

One Source

# Pneumatic Ship and Barge Unloaders



# State-of-the-art design and technology

## Proven design - and performance you've come to expect from FLSmidth

- **Finite Element Analysis (FEA) identifies and strengthens stress points**
- **State-of-the-art PLC control systems control all of the unloading functions automatically**
- **Environmentally-friendly: Material is fully encapsulated in a system of piping, hoses and vessels**
- **Every DOCKSIDER™ and KOVAKO® ship unloader is backed with a performance guarantee**



### All vacuum arms are NOT created equal!

Most pneumatic vacuum unloading arms have evolved from cranes designed for vertical lifting and are fabricated from high-tensile steel.

When these arms are under high loads and forces resulting from manipulation through dry-bulk powders they can fatigue and crack very quickly.

FLSmidth uses Finite Element Analysis (FEA) and performs full kinematic studies to identify and strengthen stress points on the DOCKSIDER and KOVAKO ship unloader arms during the design phase to prevent the arm from failing during operation.

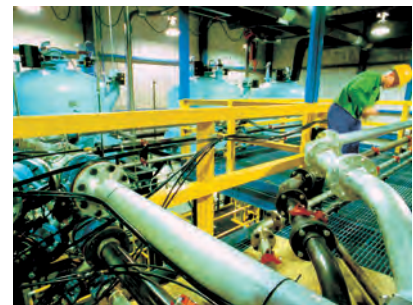
### In control with FLSmidth

All DOCKSIDER and KOVAKO ship unloaders have modern PLC control systems which control all of the unloading functions automatically using easy-to-navigate touchscreens. The control systems have built-in features to monitor operational status, process settings, historical production data, alarms and maintenance requirements. It can even simulate operating conditions and test the components and sub systems, ensuring that your unloader is ready to work when you are.

### Clean operation!

From the time it enters the vacuum nozzle to the time it reaches its storage destination, the material is fully encapsulated in a system of piping, hoses and vessels – making DOCKSIDER and KOVAKO ship unloaders among the most environmentally-friendly transfer systems in the industry.

The filtration system is either integral with the transfer kettles or in a separate filter vessel (for dual-pipeline



or extra-high capacity applications). Pleated cartridges provide optimal cloth area in a compact design, and jet-pulse cleaning and a PTFE media coating offer maximum durability and efficiency.

### Performance you need – GUARANTEED!

With the industry's continuing demand for increased capacity and for conveying multiple and diverse materials, constant research and development is critical. Only FLSmidth's Pneumatic Transport group has a laboratory capable of analyzing various materials – over 160 to date – for the sole purpose of identifying the optimal design for their movement through a pneumatic conveying pipeline. Every DOCKSIDER and KOVAKO ship unloader is backed with a performance guarantee – and FLSmidth's global reputation for superior quality and exemplary customer service.



# DOCKSIDER™ ship unloaders



## DOCKSIDER – the most versatile and most advanced pneumatic ship unloader in the world!

DOCKSIDER ship unloaders are custom-designed for your specific terminal application, with state-of-the-art technology developed by FLSmidth exclusively for the ship and barge unloading industry – offering unequalled performance, reliability and durability.

For high-capacity applications, a separate vacuum filter receiver allows for continuous airflow and faster material transfer. Multiple discharge options, including pressure tanks, feeders and rotary valves allow for conveying a wide range of dry-bulk materials – even abrasive products such as alumina and coarse limestone.

The system can even discharge through a Fuller-Kinyon® pump – allowing for simple, low-pressure pneumatic conveying, or to provide a durable vacuum seal for material transfer to a dock belt conveyor.

Starting with a range of four basic sizes, FLSmidth can supply the right DOCKSIDER ship unloader for any terminal – whether you're unloading river barges or Handymax bulk vessels, and whether you're conveying to an adjacent belt conveyor or through a 1,200 meter (4,000 foot) pipeline.

DOCKSIDER™ PNEUMATIC UNLOADERS				
Model	DS1	DS2	DS3	DS4
Maximum peak/design capacity	400 MTPH <sup>1</sup>	550 MTPH <sup>1</sup>	725 MTPH <sup>1</sup>	1200 MTPH <sup>1</sup>
Maximum vessel size	5000 DWT	35000 DWT	40000 DWT	45000 DWT
Available vacuum arm length	18 m (60') (3-section)	37 m (123') (3-section) 41 m (135') (3-section)	42 m (138') (3-section)	45 m (148') (3-section)
Available configurations	Stationary Dock mobile Gantry mobile	Stationary Dock mobile Gantry mobile	Stationary Dock mobile Gantry mobile	Stationary Dock mobile Gantry mobile

<sup>1</sup> Based on Type III Portland Cement with the shortest available vacuum arm. Convey capacity is sized for site requirement.

# KOVAKO® ship unloaders

## KOVAKO – the original pneumatic ship and barge unloader

The KOVAKO name is recognized around the world as a symbol of quality and performance for vacuum/pressure transfer of cement from ships and barges to land-side storage. Since becoming part of FLSmidth in 1992, the industry has benefitted greatly from this combination of the KOVAKO ship unloader innovative design and FLSmidth's global reputation for superior technology and customer service.

Today's KOVAKO ship unloaders are built to comply with CE design and performance requirements. Utilizing

the resources available at FLSmidth's Pneumatic Conveying R&D Facility, these systems can be accurately and confidently applied for use with various other dry-bulk materials such as fly ash and ground blast furnace slag.

KOVAKO ship unloaders are offered in three standard models that match optimal unloading capacity with typical vessel sizes – eliminating added costs associated with custom design. They are available as either diesel or electric powered and in multiple configurations – making it easy to match a KOVAKO ship unloader model to any terminal application.



KOVAKO™ PNEUMATIC UNLOADERS			
Model	K01	K02	K03
Maximum peak/design capacity	205 MTPH <sup>1</sup>	200 MTPH <sup>1</sup>	360 MTPH <sup>1</sup>
Maximum vessel size	8000 DWT	15000 DWT	25000 DWT
Available vacuum arm length	20 m (66') (4 section) 23 m (76') (4 section)	24 m (79') (3 section) 26 m (85') (3 section) 28 m (92') (3 section) 31 m (102') (3 section)	32 m (105') (3 section) 34 m (112') (3 section) 36 m (118') (3 section)
Available configurations	Stationary Roadmobile <sup>2</sup>	Stationary Dock mobile Gantry mobile	Stationary Dock mobile Gantry mobile

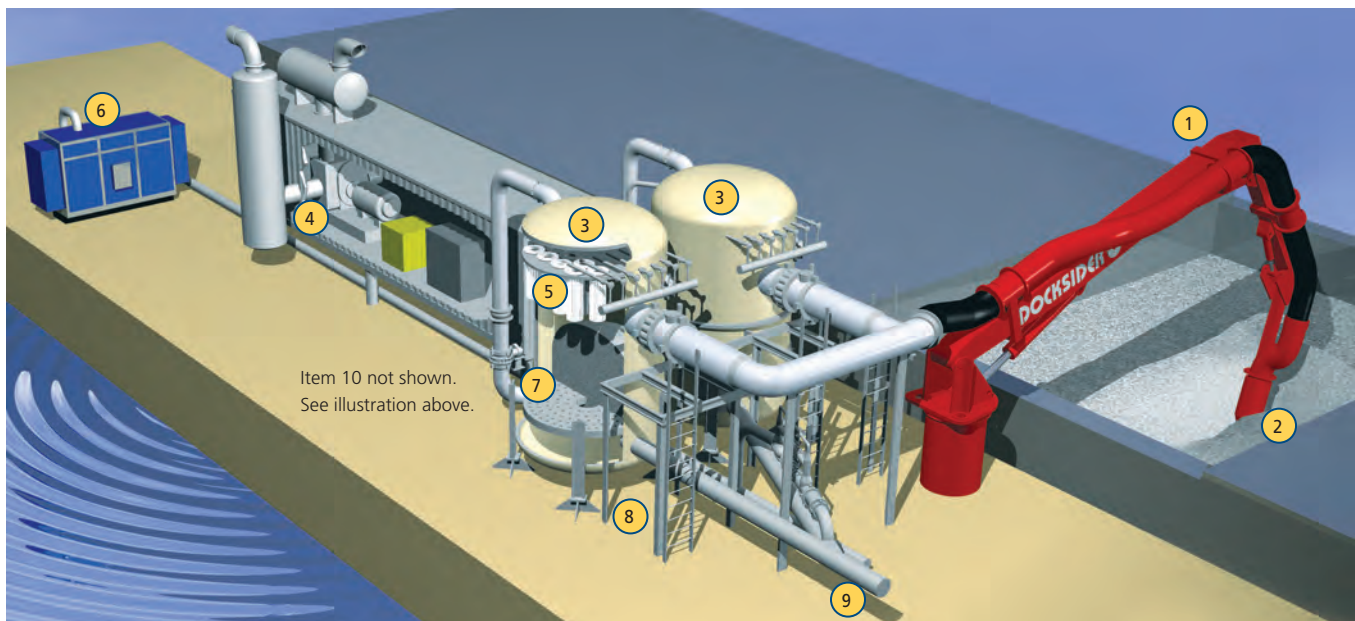
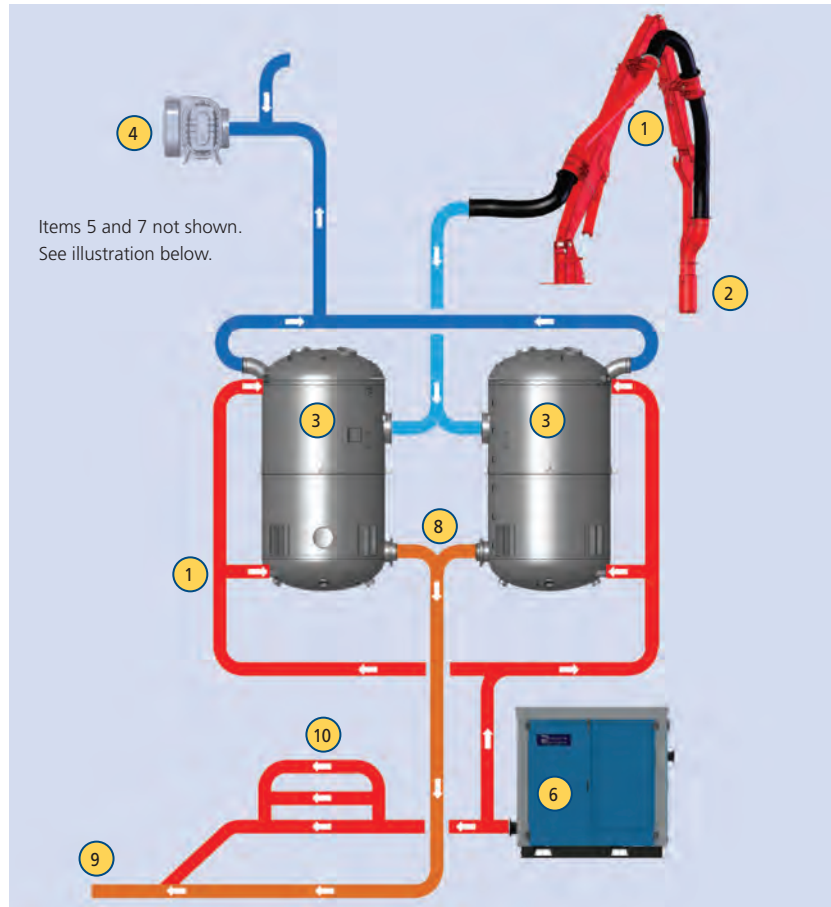
<sup>1</sup> Based on Type VIII Portland Cement with the shortest available vacuum arm and a maximum overall convey distance of 100 meters horizontal and 25 meters vertical, including (6) 90 degree equivalent bends.

<sup>2</sup> Permit may be required for movement over public roads, per local law.

# Principle of operation

## Two-vessel vacuum/pressure unloading system

- The three-section vacuum arm (1) and vacuum nozzle (2) are manipulated through the material.
- Material is drawn by vacuum through the arm piping and hoses into the transfer vessels (3). Suction is created by a rotary lobe vacuum blower (4).
- The vacuum air is separated from the material by multiple high-efficiency filter cartridges (5). Material falls by gravity to the kettle bottom.
- Once the kettle is full, it is pressurized by air supplied by an oil-free screw compressor (6). The pressurizing air is introduced into the top of the kettle, as well as through multiple Fullerator™ aeration pads (7) to fluidize the material in the kettle bottom.
- Upon reaching optimal pressure, the discharge valve opens (8) and the material is conveyed into the pipeline (9). A multi-stage air bypass system (10) controls the air/material mixture for optimal efficiency.
- While one kettle is pressurizing and discharging, the other kettle is filling – assuring uninterrupted, high-capacity conveying.





## Service and support

[www.flsmidth.com](http://www.flsmidth.com)



Service and support for your DOCKSIDER™ or KOVAKO® ship unloader can be arranged through FLSmidth's project center in the US or FLSmidth Hamburg GmbH in Germany (contact information below).

### Field Service and Emergency Repairs

Our factory-trained service engineers provide on-site assistance to help you repair or troubleshoot your DOCKSIDER or KOVAKO ship unloader during an emergency or regularly scheduled maintenance.

### Technical Support and Training

FLSmidth has an engineering staff on hand to assist in any problem solving required to meet the needs of your operation.

### Spare Parts Handling

FLSmidth offers spare parts support for all types of DOCKSIDER or KOVAKO ship unloaders. Many of the spare parts are in stock in our warehouses and can be provided immediately to any location worldwide.

### Upgrades and Optimization

Our design and field service engineers can evaluate your older or under-performing unloader and offer solutions that will keep your system operating at its optimal performance level.



#### Project Center Denmark

FLSmidth A/S  
Vigerslev Allé 77  
DK-2500 Valby  
Copenhagen  
Tel: +45 3618 1000  
Fax: +45 3630 1820  
E-mail: [info@flsmidth.com](mailto:info@flsmidth.com)

#### Project Center USA

FLSmidth Inc.  
2040 Avenue C  
Bethlehem, PA 18017-2188  
Tel: +1 610-264-6011  
Fax: +1 610-264-6170  
E-mail: [info-us@flsmidth.com](mailto:info-us@flsmidth.com)

#### FLSmidth Hamburg GmbH

Haderslebener Strasse 7  
D-25421 Pinneberg  
Germany  
Tel: +49 4101 788 - 0  
E-mail: [hamburg@flsmidth.com](mailto:hamburg@flsmidth.com)