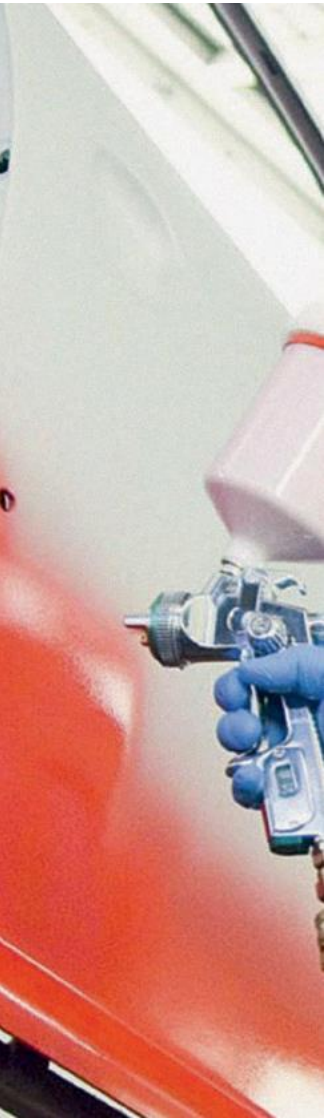
Raw Material Supply to BASF Coatings

- don’t give craters any chance!

Coatings Solution

BASF
The Chemical Company



Competence in Color

BASF is the one of the world's leading chemical companies. We use science and innovation to help our customers meet the current and future needs of society in nearly all industries. In the Coatings Division, BASF develops, produces and markets a high-quality range of innovative Automotive OEM Coatings and Automotive Refinishes as well as Decorative Paints. BASF has significant market positions in Europe, North America, South America and the Asia Pacific region.

The IAI rule

Identify
Avoid
Inform

Raw Material Supply to Automotive Coatings plants

The manufacture of our high-quality Automotive coatings has extremely high demands on the raw materials used, the transport operations, the production and distribution processes. Raw material purity, precision in manufacturing processes and streamlined filling operations guarantee Coatings of the highest quality.

Despite of great care, paint defects can occur during application in Automotive lines. One cause is the contamination of raw materials and bulk transportation containers like road tankers with surfactants, such as silicone-containing oils and greases.

This guide including the following list of substance classes should help to identify and prevent potential sources of contamination in all your operations, in supply of raw materials, etc. to avoid unnecessarily high consequential costs. BASF Coatings experts will be glad to give you advice.

List of substance classes capable of causing craters in Automotive OEM lines; non-exhaustive

- **Silicones**
- **Oils**

  Include, but not limited to:
  - Synthetic oils, e.g. polyester oils
  - Mould release agents / flow agents / mould and drawing oils
  - Pump and hydraulic oils
  - Transmission oil (mineral oil + additive)
  - Corrosion protection oils
- **Lubricants**

  Include, but not limited to:
  - Fluorinated lubricants / spray
  - Forming lubricants
- **Soaps, detergents, surfactants, cleaning materials**
- **Waxes**
- **Latex, Latex emulsions, Latex dispersions**

This list names chemicals that need to be strictly avoided in transportation of raw materials to all BASF Coatings sites producing for Automotive OEM. Any contact of mentioned materials can contaminate our OEM paints and is able to cause severe craters in Automotive OEM paint lines. Any bulk containers with products for BASF should not have chemicals from the above list as a prior load. Please provide cleaning certificate as a prove with every shipment.

Above list can’t be comprehensive and gives only information on chemical classes that should be avoided.

Packaging and Crater Risk

Packaging are also a risk for contamination, e.g. by lubricants on seals, by drawing lubricants or release agents left on wall surfaces from the production process. Packaging comprises cans, bottles, buckets, bags, drums, containers (IBC`s), tank containers, tank trucks, tank vessels, tanks wagons.

- Packaging materials can be:
  - plastic, metal, paper, glass, etc., and as well
  - one-way or re-usable packaging means are in use.

- Typical troublemakers with packaging that we observe especially for silicone contamination are:
  - sealings, e.g. lids, cover gaskets, vent caps
  - glue for sealings
  - rolling oil and release agents on surfaces of metal and plastic packaging
  - plastic in-liners of drums and paper bags
  - big bag fabric
  - corrosion protection oils
  - drain cock/ outlet tap
  - separation agent of paper bag layers
  - print inks on paper bags
  - adhesive spray for labels.

Re-usable Containers, Road Tankers

Re-usable containers or tankers can transfer residues which are incompatible with paints if they are not adequately cleaned. Only dedicated, cleaned hoses should be used during de-loading.

- Good experience:
  - Safety Level +++ for raw material deliveries in dedicated containers
  - Safety Level ++ for raw material deliveries in containers pre-loaded with products of the same family
  - Safety Level + for raw material deliveries in containers pre-loaded with
    - Aromatic, aliphatic, oxygenated solvents, e.g. solvent naphtha, alcohols, glycols, xylene, white spirit
    - Acrylic monomers
- Bad experience:
  - Silicone oils / silicone oil containing materials
  - Oils, e.g.:
    - Synthetic oils, like polyester oils
    - Mould release agents / flow agents / mould and drawing oils
    - Pump and hydraulic oils
    - Transmission oil (mineral oil + additive)
    - Corrosion protection oils
  - Lubricants / greases, e.g.
    - Fluorinated lubricants / sprays
    - Forming lubricants
  - Soaps, detergents, surfactants, cleaning materials
  - Waxes
  - Latex, Latex emulsions, Latex dispersion

Both lists are not completed with all experiences made.

Not only the pre-loading affects the contamination risk but also the cleaning processes.
Non-effective cleaning cycles that do not fit to the preloading, e.g. cleaning of mineral oil with hot water spin [P09]) needs to be mentioned as well as the use of forbidden cleaning agents, e.g. alkaline, acid or neutral detergent [C01, C10, C20], Antifoam [C90] or Fuel [C42].

All experiences made will give initial impression on risk and handling of pre-loading.

How can you ensure contaminant-free raw material deliveries?

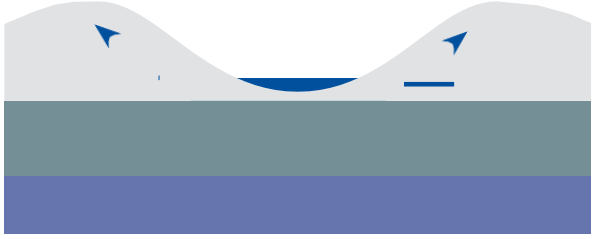
As a silicone-sensitive automotive coating producer, BASF Coatings encourages you creating your own WHITELIST based on your experiences, which includes allowed pre-loading as well as appropriate cleaning procedures.
Such a WHITELIST could be set up by gathering sustainable information regarding delivered material:

- choose your re-usable container considering our experiences mentioned above for last preloading and
- monitor customer status afterwards, complaint or no complaint.

Craters

Craters are localized, circular cavities in the coating. These become especially visible in high-gloss surfaces. Their diameter is usually 0.1 – 0.5 mm. They are in the surface finish or extend through several layers of paint. Craters result in impairment of the protective effect of the coating system, and their eradication is very material- and labor-intensive.

Craters arise if the surface tension of a surface, which has yet to be crosslinked or dried, is changed locally by substances with a lower surface tension. Everyone might be familiar with this phenomenon from the example of an oily film on dish water. A drop of dish liquid disperses this film in a circular pattern. The liquid paint and a foreign substance with a low surface tension display similar behavior.



Process stages

Craters are usually discovered during the final inspection at the assembly line. However, the cause of the contamination with a foreign substance lies in one of the numerous preceding process stages. Identifying the cause is always very time-consuming and ties up valuable resources. All those involved in the process are called upon to ensure that the process stages are such that no crater-causing foreign substances can be incorporated in the relevant product.

Production equipment
(Raw materials)
Refilling equipment
Transport media
Refilling equipment

Production equipment
(intermediate and
finished products)
Refilling equipment
Transport media
Refilling equipment

Production equipment
(processor)
Final inspection
by processor

CLIENT

Should you have specific questions or require assistance in implementation, please do not hesitate to contact us at BASF Coatings:

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