# Vapormatt | Jaguar

## Overview, technical specifications and options


Vapormatt

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## Overview

The Vapormatt Jaguar is an exceptionally, well designed wet blasting and rinsing system that uses leading-edge technology. Its technical features encourage increased production output and profitability in an ever demanding, competitive market. The Jaguar is well suited for processing high volumes of carbide inserts loaded on pallets.

**Key features include:**

- High quality stainless steel blast cabinet with abrasion-resistant lining
- Simple to use and highly intuitive colour HMI for rapid set-up and operation
- Fully automatic wet blasting, cleaning and rinse machine optimised for cutting tool inserts applications
- Recipe-driven parameter setting and post process reporting
- Different processes and blast recipes can be developed, stored and used when required for different component batches
- Extremely consistent and reproducible processing
- High levels of process control and automation
- The trolley table can hold single or multiple dies and segments ranging from 150mm (6") to 900mm (35") with a maximum height of 450mm (17.5")
- Fully self-contained unit suitable for location in quiet, controlled environments
- Efficient rinse stage removes a majority of the process media prior to a separate drying stage
- Vapormatt 4.0 enabled for remote diagnostics - maximising production up-time

## Industries and applications

The Jaguar fits within our range of fully automatic specialised machines for the tooling and extrusion die industries. It is primarily designed to be a high capacity and efficient batch machine with several customisable features to accommodate the needs of medium volume production manufacturers.

**Industries**

- Cutting tool inserts
- Extrusion die cleaning

**Applications**

- Component cleaning
- Die cleaning
- Edge preparation
- Surface activation for PVD/CVD coatings
- Post-treatment polishing and peening

## Processing description

The Jaguar's sophisticated design provides all the hardware required to produce superior controlled and consistent edge preparation. Typically, homogenous edge radii of up to 70 µm within +/- 10% or +/- 5µm can be achieved.*

Constructed from high-grade stainless steel, provides a robust, non-corrosive cabinet structure for housing the technically sophisticated processing equipment.

Wet micro-blasting of a ground substrate such as cemented carbides or HSS used for the manufacture of cutting inserts and shank tools, is proven to enhance the cutting performance and working life. The main contribution to these enrichments is the improved surface finish and cleanliness that is achieved by the Jaguar's Vapormatt wet micro-blasting technology, which is essential for excellent chemical vapour deposition (CVD) and physical vapour deposition (PVD) coating adhesion.

Standard or customer specific-trays carrying the cutting inserts are loaded onto the tray holding cassette, which upon command automatically traverses into the blasting chamber. The cassette holds a nominal of 6 trays or up to 34 shank tools per cycle. The machine is designed to process one side of cutting inserts that are contained in standard plastic pallets at a rate of 15 to 30 minutes per cycle, dependent on insert size, pallet size and process type.

De-burring, edge preparation and surface finish recipes are generated through the touch screen HMI unit, which controls the many blasting parameters needed for achieving optimal results. Recipes can be retained and coded for each component type to ensure that all future production successions are exact.

A multi-functional blast head assembly contains 8 boron carbide nozzles, equally distributed around a circular disc delivering perfect processing symmetry. The nozzles can be pre-set at the desired angle (80°, 60°, 55°, 45° and manually adjustable 45°/80°) to achieve the specified K factor.

The blast head manipulation is precision controlled through the Y and Z axis whilst the tray holding cassette indexes smoothly and accurately through the X axis. The configuration of these movements, continuous particle conditioning by means of the Vapormatt "elutriation" tower and frequent monitoring of the slurry concentration, affords full versatility for achieving a wide spectrum of edge preparation forms and dimensional tolerances.

An integrated heat-regulated spray rinse system with automatic chemical dosing; removes abrasives from the components and ensures the surface is free of contaminates.

Once the desired processes are completed, the holding tray automatically exits through the door hatch and positions onto the load and unload table.

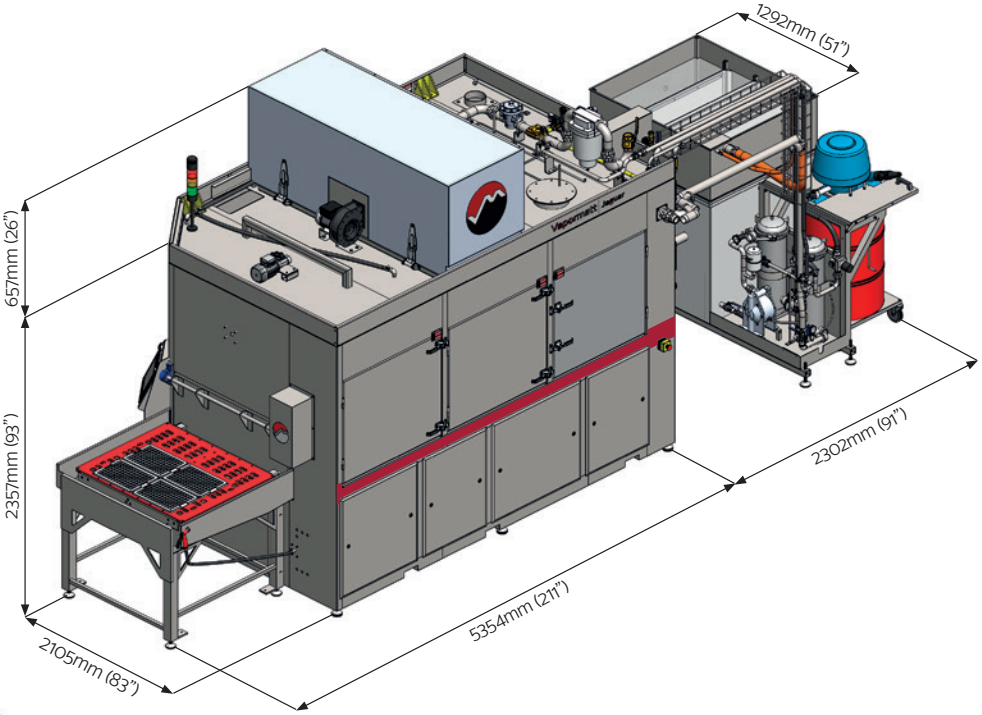
The streamlined machine design incorporates several service access doors to facilitate ease of maintenance and mechanical adjustments. The free-standing filtration tanks and water conditioning unit is positioned within close proximity.

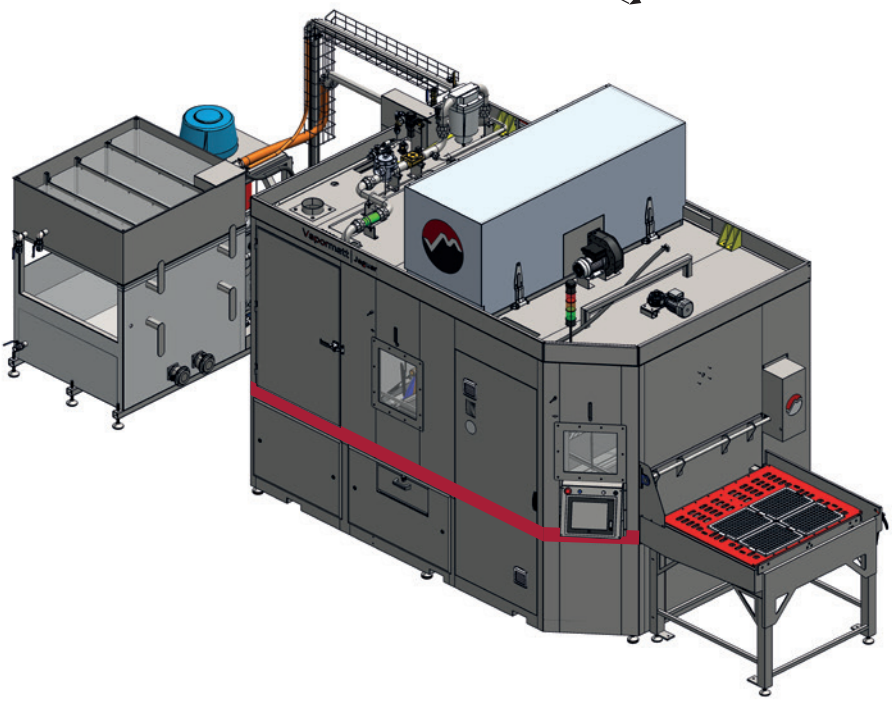
Operational noise levels can be specified down to 75 dBA.

*This is dependent on:

1. Using Vapormatt gun crowns
2. Pre-process inserts must meet the following minimum standard:
   a. no chips on cutting edges
   b. cutting edge radii tolerance ± 5µm of the average and at least 10 µm below the required final radius
      Ideally pre-process radii to be < 8 µm
   c. hardness to be uniform

Back view



Front view

## Process stages and operation

**The following features are included within the machine's basic specification.**

| | Stage | Heating | Chemical dosing | Purpose |
|---|---|---|---|---|
| 1 | Wet blast 1 | O | ✓ | Micro/Macro blasting |
| 2 | Optional wet blast 2 | O | ✓ | Micro/Macro blasting, manual flipping when required |
| 3 | Rinse | O | ✓ | Removal of most abrasive from inserts |

O = dependant on options specified.

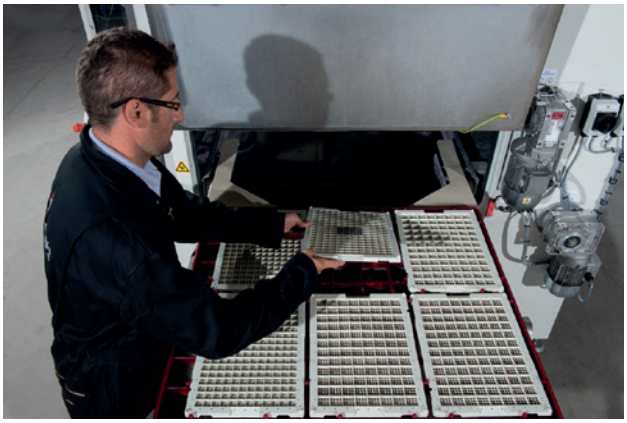
## Please note:

**It will be necessary to carry out additional rinse and drying operations in a separate washing and drying machine.**

## Technical specification

The following features are included within the machine's basic specification.

| Feature | Description |
|---|---|
| 1 | **Blast cabinet**<br>Floor area 6980 x 2300 x 3020mm high (275" x 91" x 119" high) including filtration.<br>Minimum installation space: approx. 8500 x 3900 x 3750mm high (335" x 154" x 148" high) |
| 2 | **Sound attenuation**<br>The machine is fitted with internal sound reduction panels and sound deadening maintenance inspection doors are provided for pump enclosure and cabinet entry. |
| 3 | **Cabinet internal abrasive protection**<br>Replaceable protective curtains are provided for vulnerable areas. |
| 4 | **Component flatbed processing trolley**<br>Load height approximately 990mm (39") - will accept single or multiple pallets such as 6 Manz size 383 x 281mm (15" x 11") pallets. |
| 5 | **Component pallets**<br>The unit will operate with the customer pallets subject to the design being suitable for blasting. Pallet designs may need to be optimised by the customer to maximise part retention during blasting. |
| 6 | **8 Vapormatt blast guns**<br>Each blast gun is made from solid polyurethane and incorporate standard high consistency long life 10 or 12 mm (0.39 or 0.47") or boron carbide nozzles, recessed air jets and air supply non-return valves. |
| 7 | **Oscillation system**<br>A horizontal oscillation system is mounted externally to the cabinet to prevent media and water encroachment into critical bearing areas. |



| Feature | Description |
|---|---|
| 8 | **Abrasive slurry system (2 Vapormatt vortex slurry pumps)**<br>Pump One feeds the blast guns and is provided with closed loop pressure control via a slurry pressure sensor and pump motor inverter.<br>Pump Two feeds the abrasive separation system and sump agitation system.<br>All pumping elements are made from solid polyurethane which gives exceptional abrasion-resistance. Provisions of separate pumps for process slurry agitation/filtration and process gun feed facilitates a high level of control over the process slurry pressure and flow and hence improves control and repeatability. |
| 9 | **Abrasive slurry conditioning with sight glass**<br>This system automatically removes abrasive particles that have degraded below a pre-set level from the slurry to ensure consistent media integrity. |
| 10 | **Blasting media**<br>The equipment is designed to operate with a wide range of abrasives. (Media size ranging from F150 to F320.) |
| 11 | **Component washing**<br>Spray jets are positioned above the components and are supplied with water from a recirculated rinse system that removes a majority of abrasive from the components. |
| 12 | **Component blow off**<br>Manual blow off nozzle situated at the load end to remove excess water from components and trolley. |
| 13 | **Electrical control system**<br>The machine is provided with a sophisticated control system accessed via an HMI.<br>All on screen instructions will be in English.<br>All units will be metric.<br>The general machine electrical control system includes a high specification PLC and all other necessary contactors, MCB etc. to allow proper operation of the equipment. Electrical equipment is mounted in an IP56 enclosure. Lighting is provided in the machine using bulkhead units rated to IP65. All cabinet entry doors are fitted with safety switches that shut down the machine if they are opened. |

# Optional items

The following features can be added on to the machine basic specification

| Feature | Cabinet enhancements |
|---|---|
| 1 | **Translation of operation manual, HMI screen and labels in non-English** |
| 2 | **Programmable ANDON status beacon**<br>Allows the progress of production/process of the unattended machine to be monitored at a distance from the unit itself. |

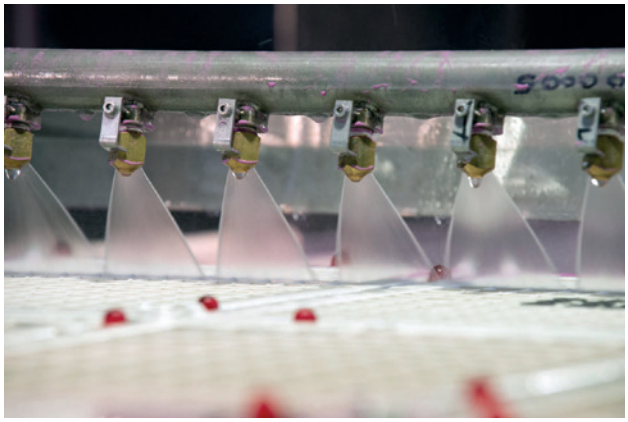
| Feature | Loading and component handling |
|---|---|
| 3 | **Load/Unload cell**<br>A shuttle system is provided with a safety cage to allow continual loading and unloading of pallets during production. |
| 4 | **HMI on swing arm**<br>This allows for the programming and loading of recipes from either side of the load end. |

| Feature | Slurry system enhancements |
|---|---|
| 5 | **Slurry concentration sensor**<br>Watchdog guards are provided to inhibit machine start and prevent blast processing should slurry concentration levels drift outside of predetermined control limits. The slurry density is automatically measured and compared with pre-set HMI set values. |
| 6 | **Automatic abrasive dosing system**<br>This consists of an abrasive vacuum unit which feeds media into the blast sump from an enclosed hopper mounted inside the dry service area of the machine. The system compensates for the broken-down media removed by the separation system. Avoiding the need for the operator to manually add abrasive on demand. |
| 7 | **Chemical concentration (sensor) control**<br>An electronic sensor is provided to monitor Vacukleen TM concentration within the sump. |
| 8 | **Automatic chemical dosing**<br>Provided to maintain consistent chemical concentration within the blast process area; the chemical is fed directly from the storage barrel. Storage locations for the chemical barrels are provided within the machine and are accessed for loading via the rear service access doors. |

| Feature | Filtration and Re-circulation |
|---|---|
| 9 | **Elutriation tower**<br>For a high level of abrasive consistency, an elutriation tower is fitted to obtain a high media size accuracy. Particles of broken-down abrasive and debris finer than the selected size are continually removed from the slurry circulation. Two variants available. |
| 10 | **Sump and rinse tank immersion heaters**<br>Is used to maintain a consistent sump water temperature. Elevated temperatures can promote faster drying of components and may improve the performance of any added chemicals. |
| 11 | **Exhaust extractor**<br>Forced centrifugal extraction unit to maintain a negative pressure within the machine<br>Exhaust needs ducting to the external atmosphere. |
| 12 | **Exhaust extractor and filter unit**<br>Forced centrifugal extraction unit to maintain a negative pressure within the machine<br>The filter unit removes mist and dust and allows exhaust to workshop atmosphere. Will include an additive dosing system. |
| 13 | **Sump magnet**<br>A large removable magnet collects stray particles or small components. |
| 14 | **Cabinet rinse**<br>A spinning water nozzle is provided to keep the machine in good condition after blasting and recycle the abrasive into the sump. |
| 15 | **Wet and dry vacuum cleaner**<br>A small size vacuum cleaner for daily routine cleaning and maintenance. |
| 16 | **Industrial wet and dry vacuum cleaner**<br>This air-powered vacuum cleaner allows easy emptying of sediment filter tanks and other areas of the machine during cleaning and maintenance. |

| Feature | Process functionality |
|---|---|
| 17 | **Vertical gun head manipulator**<br>An automatically operated Z-axis adjustment allows blast gun height to be set as part of each recipe parameter. The vertical gun head manipulator has a 200mm (7.9") stroke with an accuracy of +/-0.5mm. |
| 18 | **Mk 9 guns**<br>These latest Vapormatt blast guns are approximately 10% more efficient than the Mk3 blast guns. |

| Feature | Process functionality |
|---|---|
| 19 | **Manufacturing execution system (MES)**<br>Allows for data logging of machine status during the wet blasting process. |
| 20 | **Barcode scanner**<br>This enables the reading of data from any batch card for the automatic loading of recipes. |
| 21 | **Blast airflow monitoring**<br>If flow drifts outside pre-set limits, at any given pressure, on any blast gun due to air jet or hose failure, a fault appears on the HMI unit. This is a particularly sensitive diagnostic tool that will immediately recognise a loss of harmony and/or inconsistent mixing of the 3 inputs (solid, liquid & gas) into the blast gun. |



## Services to be provided by the customer

| Service | Requirement |
|---|---|
| Electricity | Generally 400/480V, 3 phase, 50/60 Hz, 36 amp supply. |
| Process air supply | Pressure 6 - 7 bar (90 - 100 psi)<br>Consumption 0.7 Nm³/min (26 SCFM) per blast gun at 4 bar (58 psi) (5.6 Nm³/min (209 SCFM) for 8 guns) (higher blast pressures will require additional air)<br>Connection: DN50 (2" BSP)<br>Quality DIN ISO 8573-1: class 5.6.4 |
| Control air supply | Pressure 6 - 7 bar (90 - 100 psi)<br>Consumption 0.5 Nm³/min (18.7 SCFM)<br>+ 0.5 Nm³/min (18.7 SCFM) for pumps<br>Connection: DN15 (½" BSP)<br>Quality DIN ISO 8573-1: class 4 |
| Water supply | Clean water pressure 2 - 4 bar (30 - 60 psi)<br>Connection: DN15 (½" BSP)<br>Volume 13L/min (3 gpm) intermittent flow<br>Drinking quality required |
| Drain | Excess water is pumped from the machine. The diaphragm pump has a maximum flow of 125L/min (33 gpm) within 10m (32.8') of the machine (the drain pump can pump to a head of 3m (9.8')).<br>The drain must incorporate a grit trap. |
| Vent or extraction | Plastic duct 150mm (6") diameter to outside the building which requires forced extraction. |
| Foundation | Cutting inserts: Flat and level waterproof floor, approx. size 7000mm x 2300mm (276" x 91") suitable for a point load of 500kg (1102lbs). |
| Networking | The machine runs on a closed Ethernet network, and connection to the internet is required prior to commissioning to allow program changes and machine diagnosis to be carried out.<br>Vapormatt uses a dedicated platform for its remote access services, with connection methods being cellular, Wi-Fi and Ethernet.<br>The machine is Mitted with Vapormatt's preferred platform provider as standard. |

## Dedicated project management and the Vapormatt Promise

**We always ensure our machines operate to the specification agreed upon with the customer, that's the Vapormatt Promise.**

**To achieve this every customer is assigned a dedicated project leader from order to installation.**

**Project management includes our detailed technical acceptance process, see opposite, a key part of which is our factory acceptance testing (FAT). This is where the customer's wet blasting system is extensively tested, often with the actual components the customer will be regularly processing, before it leaves us.**

**Vapormatt support doesn't end there, our aftermarket support includes spares, servicing and Vapormatt 4.0, our Industry 4.0 solution, to ensure maximum production uptime.**

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## Technical acceptance process

**QA**

The QA checks occur prior to the FAT and covers the handover of the operating system.

**Process development**

Process development will be undertaken to establish the recipes and the component holding system.

**FAT**

The Factory Acceptance Testing will be at the site of manufacture. Managed by the Project Manager in conjunction with the Commissioning Engineer.

**Commissioning**

The installation and commissioning of the machine will be undertaken by the Commissioning Engineer following delivery to site.

**SAT**

Following delivery and commissioning, the Site Acceptance Testing will happen and be managed by the same Commissioning Engineer.

**Training**

The training module will cover operation, every day maintenance and recipe fine tuning.