Sound damping, Thermal insulation and Protection against condensation
Noxudol sound damping compound is an effective and time-saving way of preventing structure-borne sounds.

**HIGH DAMPING FACTOR, LOW WEIGHT**

Noxudol sound damping compound has a documented high damping factor, low weight and it is easy to apply. These are a few of the properties that are appreciated by shipyards, train manufactures, the vehicle industry and other sectors.

Besides having a low weight (approx half the weight compared with traditional asphalt mats) the compound is simple to apply by means of spray equipment or brush. Working time can be reduced by up to 80% by using Nuxudol instead of traditional sound damping material.

**MANY DIFFERENT PACKING SIZES**

Nuxudol 3100 is available in sizes from 600 ml spray up to 208-L barrels while Nuxudol 3101 is available in 20-L canister and 208-L barrel.

**NOXUDOL X9**

Heat losses, thermal bridges and condensation are common problems where temperature differences occur. Nuxudol X9 is a water-based thermal insulating compound that can be applied on both metal and plastic. This means that the product can be used within a large variety of areas and within a wide temperature range.

**AT SEA, IN BUILDINGS AND WITHIN INDUSTRY**

The low coefficient of thermal conductivity gives the compound extremely good protection against condensation. The product is consequently used in areas including insulation of boat hulls, treatment of ventilation plants and thermal insulation of machine components. Nuxudol X9 is also used to protect installations within industry.

The compound can be applied by means of spray equipment or brush on both metal and plastic. Nuxudol X9 is available in 20-L canister.

"An effective way of reducing structure-borne sounds”

"Nuxudol 3100, 3101 and X9 is completely free from solvents”
Our every day life is filled with undesirable sounds – noise. In order to damp it, several things have to be taken into consideration.

Energy and energy
We are dealing with two types of energy which have to be absorbed in order to damp the noise around us to a minimum. The acoustic already in the air and the mechanical contained in the material, which in turn generates acoustic energy.

Acoustic energy
Sound in buildings and environments with a long resonance time, commonly known as echoing, is normally most disturbing. This might be the case in buildings with stone walls, ceilings or floors where the acoustic absorption of the sound energy is missing. When adding another source of sound to this, like a class of preschool children or some sort of noisy machines, the sound level will become too high and disturbing. By acoustic absorption of the sound energy, the resonance as well as the noise will be effectively damped. Typical absorbents are acoustic panels, thick draperies, thick carpets etc.

Mechanical energy
When a piece of material is exposed to mechanical energy by a blow or similar, sound is generated. In other words it ‘sounds’ when the drumstick hits the cymbal. The kinetic energy of the drumstick is transmitted to the cymbal, creating resonance and generating sound. Now this was a desired sound but that is not always the case. Let us look at the car body: it is exposed to massive mechanical influences from the motor, the gear box, the bumpers etc. This is the undesirable sound. In other words we need something that can absorb the mechanical energy in the body sheet. Bitumen carpets glued to the metal of the car doors f. ex., are well known. The disadvantages with bitumen carpets are also well known; they are heavy and have a tendency to come off.

Noxudol Sound damping compound
Noxudol 3100 is a viscous and elastic damping compound based on polymers. Noxudol 3100 has very little acoustic absorption and is not absorbent of acoustic energy. Instead the material is highly effective as an absorbent of mechanical energy. Add a layer Noxudol 3100 on the cymbal and it will sound as if you would hit the drumstick on the lawn.
LOSS FACTOR FOR SOUND DAMPING MATERIALS

The following data should be recognized as indications. Variations might occur due to different measuring methods or to variations in the carpets measured.

<table>
<thead>
<tr>
<th>Product</th>
<th>Dry film kg/m²</th>
<th>Wet film kg/m²</th>
<th>Wet film Lit/m²</th>
<th>Dry film m/m</th>
<th>Average loss factor at 100-1000 HZ, 23°C</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2,25</td>
<td>3,5</td>
<td>3,5</td>
<td>2,25</td>
<td>0,2</td>
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<td>2,3</td>
<td>2,3</td>
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<td>0,92</td>
<td>0,92</td>
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<tr>
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<td>3,49</td>
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<td>0,24</td>
</tr>
<tr>
<td>BROWN BITUMEN CARPET</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>0,079</td>
</tr>
<tr>
<td>MAGNETIC CARPET</td>
<td>4,2</td>
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<td>-</td>
<td>-</td>
<td>0,12</td>
</tr>
<tr>
<td>MAGNETIC CARPET</td>
<td>3,8</td>
<td>-</td>
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<td>0,12</td>
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<tr>
<td>BARE METAL</td>
<td>-</td>
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</tr>
</tbody>
</table>

![Graph showing loss factor vs frequency](image_url)
Auson offers complete equipment for applying Sound damping compound. From our warehouse in Kungsbacka, Sweden we can deliver equipment and spare parts quickly which we always back up with excellent service and support.

**Pump Merkur**

- **Ratio 1:40**
- **Spray angle 50°**
- **Nozzle diameter 0.64 mm (0.25")**
- **Container: 20 L**
- **Graco Silver Plus Gun**
- **Hose: 8 M**
- **Weight: 43.5 Kg**
- **Reverse nozzle**
- **Art nr: 96000910**

**Pump Assalub**

- **Ratio 1:26**
- **For 20-L can**
- **Hose: 5 M**
- **Reverse nozzle**
- **Spray angle 50°**
- **Nozzle diameter 0.48 mm (0.019")**
- **Graco Silver Plus Gun**
- **Weight: 14 Kg**
- **Art nr: 96000340**

**Spray Gun 1L**

- **Spray gun for 1 L can**
- **Art nr 953146101**
- **Spray gun with 1 L plastic container**
- **Art nr: 953146100**
APPLICATION INSTRUCTIONS
Noxudol 3100/3101

SURFACE PREPARATIONS
Untreated surfaces of steel in moist environment and amphoteric metal surfaces such as unalloyed aluminium, zinc etc. which can react with bases must be primed before treatment to ensure good adhesion.
Surface should be clean, dry, free of oil, grease, and mildew prior to application. Noxudol 3101 is designed to adhere to most surfaces such as aluminum, wood, frp, steel, wood and fiberglass. It also adheres to primer.

MIXING
Noxudol 3100/3101 is supplied ready to use. This product will appear thick. A mixing blade must be use with a drill for a minimum of 10 min to achieve the necessary, smooth texture of the material required before spraying. Avoid adding water. Thinning may affect the properties of the Noxudol 3101.

APPLICATION EQUIPMENT
Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results. General guidelines:

MIXER:
Use a 1/2 drill with a slotted paddle

PUMP:
56: 1 working pressure 130 bar

APPLICATION PROCEDURES
AIRLESS SPRAY: A single coat built up with a number of quick passes allows greater control over quantities, thickness and finish. In certain conditions, it may be advantageous to apply two thin coats rather than one thick coat. It is necessary to ensure that the first coat has dried to touch.

Brush/Roller: Brush application, a fully loaded brush should be use. A short-nap roller can be use this will produce a smooth texture finish. We recommend to use an sprayer for larger areas.

THICKNESS
During application, the wet film thickness should be checked using a wet film gauge. The gauge will indicate the thickness achieved. It is important to ensure that the first layer of wet film applied does not exceed 0.08”(2mm) thickness. After the first layer has dried to touch second layer of wet film of 0.16”(4mm) can be applied.

CURING SCHEDULE
Drying time is dependent upon a number of factors:
• Temperature
• Air movement
• Humidity
• Thickness of Noxudol 3101
• Method of application
Noxudol 3101 can be over coated with itself as soon as the previous coat has skinned over. It may be advantageous to allow a longer drying time between coats as this will reduce the final drying time. Sample guide to curing time based on airless sprayed.

CLEAN UP
Pump, mixer, pistol, tips and hose should be clean with soap and water after each use to avoid material to harden inside hose and pistol.

AUSON AB—Kungsbacka, Sweden  T: +46 (0) 300-56 20 00  info@auson.se  www.auson.se
BEFORE: They used to glue 1.5 mm aluminium plate with 1 mm glue on the inside of the hull. This required 1 working hour per sqm. All the aluminium plates had to be cut to the exactly right size. The weight per sqm where 5 kg.

TODAY: All vertical places, which need sound, damping, included the frame ribs, are treated with Noxudol 3100. Up to 5 kg/sqm can be applied without exceeding the cost for the material of the old system. However, Noxudol 3100’s unique sound damping properties and the possibility to treat 100 % of all vertical surfaces and frame ribs, reduce the requirement of material to about 2 kg/sqm (about 3 litre/sqm wet material). They apply up to 3 kg/sqm on surfaces where extra sound damping is required.
**REFERENCE OBJECT**

**SOUND DAMPING WITH NOXUDOL 3101**

**ALSTOM TRANSPORT**

**PETITE-FORET, FRANCE**

**BEFORE:** Used an domestic product with a weight dry film of approx. 2,8 kg/m²

**NOW:** Alstom Transport is now using Noxudol 3101 and receive the same sound damping properties with a weight of only 1,5 kg/m² and a dry film thickness of approx 1,5 mm. They reduced the weight with 120 kg per wagon.
**Reference Object**

**Sound Damping with Noxudol 3100/3100**

**Mulder 98 Flybridge**

**Sound Reduction in Practice**

Vibrating material is a major source of sounds. For example, playing the drums, or when the hood of your car falls down. Noxudol reduces the vibration and resonance in most materials. Therefore the original material will produce less noise and won’t carry noise any further through the construction.

This information sheet shows the sounds damping effects in an aluminum yacht, a Flybridge 98 (ft) build by Shipyard Mulder in Zoeterwoude in the Netherlands. All compartments were treated with Noxudol 3101 and comply to RINA Regulations.

**The Test**

In order to perform the test a sound producing device was placed straight under the sound measuring equipment. The mechanical sound is produced by an electric motor with an asymmetric weight. The motor starts to vibrate and produces the mechanical noise. Besides measuring the direct sound damping effect by measuring straight above the source, we also measured the sound damping effects over some distance. The vibrating motor was placed at 'C' and the measuring equipment at 'E', covering approx 30 ft distance. The matrix shows impressive sound damping effects, especially over some distance. Keep in mind that sound curves are progressive and with every 3 dB the sound doubles.

Due to the building phase, measurements at location A and B were performed at a horizontal stringer inside the hull. Those results are significant, but not as impressive as the other measurements which were performed on a horizontal floor/deck that covers a bigger area between ribs and stringers resulting in more vibration.

In all cases we measured the max noise produced in a timeframe of 20 seconds. All results are the averages of 3 measurements at each location. Naturally these outcomes are just an indication of the possibilities by using Noxudol. Sound and sound damping effects differ for each material and construction. The change in sound levels is much more important than the sound level itself.

**The Results**

This test shows the significant drop in sound levels by using Noxudol 3100/3101 to prevent or minimize vibrations in a construction. You will experience higher comfort levels (e.g. luxury yachts, trains, cars) and a safer working environment (e.g. workboats, offshore constructions, machine coverings).

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<td>77,1</td>
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<td>89,3</td>
<td>74,0</td>
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</tbody>
</table>
Below is our recommended film thickness table that can be used to calculate the consumption. The table is divided between different materials. The quantities below should be seen as a recommendation. Variations may occur depending on constructions and requirements.

<table>
<thead>
<tr>
<th>Material</th>
<th>Material thickness (mm)</th>
<th><strong>Noxudol 3100</strong></th>
<th></th>
<th><strong>Noxudol 3101</strong></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dry film (kg/m²)</td>
<td>Consumption (l/m²)</td>
<td>Dry film (kg/m²)</td>
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<td></td>
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</table>
The purpose of the test is to compare different solutions for sound damping on large plates with relatively high material thickness. Which difference do we get when Noxudol 3100 exclusively is applied in thinner and thicker layers?

This compared to the conventional sandwich construction where a plate, with 1/3 of the thickness of the external plate is glued on top of a 1 mm visco elastic carpet. At the same time we wanted to know which improvement we get when Noxudol 3100 is applied on spot welded expanded metal.

We chose steel plates with the dimension: 2000x300x6mm to get representative results for low frequencies.
Noxudol 3100 was used as sprayable visco elastic sound damping. The plates were hanged up at two points on the short end with a wire. The vibrations were generated with a hammer with a hard plastic tip.

As measuring instrument we used:
- Vibra Metrics accelerometer
- Brüel-Kjær -amplifier Type 2606
- printer Type 2305
- frequency filter Type 2112

Six different measurements for each frequency were made with two different points of measuring on the surface and three strokes for each point of measuring. The accelerometer were fastened on the untreated side of the objects, in the middle and near the lower edge. In the table below we state a mean value for the measured reverberation times.

**CONCLUSION**

We can come to the conclusion that visco elastic sound damping with Noxudol 3100 is a perfect alternative to damping with counter plate. If you reach film thicknesses that are as thick as the under layer you can effectively damp large surfaces on relatively thick under layer. Expanded metal somewhat increases the damping but in proportion to weight and working hours this is not very interesting.

<table>
<thead>
<tr>
<th>Fr [Hz]</th>
<th>31,5</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
<th>16000</th>
<th>31500</th>
</tr>
</thead>
<tbody>
<tr>
<td>T(60) [s] untreated plate</td>
<td>132</td>
<td>164</td>
<td>118</td>
<td>11,6</td>
<td>13,4</td>
<td>14,5</td>
<td>13,5</td>
<td>5,41</td>
<td>6,63</td>
<td>8,28</td>
<td>8,4</td>
</tr>
<tr>
<td>T(60) [s] plate with 5,8 kg/m² NOXUDOL 3100</td>
<td>2,78</td>
<td>1,4</td>
<td>1,2</td>
<td>1,1</td>
<td>1,1</td>
<td>1,2</td>
<td>1,23</td>
<td>1,18</td>
<td>1,38</td>
<td>1,23</td>
<td>1,4</td>
</tr>
<tr>
<td>T(60) [s] plate with 3,3 kg/m² NOXUDOL 3100</td>
<td>7,75</td>
<td>7,4</td>
<td>2,22</td>
<td>1,2</td>
<td>1,28</td>
<td>1,18</td>
<td>1,13</td>
<td>1,3</td>
<td>1,1</td>
<td>1,07</td>
<td></td>
</tr>
<tr>
<td>T(60) [s] plate with sandwich total 17 kg/m²</td>
<td>1,13</td>
<td>1,2</td>
<td>1,13</td>
<td>1,1</td>
<td>1,1</td>
<td>1,1</td>
<td>1,17</td>
<td>1,22</td>
<td>1,27</td>
<td>1,23</td>
<td>2,78</td>
</tr>
<tr>
<td>T(60) [s] plate with expanded metal and 4,9 kg/m² 3100 total 11,1 kg/m²</td>
<td>2,25</td>
<td>2,3</td>
<td>1,17</td>
<td>1,1</td>
<td>1,15</td>
<td>1,17</td>
<td>1,18</td>
<td>1,3</td>
<td>1,4</td>
<td>1,6</td>
<td>1,51</td>
</tr>
</tbody>
</table>
The purpose of the test is to compare different solutions for sound damping on large plates with relatively high material thickness.

Which difference do we get when NOXUDOL 3100/3101 exclusively is applied in thinner and thicker layers?

This compared to the conventional sandwich construction where a plate, with 1/3 of the thickness of the external plate is glued on top of a 1 mm visco-elastic carpet.

We chose aluminium plates with the dimension: 2000x300x6mm to get representative results for low frequencies.

NOXUDOL 3100/3101 was used as sprayable visco elastic sound damping.

The plates were hanged up at two points on the short end with a wire.

The vibrations were generated with a hammer with a hard plastic tip.

As measuring instrument we used:
- Vibra Metrics accelerometer
- Brüel-Kjær -amplifier Type 2606
  - printer Type 2305
  - frequency filter Type 2112

Six different measurements for each frequency were made with two different points of measuring on the surface and three strokes for each point of measuring. The accelerometer was fastened on the untreated side of the objects, in the middle and near the lower edge. In the table below we state a mean value for the measured reverberation times.

We can come to the conclusion that visco elastic sound damping with NOXUDOL 3100/3101 is a perfect alternative to damping with counter plate. If you reach film thicknesses that are as thick as the underlayer you can effectively damp large surfaces on relatively thick underlayer.

<table>
<thead>
<tr>
<th>Fr [Hz]</th>
<th>31,5</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
<th>16000</th>
<th>31500</th>
</tr>
</thead>
<tbody>
<tr>
<td>T(60) [s] untreated plate</td>
<td>109</td>
<td>18</td>
<td>22</td>
<td>32,6</td>
<td>17,4</td>
<td>10,3</td>
<td>2,7</td>
<td>2,6</td>
<td>4,5</td>
<td>4,5</td>
<td>4,5</td>
</tr>
<tr>
<td>T(60) [s] plate with 2,5 kg/m² NOXUDOL 3100</td>
<td>6,00</td>
<td>1,60</td>
<td>1,35</td>
<td>1,16</td>
<td>1,5</td>
<td>1,6</td>
<td>2,2</td>
<td>1,5</td>
<td>1,5</td>
<td>1,6</td>
<td>1,6</td>
</tr>
<tr>
<td>T(60) [s] plate with 4,0 kg/m² NOXUDOL 3100</td>
<td>7,80</td>
<td>1,25</td>
<td>1,22</td>
<td>1,4</td>
<td>1,55</td>
<td>1,72</td>
<td>1,35</td>
<td>1,5</td>
<td>1,55</td>
<td>1,5</td>
<td>1,6</td>
</tr>
<tr>
<td>T(60) [s] plate with sandwich totalt 7 kg/m²</td>
<td>2,03</td>
<td>1,10</td>
<td>1,24</td>
<td>1,8</td>
<td>1,1</td>
<td>1,18</td>
<td>1,02</td>
<td>1,05</td>
<td>1,4</td>
<td>1,6</td>
<td>1,9</td>
</tr>
<tr>
<td>T(60) [s] plate with 2,8 kg/m² Nuxudol 3101</td>
<td>6,30</td>
<td>1,26</td>
<td>1,03</td>
<td>1,32</td>
<td>1,37</td>
<td>1,24</td>
<td>1,25</td>
<td>1,25</td>
<td>1,45</td>
<td>1,5</td>
<td>1,7</td>
</tr>
<tr>
<td>T(60) [s] plate with 4,4 kg/m² NOXUDOL3101</td>
<td>3,50</td>
<td>1,43</td>
<td>1,08</td>
<td>1,4</td>
<td>1,18</td>
<td>1,25</td>
<td>1,32</td>
<td>1,53</td>
<td>1,7</td>
<td>1,8</td>
<td>19</td>
</tr>
</tbody>
</table>
The measuring was done on a 500x500x5 mm glass fiber armed plastic panel of the type that is used in reparations of plastic boats. The measuring equipment was a Vibra Metrics accelerometer with an associated signal amplifier, Brüel&Kjær amplifier Type 2606 and a Brüel&Kjær printer Type 2305.

Before the treatment the reverberation time was measured to 5,48 seconds. The panel was treated with 2,0 kg/m² of Noxudol 3100. After 2 weeks drying the measuring was repeated, the accelerometer placed in the same place and with the same excitation beats. The reverberation was this time measured to 0,64 seconds. Reverberation time is the time it takes to reduce the acoustic pressure with 60 dB.
On request from customers we have tested the capacity of protection against condensation that Noxudol 3100 offers.

The test was performed as follows:

- 3 pieces aluminum panels with dimensions 300x300x5 mm were used.
- Panel no. 1 was treated with a well known Swedish condensation protection compound.
- Panel no. 2 was treated with Noxudol 3100, 1,75 kg/m².
- Panel no. 3 was untreated.

The two processed panels dried for a whole week at room temperature.

Three pieces of cylindrical steel bits with a diameter 150 mm and a thickness of 100 mm were placed in a freezer during 24 hours at -25°C. All three cold steel cylinders were taken out of the freezer simultaneously and the aluminum panels were placed centrally with the untreated side against the surface of the cylinder.

After a short while condensate, formed like a circle corresponding to the area of contact with the cold cylinders, appeared on the untreated aluminum panel. The two other cylinders stayed dry.

**The result shows that because Noxudol 3100 has a low thermal conductivity it gives a relatively good protection against condensation.**
On request from customers we have tested the thermal conductivity/insulating power of Noxudol 3100. The test was worked out as follows:

Noxudol 3100 was applied on the bottom of a 5-lit can, the thickness corresponding 1,85 kg/m². After 10 days drying this can and an untreated can were filled with ice water and placed on a wooden base each. On the outside of the tin bottoms we placed a magnetic contact thermometer. The ice water was kept constantly moving. After 45 minutes the thermal balance was adjusted and the temperature was measured with a Nordtec thermometer.

### Parameters:
- **Gauge of plate in can**: 0,25mm tin-plate
- **Rooms temperature**: 18,0°C

### Treated can:
- **Water temperature**: 0,2°C
- **Bottom temperature inside**: 0,3°C
- **Bottom temperature outside**: 7,5°C
- **Film thickness Nox. 3100**: 1,85 kg/m²

### Untreated can:
- **Water temperature**: 0,2°C
- **Bottom temperature inside**: 0,3°C
- **Bottom temperature outside**: 0,4°C

We used Fourier’s formula of thermal flux in a stationary system with water in laminar flow (related to practical cases for boats).

We also regarded the fact that the thermal conductivity of the plate is considerably higher than that of the Noxudol 3100 film, which is 0,156, W/m.K The same conductivity can be found in asbestos mats or wooden plates sawed perpendicularly the fibers. Comparatively copper has a thermal conductivity of 384 W/m.K, steel 46,5 W/m.K and glass 0,7 W/m.K
**GENERAL**

Noxudol 3100 is a waterborne viscous, elastic sound damping paste based on polymers, developed for users which have high demands on fire safety. Due to its viscous elastic flexibility it converts sound producing resonance into heat. The material holds good adhesive qualities and is water-resistant when hardened. The product contains anti corrosives and can give some protection against condensation.

Noxudol 3100 has a high damping factor despite low weight/unit area (approx. half the weight compared with traditional bitumen carpets).

**RANGE OF APPLICATION**

Noxudol 3100 is a sound damping paste intended for metal and plastic in thickness between 0, 5-5,0 mm, like car bodies, ships’ hulls, ventilating ducts etc.

**PACKAGE**

39130096 / 600 ml spray (12 pcs/box.)
39110511 / 1-lit canister (12 pcs/box.)
39110405 / 5-lit can
39110408 / 20-lit can
39110731 / 208-lit barrel

**TECHNCIAL DATA**

- Colour: Black & Beige
- Consistency: Thixotropic pasta
- Type of film: Solid after drying
- Density: 990 ± 30 kg/m³
- Dry content: 64 ± 2 %
- Film thickness: 1,0 - 2,5 mm dry film/applic
- Application temperature: 15 - 30° C
- Removal with: Water, if it isn’t dry
- Spray nozzle airless: > 0, 025
- Dilution: Water
- Consumption of material: 1,5 – 4 kg/m²
- Dry film heat resistance: Max 100° C
- Moisture pickup: 3% according to STD 1027, 3375
- Storing time: 12 months
- Storing temperature: 5 - 35° C

**INSTRUCTIONS FOR USE**

Noxudol 3100 should only be applied on carefully cleaned surfaces. Untreated surfaces of steel in moist environment and amphoteric metal surfaces such as unalloyed aluminium, zinc etc. which can react with bases must be primed before treatment to ensure good adhesion. Apply with a high-pressure pump (airless) 1:26, sprayer or roller. When using a highpressure pump it is very important to switch off the pressure when not spraying. Max. interruption with pressure on, 1 minute. After switching off, the pressure in the hose must also be let out by the pistol gun; otherwise the material will pack in the hose and be very difficult to remove. The pistol gun ought to be front mounted, the hose reasonably wide and the needle as large as possible.

To achieve an effective resonance and sound damping, apply a smooth layer of 1,0 - 2,5 mm dry film, depending on the basis. The film thickness will also influence the drying time, normally 6-8 hours at room temperature. At lower temperatures or high humidity the drying time will increase considerably. The product sets in two steps. First the water evaporates, and then a chemical hardening takes place during the next 7-14 days, depending on the temperature. After the first step, the evaporation, the film is dry, manageable and already has a sound damping effect of around 80%. This effect increases during the chemical hardening. Only after the film has hardened (7-14 days) Noxudol 3100 is water and frost resistant and can then also be top coated with most paint. A practical test has to be done first on a smaller area to make sure that the paste withstands the paint.
Noxudol 3101 is a waterborne viscous, elastic sound damping paste based on polymers, developed for users which have high demands on fire safety. Due to its viscous elastic flexibility it converts sound producing resonance into heat. The material holds very good adhesive qualities and it is water-resistant when hardened. Noxudol 3101 contains anti corrosives and even give some protection against condensation. The product has a high damping factor despite low weight/unit area (approx. half the weight compared with traditional bitumen carpets).

Noxudol 3101 is a sound damping paste intended for metal and plastic in thickness between 0,5 - 5,0 mm, like car bodies, ships’ hulls, ventilating ducts etc. The product effectively eliminates disturbing sounds.

Noxudol 3101 should only be applied on carefully cleaned surfaces. Untreated surfaces of steel in moist environment and amphoteric metal surfaces such as unalloyed aluminium, zinc etc. which can react with bases must be primed before treatment to ensure good adhesion. Apply the material with a highpressure pump (airless) 1:26+, sprayer or roller. It is important to switch off the pressure when not spraying. Max. interruption with pressure on, 1 minute. After switching off, the pressure in the hose must also be let out by the pistol gun; otherwise the material will pack in the hose and be very difficult to remove. The pistol gun ought to be front mounted, the hose reasonably wide and the needle as large as possible.

To achieve an effective resonance and sound damping, apply a smooth layer of 1, 0-2, 5 mm dry film, the thickness depending on the basis. The film thickness will also influence the drying time, normally 6-8 hours at room temperature. At lower temperatures or high humidity the drying time will increase considerably. The product sets in two steps. First the water evaporates, and then a chemical hardening takes place during the next 7-14 days, depending on the temperature. After the first step, the evaporation, the film is dry, manageable and already has a sound damping effect of approx. 80%. This effect increases during the chemical hardening. Only after the film has hardened (7-14 days).

Noxudol 3101 is water and frost resistant and can then also be top coated with most paint. A practical test has to be done first on a smaller area to make sure that the paste withstands the paint.

**GENERAL**

Noxudol 3101 is a waterborne viscous, elastic sound damping paste based on polymers, developed for users which have high demands on fire safety. Due to its viscous elastic flexibility it converts sound producing resonance into heat. The material holds very good adhesive qualities and it is water-resistant when hardened. Noxudol 3101 contains anti corrosives and even give some protection against condensation. The product has a high damping factor despite low weight/unit area (approx. half the weight compared with traditional bitumen carpets).

**RANGE OF APPLICATION**

Noxudol 3101 is a sound damping paste intended for metal and plastic in thickness between 0,5 - 5,0 mm, like car bodies, ships’ hulls, ventilating ducts etc. The product effectively eliminates disturbing sounds.

**PACKAGE**

39410408 / 20-lit can
39410751 / 208-lit barrel

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Colour:</th>
<th>Beige</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency:</td>
<td>Thixotropic pasta</td>
</tr>
<tr>
<td>Type of film:</td>
<td>Solid after drying</td>
</tr>
<tr>
<td>Density:</td>
<td>1090 ± 30 kg/m³</td>
</tr>
<tr>
<td>Dry content:</td>
<td>64 ± 2 %</td>
</tr>
<tr>
<td>Film thickness:</td>
<td>1,0 - 2,5 mm dry film/applic</td>
</tr>
<tr>
<td>Application temperature:</td>
<td>15 - 30° C</td>
</tr>
<tr>
<td>Removal with:</td>
<td>Renox milieu or Naphtha</td>
</tr>
<tr>
<td>Spray nozzle airless:</td>
<td>&gt; 0, 025</td>
</tr>
<tr>
<td>Dilution:</td>
<td>Water</td>
</tr>
<tr>
<td>Consumption of material:</td>
<td>1,5 – 4 kg/m²</td>
</tr>
<tr>
<td>Dry film heat resistance:</td>
<td>Max 100° C</td>
</tr>
<tr>
<td>Moisture pickup:</td>
<td>3% according to STD 1027, 3375</td>
</tr>
<tr>
<td>Storing time:</td>
<td>12 months</td>
</tr>
<tr>
<td>Storing temperature:</td>
<td>5 - 35° C</td>
</tr>
</tbody>
</table>

**INSTRUCTIONS FOR USE**

Noxudol 3101 should only be applied on carefully cleaned surfaces. Untreated surfaces of steel in moist environment and amphoteric metal surfaces such as unalloyed aluminium, zinc etc. which can react with bases must be primed before treatment to ensure good adhesion. Apply the material with a highpressure pump (airless) 1:26+, sprayer or roller. It is important to switch off the pressure when not spraying. Max. interruption with pressure on, 1 minute. After switching off, the pressure in the hose must also be let out by the pistol gun; otherwise the material will pack in the hose and be very difficult to remove. The pistol gun ought to be front mounted, the hose reasonably wide and the needle as large as possible.

To achieve an effective resonance and sound damping, apply a smooth layer of 1, 0-2, 5 mm dry film, the thickness depending on the basis. The film thickness will also influence the drying time, normally 6-8 hours at room temperature. At lower temperatures or high humidity the drying time will increase considerably. The product sets in two steps. First the water evaporates, and then a chemical hardening takes place during the next 7-14 days, depending on the temperature. After the first step, the evaporation, the film is dry, manageable and already has a sound damping effect of approx. 80%. This effect increases during the chemical hardening. Only after the film has hardened (7-14 days).

Noxudol 3101 is water and frost resistant and can then also be top coated with most paint. A practical test has to be done first on a smaller area to make sure that the paste withstands the paint.
WATERBORNE SOUND DAMPING PASTE

Noxudol X9 is based on polymers and fillers a water-based thermal insulating compound that can be applied on both metal and plastic. This means that the product can be used within a large variety of areas and within a wide temperature range.

Noxudol X9’s low coefficient of thermal conductivity gives the compound extremely good protection against condensation. The protective paste is intended for metal and plastics in thickness between 1-3 mm. The product is consequently used in areas including insulation of boat hulls, treatment of ventilation plants and thermal insulation of machine components. Noxudol X9 is also used to protect installations within industry.

Noxudol X9 should only be applied on carefully cleaned surfaces. The compound can be applied by means of spray equipment or brush on both metal and plastic.

To achieve an effective condensation protection the recommended thickness is 1-3 mm dry film, depending on the basis. The film thickness will also influence the drying time, normally 6-12 h at room temperature. The product sets in two steps. First the water evaporates, and then a chemical hardening takes place during the next 7-14 days, depending on temperature. After the evaporating the film is dry, manageable and already has a protecting effect. This effect increases during the chemical hardening.

The insulating compound’s excellent adhesiveness means that it affixes securely to the under layer and can also be coated with more paints. A practical test has to be done first on a smaller area to make sure that the past withstands the paint.

**PACKAGE**

40700408 / 20-lit can

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Colour:</th>
<th>White</th>
</tr>
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<tbody>
<tr>
<td>Consistency:</td>
<td>Paste</td>
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<tr>
<td>Density at 20° C</td>
<td>690 ± 30 kg/m³</td>
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<tr>
<td>Dry content:</td>
<td>56 ± 2 %</td>
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<td>Solvents:</td>
<td>Water</td>
</tr>
<tr>
<td>Film thickness</td>
<td>1,0—3,0 mm dry film</td>
</tr>
<tr>
<td>Removal with:</td>
<td>Renox milieu 10 or white spirit</td>
</tr>
<tr>
<td>Application temperature</td>
<td>15—25 °C</td>
</tr>
<tr>
<td>Storing time:</td>
<td>12 months</td>
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<tr>
<td>Storing temperature:</td>
<td>5 - 35° C</td>
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<tr>
<td>Thermal conductivity:</td>
<td>0,085 W/mk</td>
</tr>
</tbody>
</table>
CERTIFICATES & TEST RESULTS

Certificates

- Bureau Veritas—Med 96/98/EC Quality System Module D Certificate
- Bureau Veritas—EC Type Examination Certificate—Low flame-spread characteristics Noxudol X9
- Lloyds Register—Certificate of fire approval Noxudol 3101

Test Reports

- Fire Technology—Smoke generation according to ISO 5659-2 Noxudol 3101
- Fire Technology—Spread of flame and rate of heat release according to IMO Resolution A.653(16) Noxudol 3101
- Fire Technology—Surface flammability of bulkhead, ceiling and deck finish materials IMO Resolution A.653 (16) Noxudol X9
- Volvo Standard STD 5031,1—Burning rate Noxudol 3100
- Pacific Testing Laboratories, INC. Thermal Conductivity in accordance with ASTM C 177-97
EC TYPE EXAMINATION CERTIFICATE

Notified Body 0062 - MARINE EQUIPMENT DIRECTIVE 96/98/EC

Auson AB
Kungsbacka - SWEDEN

Requirements:

SOLAS 74 convention as amended, Regulations II-2/4, II-2/6, XI/3
IMO Res. MSC.81(70)-F(TCP Code) Annex 1 Part 2 and 6, Annex 2
IMO Res. MSC.307(88)-F(TCP Code 2010) § 8
IMO MSC/Res. 1102
IMO MSC/Circ.1120

This certificate is issued under the French Marine Authority to attest that BUREAU VERITAS did undertake the relevant type-examination procedures for the product identified above which was found to comply with the relevant requirements of the Council Directive 96/98/EC of 20 December 1996 as amended.

This certificate will expire on: 07 May 2018

For BUREAU VERITAS Notified Body 0062,
At BV GOTHENBURG, on 07 May 2013,
Magne MOLLER

This certificate does not allow to issue the Declaration of Conformity and to affix the mark of conformity (wheelmark ⚪) to the products corresponding to this type.

By Norm. Ad E 538 May 2009

This certificate consists of 2 pages
CERTIFICATES & TEST RESULTS

TYPE APPROVAL CERTIFICATE

This certificate is issued to:

Auson AB
Kungsbacka - SWEDEN

for the type of product:

PRIMARY DECK COVERINGS
NOXUDOL 3101

Requirements:
BV Rules Part C Chapter 4 - SOLAS 74, as amended, Chapter II 2

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 24 Sep 2014

For BUREAU VERITAS,
At BY GOTHENBURG, on 24 Sep 2009,
Magne Moller

This certificate is recognized by Transport Canada

This certificate remains void until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent pages are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) referred to herein may be re-approved prior to holding a certificate in which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site www.veritas.com. Any person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishing or issuance of this document, and in connection with any activities for which it may provide.

BN/M0/Ad.E.550 May 2009
This certificate consists of 2 pages

AUSON AB – Kungsbacka, Sweden T: +46 (0) 300-56 20 00 info@auson.se www.auson.se
CERTIFICATES & TEST RESULTS

EC TYPE EXAMINATION CERTIFICATE
as per Module B of European Union Council Directive 96/98/EC on marine equipment
as amended by Commission Directive 2009/26/EC

Notified Body 0062 - MARINE EQUIPMENT DIRECTIVE 96/98/EC

For BUREAU VERITAS Notified Body 0062,
At BV GOTHENBURG, on 27 Jan 2011,

Magne MOLLER

This certificate does not allow to issue the Declaration of Conformity and to affix the mark of conformity (wheelmark  ) to the products corresponding to this type. To this end, the production-control phase module (D, E or F) of Annex B of the Directive is to be complied with and controlled by a written inspection agreement with a notified body.

This certificate is issued under the French Maritime Authority to assert that BUREAU VERITAS did undertake the relevant type-examination procedures for the product identified above which was found to comply with the relevant requirements of the Council Directive 96/98/EC of 20 December 1995 as amended.

This certificate will expire on: 27 Jan 2016

M. MOLLER

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BV Mod. Act.X; 538 May 2009

This certificate consists of 2 page(s)
CERTIFICATE OF FIRE APPROVAL

This is to certify that

The product detailed below will be accepted for compliance with the applicable Lloyd’s Register Rules and Regulations and with the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, for use on ships and offshore installations classed with Lloyd’s Register, and for use on ships and offshore installations when authorised by contracting governments to issue the relevant certificates, licences, permits etc.

Manufacturer: Auson AB
Address: Verkadengatan 3
434 42 KUNGSBACKA
Sweden
Type: PRIMARY DECK COVERING MATERIAL NOT CAPABLE OF PRODUCING EXCESSIVE QUANTITIES OF SMOKE & TOXIC PRODUCTS OF COMBUSTION
Description: Fire Resisting Material - Type: “NOXUDOL 3101” Primary Deck Coating System
Specified Standard: IMO Res. MSC.61(67) - (FTP Code) Annex 1, Part 2 and Part 6
IMO MSC/Circ 1120
IMO Res. MSC.307(88) 2010 FTP Code, Annex 1, Part 3, Section 8

The attached Design Appraisal Document forms part of this certificate.
This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

Date of issue: 29 July 2013
Certificate No.: SAS FL30150
Expiry date: 28 July 2018
Signed: [Signature]
Sheet No: 1 of 2
Name: J. M. Evans
Surveyor to Lloyd’s Register EMEA
A Member of the Lloyd’s Register Group

Note:
This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd’s Register of any modification or changes to the equipment in order to obtain a valid Certificate.

Lloyd’s Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents, are, individually and collectively, entitled to the benefit of the clauses of the Lloyd’s Register’s Lloyd’s Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information provided, unless that person has signed a contract with the relevant Lloyd’s Register entity for assessment, certification, testing, inspection or surveying and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.
Smoke generation according to ISO 5659-2 (1994)
(1 enclosure)

Product
Water carried sound absorptive mass called "Noxudol 3101" based on polymer. The product has a nominal thickness of 1.5 - 2.5 mm, a nominal density of 1090 kg/m² and a dryness of 64 ± 2 %.

Manufacturer
Auson AB, Kungsbacka, Sweden.

Purpose of test
Basis for technical fire classification.

Sampling
The samples were delivered by the manufacturer. It is not known to SP, Fire Technology if the product received is representative of the mean production characteristics.

The samples were received February 24, 1999 at SP, Fire Technology.

Test procedure:
- Three tests performed according to ISO 5659-2 (1994) at an irradiance of 25 kW/m² without any pilot flame.
- Three tests performed according to ISO 5659-2 (1994) at an irradiance of 25 kW/m² in the presence of pilot flame.
- Three tests performed according to ISO 5659-2 (1994) at an irradiance of 50 kW/m² without any pilot flame.
- Additional to the test method, FTIR gas analysis was performed at each test condition to indicate the concentration of certain gas species specified in IMO PTP Code Resolution MSC. 61(67), chapter 1, Annex 1, Part 2.
CERTIFICATES & TEST RESULTS

SP REPORT

Auson AB, R & D Laboratory
Verkstadsgatan 3
434 42 KUNGEBACKA

Report No.: 98R2 3089
Date: 1998-02-26

Burning rate according to Volvo Corporate standard STD 5031.1
(1 enclosure)

Product
Polymer based noise-reduction compound (applicable as a spray) called "Noxudol 3100".
Nominal applied area weight, 1.8-2.1 kg/m². Nominal applied thickness, 2 mm
approximately.

Manufacturer
Auson AB, Kungbacka.

Purpose of test
Basis for technical fire classification.

Sampling
The samples were delivered by the client. It is not known to SP Fire Technology if the
product received is representative of the main production characteristics.
The samples were received at the laboratory on February 20, 1998.

Deviation from standard
Testing of aged samples according to section 5.2.8 was not performed.

Test results
A full test series of conditioned (only) samples is given in enclosure 1.
Surface flammability of bulkhead, ceiling and deck finish materials according to IMO Resolution A.653(16)
(1 appendix)

Product
The product called “Noxudol X9” is a waterborne thermal insulation paste based on polymer and fillers. The samples consisted of the product sprayed on steel plates with a dry weight of approximately 1.19 kg/m². The colour of the paste was grey.

Manufacturer
Auszon AB, Kungsbacka, Sweden.

Purpose of test
Basis for technical fire classification.

Sampling
The samples were delivered by the client. It is not known to SP Fire Technology, if the product received is representative of the mean production characteristics. The samples were received on July 7, 2010 at SP Fire Technology.

Test results
The test results are given in appendix 1. The test results relate only to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Criteria
According to IMO FTP Code, Annex I, Part 5, materials used as bulkhead, wall and ceiling linings must have surface flammability values meeting the following limits: CFE ≥ 20.0 kW/m², Qh ≥ 1.5 MJ/m², Qs ≤ 0.7 MJ and qp ≤ 4.0 kW, when tested according to IMO Resolution A.653(16).

According to IMO FTP Code, Annex I, Part 5, materials used as floor coverings must have surface flammability values meeting the following limits: CFE ≥ 7.0 kW/m², Qh ≥ 0.25 MJ/m², Qs ≤ 2.0 MJ and qp ≤ 10.0 kW, when tested according to IMO Resolution A.653(16).

The above follows the subsequent nomenclature:
CFE = critical flux at extinguishments
Qh = heat for sustained burning
Qs = total heat release
qp = peak heat release rate.
CERTIFICATES & TEST RESULTS

PACIFIC TESTING LABORATORIES, INC.
24950 Avenue Tibbals, Valencia, CA 91355-3426, USA • (661) 257-1437 • FAX (661) 257-3411

TEST REPORT

<table>
<thead>
<tr>
<th>In Account With</th>
<th>Date</th>
<th>Page 1 of 2 pages</th>
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<td>March 21, 2005</td>
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<td>W.O. No. 30083</td>
<td>Specification None Specified</td>
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<td>Gardena, CA 90248</td>
<td>P.O. No. 6163</td>
<td>Received 03-08-2005</td>
</tr>
<tr>
<td>Attn: Carlos Rivas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IDENTIFICATION: One (1) sample material was submitted for "Thermal Conductivity" testing in accordance with ASTM C 177-97. The test sample was identified as follows:

Description
Noxudol X9

SPECIFICATION: None specified.

REFERENCE: Purchase Order Number 6163.

TESTING: Thermal Conductivity in accordance with ASTM C 177-97.

SUMMARY: The test results, reported herein, are submitted for customer evaluation.

Respectfully submitted,
PACIFIC TESTING LABORATORIES, INC.

[Signatures]
Michael Shin
Laboratory Director
Donald W. Belanger
Staff Engineer

This report applies only to the sample(s) tested and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and Pacific Testing Laboratories, Inc., this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from Pacific Testing Laboratories, Inc.

TESTING ENGINEERING RESEARCH & DEVELOPMENT
Surface flammability of bulkhead, ceiling and deck finish materials according to IMO Resolution A.653(16)  
(1 appendix)

**Product**
The product called “Noxudol X9” is a waterborne thermal insulation paste based on polymer and fillers. The samples consisted of the product sprayed on steel plates with a dry weight of approximately 1.19 kg/m². The colour of the paste was grey.

**Manufacturer**
Auson AB, Kungsbacka, Sweden.

**Purpose of test**
Basis for technical fire classification.

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The samples were delivered by the client. It is not known to SP Fire Technology, if the product received is representative of the mean production characteristics. The samples were received on July 7, 2010 at SP Fire Technology.

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The test results are given in appendix 1. The test results relate only to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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According to IMO FTP Code, Annex I, Part 5, materials used as floor coverings must have surface flammability values meeting the following limits: CFE ≥ 7.0 kW/m², Q₀ ≥ 0.25 MJ/m², Q₁ ≤ 2.0 MJ and q₂ ≤ 10.0 kW, when tested according to IMO Resolution A.653(16).

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Q₀  = heat for sustained burning
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