

Ship Unloading Hoppers



Discharging of
dry bulk cargoes

Introduction

The Buttimer group has been designing and manufacturing dry bulk unloading hoppers since the 1980's. Over this period of time we have developed a unit that is both flexible enough to suit all applications and robust enough to survive in all environments. With changing legislations and ever greater demands for increased capacities, Buttimer has been forced to evolve the design of our units to the end that we can now boast on having a market leading range of units available to our customers.

We would now like to lay out in these pages the benefits and potential of our units.



SML on a moving gantry with discharge to a conveyor



Small capacity DML's

Overview

The Buttimer Unloading Hoppers are supplied mounted on pneumatic tyres, rail mounted and statically mounted and so are designed to suit all quay layouts—existing or new. They can be discharged to truck, train wagon, barges and conveyors or a combination of these. All units can be supplied with a varying degree of dust control, be that mechanical FlexFlap system or full dust aspiration at grab intake and outloading to transportation. As a result of the flexibility of our supply the following products can be put through our unloading hoppers—but not limited to...

- ◆ Grains/Cereals
- ◆ Seed Cakes/Crushed Seeds(Rape seed, Soya bean etc)
- ◆ Biomass(Woodchip, Wood pellets, crushed Olive seed etc)
- ◆ Fertilizers
- ◆ Aggregates
- ◆ Coal
- ◆ Limestone/Clinker/Gypsum
- ◆ Iron ore/Nickel ore

The common problem the world over at bulk terminals is the fact that space is limited, especially as each port has a huge demand for different forms of unloading, be that dry/liquid bulk, break bulk, containers, ro-ro etc. With our Dockside Mobile Loaders (DML) we solve one problem. When the DML is not in use it can be removed from the quay wall and hence free up space for other activities.

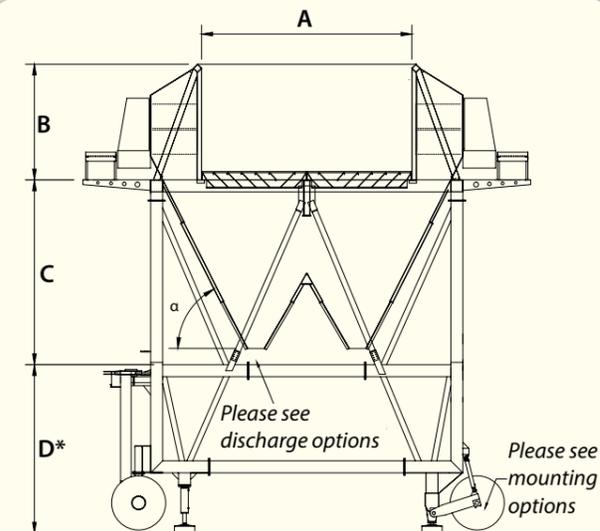
Each configuration can be designed to achieve capacities of up to 5,000 TPH depending on the product, the crane, the grab and the rate that the product can be taken away. By installing one or more hoppers the capacity of the port can be increased whilst also reducing the environmental impact on the surrounding area.



Discharge complete with crumbler

Standard and Custom hopper designs

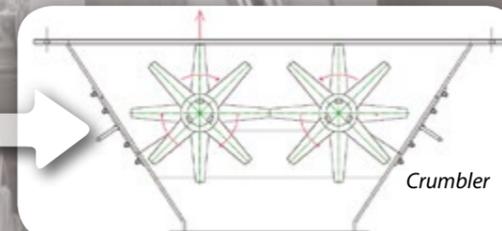
Buttimer supplies a range of standard hopper designs and sizes. The units are based on the most common grab and crane sizes as supplied by the main crane and grab suppliers. The units will cater for grab sizes up to 40m³. Please see chart below for main hopper and structure sizes.



* Based on discharge to trucks and train wagons, but this dimension is determined by client and discharge option.

Model	Grab size	Dimensions in Metres			
		A	B	C	D
ML - 6	1-10 m ³	6	2.4	8	5.5
ML - 7	8-20 m ³	7	2.9	9.4	6.1
ML - 8	15-28 m ³	8	3.2	10.4	6.1
ML - 9	22-40 m ³	9	3.4	11.3	6.1

In a perfect world standard units would be the norm but from experience Buttimer has learned that this is not always the case. As no two ports have the same layout and each client has different requirements to suit their situation. With over 30 years experience in designing and building ad-hoc structures and mechanical systems Buttimer can safely say that no demand is unattainable and, whilst working closely with the client, the best solution for all can be achieved. Please see drawing showing custom RML.

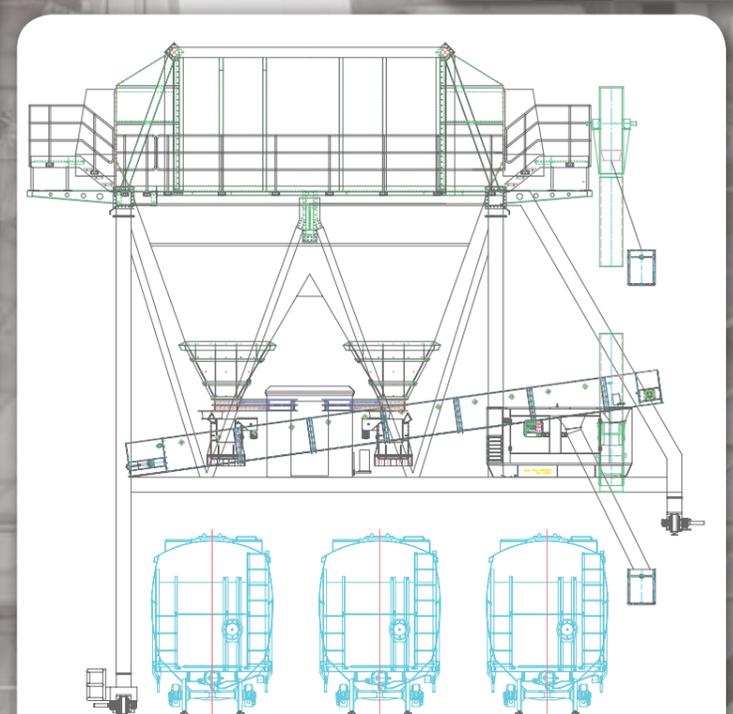


Crumbler



Rail mounted loader in operation

Dockside Mobile Loader (DML)



Custom RML



Reduced height DML

Environmental Impact and Dust Control

In recent years the demand for quicker cycle times for both loading and unloading of ships, coupled with larger vessels, has caused an ever increasing demand for larger handling equipment. Whilst this is achievable it brings its own problems. As a direct consequence of the nature of crane and grab unloading, being open to the elements from hold to hopper, large quantities of dust are released from the displaced product. This can create an environmental problem—not to mention the effect on mechanical equipment at the port.

The Buttimer Hoppers are fitted with numerous systems at both the intake, at the top of the hopper, and the discharge area of the hopper. These systems are designed to reduce dust emissions to an acceptable level and can be ordered as required by the client. These systems are as follows...

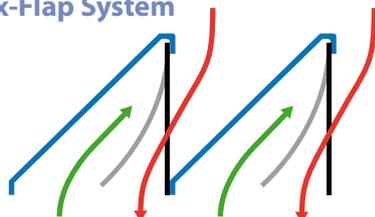
Flex-Flap System

This is a simple mechanical system that has angled steel plates and vertically hanging rubber flaps (see diagram below). The system works as follows...

- ◆ Product dropped from Grab, passes through a grid by opening or pushing aside the vertical flaps and flowing over the angled plates.
- ◆ Once product has passed through, the flaps fall back into their closed position.
- ◆ The displaced air volume within the hopper tries to escape, bringing with it dust, but once it reaches the flex-flap system the grid is sealed and so works as a non-return valve.

Flex-Flap System

- Steel
- Closed Flap
- Open Flap
- Product Inflow
- Dust



Dust extraction/Filtration system plus Thimble

Around the top of the hopper a wall or thimble is installed. Flush with two sides of the hopper and positioned inside the other two walls this creates a cavity. Within this cavity, insertable reverse jet cassette filters are installed—see illustration of standard sized hoppers on inside pages.



The system works as follows...

- ◆ The grab is opened inside the thimble and so creates a finite space, bounded on four sides by the thimble walls, on the bottom by the hopper and above by the grab.
- ◆ Discharged product passes through the flex-flap system and into the hopper.
- ◆ The filters pull the air from the enclosed thimble area down through the grid and through the filter cloths. It is necessary to allow a 10% opening in the flex-flap system to allow a volume of air to be pulled through to make the filter systems effective.
- ◆ The reverse jets are activated by compressed air and the dust is dropped directly into the body of product in the hopper.

Discharge control

When unloading to trains, trucks and barges we create a finite and manageable space by using rubber curtains at each end of the discharge area. In addition, loading chutes or bellows are fitted complete with automatic retraction and are connected by duct and fan back to the hopper to extract dust.

Dust Free Plant Room

This is an extra we can install whereby we create a dust free plant room for all equipment. This is achieved by installing a fan system to keep a positive clean air pressure in the room and so no dirty air is drawn in—so is of huge benefit for smooth running and maintenance of equipment.

Discharge Options

The discharge of the hopper is influenced by many factors. To name a few; the product being unloaded; the infrastructure in the port; the proximity to commercial or residential communities etc. With regard to the product being discharged it will have an impact on the system used.

For instance, if you are transporting grains or cereals to a conveyor or the bed of a truck or wagon, a simple discharge slide can be used as the product is free flowing and easy to handle.

If you are unloading a product which is liable to bridge and block, either the hopper itself or systems following it, for example crushed soya bean or soya bean cake, Buttimer can fit a discharge crumbler system which is installed above the outlet of the hopper and aids in breaking up of the lumpy product and allows for easy flow.

If you are unloading a product such as limestone which flows very much with the characteristics of water, a drag-link discharge system is used to feed the product onto a belt conveyor at a constant and even rate.

These are just a few examples. However, Buttimer works closely with each and every client to come up with the best solution for their situation.

Drive/Mounting Options

Buttimer offers three different drive/mounting options. These are, Static Mounted Loaders (SML), Rail Mounted Loaders (RML) and finally pneumatic tyre mounted or Dockside Mobile Loaders (DML). Photos of the different types appear throughout this brochure.

Dockside Mobile Loader (DML)



SML—Static Mounted Loaders

Static installations can be provided and are designed to suit the customer's needs. These can be bolted down permanently or secured in a way that they can be moved by crane. All dust control and discharge systems are available on these units.

RML—Rail Mounted Loaders

Rail mounted installations can be built to suit existing rail systems and the bogie system can be designed to suit the load bearing of the rail in question. Optimum rail width can be suggested to the client if a new installation is being realised. Buttimer offers three different options for driving the RML's. They can be pulled or pushed by front-end-loader or tractor, they can be attached to a crane system and pulled along, they can be self driving using an installed generator set or shore power. We can work closely with all major crane suppliers to offer the best solution for the client.

DML—Dockside Mounted Loaders

With both SML and RML systems the structure of the hopper remains rigid, and does not flex, since the SML is mounted on solid concrete foundations and the RML is mounted on a level track. The problem arises with the DML units as they are mounted on pneumatic tyres and, as they travel over the quay wall, they have to absorb the difference in levels. No matter how smooth the quay wall may be, with the DML having a wheel base of up to 14m x 14m, the structure will experience large variations in levels across its base. This, coupled with the fact that the unit can weigh up to 120 tonnes, means that very large torsional loads will be experienced in the joints of a rigid structure during travel.

Buttimer has developed a hydraulic suspension/jacking system which equalises the load on all four corners of the structure during travel and loading, and so eliminates any twisting of the rigid structure. The Buttimer system will allow for a difference in level of up to 1m across the diagonal. This hydraulic system, coupled with our robust mechanical steering system, results in a highly manoeuvrable and market leading unit.

Our Background

The Buttimer Group was founded in 1978 by Mr. Edward Buttimer and has been trading in Ireland as E. Buttimer & Co. Ltd uninterrupted since. The company has grown steadily over this period.

The Group was initially focused on the Agri and Dairy industries, namely in the mechanical handling equipment supply and erection. However as the company continued to grow the limitations due to the size of the market in Ireland, only 4 million

people, forced us to diversify. We pursued markets such as bridge building, liquid bulk handling, including tanks, pressure vessels, pumping stations etc, plus ad hoc design and builds. Our core business has always been the handling of dry bulk cargoes, however, as a result of our diversification, we now have an in-house ability to offer our prospective clients complex and complete turnkey projects to suit their exact needs.



Loaded truck departing from a DML



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