Nano-Clear Functional Additives

PROTECTION WITHOUT COMPROMISE

Nano-Clear Functional additives were specifically developed to expand the application potential of Nano-Clear Coatings. Nano-Clear Functional Additives can be mixed and blended together with Nano-Clear NCI to create a multitude of "new coating formulations".

NCA Accelerator Additive (pg. 1-3)
Decreases the set / cure time of Nano-Clear NCI.

NCIM Matting Additive (pg. 4-7)
Provides varying degrees of flatness / hardness when added to Nano-Clear NCI.

VV-200 Adhesion Promoter / Crosslink Booster (pg. 8-10)
Provides improved adhesion of Nano-Clear NCI to aluminum.

NCFP Fluoropolymer Additive (pg. 11-13)
Provides ice and paint repellency when added to Nano-Clear NCI.
**PRODUCT DESCRIPTION**

Nano-Clear® Accelerator (NCA) is a proprietary additive designed to accelerate the dust & tack-free times of Nano-Clear® Industrial (NCI) during coating applications.

**PROTECTION WITHOUT COMPROMISE**

Nano-Clear® Industrial (NCI) is a proprietary nano-structured (bottom-up engineering), transparent, polyurethane/polyurea hybrid, industrial grade, high gloss top coat. NCI operates as a multi-functional coating which has remarkable protective properties developed for the restoration, enhancement, and extended service life (10+ years) of high value commercial, industrial, transportation, oil & gas, and military assets.

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**TECHNICAL ADVANTAGES**

NCA Additive admixed into Nano-Clear NCI (NCI + NCA) provides the following benefits:

- Faster dry/tack and cure times for NCI, (tack time as low as 20 minutes).
- Increased hardness without affecting flexibility.
- Easy incorporation into NCI prior to coating application.

**NOTE:** Due to the accelerated tack/dry time with the addition of NCA to NCI, it is highly recommended to employ two applicators during a coating project. Recoats by one applicator will be much more challenging to accomplish successfully.

**NOTE:** Admixing of the NCA to NCI must only be done just before the coating application.

**FEATURES:**

- VOC content for the NCA (less exempts) Accelerator Additive is 0% by weight allowing NCI to retain its 150g/L VOC content figure.
- NCI + NCA blend can be applied to new or highly oxidized coatings, powder coatings, polyesters, gel coats, 2K epoxies / polyurethanes, e-Coats, fibreglass, and anodized aluminum.
- A simple Part A+B Admix – Stir In process.
- Solids content: 10% by weight.

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**ADMIX % BY VOLUME**

<table>
<thead>
<tr>
<th>Part A NCI 100% Gal / Ltr</th>
<th>Part B: NCA 1% Admix mls</th>
<th>Part B: NCA 2% Admix mls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 3.785</td>
<td>38</td>
<td>76</td>
</tr>
<tr>
<td>5 / 18.925</td>
<td>189</td>
<td>379</td>
</tr>
</tbody>
</table>

**Tack Free Time (Minutes)**

|                             | 30 | 20 |

Table 1

Accurate admixing of NCA into NCI is based on the volume of NCI. NCA can be added to NCI from 1% to 2% (maximum). For verification that the desired repellency and resistance effect has been achieved, it is recommended that a test panel be sprayed with the NCI + NCA mixture.
**AD MIX PROCEDURES**

1. Using an appropriate size scaled paint prep mixing cup, add NCI - Part A taking note of the volume.
2. To this volume, admix a minimum 1% to a maximum of 2% of NCA – Part B (refer to Table 1).
3. Recap the NCA container immediately after dispensing to avoid solvent evaporation.
4. Stir mixture by hand for ~60 seconds.
5. For larger volumes, please use a compressed air powered mixer. **DO NOT** use an electric powered mixer.
6. The NCI + NCA mixture is now ready for application.

**APPLICATION, EQUIPMENT, FLASH OFF, AND DRYING DETAILS**

**Post NCI and NCA Admix**

**APPLICATION AND EQUIPMENT**

- Follow application procedures and use listed equipment as per information provided in the NCI TDS document.

**FLASH OFF**

Flash off time between coats:

- Allow 2 - 5 minutes between wet coats to allow for solvent evaporation.

**DRYING TIMES**

- Drying time will depend on admix dosage, relative humidity and temperature.
- Admixing NCA to NCI will decrease tack and dust free times.

**EQUIPMENT CLEAN-UP**

- Clean application equipment immediately after use with Acetone or MEK.
- **DO NOT** clean application equipment with water or alcohol.
STORAGE AND SHELF LIFE INFORMATION

- **UNOPENED:** 6 months, tightly capped and in original container.
- **OPENED:** 2 months, tightly capped and in original container.
  
  **NOTE:** Container must be closed and capped immediately after product dispensing to prevent and reduce solvent evaporation.

- **TEMPERATURES:** Store opened and un-opened NCA in a dry and low light area at temperatures between 40°F / 4°C and 72°F / 22°C. Higher temperatures will decrease shelf life.

HEALTH AND SAFETY

**NCI and NCA are for commercial and industrial use only,** and are not to be used for purposes other than those specified. The information within this TDS is based on past, present, and ongoing scientific and technical knowledge and it is the responsibility of the user to take all necessary steps in order to ensure the suitability of the products for the intended purpose. For Health and Safety information, please refer to the material Safety Data Sheets (SDS).

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**PRODUCT DESCRIPTION**

The admixing of our proprietary NCIM Matting Additive into Nano-Clear® Industrial (NCI) reduces NCI’s high specular gloss level to a desired “flatness” with no negative effect to its multifunctional properties. This “first-to-market” matting additive is based on Nanovere’s proprietary multifunctional polymers (NCI) and the functional nanoparticles of NCIM.

Nano-Clear® NCI Industrial is a proprietary nanostructured (bottom-up engineered) transparent hybrid polyurethane/polyurea industrial high gloss top coat. NCI as a multi-functional coating has remarkable protective properties developed for the restoration, enhancement, and extended service life (10+ years) of high value commercial, industrial, and military assets.

**MARKETING INFORMATION AND TECHNICAL ADVANTAGES**

- NCIM admixed into NCI will easily produce a specific level of “flatness”.
- VOC content for the NCIM (less exempts) Matting Additive is 0% by weight allowing NCI to retain its 150g/L VOC content figure.
- NCI + NCIM can be applied to new or highly oxidized coatings, powder coatings, polyesters, gel coats, 2K epoxies / polyurethanes, e-Coats, fibreglass, and anodized aluminum.
- Simple Part A+B Admix – Stir In process.
- High nano-particle count: 20% solids, extreme surface coverage.
- NCIM’s addition to NCI will dramatically *increase*:
  - Pencil hardness from a 4H to 7H,
  - Chemical, atmospheric, weathering, environmental, and UV resistance,
  - Scratch, abrasion, and chip resistance,
  - Corrosion resistance,
  - The technical performance specification for coating requirements.

**ADMIX % BY VOLUME AND BLENDING INSTRUCTIONS**

To insure accurate and repeatable admixing of NCI and NCIM they should be mixed by weight. To verify the desired “flatness” finish we also recommend that a test panel be sprayed with the desired NCI + NCIM admix.

Once the panel has cured we suggest performing a gloss measurement using the appropriate measuring geometry of either 20°, 60°, or 85° for the finish captured. Record the test results onto a label and affix to the rear of the coated panel for future reference.

<table>
<thead>
<tr>
<th>Desired Finish</th>
<th>Part A: NCI</th>
<th>Part B: NCIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matte</td>
<td>100%</td>
<td>20.1 – 30%</td>
</tr>
<tr>
<td>Eggshell</td>
<td>100%</td>
<td>10.1 – 20%</td>
</tr>
<tr>
<td>Semi-Gloss</td>
<td>100%</td>
<td>10%</td>
</tr>
</tbody>
</table>
ADMIX PROCEDURES

1. Shake NCIM well prior to admixing with NCI.
2. Using an appropriate sized painter’s cup, weigh NCI (Part A) on an electronic scale. DO NOT remove cup from scale once weight is established.
3. Record the weight figure for the NCI. (NOTE this figure can be applied to the test panel label)
4. Next refer to the Admix % by Weight Table to determine the desired Finish for your project.
5. Calculate and use this weight figure for NCIM (Part B).
6. Record the weight figure for NCIM. (NOTE this figure can be applied to the test panel label)
7. Use the NCIM (Part B) weight figure and Admix it to the NCI (Part A).
8. Recap the NCIM container immediately after dispensing to avoid solvent evaporation.
9. Stir mixture for ~60 seconds.
10. The NCI + NCIM mixture is now ready for application.

NOTE: Theoretical: Full Matte Finish @ 30% - Admix 1.136 litre of NCIM (Part B) to 3.785 litre / 1 Gallon of NCI (Part A).

APPLICATION, EQUIPMENT, FLASH OFF, AND DRYING DETAILS
Post NCI and NCIM Admix.

APPLICATION AND EQUIPMENT

- Following application procedures and use listed equipment as per information provided in the NCI TDS document.

FLASH OFF

Flash off time between coats:
- Allow at least 10 minutes between wet coats to allow particle to rise to the surface. Visual que: “A flattening effect” can be observed as the NCIM nanoparticles rise to the surface with the first, second, and third coats.

DRYING TIMES

- Drying Time information is supplied within the NCI TDS.
- Follow the specified drying times for Nano-Clear NCI.

EQUIPMENT CLEAN-UP

- Clean application equipment immediately after use with Acetone or MEK.
- DO NOT clean application equip with water or alcohol.
STORAGE AND SHELF LIFE INFORMATION

- **UNOPENED:** 6 months, tightly capped and in original container.
- **OPENED:** 2 months, tightly capped and in original container.

**NOTE:** Container must be closed and capped immediately after product dispensing to prevent and reduce solvent evaporation.

- **TEMPERATURES:** Store opened and un-opened NCIM in dry and low light area at temperatures between 40°F / 4°C and 72°F / 22°C. Higher temperatures will decrease shelf life.

HEALTH AND SAFETY

**NCI and NCIM are for commercial and industrial use only**, and are not to be used for purposes other than those specified. The information within this TDS is based on past, present, and ongoing scientific and technical knowledge, and it is the responsibility of the user to take all necessary steps in order to ensure the suitability of the products for the intended purpose. For Health and Safety information please refer to the material Safety Data Sheets (SDS).

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PRODUCT DESCRIPTION

Nano-Clear® VV-200 is a single component (1K) adhesion promoter and crosslink booster that will enhance the bonding and crosslinking properties of Nano-Clear NCI. Nano-Clear VV-200 provides an excellent bond to properly prepared acid etched aluminum and improves crosslink density when added directly to Nano-Clear NCI (1-3%).

VV-200 admixed to Nano-Clear NCI will also boost the crosslinking within NCI’s matrix. This will result in the enhancement of NCI’s chemical, corrosion, scratch and water resistance properties.

PROTECTION WITHOUT COMPROMISE

Nano-Clear® Industrial (NCI) is a proprietary nano-structured (bottom-up engineering), transparent, polyurethane/polyurea hybrid, industrial grade, high gloss top coat. NCI operates as a multi-functional coating which has remarkable protective properties developed for the restoration, enhancement, and extended service life (10+ years) of high value commercial, industrial, transportation, oil & gas, and military assets.

TECHNICAL ADVANTAGES

Nano-Clear VV-200

- Adhesion Promoter
  Provides an improved molecular bond between the NCI and challenging substrates
- Easy spray application
  Can be applied direct to a substrate using conventional HVLP or Airless spray equipment
- Crosslink Booster / Additive
  Easy stir-in admix to NCI, up to 3% by volume (See Table 1)

FEATURES:

- VOC content for the VV-200 (less exempts) adhesion promoter and crosslink booster is 0% by weight allowing NCI to retain its 150g/L VOC content figure.
- NCI + VV-200 blend can be applied to new or highly oxidized coatings, powder coatings, polyesters, gel coats, 2K epoxies / polyurethanes, e-Coats, fibreglass, and anodized aluminum.
- A simple Part A+B Admix – Stir In process.
- Solids Content: 20% by weight.

ADMIX % BY VOLUME

<table>
<thead>
<tr>
<th>Part A NCI 100% Gal / Ltr</th>
<th>Part B: VV-200 1% Admix mls</th>
<th>Part B: VV-200 2% Admix mls</th>
<th>Part B: VV-200 3% Admix mls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 3.785</td>
<td>38</td>
<td>76</td>
<td>114</td>
</tr>
<tr>
<td>5 / 18.925</td>
<td>189</td>
<td>379</td>
<td>568</td>
</tr>
</tbody>
</table>

Table 1

For verification that the desired level of bonding and crosslinking has been achieved, it is recommended that a test panel be sprayed with the NCI + VV200 mixture.

Accurate admixing of VV-200 into NCI is based on the volume of NCI. VV-200 can be added to NCI from 1% to 3%.

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ADMIX PROCEDURES

1. Using an appropriate size scaled paint prep mixing cup, add NCI - Part A taking note of the volume.
2. To this volume, admix a minimum 1% to a maximum of 3% of VV-200 – Part B (refer to Table 1).
3. Recap the VV-200 container immediately after dispensing to avoid solvent evaporation.
4. Stir mixture by hand for ~60 seconds.
5. For larger volumes, please use a compressed air powered mixer. **DO NOT** use an electric powered mixer.
6. The NCI + VV-200 mixture is now ready for application.

ADHESION PROMOTER DIRECT TO SUBSTRATE

SURFACE PREPARATION

- Bare aluminum requires phosphoric acid (85%) etching pre-treatment prior to the application of VV-200 as an adhesion promoter.
- Spray 1 coat of neat VV-200 @ 2 mils wet film thickness (WFT) with an HVLP spray gun (1.4 mm spray tip and 29 psi / 0.013 bar operation pressure)
- Allow VV-200 to cure from 30 - 40 minutes before the post application of NCI.
- VV-200 applied as an adhesion promoter will cover up to 640 square feet (59.5 m²)

NCI + VV-200 APPLICATION PROCEDURES

APPLICATION AND EQUIPMENT

- Follow application procedures and use the listed equipment as per information provided in the NCI TDS document.

FLASH OFF NCI

Flash off time between coats:

- Allow 5 - 10 minutes between wet coats to allow for solvent evaporation.

DRYING TIMES

- Follow the specified drying times for Nano-Clear® NCI.
- Drying times will depend upon film-build thickness, relative humidity/RH, and temperature. (Please refer to information supplied within the NCI TDS).

EQUIPMENT CLEAN-UP

- Clean application equipment immediately after use with Acetone or MEK.
- **DO NOT** clean application equip with water or alcohol.
STORAGE AND SHELF LIFE INFORMATION

- **UNOPENED:** 6 months, tightly capped and in original container.
- **OPENED:** 2 months, tightly capped and in original container.
  
  **NOTE:** Container must be closed and capped immediately after product dispensing to prevent and reduce solvent evaporation.

- **TEMPERATURES:** Store opened and un-opened VV-200 in a dry and low light area at temperatures between 40°F / 4°C and 72°F / 22°C. Higher temperatures will decrease shelf life.

HEALTH AND SAFETY

*NCI and VV-200 are for commercial and industrial use only*, and are not to be used for purposes other than those specified. The information within this TDS is based on past, present, and ongoing scientific and technical knowledge, and it is the responsibility of the user to take all necessary steps in order to ensure the suitability of the products for the intended purpose. For Health and Safety information, please refer to the material **Safety Data Sheets (SDS)**.

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PRODUCT DESCRIPTION

Nano-Clear® Fluoropolymer NCFP is a proprietary, low surface energy, fluoropolymer additive. When admixed into Nano-Clear® Industrial (NCI), NCFP improves dirt, oil, water, ice and paint repellency.

PROTECTION WITHOUT COMPROMISE

Nano-Clear® Industrial (NCI) is a proprietary nano-structured, polyurethane/polyurea hybrid, industrial grade, high-gloss top coating. NCI operates as a multi-functional coating which has remarkable protective properties developed for the restoration, enhancement, and extended service life (10+ years) of high value commercial, industrial, transportation, oil & gas, and military assets.

TECHNICAL ADVANTAGES

Nano-Clear NCFP Additive admixed into NCI (NCI + NCFP) provides the following benefits:

- Increases Repellency to Water, Ice, Dirt, Oil, Paint, Organics, Algae
- Increases Resistance to Scratch, chip, and abrasion damage
- Eases Cleaning A more efficient anti-graffiti / paint release (at 3%, see Table 1)
- Reduces Maintenance Requires less frequent surface maintenance
- Optimizes Lifecycle and asset management

FEATURES:

- VOC content for the NCFP (less exempts) Fluoropolymer Additive is 0% by weight allowing NCI to retain its 150g/L VOC content figure.
- NCI + NCFP blend can be applied to new or highly oxidized coatings, powder coatings, polyesters, gel coats, 2K epoxies / polyurethanes, e-Coats, fibreglass, and anodized aluminum.
- A simple Part A+B Admix – Stir In process.

ADMIX % BY VOLUME

<table>
<thead>
<tr>
<th>Part A NCI 100% Gal / Ltr</th>
<th>Part B: NCFP 1% Admix mls</th>
<th>Part B: NCFP 2% Admix mls</th>
<th>Part B: NCFP 3% Admix mls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 3.785</td>
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<td>5 / 18.925</td>
<td>189</td>
<td>379</td>
<td>568</td>
</tr>
</tbody>
</table>

Table 1

Accurate admixing of NCFP into NCI is based on the volume of NCI. NCFP can be added to NCI from 1% to 3%. For verification that the desired repellency and resistance effect has been achieved, it is recommended that a test panel be sprayed with the NCI + NCFP mixture.

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**ADMix PROCEDURES**

1. Using an appropriate size scaled paint prep mixing cup, add NCI - Part A taking note of the volume.
2. To this volume, admix a minimum 1% to a maximum of 3% of NCFP – Part B (refer to Table 1).
3. Recap the NCFP container immediately after dispensing to avoid solvent evaporation.
4. Stir mixture by hand for 60 seconds.
5. For larger volumes, please use a compressed air powered mixer. **DO NOT** use an electric powered mixer.
6. The NCI + NCFP mixture is now ready for application.
7. NCI and NCFP can be pre-mixed and stored for application at a later time. However, this mixture will need to be vapour blanketed using an inert gas such as nitrogen for proper storage, and to retain NCI’s shelf life. **Please contact** your Nano-Clear® representative for full details.

**NOTE:** NCI + NCFP can only be recoated after fully sanding surface with a 400 grit orbital sander.

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**APPLICATION, EQUIPMENT, FLASH OFF, AND DRYING DETAILS**

**Post NCI and NCFP Admix**

**APPLICATION AND EQUIPMENT**

- Follow application procedures and use listed equipment as per information provided in the NCI TDS document.

**FLASH OFF**

Flash off time between coats:
- Allow 5 to 10 minutes between wet coats to allow for solvent evaporation. **Avoid recoating wet coats of NCI + NCFP after 20 minutes as an “anti-graffiti effect” will occur.**

**DRYING TIMES**

- Drying Time information is supplied within the NCI TDS.
- Follow the specified drying times for Nano-Clear® NCI.

**EQUIPMENT CLEAN-UP**

- Clean application equipment immediately after use with Acetone or MEK.
- **DO NOT** clean application equip with water or alcohol.
STORAGE AND SHELF LIFE INFORMATION

- **UNOPENED:** 6 months, tightly capped and in original container.
- **OPENED:** 2 months, tightly capped and in original container.
  
  **NOTE:** Container must be closed and capped immediately after product dispensing to prevent and reduce solvent evaporation.

- **TEMPERATURES:** Store opened and un-opened **NCFP** in a dry and low light area at temperatures between 40°F / 4°C and 72°F / 22°C. Higher temperatures will decrease shelf life.

HEALTH AND SAFETY

**NCI and NCFP are for commercial and industrial use only,** and are not to be used for purposes other than those specified. The information within this TDS is based on past, present, and ongoing scientific and technical knowledge, and it is the responsibility of the user to take all necessary steps in order to ensure the suitability of the products for the intended purpose. For Health and Safety information, please refer to the material **Safety Data Sheets (SDS).**

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