ROTAJET
SYSTEMS

ROTAJETSYSTEMS.COM

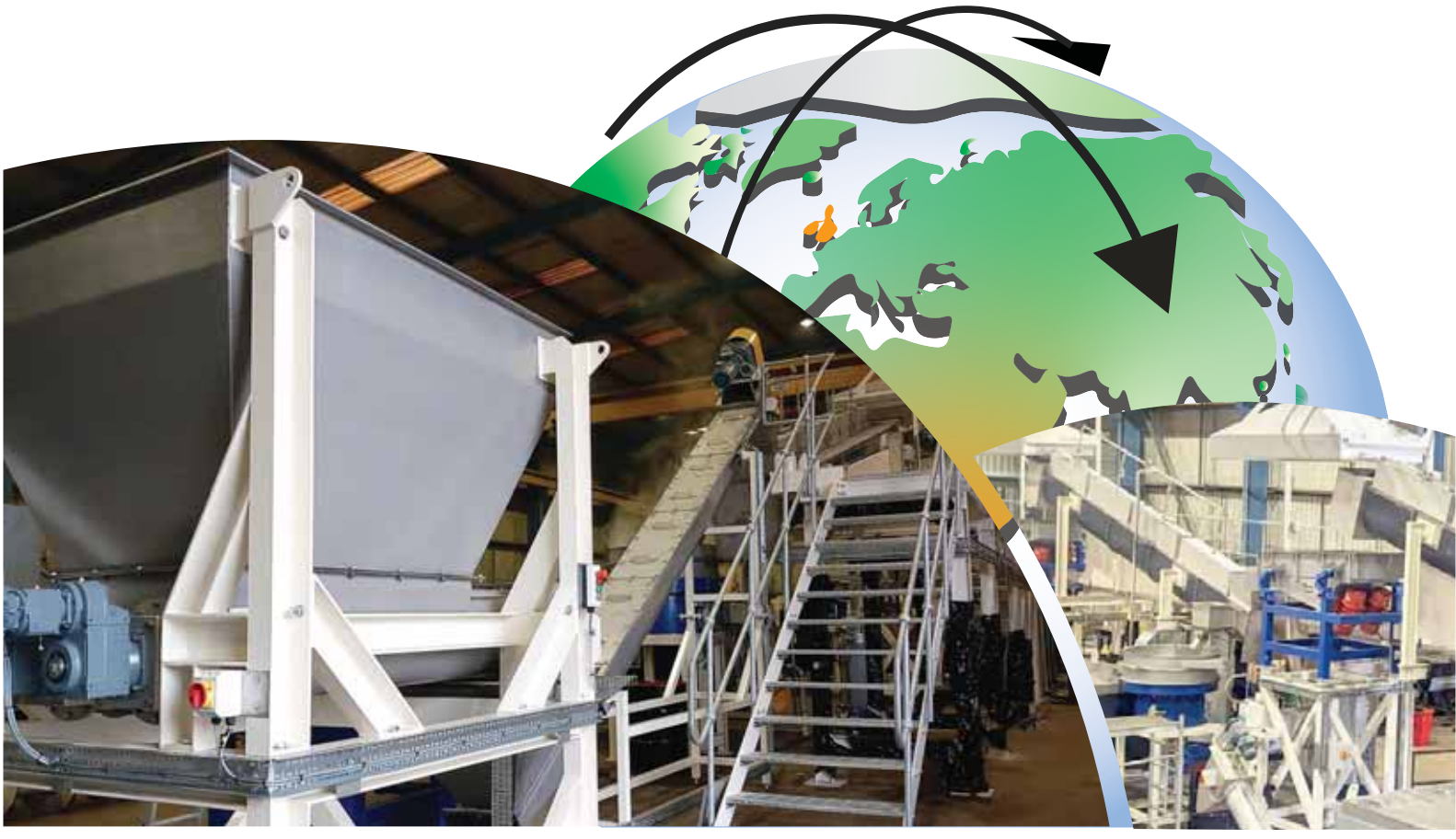
METAL TURNINGS
WASH PLANT

ABOUT

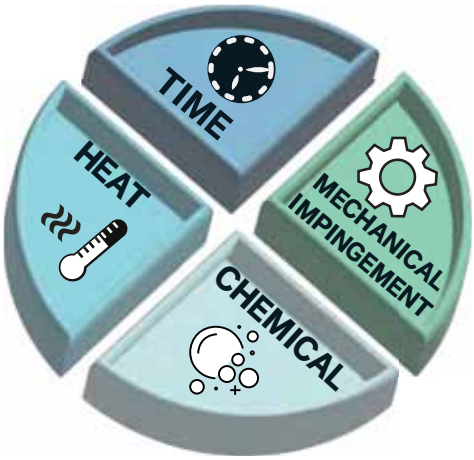
From our facility in Wakefield, UK, Rotajet specialise in designing and manufacturing solutions for metal degreasing processes. Our machines are used across the globe to eliminate oils, grease, and various contaminants from metal surfaces ensuring optimal conditions for downstream procedures.

We operate across a diverse range in the industrial sectors, including manufacturing, automotive, aerospace, and metalworking.

Our swarf degreasing machines process high value metals and super alloys produced during the machining process. These lines wash, decontaminate and dry the material creating a raw material suitable for vacuum melting.



Rotajet's metal turnings line targets even the fine ridges found in the metals surface.



AN EFFECTIVE WASH

Oils can be particularly tricky to clean off a surface... Due to the nature of the substance, physical impingement or heat is not always enough to do the job. Especially in the case of metal swarf, it is essential that the material is thoroughly clean and free of any oils or contamination as any leftover residue and cause defects and serious problems in the end product.

Our wash lines use a combination of all four washing methods chemical washing, heated washing and physical impingement to ensure the out-feed material is completely oil and residue free.

WHY WASH SWARF?

Metal swarf is high value material and is worth a lot in resale costs. Cleaning and processing swarf adds huge amount of value to the material which in turn adds value back into your business.

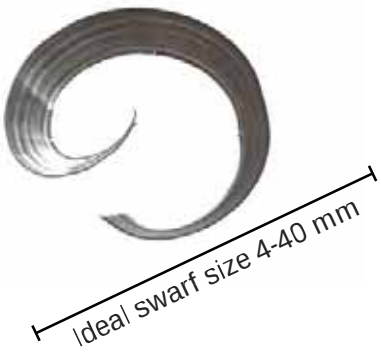
A ENVIRONMENTALLY FRIENDLY BLEND

Traditionally, the material has been in processed in batch form, using solvents which are continually being reclassified, resulting in stringent HSE and environmental regulations.

Rotajet has developed an aqueous based system that utilize environmentally friendly blend of surfactants that clean and degrease the cut turnings in a continuous operation.

THE IDEAL SWARF PARAMETERS

The ideal in-feed material for our metal washing lines is size reduced swarf between 4-40 mm. Any dense solids or large pieces can cause issues or not be as effective.



ROTAJET Swarf washing line

IN-FEED

- Twin screw
- Inverter Drum
- Controlled uniform feed

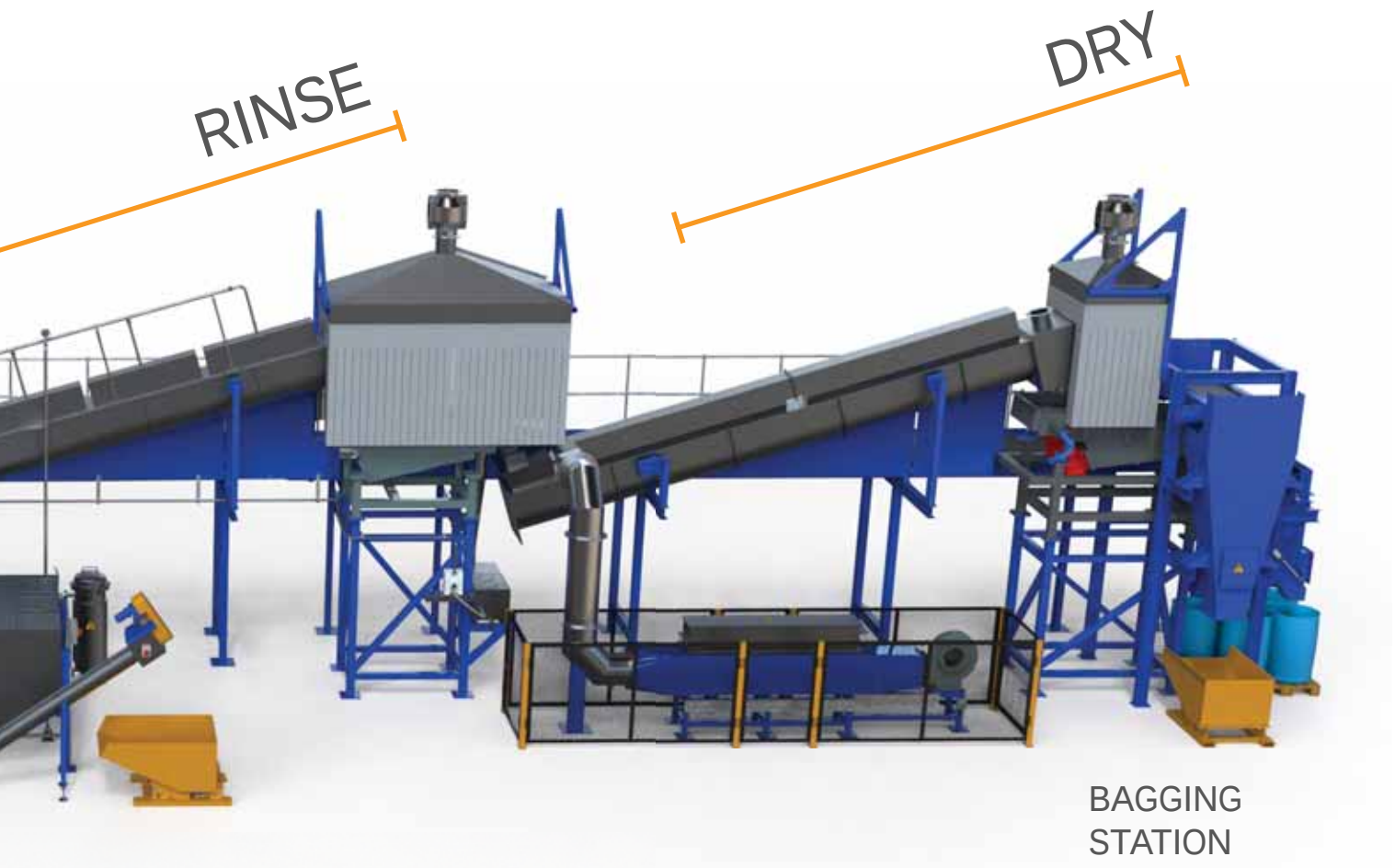
WASH

- Wash screw
- Overhead wash spray nozzles
- Wash water recirculation tank
- Linear vibrating deck

The Rotajet metal turnings line is comprised of 3 main sections; Wash, rinse and Dry with an in-feed hopper on the front end and a bagging off station for the out feed.

Since this line is comprised of modular machines, the layout can be turned and changed to accommodate for floor spacing and facility requirements. The machines are also available and individual machines and can be retrofitted into an exiting facility or space

See page 10 for more details.



RINSE

- Rinse screw
- Overhead rinse spray nozzles
- Rinse water recirculation tank
- Linear Vibrating deck

DRY

- Drying screw
- Hot air blower
- Overhead magnetic ferrous removal
- Gause magnetic drum

BAG OFF

- Optional load cells
- Drums or bulk
- Autosample

IN-FEED MATERIAL + WASH

FEED HOPPER

Initially, the in-feed material is loaded into the twin screw feed hopper. This is connected to a screw conveyor that will control both the speed and amount of material loaded into the wash line.

The feed hopper ensures and a consistent throughput and uniform production feed. This in turn regulates the working process.

WASH SCREW

From the feed hopper, the swarf is transported into the washing screw. This screw uses the Rotajet **SIB method** to thoroughly and effectively target all internal and external surfaces of the swarf.

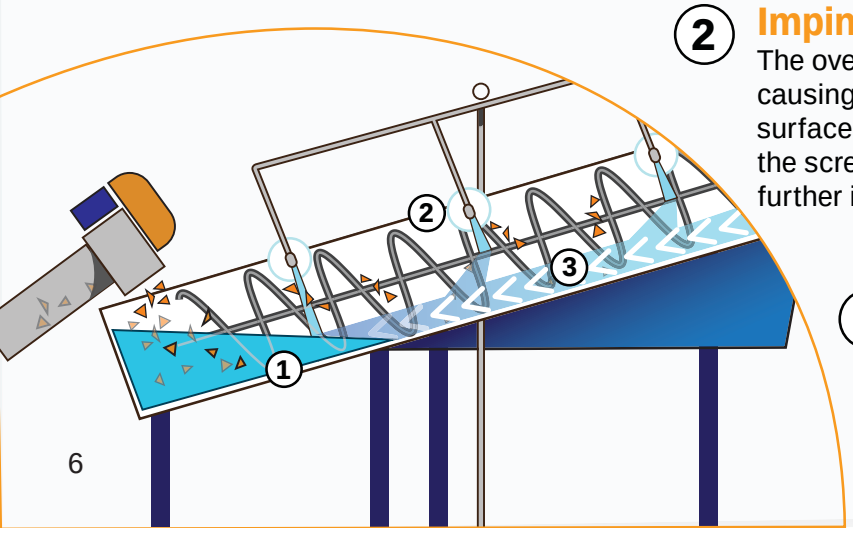
The heated wash bath at the start of the screw will initially soaks the entire surface of the swarf with the wash solution. This submersion degreases and loosens any oils and contamination and targets even tight crevices and ridges. Due to the shape of the swarf, this submersion method ensures the entire surface of the metal is targeted and gives the solution time to be most effective.

The material leaves the bath and is screwed upwards. The overhead spray bars deliver high pressure impingement direct from the wash tank to further target the surface of the swarf.

Rotajet S.I.B Method

1 Submerge

The swarf is submerged into to a heated bath of environmentally friendly wash chemicals. This stage ensures every internal and external surface of the swarf cut turnings comes into contact with the wash solution and contamination and oils can be targeted, even from fine ridges.



2 Impingement

The overhead spray bars impinges the surface of the swarf causing a mechanical physical action on the turnings surface to degrease and decontaminate. The movement of the screw also causes a mechanical friction action for further impingement.

3 Back-flow

The liquid from the spray nozzles flows back down the screw forming a constant stream. This delivers a final flush to the swarf to ensure the internal surfaces of the turnings are thoroughly washed.

LINEAR DECK

From the wash screw the swarf is transferred onto the linear vibrating deck. Here it is conveyed and any fines are separated through the screen. The step also de waters the material to prevent any cross contamination from the wash liquor stand and the rinse stage.

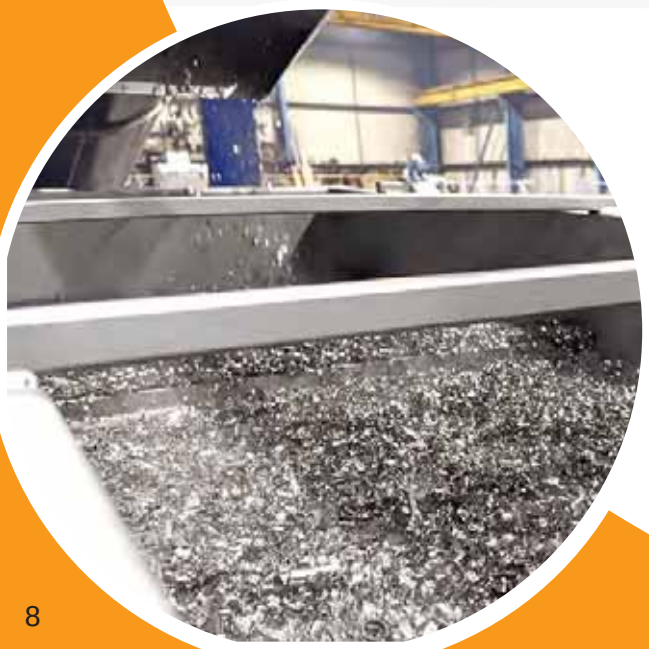
WATER CIRCULATION TANK

1. Wash solution is heated and recirculated into the cycle from the wash tank.
2. The in-line pressure filter is used to filter the wash solution with interchangeable 100, 400 or 600 micron options
3. The solution is then pumped to the overhead spray bars where it is impinged through the high flow knife jets directly onto the materials surface.
4. The solution flows down the screw and drains out to the vibro sieve where the liquid if filtered through a 300 micron screen to remove any fines and solid picked up through the swarf. This is fed back into the wash tank.

RINSE

The rinse section uses the same configuration as the wash. This stage howewer, uses water only to rinse the turning of any remaining residue, affluent or wash.

Using the Rotahet SIB again, the rinse screw will submerge, impinge and back flow the water for a thorough rinse process.



The screw leads onto the second vibrating sieve where the swarf will transfer across the screen to be dewatered and a final fines filter. This stage is crucial to reduce the moisture on the surface of the cut in preparation for the subsequent drying stage.

This step ensures less energy is needed to dry and that the drying stage will be more effective.

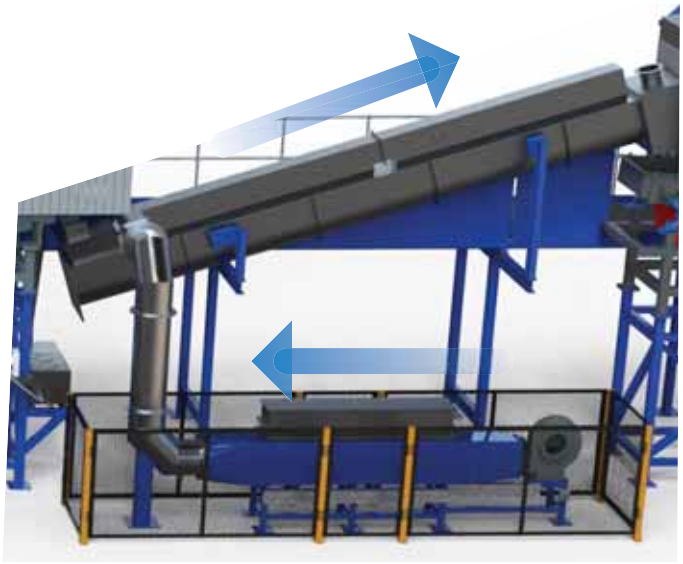
DRY

Drying metal turnings is notoriously difficult due to how quickly the material dissipates heat.

Rotajet have incorporated a drying screw that uses a hot air blower to create an airflow down the screw that will dry the surface of the swarf.

As the swarf is constantly transfered up the screw, all surfaces of the swarf is in contact with the hot air and by the time it exits the screw, the material is completely dry.

- Easily accessible heat exchanger
- Option of gas or electric heater



FERROUS REMOVAL

To achieve optimum separation a combination of magnets are used to separate any residual contamination. In order to remove the heavy ferrous contamination, the material is first passed under an over band magnet that will attract any ferrous metal and convey it to an out feed.

The remaining material is then fed through a drum magnet to remove any remaining fine ferrous to ensure a complete removal.

BAGGING OF STATION

The final stage of the line is the bagging off station. Customers have the option to use bulk bags or drums to collect the clean and dry swarf.

Rotajet provide optional extras to aid with this stage:

- Transfer conveyors
- Load cells with auto transfer
- Bulk bag filling
- Weighing scale
- Auto Sampler

INSTALLATION AND DELIVERY

From Wakefield to Singapore: Rotajet's Swarf Washing Plant Embarks on Epic 6000-Mile Super Alloy Voyage

This line was manufactured, assembled, and tested in Rotajet's UK facility complete with a Factory Acceptance Test (FAT) to ensure the agreed throughputs and cleaning specifications were achieved.

The machine was then disassembled and shipped to Singapore. Rotajet engineers installed and commissioned the machine, followed by on-site training for the local operators . Thanks to the Rotajet team's methodical approach, the smooth installation allowed the customer to quickly maximise the machine potential.

We were very pleased with our experience with the team at Rotajet. They have put together a robust and innovative system which includes design, build, testing, installation, and training, making it a unique and desirable solution to complement our business. We hope to continue to develop this business with the co-operation of our partners at Rotajet."

- **CEO of DMT, Vedant Didwania**

Configurations to suit you

Our in-house team can custom design your plant to fit into your factory floor plans to streamline your production and maximise space.

This can be done to fit the plant into tighter areas, aid an existing process or to ensure input collection and the output feed correspond with your work flow.