **filtered** through a sieve with **size of 150-200 µm** (80-100 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.

#### 2. COATING LINES

senotherm<sup>®</sup> coatings of series -1666- 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 air-assist electrostatic systems generally used in the industry. An application by means of **brush, dip and flow coating** is - because of the **poor surface quality that would be achieved** - generally not suitable.

All **parts carrying the lacquer**, as e.g. pipes, seals etc. must offer **sufficient resistance against aromatic hydrocarbons** as e.g. xylol. Prior to application of another system, the line should be cleaned with thinner 00-9597-100066 or another suitable quality.

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#### 3. SUBSTRATES

This coating material allows use of the following substrates: aluminium, steel, stainless steel as well as temperature-resistant materials e.g. aluminised steel, chromized steel and Galvalume. 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, metallicly 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.

#### 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. As an example, processing at 15° C requires a higher addition of thinner than an application at 25° C. At the same time wet film thickness 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 atomization** 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 (36 - 58 PSI) at an efflux time of 20-25 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.

#### 5. CURE

senotherm<sup>®</sup> paints of series -1666- can be **airdried and stoved**. **Airdrying films** offer apparently **lower mechanical strength**. This means that subject films only obtain full resistances after first charge at temperatures from 200° C (392 °F). In order to immediately achieve full hardening and hence **optimum strength** of the finish, coating is - after flash-off for 15 minutes at room temperature - **to be cured at 250° C (482 °F) object temperature for 30 min..** This procedure further offers the advantage that **unpleasant smells** that appear when the finished article is first put into operation are **minimised**. 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 15-5 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 exposed (see VBG 24 Drying lines for coating materials) 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.

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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	1 hr – 125° C
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	
Salt spray test	DIN 50 021 SS	

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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 the coating's adhesion. Low carbon (that can be enamelled)
	degrease & phosphatization	conditional suitability	
	degrease & sandblasting	suitable	steels show better results.
Cast iron	degrease & sandblasting	suitable	see sheet steel
Aluminised steel	Degrease	suitable	Suitable up to approx. 500° C. Temperatures exceeding 500° C may lead to alu dipping. Change of volume entailed may lead to adhesion problems.
	degrease & chromatization	suitable	
Electrolytically galvanized steel	Degrease	conditional suitability	Risk of loss of adhesion if exposed to vapours.
Galvan (hot-dip galvanized steel, however, 95% Zn + 5 % Al)	Degrease	conditional suitability	Risk of loss of adhesion if exposed to vapours.
	degrease & chromatization	conditional suitability	
Galvalum (hot-dip galvanized steel, however, 45 % Zn + 55 % Al)	Degrease	conditional suitability	
	degrease & chromatization	conditional suitability	
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	
Stainless steel	Degrease	conditional suitability	
	degrease & sandblasting (corundum)	well suited	
Non-glazed ceramics	Degrease	conditional suitability	Visual appearance heavily depends on absorbency.

**As a rule, every material combination has - prior to application - to be tested with respect to its suitability.**

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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.