MSM WALSRODE

WALSRODER™ NITROCELLULOSE

Safe Storage, Handling and Usage

Safe Handling of Industrial Nitrocellulose

With Safety & Health as one of our core values, the safety and well-being of our employees, plants, products – and our valued customers – is our highest priority. To that end, we would like to provide guidelines on the safe storage, handling and usage of WALSRODER™ Nitrocellulose products.

WALSRODER™ Nitrocellulose used for manufacturing inks and coatings consists of cellulose nitrate with a nitrogen content ≤ 12.6 %. We currently don't produce energetic nitrocellulose grades with a nitrogen content > 12.6 %.

As required by law these technical grades put on the market contain a desensitizing agent – either water or alcohol – in a quantity of at least 25 wt% or a gelatinizing plasticizer in a quantity of at least 18 wt%.

This brochure will focus on the main safety aspects and is not comprehensive. Please additionally take note of the respective Material Safety Data Sheet (MSDS) as well as local law and regulations.

The word "Nitrocellulose" will be abbreviated with "NC" througout this brochure.

General Hazards of NC

Desensitized NC is a flammable solid.

GHS classification in countries / regions with GHS implemantation < GHS rev. 6	Hazard Class 2.7 Signal word Hazard statement	: :	Flammable solid, Cat. 1 Danger Flammable solid (H228)
GHS classification in countries / regions with GHS implemantation ≥ GHS rev. 6	Hazard Class 2.17 Signal word	: :	Desensitized explosive, Cat. 1–4 Cat. 1 and 2 : Danger Cat. 3 and 4: Warning

Hazard statements:
Cat. 1: Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced (H206)

Cat. 2/3: Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced (H207)

Cat. 4: Fire hazard; increased risk of explosion if desensitizing agent is reduced (H208)

- NC may be ignited by flame, spark, heat, hot surfaces, friction, impact or static electricity.
- Fumes emitted from burning NC may contain very toxic nitrous gases.
- Dry NC is even more sensitive to ignition sources than desensitized NC.
- NC must not be dried.
- NC desensitized with alcohols or water: The desensitizing agent content must not decrease below 25 %. If this threatens to happen immediately redamp with the according desensitizing agent.
- Hazards may also arise from desensitizing alcohols.

Hazards of Desensitizing Agents

Fibrous WALSRODER™ NC grades are desensitized with 30 or 35 % isopropanol (IPA), ethanol (ETH) or water (WTR).

- IPA and ETH are flammable liquids and form flammable vapours.
- IPA and ETH may cause eye irritation.
- Inhalation of IPA vapour may cause drowsiness or dizziness.

WALSRODER™ NC chips grades are desensitized with 20% plasticizer.

- Acetyl tributyl citrate (ATBC) or
- Epoxidized Soybean Oil (ESO)

No hazards are currently known about these plasticizers.

Handling of NC – Recommended PPE

Eyes	Safety glasses or protective goggles.
Skin	Long shirts and pants (flame resistant clothing is recommended), safety shoes, mechanical or – if product contact cannot be excluded – chemical gloves.
Respiratory tract	Use local ventilation to keep ambient vapor concentrations below your local occupational exposure limits for IPA / ETH.

Please see MSDS for details.

First aid

Eye contact

Immediately flush eyes at least 10 minutes with plenty of water with the eyelids held open, ask colleagues for help, call a physician.

Skin contact

Flush skin with soap and plenty of water, remove contaminated clothing, wash clothing before reuse, call a physician if any irritation persists.

Ingestion

Do not induce vomiting, drink water in several small quantities, never pour anything down the throat of an unconscious person, call a physician.

Inhalation:

Remove to fresh air, if casualty is not breathing, give artificial respiration, call a physician.

If inhalation of brown **Nitrous Gases** cannot be excluded: Poisoning symptoms may appear many hours after inhalation, hence remain under medical supervision for at least 48 hours.

Fire Fighting

- Use portable fire extinguishers only for incipient fires and if NC is not yet burning.
- If NC is burning: Remove yourself and immediately call the fire brigade.
- Burning NC: The only extinguishing agent is **Water**. Other agents (foam, powder, CO_2, sand, ...) **must no** be used.
- Beware of darting flames. Drum lids can be blown off.
- Beware of toxic fumes.
- Move to a place at safe distance on the windward side.

Storage

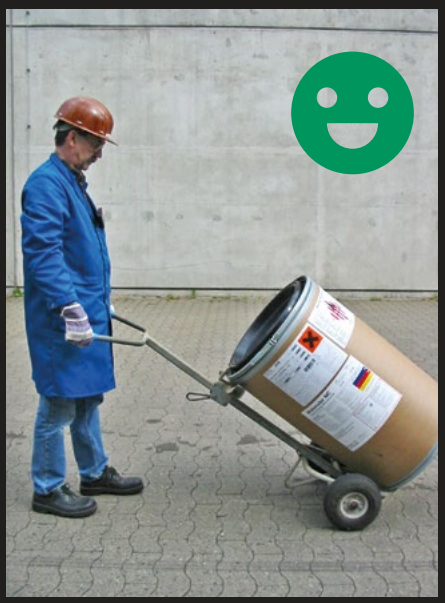
- Keep it cool (< 40 °C) – Keep away from heaters, steam pipes and direct sunlight.
- Keep it dry – Do not store without weather protection.
- NC must not be stored together with:
  acids, alkalis, amines, oxidizing substances, solvents, lacquers (non-exhaustive examples)
  It is strongly recommended to store NC separately.
- Do not open any NC drums or boxes in the warehouse.
- Take care to process NC material according to “first in first out” principal (FIFO).
- Storage should not exceed the shelf life printed on the packaging (two years from manufacturing date)

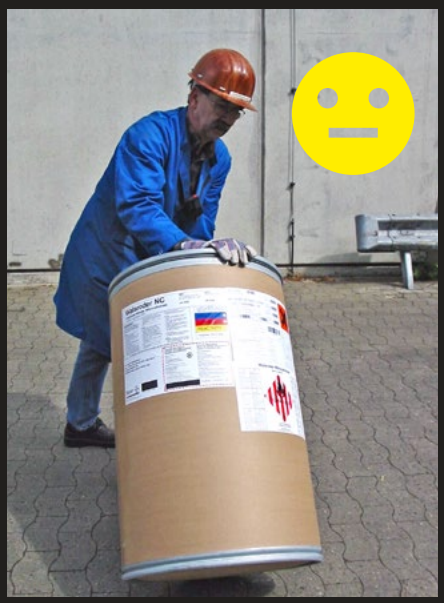
House-keeping

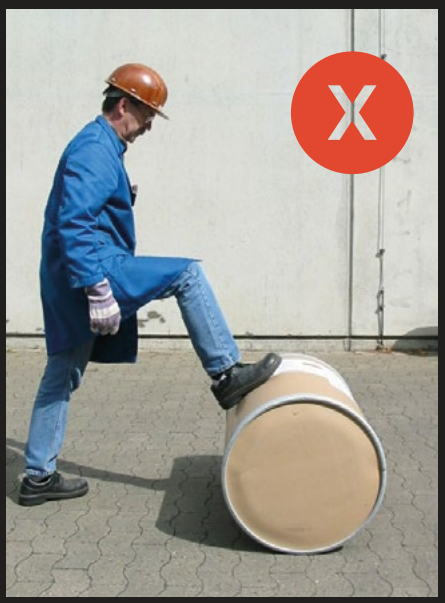
- Make sure at all times to remove any NC residues (spills, dust).
- Keep quantity in processing plant to a minimum
  (best practice: limit quantity to the need of one shift only).
- If possible use the content of a drum all in one.
- If the content is only partly used make sure to tightly close the inliner after usage in order to prevent liquid desensitizing agents (alcohols or water) from evaporating.
- Partly used drums should be stored in a separate area to keep them in mind and should be used with the next possible batch.

Transportation on site

- Handle with care.
- Do not drop or slide drums.
- Do not allow drums to roll freely.
- Preferred practice: Use a drum trolley for transportation of single drums.
- Acceptable practice for short distances: Roll drums over the bottom rim.
- Secure drums if transported on a pallet with a fork lift truck.







Processing/Preparing a solution

Make sure to adhere to the following sequence:

1. Put the solvent into the empty vessel.
2. Turn on the stirrer.
3. Open the the nitrocellulose packaging.
4. Make sure the packaging is grounded (see section “Static Discharge).
5. Slowly and carefully add the nitrocellulose. If tools are needed to facilitate drum emptying: Use only tools made of non-sparkling materials (for example bronze forks)
6. If the package content was only partially used: Carefully close the pack–age again in order to prevent the desensitizing agent to evaporate.

Never put the nitrocellulose into the empty vessel. If you do so and turn on the stirrer the nitrocellulose might catch fire due to frictional heat.

Damaged drums on site

If the inliner (PE bag) is not damaged (i.e. no NC leaks out of the drum):

- Tape the hole with strong tape.
- Mark the drum.
- Store the drum in a separated area.
- Use the drum for the next possible batch.

If the PE bag is damaged (i.e. NC leaks out of the drum):

- Use the drum immediately.
- Tape the hole with strong tape to avoid further leakage of NC.
- Remove the spilled NC from the area around the drum.
- After emptying remove the inliner and clean the drum with water.
- Collect and dispose the contaminated water according to local regulations.

Spills

NC desensitized with alcohol or water:

- Damp the spilled NC with suffi-cient volume of water (approx. 0.7 x weight of nitrocellulose).
- Spray the water on the nitrocellulose.
- Remove the wetted NC carefully and slowly from the ground.
- Best practice and most economic way: Dissolve the NC in an organic solvent (for example acetone) and dispose the solution as laquer waste.

NC Chips:

- Remove the NC chips carefully and slowly from the ground
- Spray water onto the NC chips before removal to be on the safe side
- Best practice and most economic way: Dissolve the NC Chips in an organic solvent and dispose the solution as laquer waste.

Fire/Burning NC

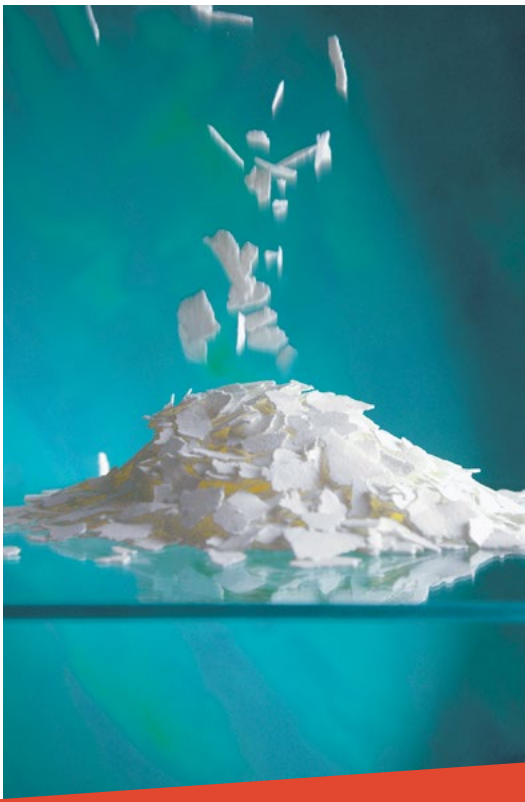
Nitrocellulose

- is a flammable solid (please note that also the vapors of alcohol-wetted NC are flammable)
- creates only N_2, water and CO_2 but no toxic gases when burning in the atmosphere
- decomposes at higher tempera-ture in oxygen-deficient atmosphere by forming toxic gases (brown nitrous gases)
- may explode only if decomposi-tion takes place under confine-ment of NC
- fires shall only be extinguished with water.

Nitrocellulose solution

- burns like the solvent itself. No decomposition will occur.
- fires may be extinguished with any extinguishing agent suitable for the solvent itself.

Carefully avoid any ignition sources (i.e. sparks, hot surfaces, friction, electrical discharge).



Explosion/Decomposition

Nitrocellulose

- is not an explosive ! If not confined NC will rapidly burn when ignited but will not explode.
- will spontanuously decompose at about 170 °C (NC Chips) or 180 °C (NC desensitized with alcohol or water)
- may violently react with strong alkali or amines. Reaction heat might ignite the nitrocellulose. Toxic nitrous gases might be formed.

Static Discharge

Packaging of WALSRODER™ Nitrocellulose desensitized with alcohol or water:

- Antistatic Fiber drum / box with antistatic polyethylene inliner, electrical resistance between 10^8 and 10^{11} Ω

Packaging WALSRODER™ Nitrocellulose Chips:

- Antistatic Fiber drum

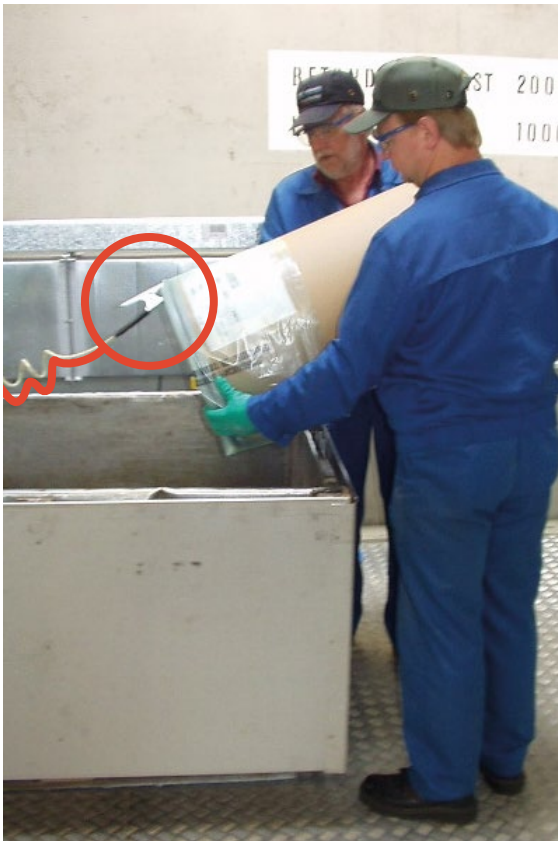
Grounding is imparitive while emptying a drum/box:

Drum / box with inliner:

- Best practice is to use a grounding clamp placed on the antistatic inliner (see picture on the right).
  Grounding via the operator may be used if a grounding clamp is not available and a complete conductive chain to the ground is maintained.
  Never separate an NC-filled inliner from the drum / box.

NC Chips without inliner:

- The use of a grounding clamp is imperative. It has to be placed on the upper metal rim of the drum.



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