Vapormatt | Oncilla Cub

Overview, technical specifications and options

Vapormatt

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Overview

The Oncilla Cub is an innovative wet blasting system designed to consistently and automatically prepare for round shank tools including solid carbide end mills, drill bits, and taps, for vacuum coating.

The machine can cater to a diverse range of customers with varying production capacities, batch sizes, and cleanliness standards. When processed to these quality standards, these tools are well-prepared for subsequent PVD and CVD coating processes.

As a robotic system, the Oncilla Cub enhances repeatability and ensures reliability through its robust, prefabricated stainless steel cabinet, equipped with advanced monitoring systems.

The system features a configurable design, making it versatile for tasks like edge preparation, surface activation, and posttreatment applications.

Key features include:

- High-quality stainless steel blast cabinet offering a very rigid and robust structure. The main blast enclosure door doubles as a large viewing window to allow observation of the equipment when in use
- This system can produce controlled, consistent edge hones where homogenous edge radii within +/- 3µm can be achieved
- Component surfaces are well prepared for subsequent PVD and CVD coating processes, typically leading to HF-1 adhesion levels according to the Rockwell-based coating adherence standard
- Multiple different processes and blast recipes can be developed, stored and used when required for different component batches
- The machines can accommodate round shank tools between 3 - 25.4mm (0.19" - 1") diameter and 46 - 204mm (1 ¾ - 8") length.
- Maximum tool weight is 1kg (2.2lb). Minimum tool pick-up length is 25mm (1")
- Simple to use and highly intuitive colour HMI for rapid set-up and operation
- Recipe-driven parameter setting and post-process reporting for very accurate control which yields continuous monitoring and feedback for optimum processing
- Fully self-contained unit suitable for installation in quiet, controlled environments
- Vapormatt 4.0 enabled for remote diagnostics - maximising production up-time

Industries and applications

Thanks to the versatility in application configuration, the Oncilla Cub systems offer sophisticated process control and monitoring that yields extremely consistent and reproducible processing results across the round shank tool industry.

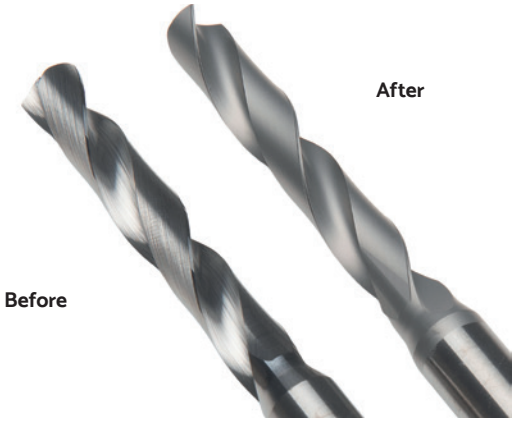
Industry

- Round shank tools

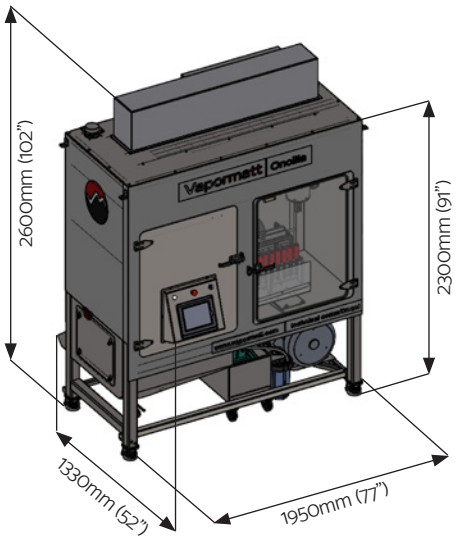
Applications

- Component cleaning
- Edge honing
- Preparation for coating
- Surface activation for PVD/CVD coatings

Drill bit before and after wet blasting



Processing description



The Vapormatt Oncilla Cub system brings ultimate repeatability when preparing round shank tools. The machine is designed to give better control to research and development facilities as well as manufacturers with medium to high volume production. Taking Vapormatt established monitoring and control technology, the Oncilla Cub offers high process control in an extremely compact footprint.

Constructed from stainless steel, the Oncilla Cub provides a robust, non-corrosive and quiet structure (80dBA) for the sophisticated processing controls. Using the integrated HMI screen to develop recipes, programming becomes easy and effortless, ensuring consistent results with minimal supervision.

The operator places a single line pallet loaded with tools with the cutting edge facing down at the un/load station or from a multiple row pallet on the Y-axis loader if that option has been selected.

The pallet of tools is moved into position underneath the gantry robot, it picks up from the pallet by the base of the tool without touching the cutting edges.

Depending on what loading option is selected at time of order, this is performed via a 3 jaw effector on single inline rack or via a 2 jaw manipulator for the Vapormatt tool multi row pallet.

The robot moves the tool to the blasting station and lowers the tool facing downward into the blast stream for processing, air knives blow off most of the abrasive before moving to the next stage.

The tool gets sequentially transferred to the blast and rinse zones. The rinsing zone uses mains water with overflow to drain as standard, but an ecofriendly recirculating rinse system is available as an option. Due to the inherent nature of the blasting system the effector fingers get rinsed alongside the tool to remove majority of the abrasive (further cleaning may be required as a follow on stage). After the rinsing stage, the tools are moved and placed back into the same place it was taken from in the pallet or depending on the loading option taken the tool is placed into a second unload pallet if the Y-axis loader option is selected.

The drying of the components is performed by a forced air system that is constantly blowing over the un/load section drying the processed tools whilst waiting for the rest of the batch to be completed.

The operator manually unloads the processed batch.

The process for any of the machine configurations can be paused at any time, and the doors opened to allow operator intervention and then be restarted at the point where it was stopped.

Note - The machine is controlled via an HMI (Human Machine Interface) panel mounted at the front of the machine. All on screen instructions will be in English. Units will be metric.

Some process parameters require the appropriate gun arrangement and to obtain repeatable edge radii results and accurate tolerances, some quoted options will be mandatory.

Follow on stages after Oncilla Cub processing

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

Coating should be carried as soon as possible after wet blast processing to take full advantage of the reactive surface which the Oncilla Cub wet blast stage has achieved.

Process stages

	Stage	Media	Heating	Chemical dosing	Water purity (µS/cm)	Purpose
1	Wet blast			O		Macro blasting
2	Blow off	Compressed air				Removal of most abrasive from tools
3	Rinse	Mains water / Recirculated towns water	O	✗		Removal of abrasive from tools
9	Dry	Air blower	✗			Removal of excess water from tools in unload zone

O = dependent on options specified.

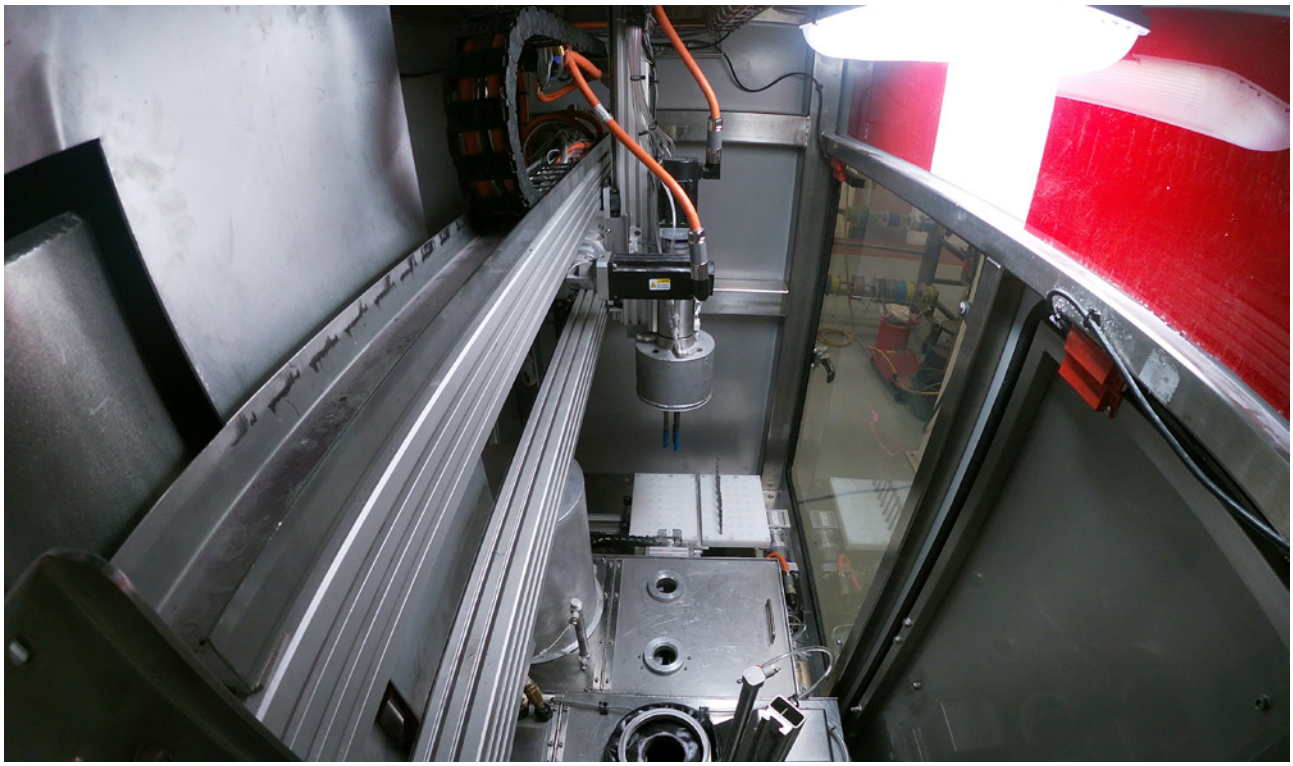
Indicative TAKT time for 10mm diameter drill, 133mm long, 87mm blasted: 110 seconds.
Times are non-contractual until confirmed by tests at Vapormatt R&D department.

Technical specification

The following features are included within the machines basic price.

Feature	Description
1	**Cabinet** Constructed from welded stainless steel, the Oncilla Cub machine offers a very rigid and robust structure. Large maintenance access doors are provided at the front and rear of the cabinet. The main blast enclosure doors double as large viewing windows to allow observation of the equipment when in use. Minimum installed dimensions (doors closed): 1950mm long x 1330mm wide x 2600mm high (77" x 52" x 102"). Dimensions are approximate and will be confirmed depending on machine final configuration.
2	**Electrical control system** IP54 electrical equipment enclosure is fitted mainly with Rockwell components, an Allen-Bradley PLC and servo drives. A panel mounted touch screen HMI display gives the necessary versatility to program and store recipes for a wide range of tools. Built-in diagnostics are also included. The machine is fitted with a 'site manager' which, when enabled, allows remote access for machine diagnosis and minor program upgrades. All on-screen instructions will be in English. Units will be metric.
3	**Overhead gantry robot** Using servo driven axes, the Oncilla Cub combines vertical and horizontal oscillations which are extremely accurate and fast. With all axes travelling at up to 1000mm/s (39.4 in/s) speed coupled with good position accuracy gives the user reduced cycle times and ensures uniform blasting across complex tool geometries.
4	**Effector jaw** Holding device mounted on a rotary head The effector moves the tools between the various zones inside the machine. The machine is fitted with a standard effector suitable for 8 to 20mm (0.31 - 0.79") Ø tools, see options for other available effectors.
5	**Abrasive pump** The 2.2kW slurry pump acts as the heart of the system and feeds both the blast guns and the slurry conditioning system. The slurry is pumped through a series of abrasion resistant hoses and solid polyurethane components from the unique Vapormatt slurry pipework system.
6	**Vapormatt blast guns** The machine is provided with up to 2 Vapormatt Mk3 blast guns, the blast guns are made from solid polyurethane and incorporates high consistency long life 10 or 12 mm (0.39 or 0.47") boron carbide nozzles, recessed air jets and air supply non-return valves. Air pressure to the guns is controlled via a manual pressure regulator.
7	**Abrasive blow off** After blasting the tools will be passed through air nozzles to blow off most of the abrasive. The remaining abrasive will be washed off in the rinse station. Manual abrasive top up will be required to maintain the concentration.
8	**Abrasive level sight glass**
9	**Rinse station (mains water supply)** A set of rinse spoon jet nozzles remove the abrasive from the tools. The tools are released in a holding fixture and rinsed all over. The rinse water runs through a series of clear tanks into a reservoir tank. Overflow is to drain unless specified with the closed loop recirculating rinse option.
10	**Drying station** Drying of the components is performed in the un/load zone with an air blower.
11	**Cabinet exhaust system** Supplied with a 100mm (4") diameter ventilation/air extraction outlet on the roof of the machine. The machine needs to be ducted to external atmosphere if the filtered air extraction option is not taken.


CONTROL
ON
STOP



Optional items

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

Feature	Cabinet enhancement
1	**Translation of operation manual, HMI screen and labels in non-English**
2	**Programmable ANDON status beacon** 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	**Y-Axis loader and unloader with Pneumatic 180° flipper** Enables pallets rather than a single row of tools to be loaded. This allows a greater volume of tools to be processed before human intervention required.
4	**Effector jaws for different shank diameters** A set of effector jaws for 3 to 15mm (0.19 - 0.59") tools or a set of effector jaws for 13.5 to 25.4mm (0.53 - 1") tools (please specify the required set). – This option is additional to the standard set fitted.
5	**Additional tool pallets** In-line pallet for shank diameters: 3 to 25.4mm (0.19 – 1"), capacity 10 tools (dependant on tool diameter) Multiple row pallet for shank diameters: 3 to 15mm (0.19 - 0.60"), capacity 32 tools (Y-Axis loader required for this option) Multiple row pallet for shank diameters: 15.5 to 25.4mm (0.61 - 1"), capacity 24 tools (Y-Axis loader required for this option) Please specify tool diameter at time of order.
Feature	**Slurry system enhancement**
6	**Slurry concentration sensor (SCS)** Watchdog guards are provided to inhibit machine start and prevent blast processing should slurry concentration levels drift outside of predetermined control limits.
7	**Automatic chemical dosing system** A chemical dosing system is provided to maintain consistent chemical concentration within the blast process area; chemical is fed directly from a storage barrel. We recommend the use of Vacukleen TM in the blast station to provide improvement in surface cleaning and reduction / elimination of cobalt leaching effects. Storage locations for the chemical barrels are provided within the machine.

Feature	Filtration and re-circulation
8	**Recirculated rinse system** A re-circulated rinse water system with air powered diaphragm pump to return the rinse water from the filter system is fitted to the machine. Includes cartridge filter to complete recirculated water for a fully closed loop system.
9	**Exhaust extractor** Forced centrifugal extraction unit to maintain a negative pressure within the machine Exhaust needs ducting to the external atmosphere
10	**Exhaust extractor and filter unit** Forced centrifugal extraction unit to maintain a negative pressure within the machine The filter unit removes mist and dust and allows exhaust to workshop atmosphere. Will include an additive dosing system.
11	**Wet and dry vacuum cleaner** Allows for easy emptying of sediment filter tanks and other areas of the machine during cleaning and maintenance.
Feature	**Process functionality**
12	**Micro nozzles** For more efficient blasting of tools with diameters under 6mm (0.24").
Feature	**Process monitoring**
13	**HMI control of blast air pressure** This allows the air pressure to the guns to be controlled via the HMI unit and the electro-pneumatic pressure regulator.

Services to be provided by the customer

The following services are required for the machine to be run correctly.

Service	Requirement
Electricity supply	Operating voltage; 380 - 460V 3 phase frequency; 50/60Hz Basic specification 20A at 400V 50Hz Options may require extra.
Air supply	Pressure 6 - 7 bar (90 – 100 psi) 2 x Mk3 guns: 1.4 Nm3/min (50 SCFM) at 4 bar (60 psi) 2 x micro-nozzle guns: 0.68 Nm3/min (24 SCFM) at 4 bar (60 psi) (Higher blast pressures will require additional air) Connection: DN25 (1" BSP) Quality DIN ISO 8573-1: class 4
Town water supply	For machine fill, top-up and rinsing Pressure 2 - 7 bar (30 - 100psi) Volume; 13 L/min (3 gpm) intermittent flow. Connection: DN15 (½" BSP) Drinking quality required
Drain	Floor level with grit trap
Extraction	Ø100 mm (3.94") connection that can be extended to the outside of the building by the end user. (See option: extraction and filter unit)
Foundations	A waterproof flat and level floor is required to take 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. Vapormatt uses a dedicated platform for its remote access services, with connection methods being cellular, Wi-Fi and Ethernet. The machine is fitted with Vapormatt preferred platform provider as standard.

Dedicated project management and the Vapormatt Promise

We always ensure our machines operate to the specification agreed 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 below, 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 up-time.

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.

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For further information contact:

Vapormatt Ltd
Vapormatt Innovation Centre
Robins Drive
Bridgwater
TA6 4DL
United Kingdom

t +44 (0) 1823 257976
e sales@vapormatt.com

Vapormatt.com