Verband Schmierstoff-Industrie e. V.

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Addressing health and safety issues specific to the metalworking industry

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Overview

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- Why cutting fluids?
- Air quality & misting
- Bacteria & fungi
- Maintenance
  - Mixing
  - Tramp oil
  - Filter
  - Cutting fluid

Why metalworking fluids (MWF)

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- Cutting fluids are used for
  - Lubricating
  - Cooling
  - Flushing
  - Corrosion protection
- Mainly, two types of MWF are used
  - Water miscible (WM): app. 5% of concentrate diluted in water
    - Conventional, synthetic and semi-synthetic fluids
  - Neat cutting oils (NWM)
    - Base oil plus additives

Health and safety risks

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- MWF contain chemicals, which are sometimes not healthy…
- H & S risks result mainly from
  - Skin contact
  - Aerosols (inhalation)
- Both risks can be kept under control by simple measures…

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Air quality: Oil mist is generated mainly by open application of MWF…

Grinding…

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…Milling…

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…Drilling…

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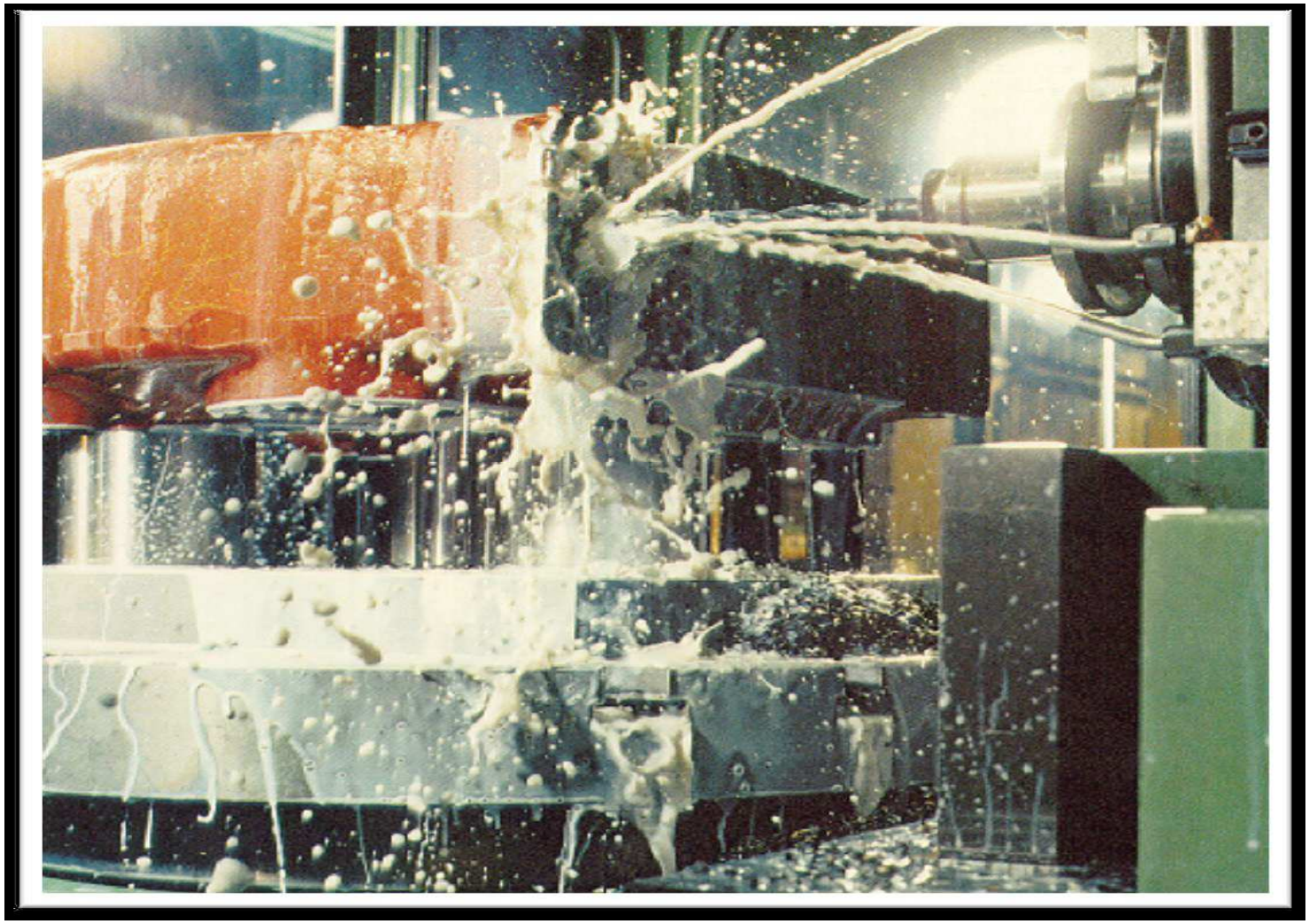

…but also by evaporation from chips…

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…and hot surfaces (low boiling fluids)

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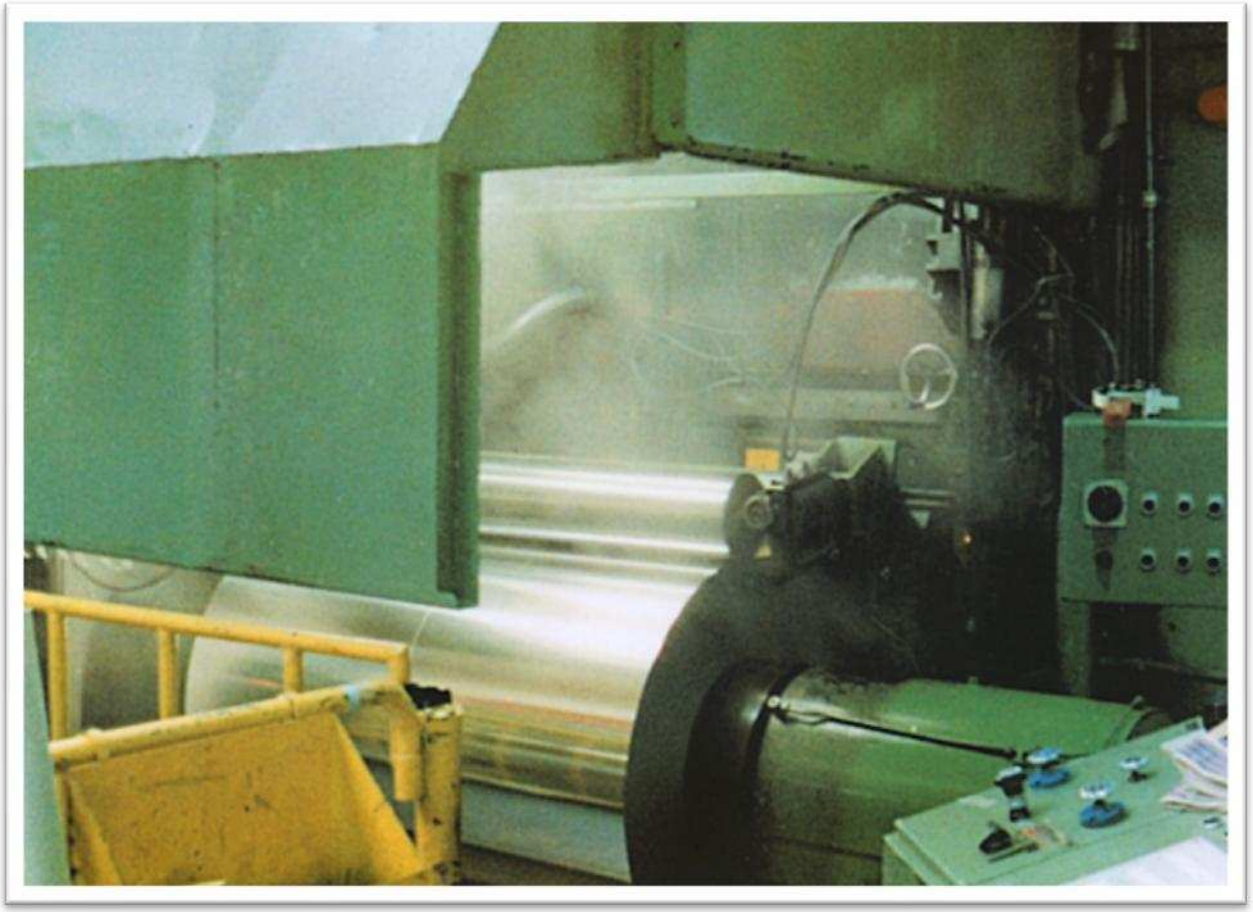

Containment protects, but no exhaust ventilation (high mist concentration when opened)

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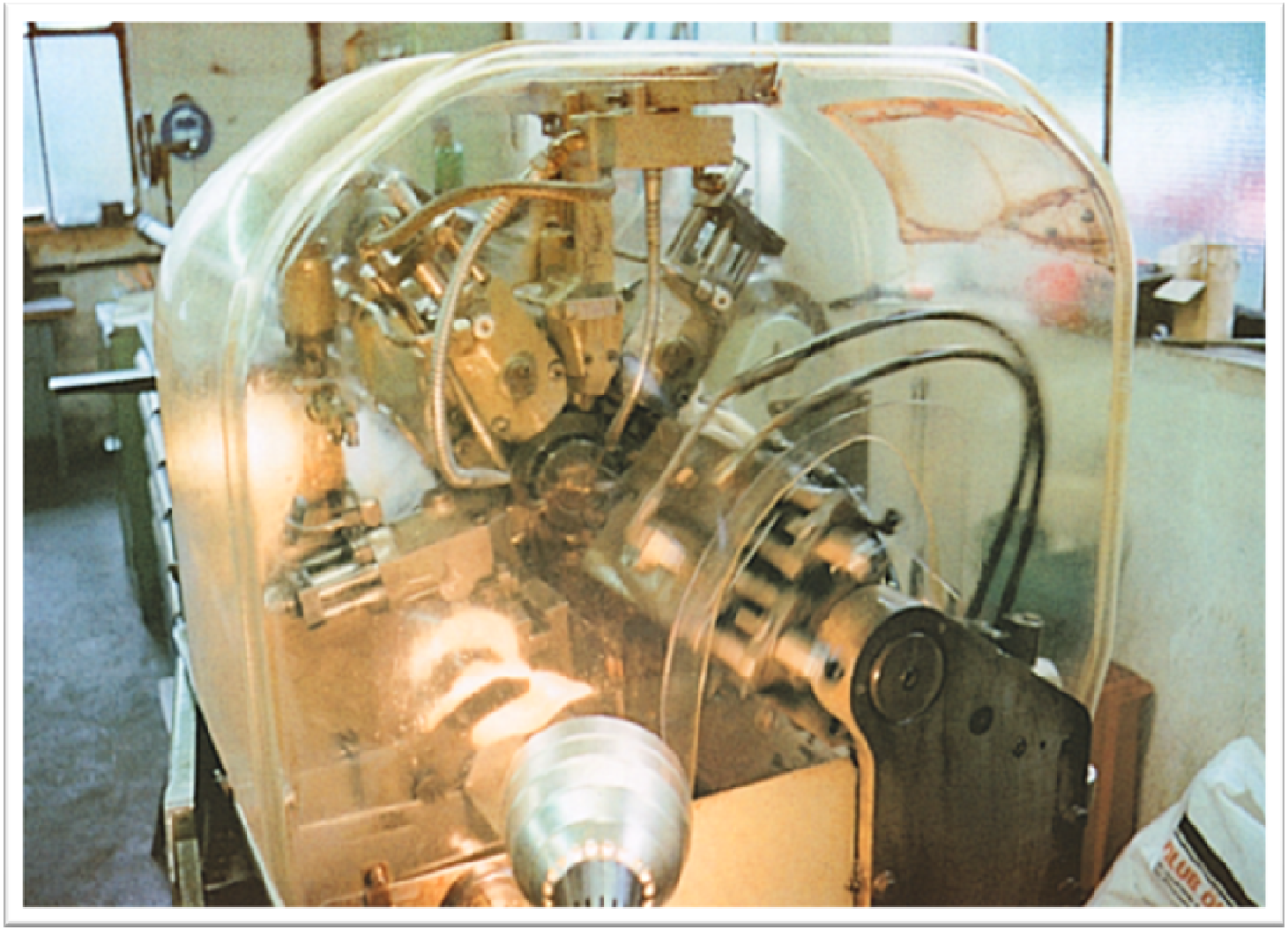

Exhaust ventilation?

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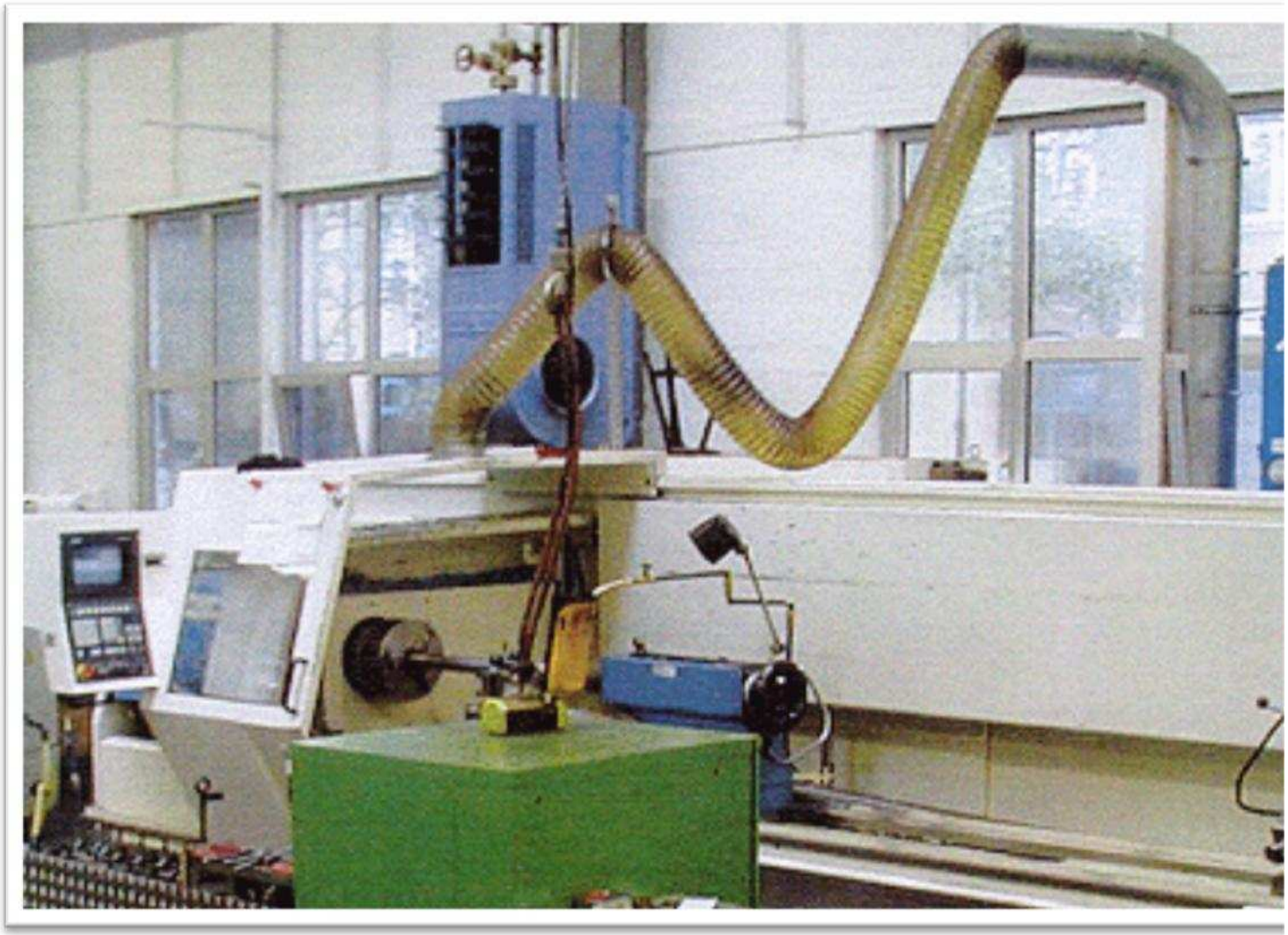

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Oil may evaporate!

Good!

Where are the mist and vapor generators?

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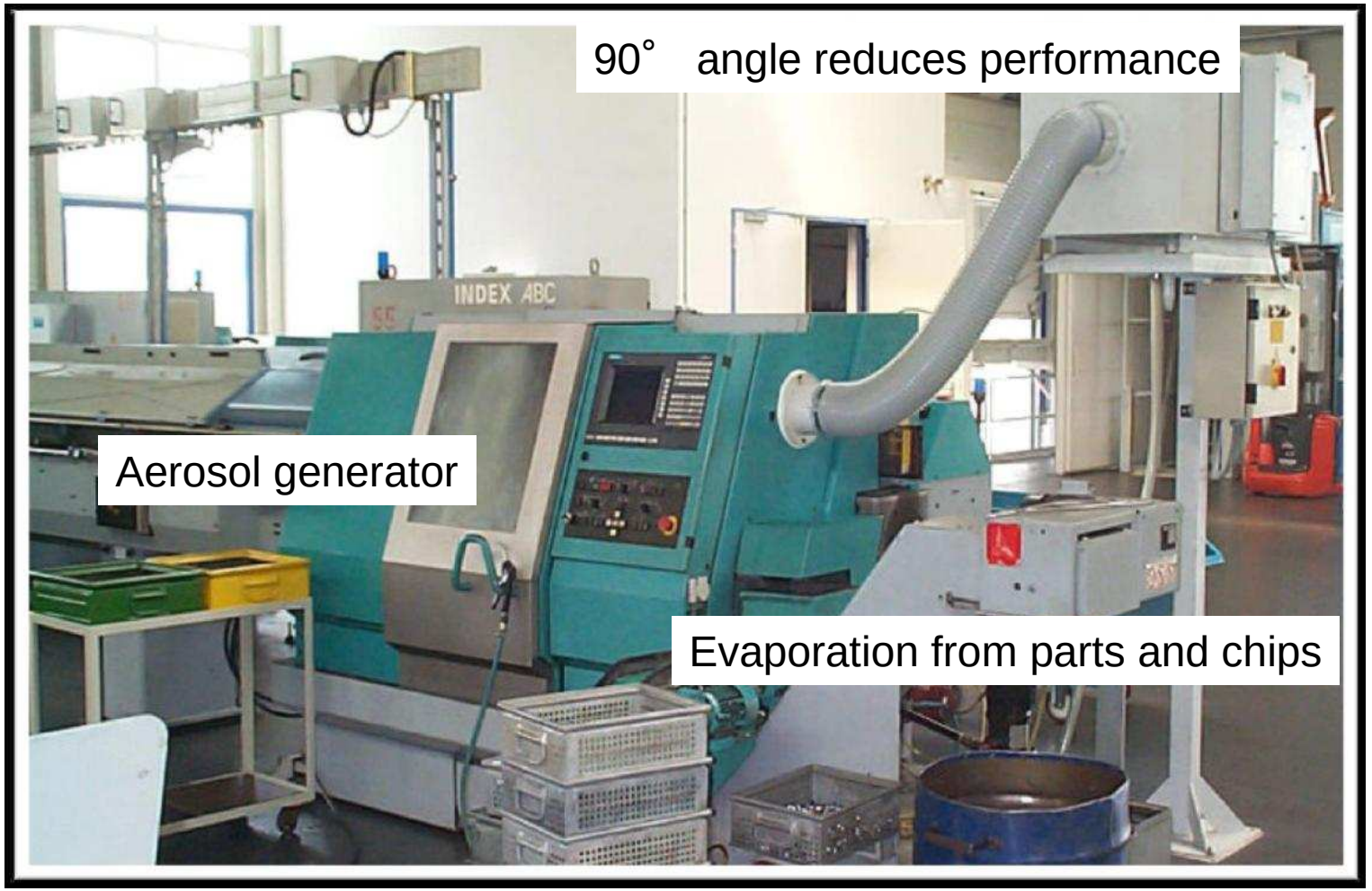

How it should be…

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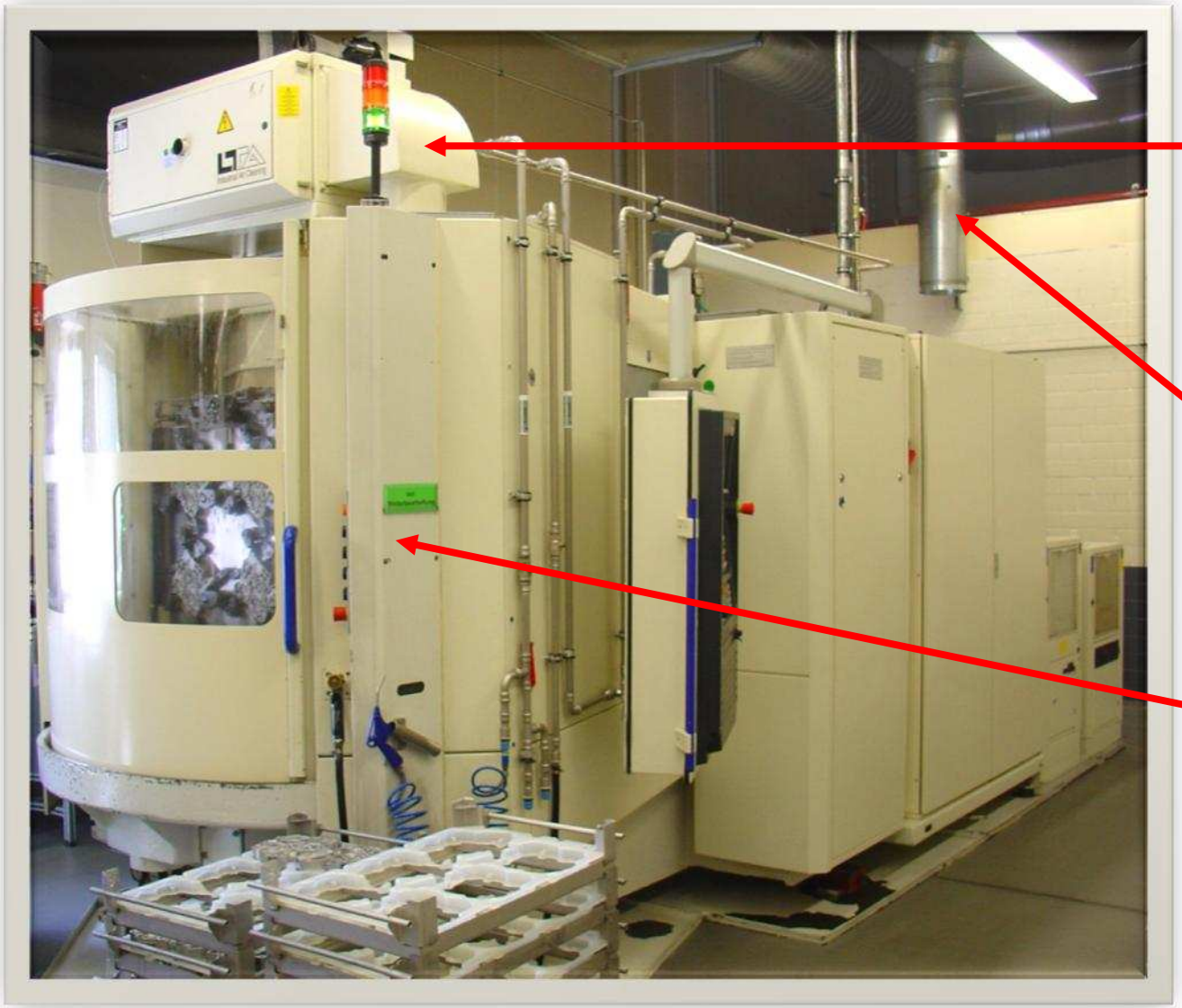

LEV,
Separator

Fresh Air

Enclosed
machine

Sometimes it‘s like that…

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…or like this…

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But also operators should be more carefull…

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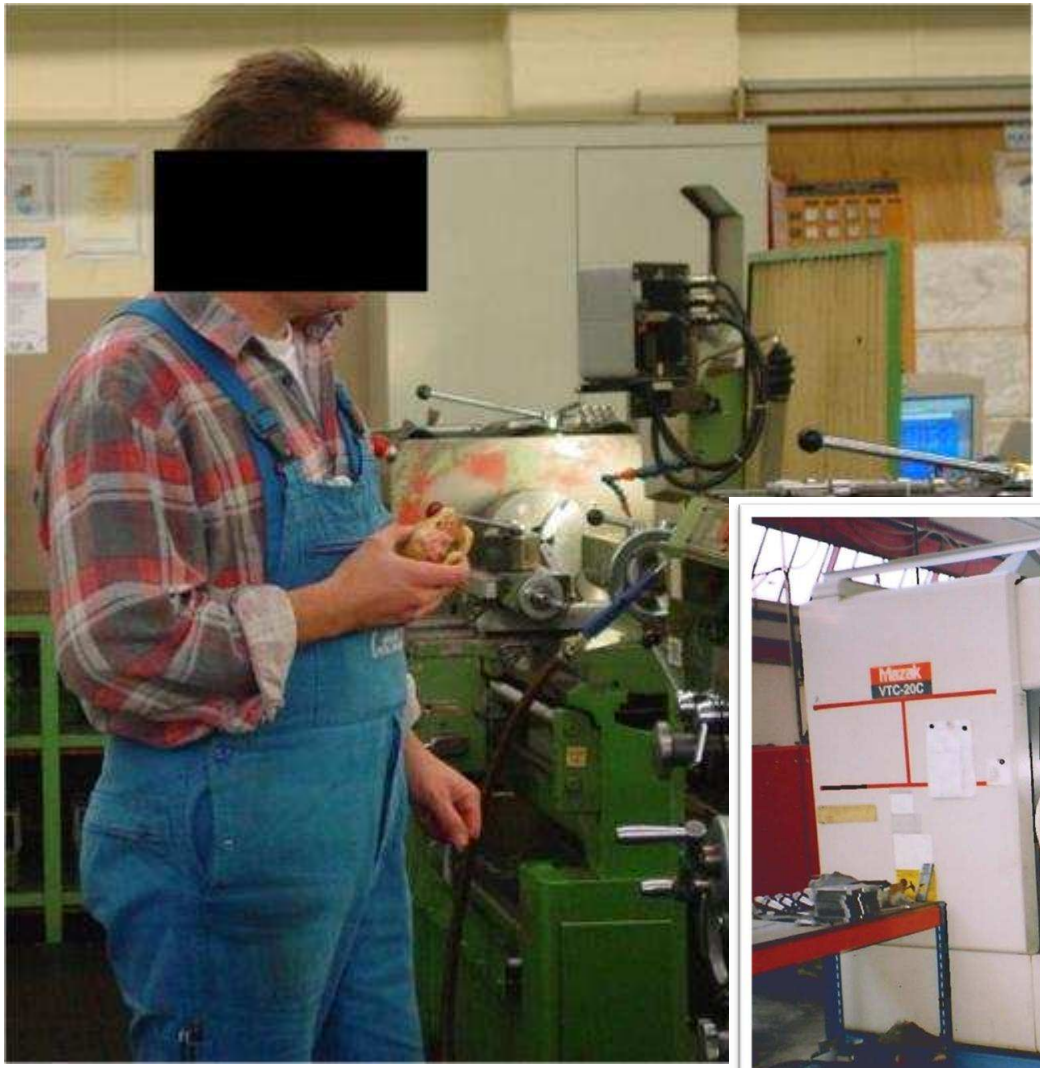

Do you see the risks?

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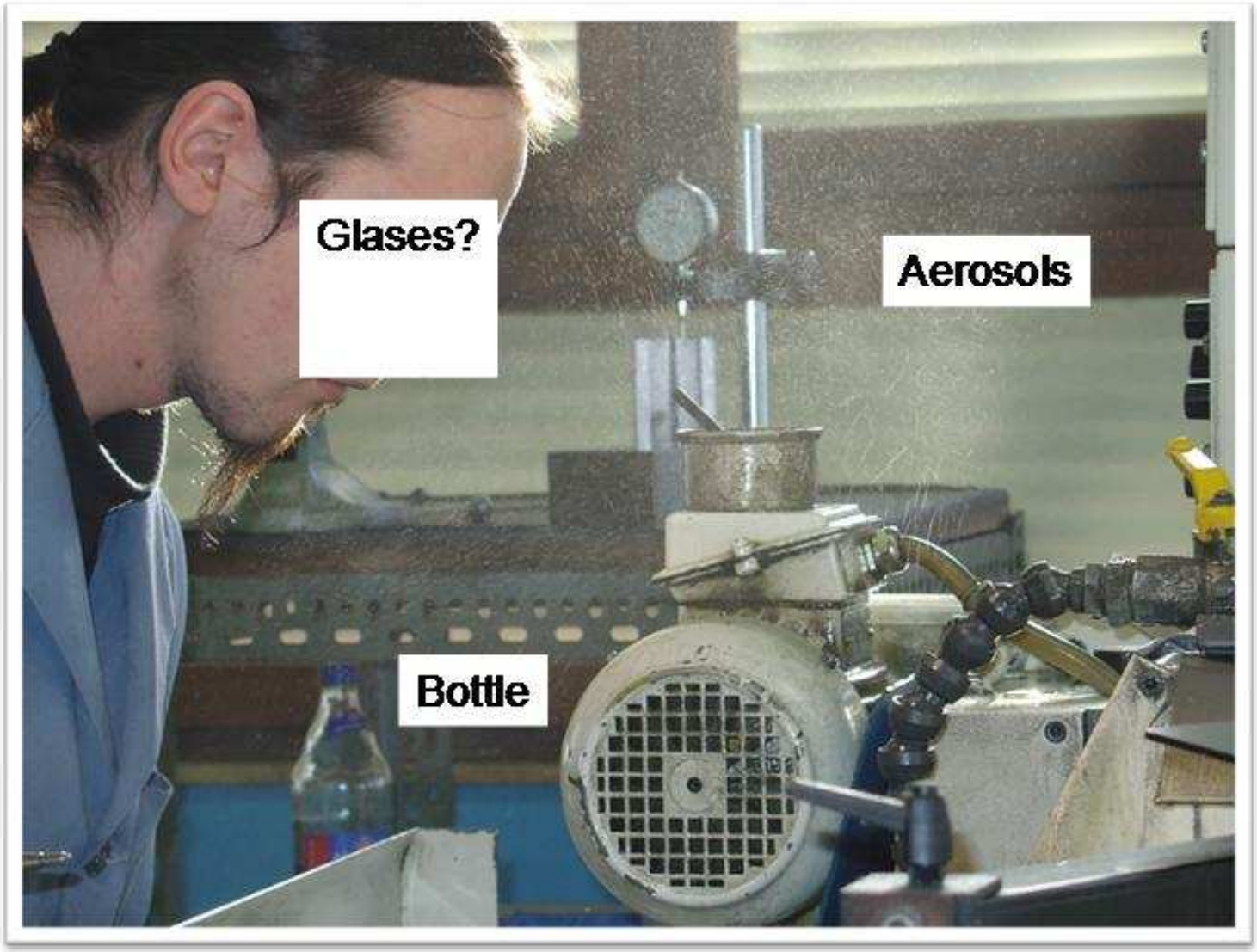

How it should not be…

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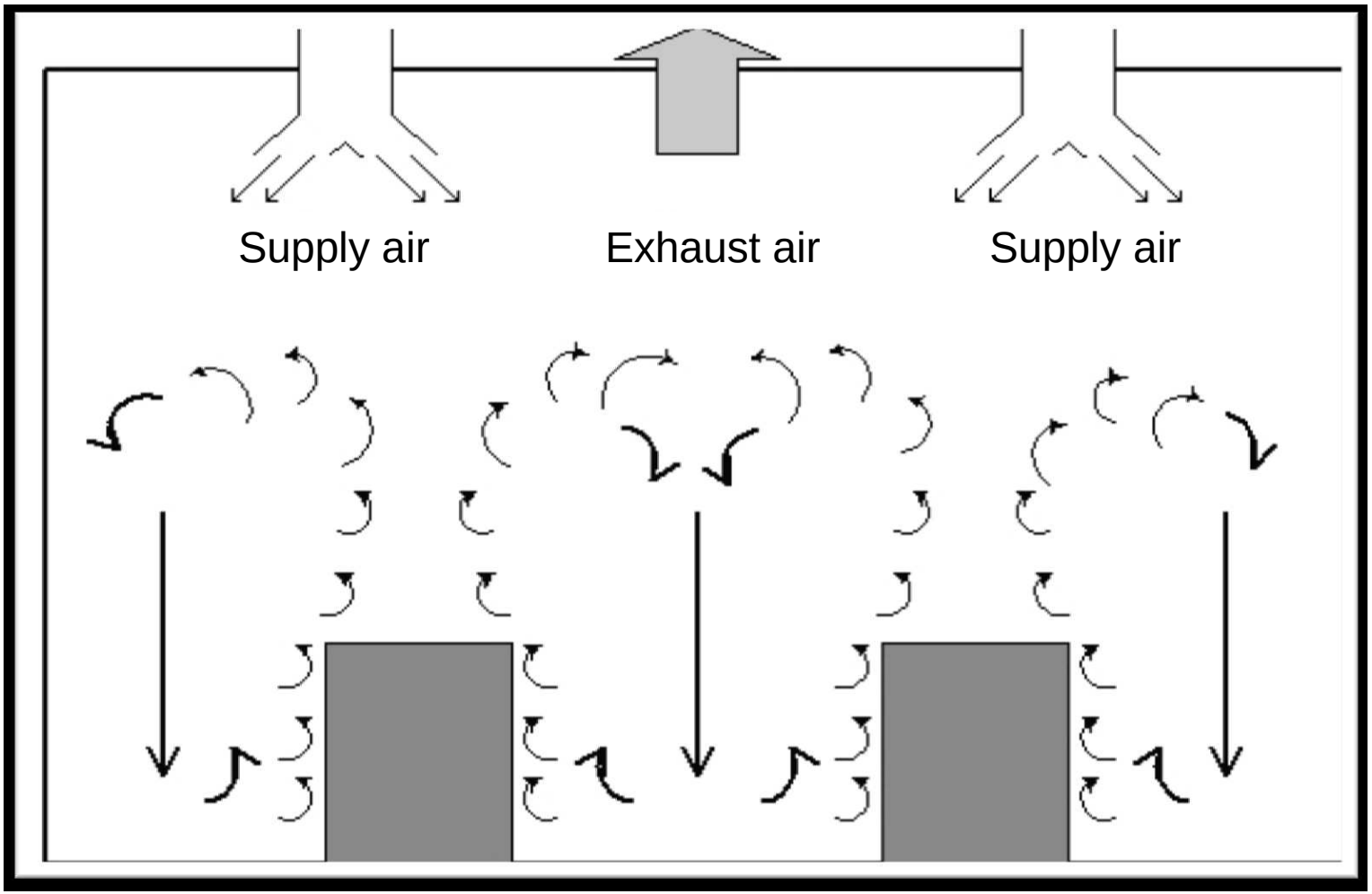

…better…

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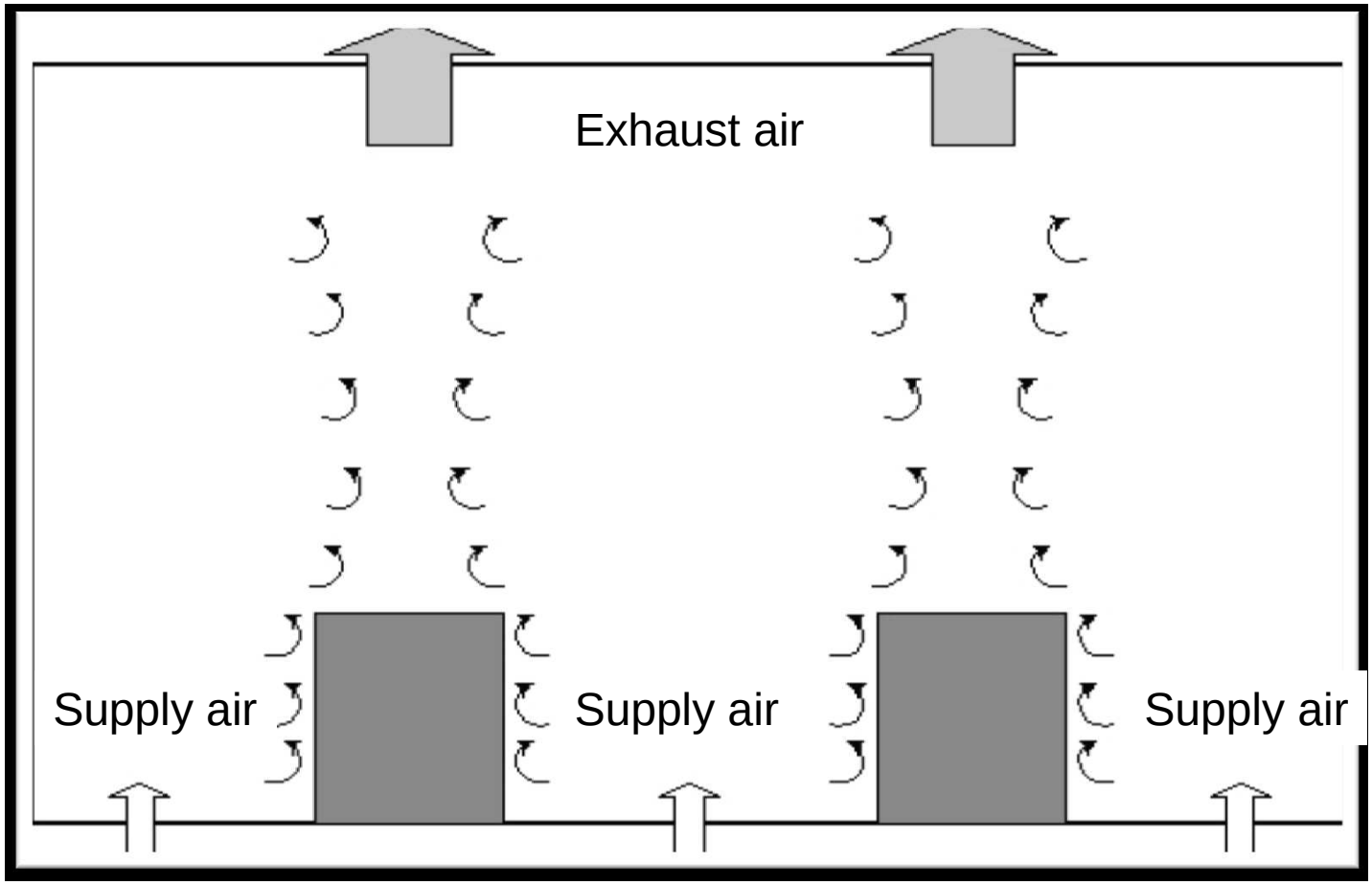

Aerosols & Vapor: 10 mg/m³ is state-of-the-art!

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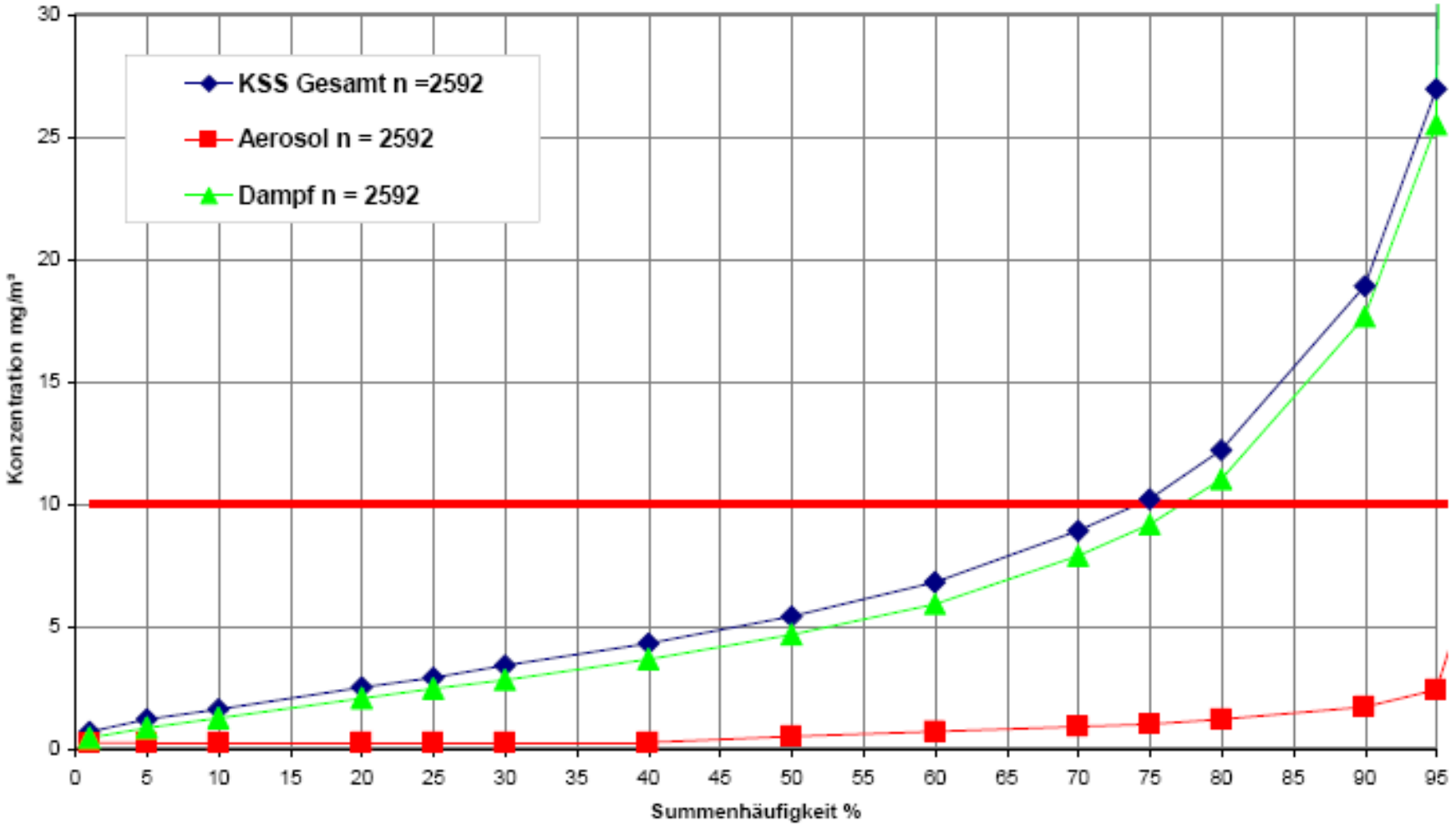

However, a low Noack base oil is preferred. Anti mist additives limit misting.

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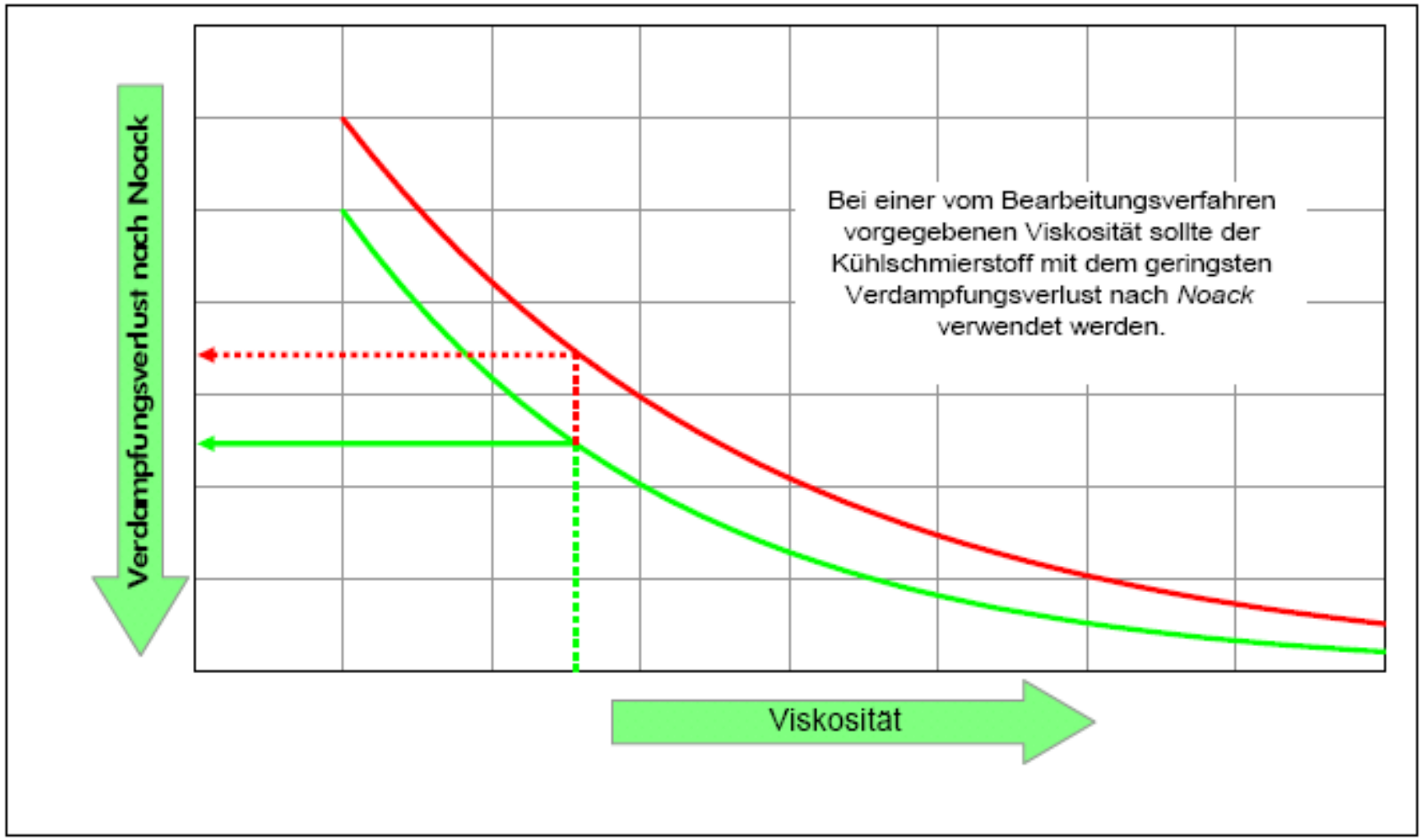

Another problem: bacteria and fungi

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WM MWF contain all Elements, bacteria need for growth:

- Water
- Sulfur
- Hydrocarbons
- etc.

And this is the result!

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Biocides and fungicides are needed to keep microorganisms under control…

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How to treat emulsions?

Preparing an emulsion as a first step…

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Mixing devices are highly recommended to obtain a homogenous emulsion at the desired concentration.

Low concentration leads to low performance and bacteria growth
High concentration may lead to skin problems and foam

Keep the system clean!

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Filter need also maintanance…

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Filtration & tramp oil removal

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With simple measures…risks can be kept under control and metalworking fluids can be handled safely and effective.

Summary: WM MWF Problems & Treatments

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