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# Surface preparation



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# Shipyard Solutions

Wheelabrator offers the widest range of surface preparation and engineering solutions. The sheer size of components and steel plates found in the shipping industry demands quite specific engineering capability. Wheelabrator's expertise has been tried and tested over many years, and many manufacturers have come to depend on the know-how, reliability and high quality service provided by Wheelabrator Group. This brochure is intended to give a brief overview of the many technologies and applications available.

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# Pre-heating, blasting, coating, drying



## Ship building

The size of metal sections used in the ship building industry presents great challenges for surface preparation and treatment suppliers.

Huge quantities of sheet steel, profiles and fabrications have to be cleaned, treated and painted before final assembly. Corrosion protection is of paramount importance.

The first part of the treatment process occurs on a preservation line, which incorporates the different stages of blasting and priming.

On the preservation line, sheets and profiles are thoroughly blast cleaned and provided with a temporary corrosion protection coating.

Along with the external transport unit, a preservation line consists of a pre-heating oven, a pass-through blasting machine, a painting unit and a drying tunnel with its associated slat conveyor.

Typical plate widths can vary from 800mm to 5m with process line speeds between 1.0m/min to 6.0m/min.

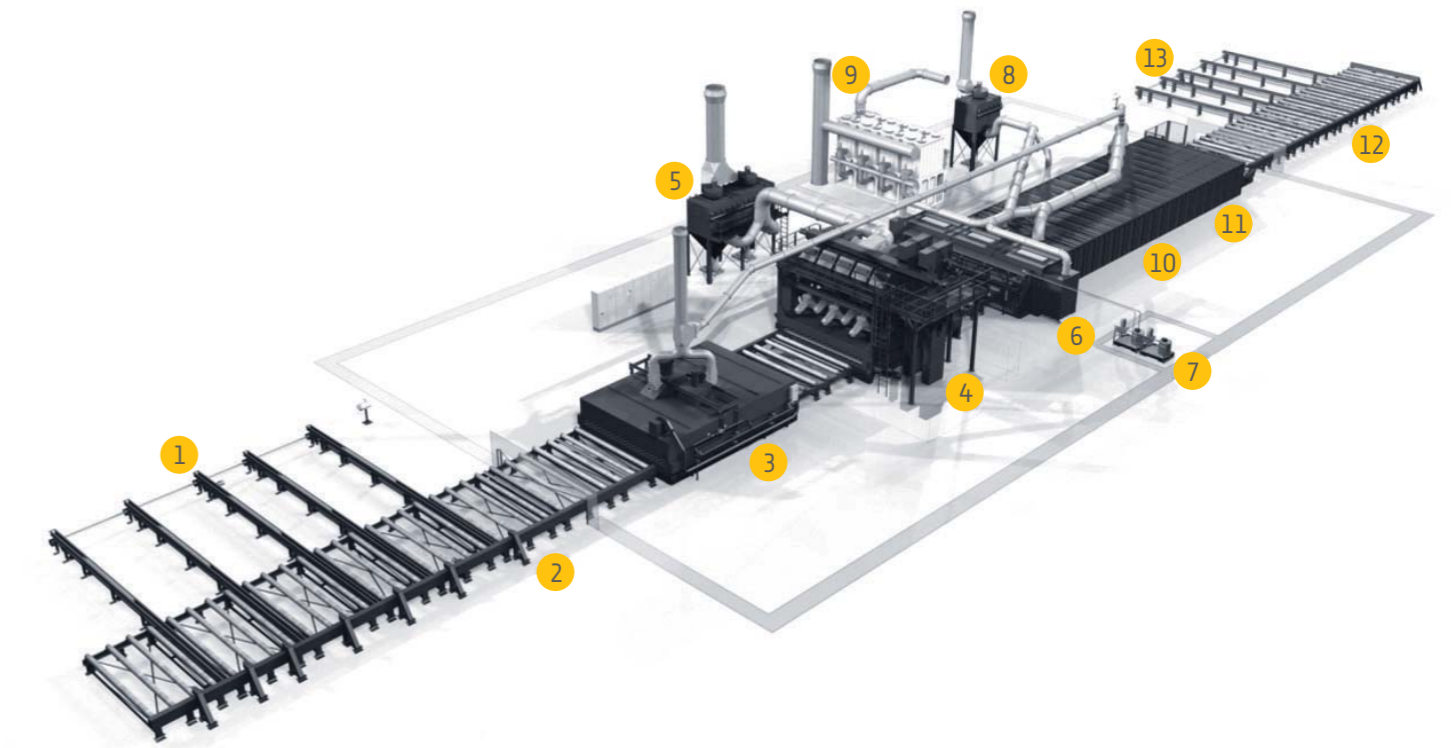
## Preservation line

### Sections 1 & 2: Cross transfer conveyor and inlet roller conveyor

The first section of plant on this scale is the materials handling section, the cross transfer conveyor. The steel sheets and profiles are delivered here, and then fed into the treatment process by the Inlet Roller Conveyor.

### Section 3: Pre-heater

The plates and profiles first pass through the pre-heater, this raises the temperature of the metal ready for blasting and removes any surface moisture.



- 1 Cross transfer conveyor
- 2 Inlet roller conveyor
- 3 Pre-heater
- 4 Roller conveyor shot blast machine
- 5 Blast machine filter
- 6 Paint spray chamber
- 7 Paint supply system
- 8 Filter from VOC-System
- 9 VOC-System
- 10 Drying chamber
- 11 Slat conveyor
- 12 Outlet roller table
- 13 Cross transfer conveyor

# Wheel blasting

## Preservation line

### Section 4: Roller conveyor shot blast machine

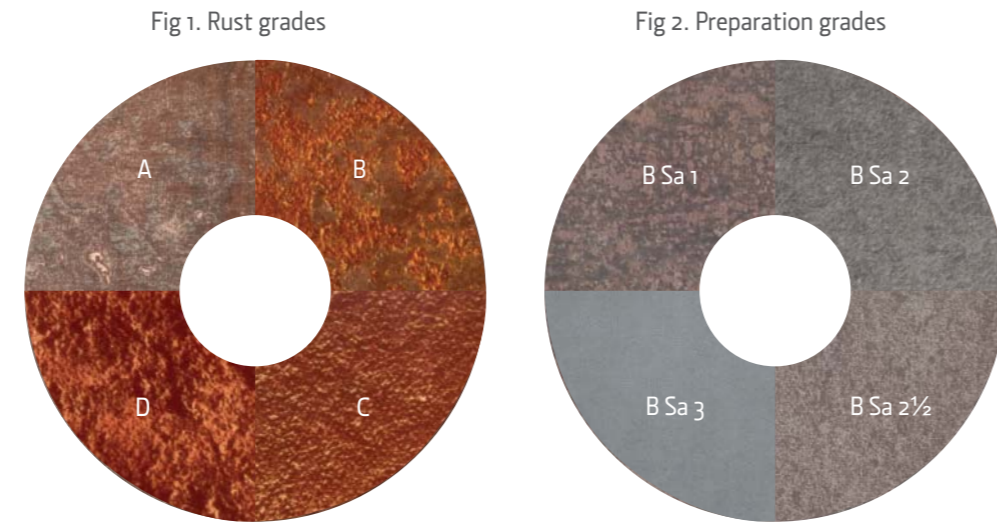
The blast chamber removes rust and mill scale (fig 1) and provides a finish to internationally recognised preparation grades (fig 2) according to ISO 8501-1.

### Fig 1. Rust grades

Four rust grades are specified. These are defined by precise written descriptions and photographic examples in ISO 8501-1 documentation. They vary from A: mill scale, to D: where the mill scale has rusted away and general pitting is visible.

### Fig 2. Preparation grades

Surface preparation by blast cleaning is designated by the international standard ISO 8501. Four grades are specified, ranging from Sa 1: light blast cleaning, to Sa 3: blast cleaning to visually clean steel. Fig. 2. Shows surface preparation grades as applied to steel of rust grade B: a surface which has begun to rust and from which the millscale has begun to flake.



Roller conveyor shot blast machine



Conveyor detail

## Preservation line

### Sections 4 & 5: Roller conveyor shot blast machine and filter

The roller conveyor shot blast machine is the key piece of equipment in the preservation line.

The position of the turbines is adapted to the specific requirement.

### Standard 1:

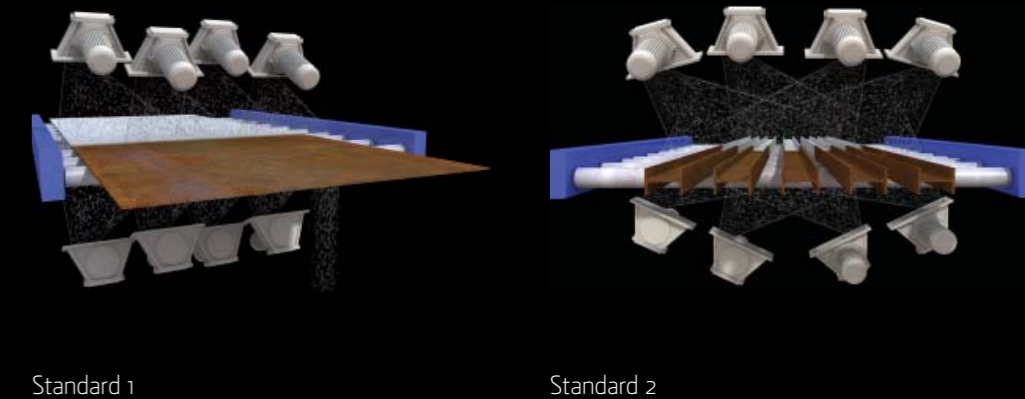
When only plates and flat profiles are treated, the wheels are installed in line and the upper and the lower wheels have the same distance from the plates. This gives the fastest and most even, perfect blast result.

### Standard 2:

A more universal blast machine is required when beams and pipes must also be treated. The wheels are arranged to ensure thorough cleaning of the side flanges.

Roller conveyor machines can remove rust from sheets up to five metres wide, and have a working blasting speed of up to six metres per minute.

The dust produced during the blast process is extracted by an automatic filter unit which cleans the exhaust air to a value below 2mg/m.



# Quality control

## Quality control

The controlled removal of rust and scale, and the generation of a consistent surface profile are critical to the successful bonding of coatings that follow. Throughout these processes the strict application of exhaustive quality controls is mandatory.

## Priming

**Sections 6-9:**  
Paint spray chamber, voc-system and filter  
The various plate and profile widths are automatically identified and are coated in a continuous process with a weld-primer coating thickness of approximately 15 - 25µm.

Paint dust and solvents (if no water based paint is used) are treated according to the local requirements in an automatic filter unit and a VOC-treatment plant.

## Sections 10 & 11:

### Drying chamber & slat conveyor

This chamber can be heated by the exhausted air from the pre-heater (section 3). Additional circulation of high quantities of air accelerates the drying process.

Lying on the support points of the conveyor cross slats (section 11), the wet primer remains undamaged at the plates pass through the drying chamber.

## Marking

Each sheet has its own unique identification to allow subsequent allocation and control. The mark is spray painted by computer controlled nozzles. The paint can be fed from reservoirs or from the paint supplier's drums.

## Edge cleaning

To ensure optimum weld quality, the edges of the profiles are blasted to remove paint from the weld area (sections 11-13). High through speeds are the rule.

Airblast units for this operation are suitable for smaller profiles and often precede a gas-cutting machine.

## Sections 12 & 13:

### Conveying

The plates are now conveyed to be fabricated into ship segments.



Quality control



Edge blasting



Edge cleaning airblast unit



# Air blasting

## Air blasting

After pre-treating the plates, they are built up into huge segments which are constructed to be as big as can possibly be handled.

These huge components have to be reblasted around the welding seams and then given a protective coating in order to obtain a corrosion protection certificate.

A weight of 100 tonnes or more for such a ship component is commonplace. The components are transported by special carriers into the respective blast and paint rooms where both interior and exterior surfaces are blasted.

Filter units, with a capacity of up to 200,000m per hour, ensure good visibility, and abrasive storage silos holding up to 80 tonnes supply enough abrasive for uninterrupted blasting for long periods of time.

## Abrasive recovery

After blasting, the tonnes of used abrasive have to be recovered. Abrasive from the inside of the segments is extracted with high vacuum suction units, removing up to 15 tonnes per hour.

The abrasive that is used on the external surfaces can be pushed by a forklift truck, equipped with a scraper, to a collection hopper in one corner of the blast room. This is the easiest but most labour intensive version.

Faster and wider automated systems such as vibrating chutes, storage screw conveyors and, in particular, the "Pulsostrip Air Plus" low-built mechanical conveying system ease and speed up the abrasive collection work.



Air blasting



Media silo with pressure vessel

# Painting and drying

## Painting and drying

Painting is a critical part of the corrosion protection process and must meet strict quality criteria.

Large component dimensions dictate that the painting process is performed in large painting halls, this requires great attention for both economic and ecological reasons.

Wheelabrator has developed a specific wide-angle nozzle air distribution technique which ensures good ventilation of the working area and a significant reduction of installed air movement, heating energy consumption, and thus operating costs.

Similar to blasting, 50% to 70% of the painting work is carried out inside the welded sections. Ventilation within the sections is performed by grounded hoses for removing dust and solvent

vapours. 1-C pumps as well as 2-C mixing and dosing units can be used. A unique fresh and exhaust air system has been developed to minimise operational costs. After the painting process the facility can be switched over to the drying process.

## Mobile systems for marine blasting and painting processes

A full range of horizontal and vertical mobile systems are also available. Mobile systems are used to blast and coat the welds of new ship sections that are too large to fit in the blast rooms, and are used extensively in ship repair.

Vacuum recovery units, dust collectors, specific application technology and other equipment are also available. Ask your Wheelabrator representative for more detail.



# Wheelabrator Plus

## Wheelabrator Plus – the after-market division of Wheelabrator

Wheelabrator Plus is the after-market service, support and supply division of Wheelabrator Group.

Focused entirely on providing a customer-friendly solution that is affordable and profitable for the customer, the Wheelabrator Plus team offers a whole range of services for all users of surface preparation equipment, no matter how large or small.

If you use surface preparation equipment in your production processes, you need to be confident that you are getting the highest efficiency with optimum output at the lowest cost. This is where Wheelabrator Plus can

help, with an extensive range of services including:

- Equipment modernisation
- Training
- Maintenance and service programmes
- Replacement parts and consumables

## Equipment Modernisation Programmes (EMP)

Our dedicated team of engineers are able to assess your surface preparation equipment, including non-Wheelabrator machinery, and provide you with a report detailing modernisation recommendations to bring your equipment back to optimum efficiency, performance and safety.

## Service, maintenance and training

Wheelabrator Plus will define a service and maintenance schedule to suit your requirements, and will provide staff to ensure that your equipment continues to work in the most productive manner.

Training can be provided for your operations and maintenance staff on request.

## Replacement parts and consumables

Wheelabrator Plus supplies original OEM replacement parts for our surface preparation equipment as well as pattern parts for non-Wheelabrator technologies.

