SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

· Trade name: Chloro(4-cyanophenyl)\{(R)-1-\{(S)-2-(diphenylphosphino)ferrocenyl\}ethyl\}(di-t-butyl)phosphine/nickel(II)

· Item number: 28-0170
· CAS Number: 2049086-34-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

No further relevant information available.

1.3 Details of the supplier of the safety data sheet

· Manufacturer/Supplier:
  Strem Chemicals, Inc.
  7 Mulliken Way
  NEWBURYPORT, MA 01950
  USA
  info@strem.com

· Further information obtainable from: Technical Department

1.4 Emergency telephone number:

EMERGENCY: CHEMTREC: +1 (800) 424-9300
During normal opening times: +1 (978) 499-1600

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

· Classification according to Regulation (EC) No 1272/2008
  The substance is not classified according to the CLP regulation.

2.2 Label elements

· Labelling according to Regulation (EC) No 1272/2008 Void
· Hazard pictograms Void
· Signal word Void
· Hazard statements Void
· Precautionary statements

  P231 Handle under inert gas.
P262 Do not get in eyes, on skin, or on clothing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P422 Store contents under inert gas.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

· Results of PBT and vPvB assessment
  · PBT: Not applicable.
  · vPvB: Not applicable.

(Contd. on page 2)
SECTION 3: Composition/information on ingredients

- 3.1 Chemical characterisation: Substances
- CAS No. Description
  2049086-34-0 Chloro(4-cyanophenyl){(R)-1-[{(S)-2-(diphenylphosphino)ferrocenyl]ethyl(di-t-butyl)phosphine} nickel(II)

SECTION 4: First aid measures

- 4.1 Description of first aid measures
  - General information: No special measures required.
  - After inhalation: Supply fresh air; consult doctor in case of complaints.
  - After skin contact: Generally the product does not irritate the skin.
  - After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
  - After swallowing: If symptoms persist consult doctor.
- 4.2 Most important symptoms and effects, both acute and delayed No further relevant information available.
- 4.3 Indication of any immediate medical attention and special treatment needed No further relevant information available.

SECTION 5: Firefighting measures

- 5.1 Extinguishing media
  - Suitable extinguishing agents: Use fire extinguishing methods suitable to surrounding conditions.
- 5.2 Special hazards arising from the substance or mixture No further relevant information available.
- 5.3 Advice for firefighters
  - Protective equipment: No special measures required.

SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures Not required.
- 6.2 Environmental precautions: Do not allow to enter sewers/ surface or ground water.
- 6.3 Methods and material for containment and cleaning up:
  Dispose contaminated material as waste according to item 13.
- 6.4 Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

SECTION 7: Handling and storage

- 7.1 Precautions for safe handling
  No special measures required.
  Open and handle receptacle with care.
- Handling: Handle under inert gas.
- Information about fire - and explosion protection: No special measures required.
- 7.2 Conditions for safe storage, including any incompatibilities
- Storage: Store contents under inert gas.
- Requirements to be met by storerooms and receptacles: No special requirements.
44.1.1 · Information about storage in one common storage facility: Not required.
· Further information about storage conditions: None.
· 7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

· Additional information about design of technical facilities: No further data; see item 7.
· 8.1 Control parameters
· Ingredients with limit values that require monitoring at the workplace: Not required.
· Additional information: The lists valid during the making were used as basis.
· 8.2 Exposure controls
· Personal protective equipment:
· General protective and hygienic measures:
The usual precautionary measures are to be adhered to when handling chemicals.
· Respiratory protection: Not required.
· Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· Material of gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· Penetration time of glove material
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· Eye protection: Safety glasses

9.1 Information on basic physical and chemical properties
· General Information
· Appearance:
   Form: Solid
   Colour: Violet
· Odour:
· Odour threshold: Not determined.
· pH-value: Not applicable.
· Change in condition
   Melting point/freezing point: Undetermined.
   Initial boiling point and boiling range: Undetermined.
· Flash point: Not applicable.
· Flammability (solid, gas): Product is not flammable.
· Ignition temperature:
   Decomposition temperature: Not determined.
   Auto-ignition temperature: Not determined.
Safety data sheet
according to 1907/2006/EC, Article 31

Trade name: Chloro(4-cyanophenyl)(R)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyl(di-t-butyl)phosphine]nickel(II)

CONTINUED FROM PAGE 3

<table>
<thead>
<tr>
<th>Explosive properties:</th>
<th>Product does not present an explosion hazard.</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Explosion limits:</td>
<td></td>
</tr>
<tr>
<td>Lower:</td>
<td>Not determined.</td>
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<tr>
<td>Upper:</td>
<td>Not determined.</td>
</tr>
<tr>
<td>· Vapour pressure:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>· Density:</td>
<td>Not determined.</td>
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<tr>
<td>· Relative density</td>
<td>Not determined.</td>
</tr>
<tr>
<td>· Vapour density</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>· Evaporation rate</td>
<td></td>
</tr>
<tr>
<td>· Solubility in / Miscibility with water:</td>
<td>Insoluble.</td>
</tr>
<tr>
<td>· Partition coefficient: n-octanol/water:</td>
<td>Not determined.</td>
</tr>
<tr>
<td>· Viscosity:</td>
<td></td>
</tr>
<tr>
<td>Dynamic:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Kinematic:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>· Solvent content:</td>
<td></td>
</tr>
<tr>
<td>Organic solvents:</td>
<td>0.0 %</td>
</tr>
<tr>
<td>VOC (EC)</td>
<td>0.00 %</td>
</tr>
<tr>
<td>· 9.2 Other information</td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

SECTION 10: Stability and reactivity

· 10.1 Reactivity No further relevant information available.
· 10.2 Chemical stability
· Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
· 10.3 Possibility of hazardous reactions No dangerous reactions known.
· 10.4 Conditions to avoid No further relevant information available.
· 10.5 Incompatible materials: No further relevant information available.
· 10.6 Hazardous decomposition products: No dangerous decomposition products known.

SECTION 11: Toxicological information

· 11.1 Information on toxicological effects
· Acute toxicity Based on available data, the classification criteria are not met.
· Primary irritant effect:
· Skin corrosion/irritation Based on available data, the classification criteria are not met.
· Serious eye damage/irritation Based on available data, the classification criteria are not met.
· Respiratory or skin sensitisation Based on available data, the classification criteria are not met.
· CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)
· Germ cell mutagenicity Based on available data, the classification criteria are not met.
· Carcinogenicity Based on available data, the classification criteria are not met.
· Reproductive toxicity Based on available data, the classification criteria are not met.
· STOT-single exposure Based on available data, the classification criteria are not met.
· STOT-repeated exposure Based on available data, the classification criteria are not met.

(Contd. on page 5)
Trade name: Chloro(4-cyanophenyl){(R)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyl(di-t-butyl)phosphine} nickel(II)

- **Aspiration hazard**: Based on available data, the classification criteria are not met.

### SECTION 12: Ecological information

- **12.1 Toxicity**
- **Aquatic toxicity**: No further relevant information available.
- **12.2 Persistence and degradability**: No further relevant information available.
- **12.3 Bioaccumulative potential**: No further relevant information available.
- **12.4 Mobility in soil**: No further relevant information available.
- **Additional ecological information**:
  - **General notes**: Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **12.5 Results of PBT and vPvB assessment**
  - **PBT**: Not applicable.
  - **vPvB**: Not applicable.
- **12.6 Other adverse effects**: No further relevant information available.

### SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
  - **Recommendation**: Disposal must be made according to official regulations.
- **Uncleaned packaging**:
  - **Recommendation**: Disposal must be made according to official regulations.

### SECTION 14: Transport information

- **14.1 UN-Number**
  - ADR, ADN, IMDG, IATA: not regulated
- **14.2 UN proper shipping name**
  - ADR, ADN, IMDG, IATA: not regulated
- **14.3 Transport hazard class(es)**
  - ADR, ADN, IMDG, IATA: not regulated
- **14.4 Packing group**
  - ADR, IMDG, IATA: not regulated
- **14.5 Environmental hazards**: Not applicable.
- **14.6 Special precautions for user**: Not applicable.
- **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**: Not applicable.
- **UN "Model Regulation"**: not regulated

(Contd. on page 6)
SECTION 15: Regulatory information

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Directive 2012/18/EU
  - Named dangerous substances - ANNEX I Substance is not listed.
  - National regulations:
    - Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.
  - 15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- Department issuing SDS: Technical Department.
- Contact: Technical Director
- Abbreviations and acronyms:
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - IMDG: International Maritime Code for Dangerous Goods
  - IATA: International Air Transport Association
  - GHS: Globally Harmonised System of Classification and Labelling of Chemicals
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - VOC: Volatile Organic Compounds (USA, EU)
  - PBT: Persistent, Bioaccumulative and Toxic
  - vPvB: very Persistent and very Bioaccumulative