econ INDUSTRIES

14th International HCH and Pesticides Forum

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Position:
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MERCURY AND HCH WASTE TREATMENT FROM CHLOR-ALKALI PLANTS

Zero Industrial Waste! Profitable. Reliable. Green energy powered.

Agenda

1. Introduction
2. Available on-site treatment technologies
3. VacuDry® technology
4. Mobile Mercury Conversion Unit
5. Conclusions

Introduction

VacuDry®

Current situation

- Increased demand for the decommissioning of chlor-alkali plants
  - High volumes of contaminated waste with Hg, HCH compounds and others
  - Requirement of best available on-site technologies to treat the obtained wastes

- econ industries has developed the most efficient and cleanest on site solution to recover resources from industrial hazardous wastes, based on 20+ years experience and more than 30 industrial waste recycling plants.

Making clean recyclable materials available for reuse

Supersede landfilling and incineration

Reduce CO_2 emissions

Avoid waste export and large waste transports

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Introduction

Who we are

- econ is a family owned business & was founded in 2003 as machinery supplier

- 30 hazardous waste treatment projects (18 VacuDry® units) worldwide, on 3 continents, in 13 different countries

- Involved in international working groups, such as:

Worldwide recognized for our unique VacuDry® solution to recover resources from industrial hazardous wastes

Available on-site treatment technologies

Chlor- alkali waste treatment

VacuDry®

VacuDry® - vacuum distillation

- For soils & sludges cont. with elemental mercury, HCH compounds and other pollutants
- Max. 400 °C
- Low vacuum < 50 mbar(abs)
- Advanced and flexible treatment technology

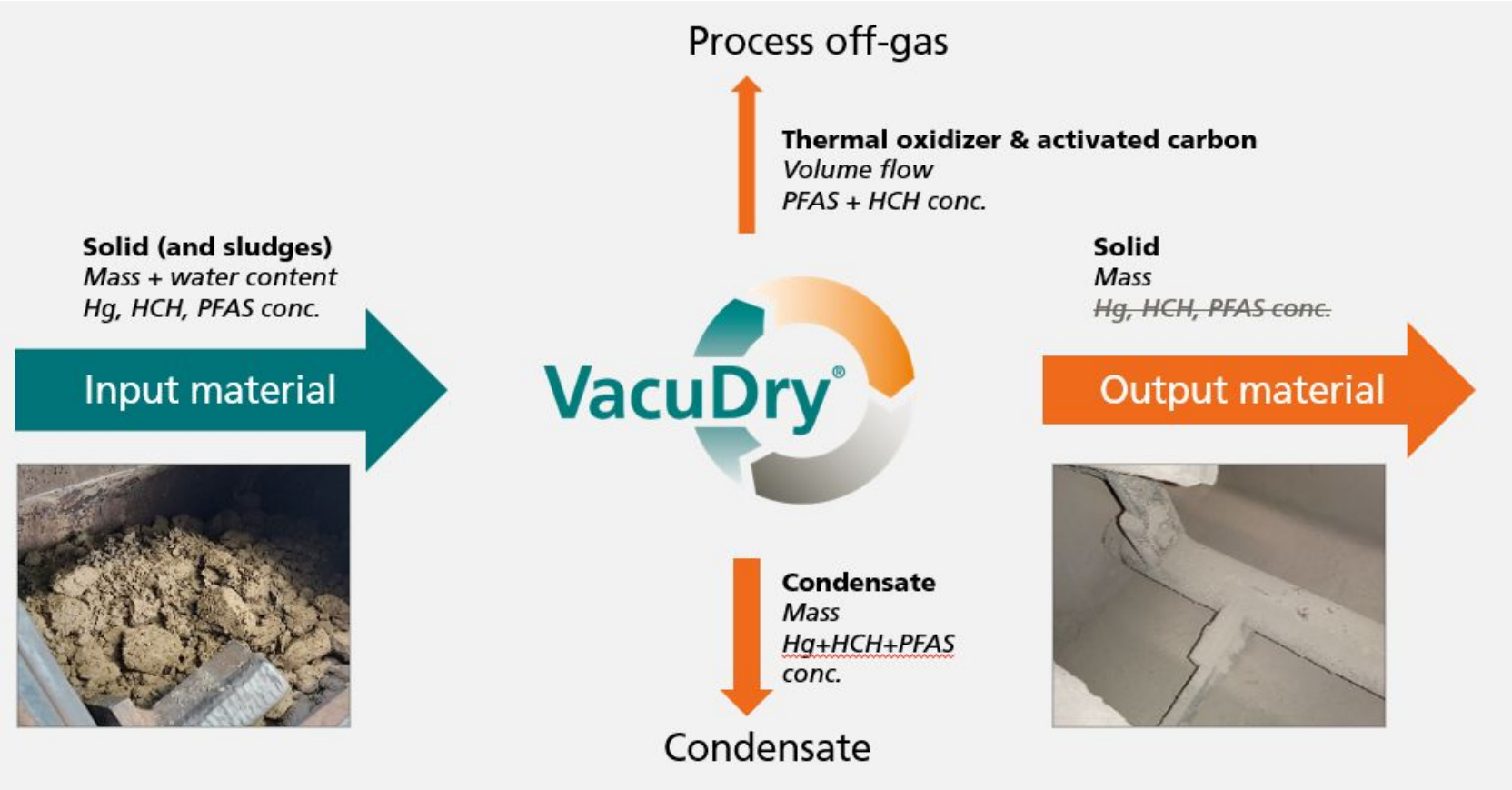
MMCU

Mobile Mercury Conversion Unit

- Conversion of pure elemental Hg to HgS (cinnabar)
- max. 200 °C
- Atmospheric pressure
- Completely seal system

VacuDry ® technology

Concept

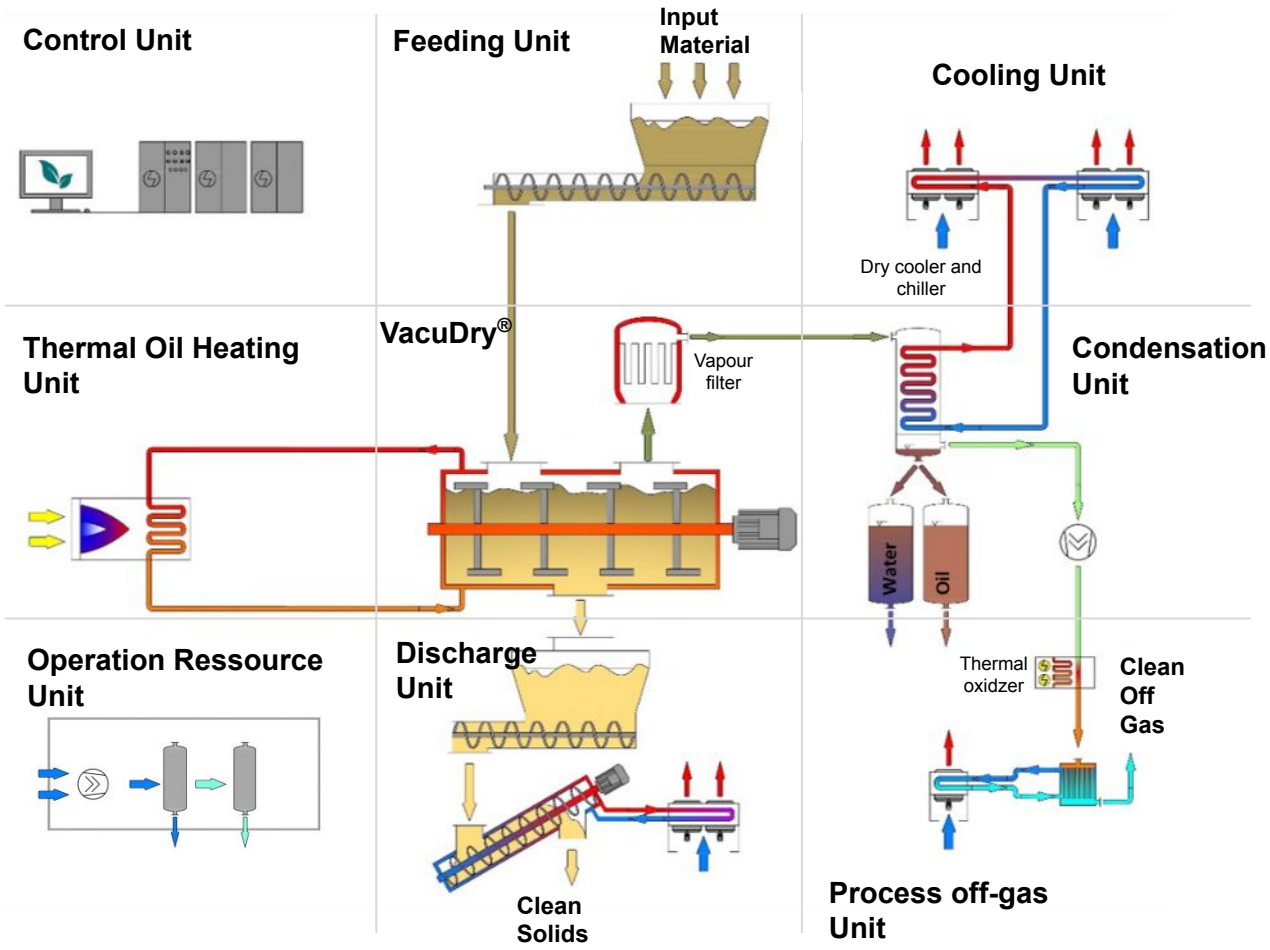


We separate substances having a boiling point of up to ~ 450 °C.

Or, we decompose substances and evaporate the volatile parts.

VacuDry® technology

VacuDry® Flowchart

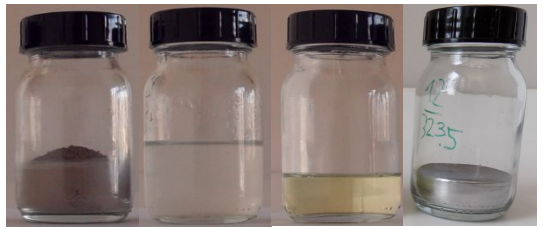


Working principle

Contaminated soils & sludges

Treatment (VacuDry®)

Recovered resources



VacuDry® is a physical separation by vacuum distillation with the highest quality of recovered resources due to the vacuum and low temperature treatment

VacuDry® for on site remediation (France)

70,000 tons of mercury & PAH contaminated soil and building rubble had to be cleaned in an industrial facility in the south of France

Plant set up:

- Vacuum dryer type: VacuDry® 12 000
- Batch size: 8,400 litres
- Heating system: Thermal oil Unit – Natural Gas
- Operating pressure: 50 mbar (abs)

Composition (input material)	Water	Mercury	Solids (soil)
	6.1%	> 50 ppm	93.9%

Batch time	255 min	Min. Pressure	50 mbar (abs)
Max. material temp.	350 °C	Max. heating temp.	380 °C

Input material

[Hg]: > 50 ppm

Condensate

Output material

[Hg]: < 1 ppm

VacuDry® cleaned 70,000 tons of mercury & PAH contaminated soils for reuse

VacuDry® for on site remediation (India)

In order to treat mercury contaminated soil derived from a former thermometer factory in India, it was necessary to implement a technology that would allow for on-site, ex situ remediation rather transporting contaminated material over long distances.

Plant set up:

- Vacuum dryer type: VacuDry® 3 000
- Batch size: 2,800 litres
- Heating system: Thermal oil heating unit – operated by electricity
- Operating pressure: 50 mbar(abs)

Composition (input material)	Water	Mercury	Solids (soil)
	17.5%	> 80 ppm	82.5%

Batch time	255 min	Min. Pressure	50 mbar (abs)
Max. material temp.	350 °C	Max. heating temp.	380 °C

Input material

[Hg]: > 80 ppm

Condensate

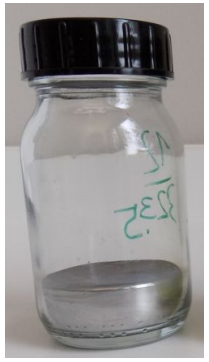
Output material

[Hg]: < 1 ppm

Mobile Mercury Conversion Unit

Concept - Conversion process

Elemental Mercury



Elemental Sulphur

Mobile Mercury Conversion Unit

Mercury sulphide (HgS)

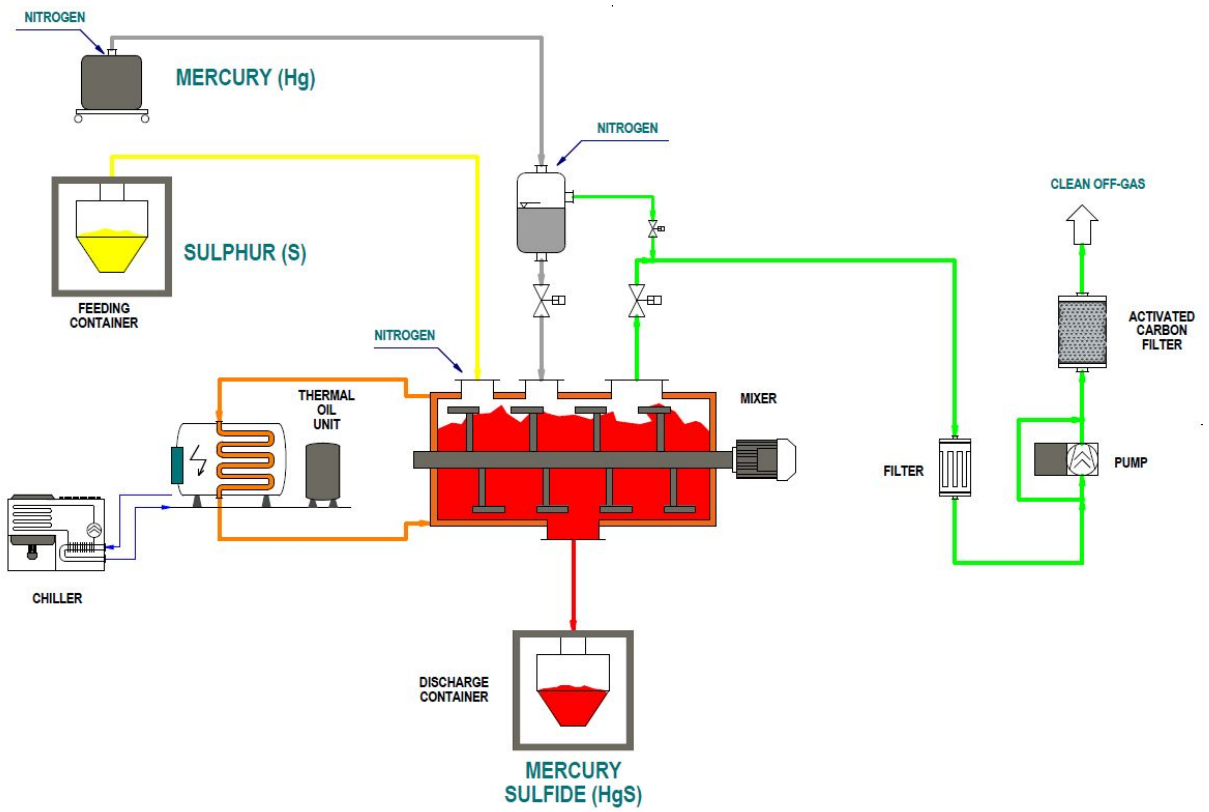
Non toxic, stable and insoluble compound

Conversion of pure elemental mercury (Hg) to mercury sulphide (HgS / cinnabar)

Mobile Mercury Conversion Unit

For final disposal of pure elemental mercury

MMCU Flowchart



Specifications

- Nitrogen atmosphere, safe and hermetically closed mixer
- Operation under ambient pressure
- Mercury and sulphur are fed to the mixer
- Increased temperatures inside the mixer by the thermal oil unit
- active cooling of the mixer
- Liquid phase chemical reaction
- Low off-gas flow during stabilization process

An inert atmosphere and a liquid phase chemical reaction ensure safe operations

Mobile Mercury Conversion Unit

On-site mercury conversion references

UK – chlor-alkali plant:

400 tons Hg converted to HgS on-site

Poland – chlor-alkali plant:

130 tons Hg converted to HgS on-site

econ stabilised on-site more than 500t of Hg to HgS for safe final disposal

Conclusions

On-site Chlor-alkali waste treatment using econ technology

- Proven on-site treatment solution, from the treatment of mercury waste to the stabilisation of the recovered mercury for its safe final disposal.
- On site treatment reduces significantly logistics costs and avoids unpredicted transport risks during the waste mobilization from site to site.
- Highly flexible system that allows treatment of different kind of waste: liquid, pasty, solid
- High degree of decontamination (>95%) of solid waste, enabling it to be re-used as backfill material during the site remediation.
- Very low carbon footprint due to advanced technology and the use of renewable energy supply
- The system fully complies with the requirements laid down for the regulatory authorities.

Proven , Profitable, Reliable and Green energy powered technology

econ industries provides

the most efficient and cleanest

solutions …

… to recover resources

from special wastes worldwide.

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Zero industrial waste …!

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