YOUR PROCESSES ON SAFE FLOORING
nora® flooring systems for cleanrooms
Safety for your processes – from the ground up

Cleanroom suitability

nora® flooring systems were tested by Fraunhofer IPA, which certified their eligibility for GMP A as well as under ISO 14644-1 to Class 3. With their high resistance to biological contamination, chemicals and disinfectants, nora flooring is the ideal solution for cleanrooms.

Cleanliness suitability

In the context of suitability in the different application areas, we guide and support you with personalised consulting tailored to your project: The application relevant parameters of the process environment are coordinated with your project. The assessment of the influence of different process media and the disinfectants used complete the nora service offer.

All-round safety with nora flooring systems

Application
• Permanent elasticity to protect against falling objects
• Ergonomic – for high walking and standing comfort
• Resistant even at high loads
• Discharge capability / ESD protection with 10 years warranty

Hygiene:
• Easily disinfected
• Hygienic solutions for frames, pipes, drains
• Homogeneous and free of coating

Maintenance:
• Quick refurbishment of stressed surfaces, depending on the process, even when operational (<1 day possible)
• Conversion of small areas to different processes possible
• nora one®, a complete flooring system with a single warranty made in Germany

Advantages:

Extremely robust and impact resistant surface

Natural rubber as a homogeneous material makes extra coating redundant

Modular installation allows maintenance even when operational

nora floorings are tested for media compatibility
Flexible solutions for a smooth operation

Have your processes changed? Do you need to change your equipment configuration? Would you like to refurbish highly stressed areas during operation?
nora® flooring system gives you flexible solutions.

Adaptation to changed processes

Changes or expansions to the production process usually also entail structural changes. Thanks to the modular installation possibility of nora floorings, surfaces can easily be adapted to the new processes.

Refurbishment of surfaces

Highly stressed surfaces can be refurbished – without the need for complex replacement of the entire flooring.

Hygienic connections of installations

nora floorings can be applied in various ways to vertical installations or recesses. A variety of configurations are available for connections to frames, pipes, drains or other installations.
Comfort and safety for your employees

A safe, comfortable work environment contributes significantly to the health and wellbeing of your employees. nora® flooring systems are made of natural rubber to create a positive working environment through their health tolerance, permanent resilience and a large range of colours.

Highest ergonomic comfort

The permanently elastic material – natural rubber – offers high walking and standing comfort, making it easier on the back and joints. The body thus suffers much less fatigue than on hard floors even after prolonged standing.

Low emissions for good indoor air

nora floors are free of phthalate plasticizers and halogens and contribute to healthy indoor air. This has been recognised with the award of the eco-label “The Blue Angel” (RAL-UZ 120 or 113) as well as many other major international environmental certificates.
nora one® – a fully certified flooring system

nora one provides the best possible solution for semi-wet bonding of rubber floor coverings.

The combination of low-emission nora floors with suitable floor installation products and flooring installers specially trained by nora form a certified complete system.

This low-emission complete system is certified in line with Indoor Air Comfort GOLD. This eliminates harmful interactions between the separate elements. The individual components have also been awarded the Emicode EC1+ certificate.

nora also provides an extended warranty period of eight years on this coordinated complete system.

Details of the certified products are available at www.nora.com or upon request.

Overview of system components:

Your benefits at a glance

A reliable system

A cooperative partnership

A secure investment

Healthy indoor air

Further information can be found in our nora one® brochure and at www.nora.com.
nora® floorings for GMP and ISO

- Particle emission characteristics: to ISO Class 3 / GMP Class A
- Outgassing characteristics: to ISO AMC Class 6.8
- Body voltage generation / walk test: < 10 V
- High resistance to biological contamination
- High resistance to disinfectants and chemicals
- High walking and standing comfort thanks to permanent elasticity
- Excellent fire protection properties
- Extremely leakproof and closed surface without coatings
- Free of PVCs, phthalate plasticizers and halogens
- Certified environmental sustainability
- Guaranteed ESD protection: 10 year warranty on the electrostatic properties
- An extensive accessory collection for hygienic connections

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Testing standard</th>
<th>Requirements</th>
<th>Average test values of the current production</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE compliance</td>
<td>EN 14 041</td>
<td>manufacturer: nora systems GmbH, D-69469 Weinheim</td>
<td>acceptable</td>
</tr>
<tr>
<td>DoP-No.</td>
<td>EN 14 401</td>
<td>M001</td>
<td>M005</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>EN 10456</td>
<td>λ = 0.17 W/(m·K)</td>
<td>60mm 0.17</td>
</tr>
<tr>
<td>Dynamic coefficient of friction</td>
<td>EN 13 893</td>
<td>DS</td>
<td>Fullfilled</td>
</tr>
<tr>
<td>Electrical characteristics</td>
<td>EN 1081</td>
<td>ed ≤ 10Ω/Ohm</td>
<td>10Ω ≤ ed ≤ 10Ω</td>
</tr>
<tr>
<td>Fire Class</td>
<td>EN 13 501-1</td>
<td>Unboxed</td>
<td>C ≤ 1</td>
</tr>
<tr>
<td>Fire Class</td>
<td>EN 13 501-1</td>
<td>Bonded on mineral supporting base</td>
<td>B ≤ 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical measurements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth resistance</td>
<td>EN 1081</td>
</tr>
<tr>
<td>Resistance to EPA earth</td>
<td>ESD STM 71 / IEC 61340-4-1</td>
</tr>
<tr>
<td>Earth resistance or resistance to EPA earth</td>
<td>ESD STM 97.1 / IEC 61340-4-5</td>
</tr>
<tr>
<td>Body voltage generation</td>
<td>ESD STM 97.2 / IEC 61340-4-5</td>
</tr>
<tr>
<td>Electrical propensity when walked upon</td>
<td>EN 1815</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>VDE 0100-600</td>
</tr>
<tr>
<td>Electrical insulation properties</td>
<td>VDE 0533 3.30</td>
</tr>
</tbody>
</table>

Certifications:
- Certified DIN EN ISO 14001, DIN EN ISO 50001
- c2ds certified manufacturing site
- Certificate for Sustainable Building by TÜV Rheinland
- M1
- Certified Environmentally Preferable Product by The US Government
- Certified product in accordance with the German governmental policy on electronic systems, German government policy on electronic systems
**Required material properties according to ISO 14644-4 and EG-GMP guidelines**

Our floor coverings are tested by independent testing institutes. An extract of the results can be found in the following table. We will be pleased to provide you with the relevant results for your specific project on request.

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</thead>
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<tr>
<td>Smooth, leakproof, nonporous surface</td>
<td>VDI 2083-17</td>
<td>Air Purity Class according to ISO 14644-1</td>
<td>Extremely leakproof and closed surface without coatings</td>
</tr>
<tr>
<td>High abrasion resistance or low particle emissions characteristic</td>
<td>GMP Class according to EG-GMP Annex 1, in operation</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Biological Resistance</td>
<td>ISO 846, Method A</td>
<td>Biological resistance to fungi</td>
<td>ISO / CSM: 1/very good</td>
</tr>
<tr>
<td>Microbial metabolic potential</td>
<td>ISO 846, Method C</td>
<td>Biological resistance to bacteria</td>
<td>ISO / CSM: 1/very good</td>
</tr>
<tr>
<td>Outgassing</td>
<td>VDI 2083-17</td>
<td>ISO AMC Class according to ISO 14644-8</td>
<td>ISO -6.3</td>
</tr>
<tr>
<td>Outgassing characteristics (TVOC at 23°C / 90°C)</td>
<td>Amine</td>
<td>Not detectable</td>
<td>3.4 x 10E-5 g/m²s</td>
</tr>
<tr>
<td></td>
<td>Organophosphate</td>
<td>Not detectable</td>
<td>Not detectable</td>
</tr>
<tr>
<td></td>
<td>Siloxane</td>
<td>Not detectable</td>
<td>Not detectable</td>
</tr>
<tr>
<td></td>
<td>Phthalates</td>
<td>Not detectable</td>
<td>Not detectable</td>
</tr>
<tr>
<td>Cleaning and disinfection properties</td>
<td>nora® flooring systems are resistant to surface disinfectants from the list of the Disinfectants Commission of the Association for Applied Hygiene (VAH) and the Robert Koch Institute (RKI) and are to be safely treated with a correctly performed wipe disinfection.1)</td>
<td>Resistant depending on concentration and exposure time2)</td>
<td></td>
</tr>
<tr>
<td>H₂O₂ Absorption/Desorption</td>
<td>VDI 2083-20</td>
<td>decay time</td>
<td>fast</td>
</tr>
<tr>
<td>Resistance to chemicals and corrosion</td>
<td>EN ISO 26 987</td>
<td>overall3)</td>
<td>1/very good</td>
</tr>
<tr>
<td>Slip resistance</td>
<td>DIN 51 130</td>
<td>R9</td>
<td>R9</td>
</tr>
<tr>
<td>Toxicity of the fumes</td>
<td>DIN 53 436</td>
<td></td>
<td>R9</td>
</tr>
</tbody>
</table>

* nora® mega ed and nora® sentica ed has been tested. Due to identical manufacturing processes and ingredients, results should be identical to those of nora® signa ed

1) Disinfectability confirmed by the Heidelberg University Hospital, Department of Infectious Diseases (Prof. Dr. med. U. Frank) or by the Institute for Medical Microbiology and Hospital Hygiene at the University of Marburg (Prof. Dr. R. Mutters). Test certificates can be requested if necessary.

2) In the case of increased exposure to oils, greases, acids, alkalis and other aggressive chemicals, consultation with us is required.

3) Detailed information on request.

4) The stated values apply to the installation in accordance with our recommendations for electrostatic dissipative or electrostatic conductive nora® flooring systems while taking into account the information given by the adhesive manufacturers. According to EN 13 415, the adhesive used must permanently maintain a resistance of R <3 x 10¹ Ω.

5) If prolonged extremely low humidity values (<25 % r.h.) are expected, please consult with nora systems GmbH.

We reserve the right to alter production-related colour variations as well as technical changes which serve to improve the products.