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# COMETEL RECYCLING

## CONTRIBUTING TO THE ENVIRONMENT AND IMPROVING PRODUCTION COSTS

*THE RECYCLING OF ALUMINIUM CHIPS/SWARF*

# CAUTION!

# INDEX

## SIGNIFICANT ENVIRONMENTAL BENEFITS TO RECYCLING ALUMINIUM

- Recycling aluminium uses **95% less energy** than producing aluminium from raw materials.
- It also **saves 97% of green house gas emissions** produced in the primary production process.
- Recycling 1 tonne of aluminium **saves 9 tonnes of CO2 emissions and 4 tonnes of bauxite** – the raw material from which aluminium is made. 1 tonne of CO2 is equivalent to driving over 3,500 miles.

## NATURE OF THE SWARF

- **Moisture content (water, oil, lubricants)**

The chip is generated during the machining process, usually remains impregnated with coolants

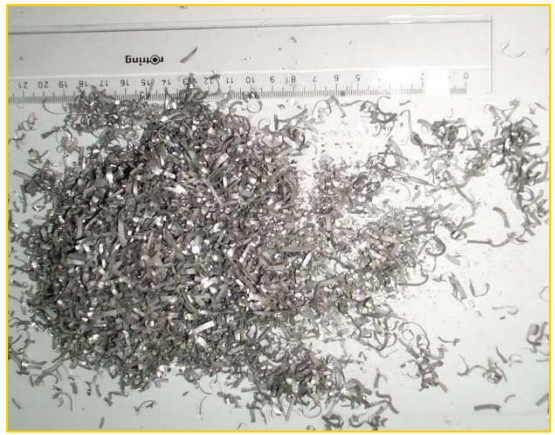
** The adhered refrigerant content represents (8% -25%) of its weight*

The presence of residual coolants in the chip implies:

1. Environmental penalties
2. Melting problems
3. Sales price penalties

## NATURE OF THE SWARF

- **Bulk or filling density (kg/m3)**



## NATURE OF THE SWARF

- **Iron content**

** ALUMINIUM CHIPS MIXED WITH FERROUS PARTICLES.*

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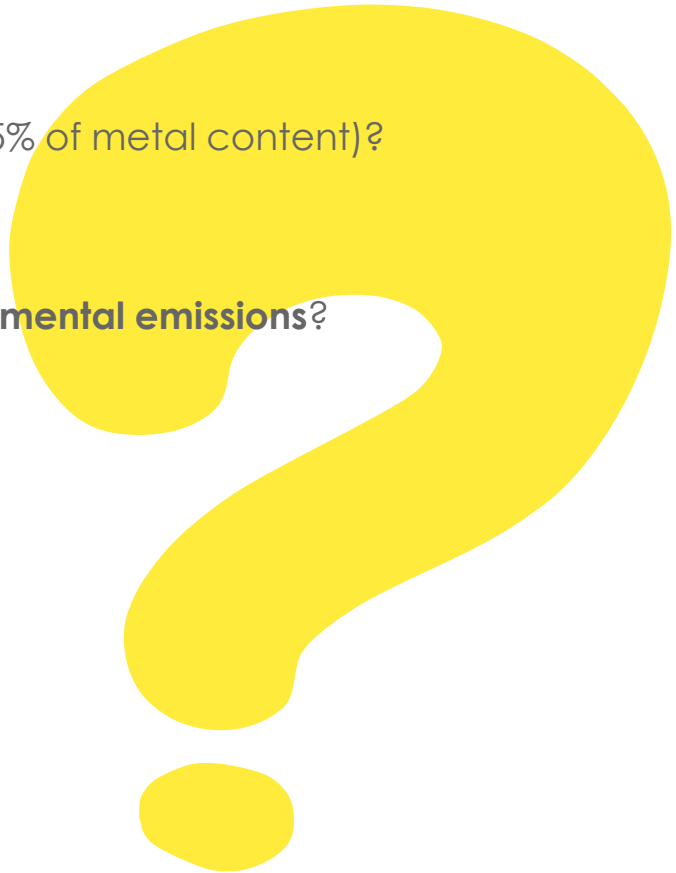
- How can we reach **the highest metal recovery** (target > 95% of metal content)?
- How to get it at the **highest standards in relation to environmental emissions**?
- Which are the **Best available technologies**?



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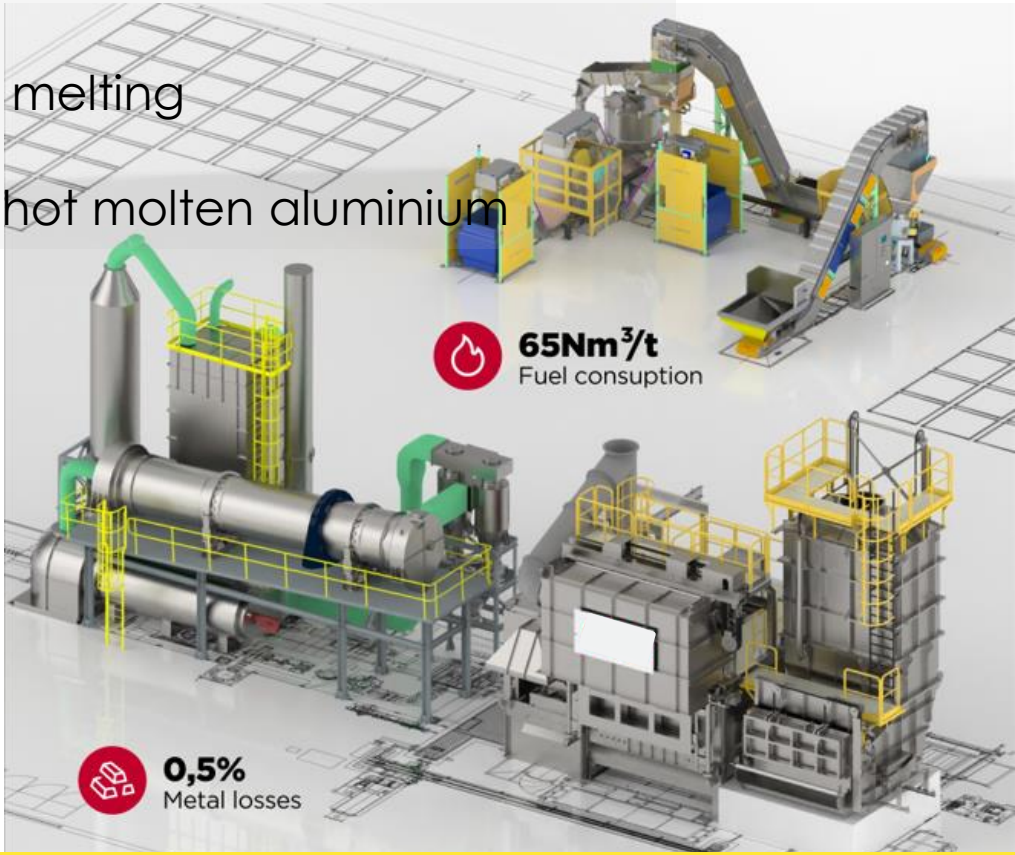
3 stages continuous lines

- **Swarf pretreatment by cold mechanical systems:**
  *COMETEL EXPERTISE*
- Full thermal drying of the swarf before melting
- Melting them quickly sunk in a flow of hot molten aluminium



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*HOW DO WE CONTRIBUTE TO ACHIEVE THOSE TARGETS?*

**COMETEL GROUP**
FACILITIES

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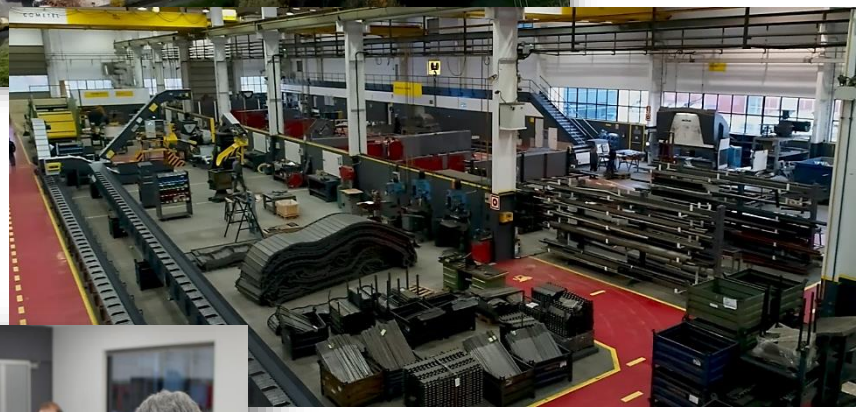
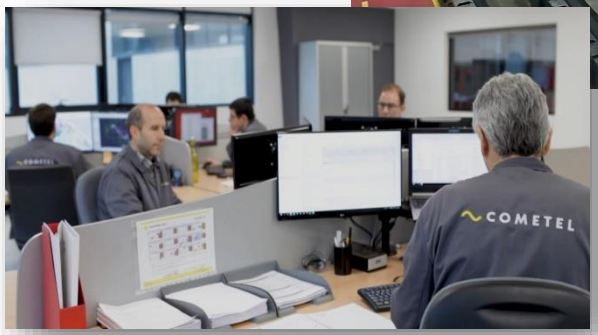
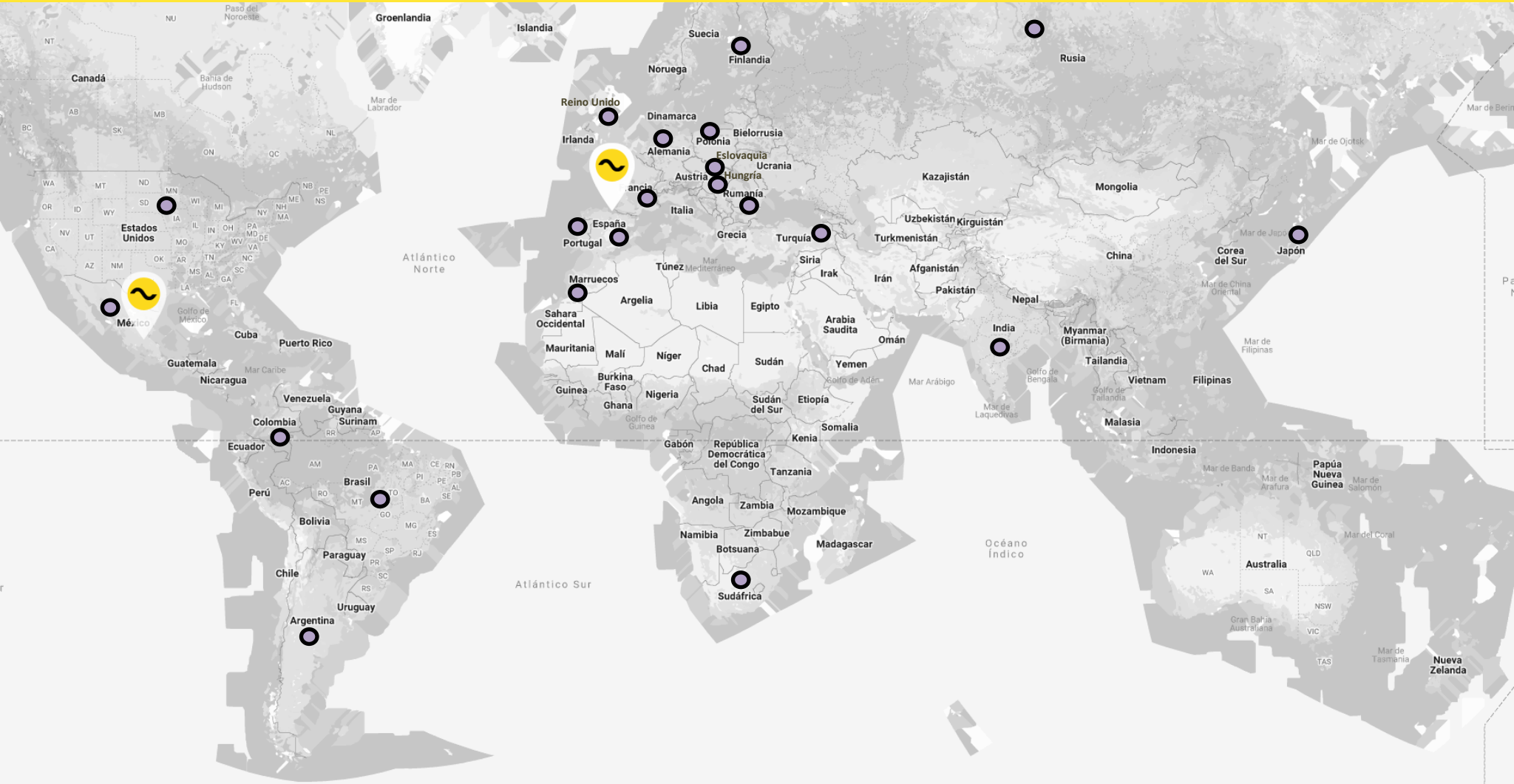





A family business with professional management and more than 35 years of experience in the design, manufacture and commissioning of solutions for the treatment of chips.

100% IN-HOUSE DESING & MANUFACTURING

IN-HOUSE TECHNICAL DEPARTMENT




PROJECTS INSTALLED IN OVER 25 COUNTRIES, **TWO** PLANTS IN **SPAIN** AND **MEXICO**

PRODUCTION PLANTS

INSTALLED PROJECTS

# WHAT WE DO?

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- COMETEL RECYCLING designs and manufactures turnkey installations for the PRE- treatment and transport of machining chips with the objective of :
- **REMOVE/RECOVER** up to 98% of the tramp coolants from machining chips (ALUMINIUM, COPPER, BRASS, IRON, STAINLESS, TITANIUM….
- Reduce the volume / **Increase density**

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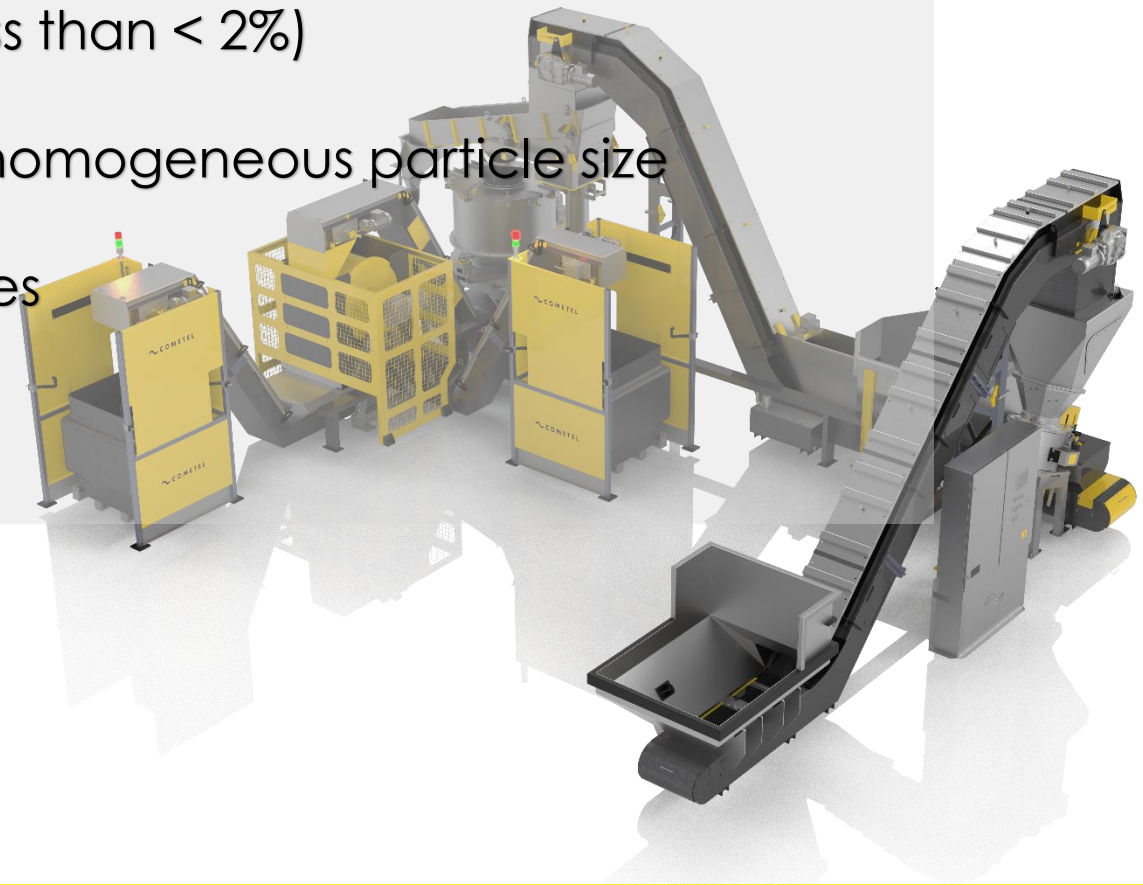
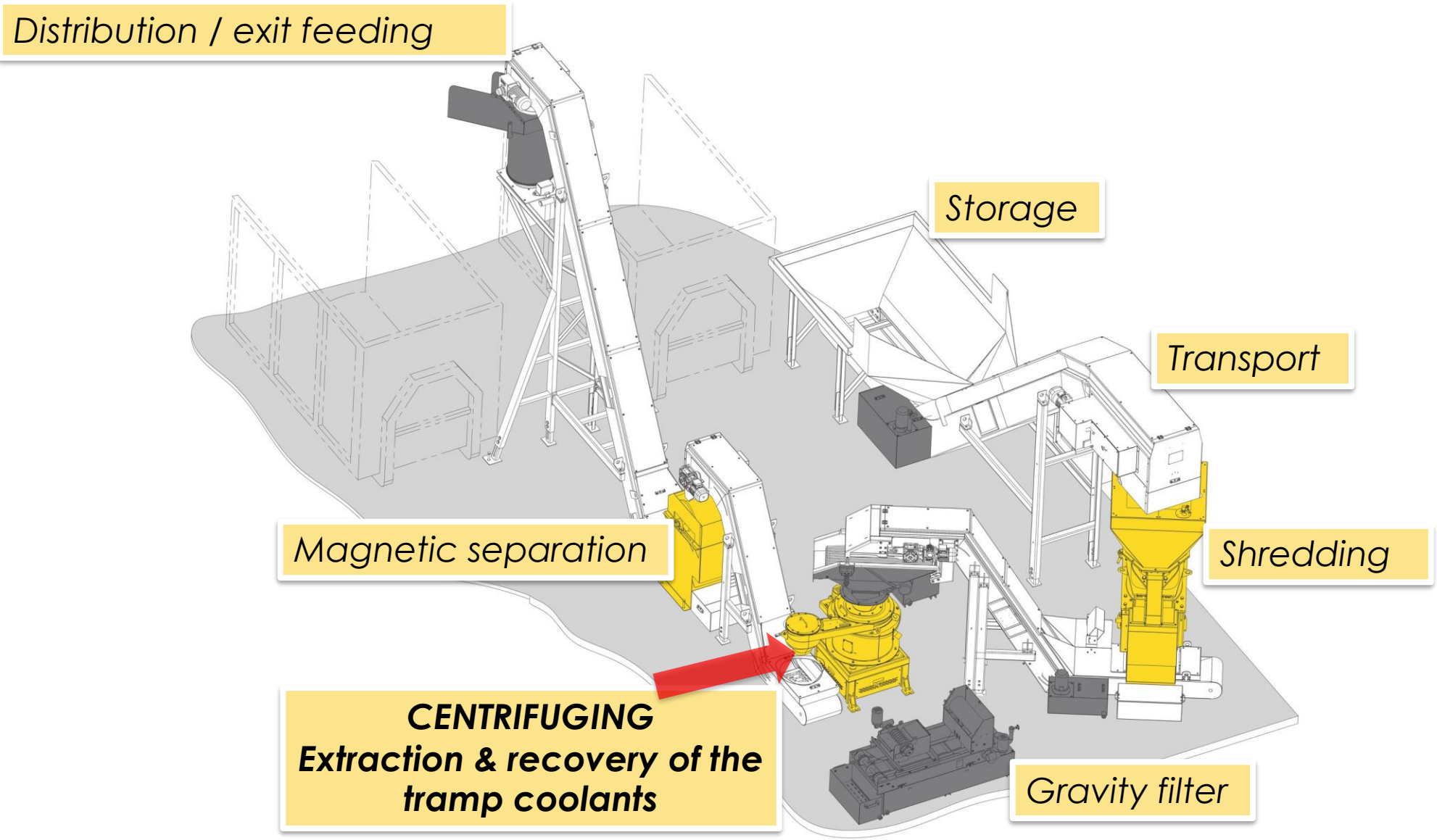
## Swarf pretreatment

1. Remove (and recover!) majority of the lubricants (remaining moisture less than < 2%)
2. Reach a uniform and homogeneous particle size distribution to facilitate the rest of the processes
3. Eliminate as much iron dust as possible



## WHAT PROCESSES MAY INCLUDE AN INSTALLATION?



# MAIN PROCESS - CENTRIFUGATION

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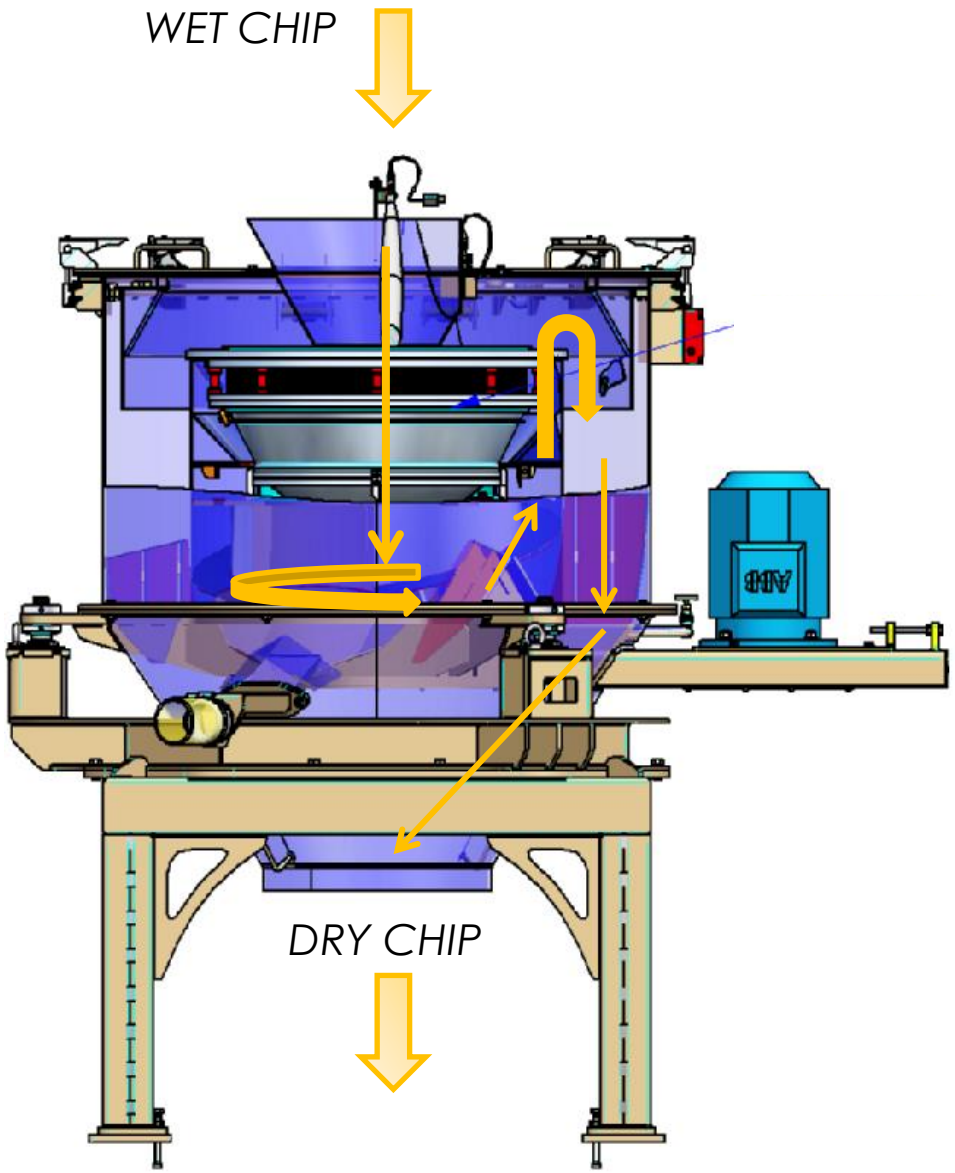
- The chip is introduced through the loading hopper into the centrifuge and it falls inside a rotating drum.
- The material is subjected to a **centrifugal force** that displaces it to the bottom edge of the drum, gliding along the walls.
- On the tour, the material where the material is guided to the walls of the drum, **it passes along a section equipped with a screen** that allows the passage of the fluid away from the solid material.
- This is done continuously, generating a flow of material inside the machine that keeps the drum free of adhesions and free from obstructions.



# MAIN PROCESS - EQUIPMENT

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## CRUSHER

## CENTRIFUGE

## MAGNETIC DRUM

# EQUIPMENT-ACCESORIES

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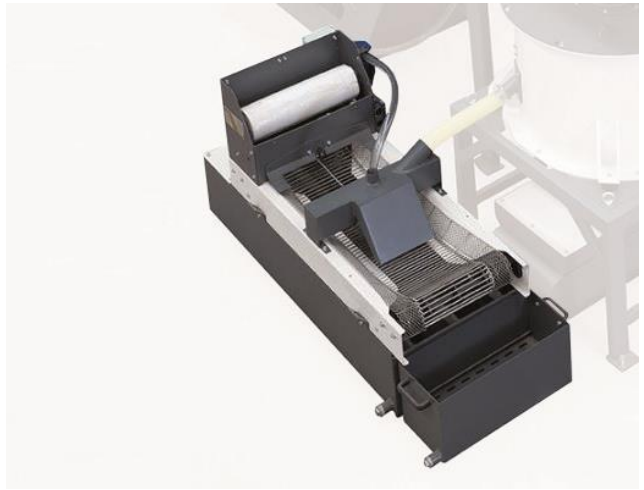
## FEEDING HOPPER

## SWIVEL TRAY


## SCREEN

## COOLANT FILTER



# EXAMPLE-PROJECTS

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VIDEO

PROJECTS

# EQUIPMENT-BRIQUETTING PRESS

## Available technologies

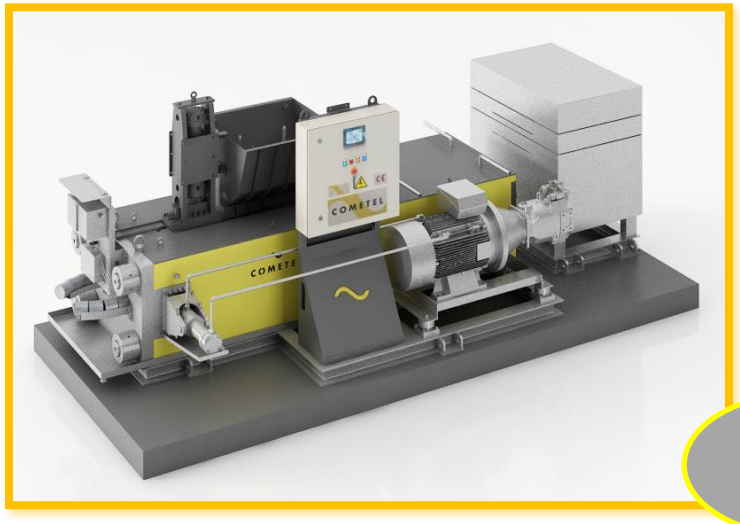
BEFORE

AFTER

Compaction of short chips at high pressures inside a mould to obtain semi-rigid bodies in order to reduce the volume of the chip.

Typical loose chips have an average density of 0.20 to 0.50 kg/dm3.

With the compacting process, we achieve densities between 2.0 and 2.20 kg/dm3, with a storage reduction of 75% in volume.



VIDEO

# BRIQUETTING

For correct & homogeneous briquetting, it is recommended that the shavings have been previously **crushed and centrifuged.**

Centrifuging is recommended as compaction alone does not guarantee full extraction of lubricants, **otherwise higher residual moisture remains inside the briquette.**

Briquetting is a good process for compacting, reducing space and optimize logistics, adding further value, **it is not recommended (without centrifuging) prior to melting, as all the volatiles arenot removed.**

When melting, a good metallic yield is achieved by briquets when properly dry, otherwise **they generate uncontrolled fumes from the remains of lubricants.**

COMPATED SWARF WITHOUT CENTRIFUGATION


FUMES, EXPLOSIONS, ETC.

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# *CASE STUDIES : ROI*

# MACHINING COMPANY

CUTTING FLUIDS RECOVERY

LOWER ENVIRONMENTAL IMPACT

INCREASE SELLING PRICE

FROM HAZARDOUS WASTE TO SPECIAL WASTE

***COST CENTRE: LATHES**: 1,000 KG/H CHIPS WITH 10% MOISTURE = 100L LOST COOLANT*
***COMETEL** MOISTURE REDUCTION/RECOVERY RATE (~ **98%**)*

✓ COOLANT PRICE (Fuchs Renolin B10) =2,5 €/L

| EXAMPLE | HOUR | MONTH (1 Shift) | YEAR (11 months) |
|---|---|---|---|
| RECOVERY | 98 L | 15.680 L | 172.480 L |
| SAVING | 245 € | 39.200 € | 431.200 € |

ECONOMIC BENEFITS: 431.200 €

PROJECT COST: 250.000 €

**ROI: 7 MONTHS**

# FOUNDRY

NO SMOKES/FUMES

ENERGY COST AND FURNACE MAINTENANCE REDUCTION

INCREASE OF THE YIELD

LOWER ENVIRONMENTAL IMPACT

***COST CENTRE:*** ***CHIP DRYER*** *CAPACITY 1,000 KG/H SWARF WITH 10% MOISTURE*
***COMETEL*** *MOISTURE REDUCTION/RECOVERY RATE (~* ***98%****)*

COST KW= 0,4€
AVERAGE CONSUMPTION= 200 KW/TN (with <3% moisture)
AVERAGE CONSUMPTION= 400 KW/TN (with 10% moisture)

**1. ENERGY CONSUMPTION**

| CONSUMPTION + PRODUCTION | | | |
|---|---|---|---|
| EXAMPLE | HOUR | MONTH | YEAR |
| MOISTURE > 10% | 400 KW – 1,000 KG/H | 64.000 KW | 704.000 KW |
| MOISTURE ≤ 3 | 200 KW - 1,000 KG/H | 32.000 KW | 352.000 KW |

**ECONOMIC BENEFIT: 141,000 €**

# FOUNDRY

NO SMOKES/FUMES

LOWER ENVIRONMENTAL IMPACT

ENERGY COST AND FURNACE MAINTENANCE REDUCTION

INCREASE OF THE YIELD

***EXAMPLE:*** ***FURNACE*** *PROCESSING CAPACITY 1,000 KG/H*
***COMETEL*** *MOISTURE REDUCTION/RECOVERY RATE (~* ***98%****)*

**1. MOISTURE IMPLICATIONS: 1% MOISTURE CONTENT = 2% OXIDATION**
**therefore: 10% Moisture content = 20% oxidation vs 2% centrifuged moisture = 4% oxidation**

| | 10% MOISTURE | 2% MOISTURE |
|---|---|---|
| OXIDATION/H | 20%*1,000 KG= 200 KG/H | 4%*1,000KG= 40 KG/H |
| AL NET PRODUCTION | 1000-200= 800 KG/H | 1000-40= 960 KG/H |
| OXIDATION/YEAR | 220D*8H*200 KG = 352TN | 220D*8H*40 KG = 70 TN |
| | **282 TN ADDITIONAL NET PRODUCTION IN 1 YEAR.** | |

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# FOUNDRY

- ✓ ASSUMING INGOT SALE PRICE: **2€/KG**

| | |
|---|---|
| - DRYER SAVINGS: | 141,000 € |
| - ADDITIONAL NET PRODUCTION: | 564,000 € |
| **GRAND TOTAL:** | **705,000 €** |

PROJECT COST: 250.000 €

**ROI < 5 MONTHS**

**COMETEL RECYCLING**
CONTACT

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# **THANK YOU,**
# for you attention!



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