

PROCESS

TRUCK UNLOADING

Description

Dry raw materials are often delivered in bulk trucks. Unloading of such trucks is done by:

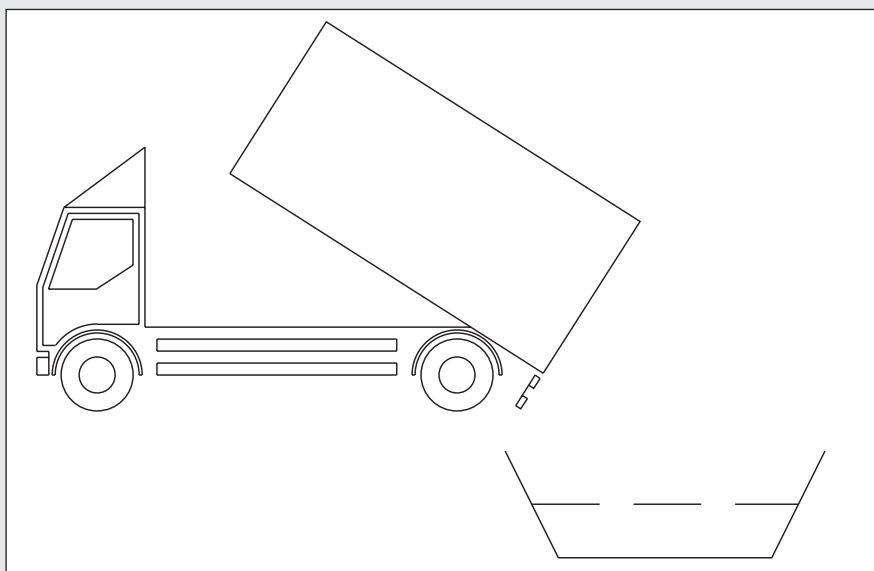
- ▶ **Gravity**, in which the product slides out of the tilted truck and falls into a dump pit from where it is transported further by the plant's own systems.
- ▶ **Blowers**. The truck is often connected to a pneumatic transport and then unloaded by means of overpressure in the truck, created by the truck's own blower, possibly in combination with the plant's own suction system.

Mixtures

In particular with gravity unloading there is a considerable dust development around the dump pit. In the case of pneumatic unloading systems an explosive mixture may arise, mainly in the receiving bin.

Ignition sources

During truck unloading the product can get charged electrostatically. This way the truck itself will be charged up, too (if the product is e.g. charged negatively, the truck will have a positive load). As a truck has a relatively large electric capacity, this may lead to very powerful spark discharges. It can happen that the truck is already charged by the road transport. The truck's blower is also an important ignition source. Finally the truck itself, when it enters a dangerous dust cloud, can be an ignition source. Think e.g. of a hot exhaust pipe.



Protection

The best way to prevent spark discharges is to apply proper truck earthing. As the risk is real that connecting the earth cable once in a while will be forgotten, the best solution is an earthing system that earths the truck, monitors the earthing and then gives the release signal.

Besides this earthing it is very difficult to provide preventive measures on the truck itself: this is in most cases owned by a transport company which makes it difficult for the receiving company to build in guarantees to, e.g., prevent the use of a badly working, spark generating compressor. That's why, in the case of unloading by means of the truck's own blower, the best solution is to install ignition source detection on the transport duct, combined with a fast shutting valve. This way not only smouldering product showing up in the installation can be prevented, but, as the product is "inspected" on the presence of smouldering product, also subsequent discussions over liability are avoided.

It is also difficult to avoid the truck being an ignition source. The best solution is, by means of e.g. a good exhaust system on the dump pit, to reduce the dust cloud so much that the truck stays out of the danger zone.

Constructive protection of truck unloading is not customary. The dump pit is usually open, which makes explosion venting pointless and explosion suppression impossible. The receiving systems however (elevators, separators, silos) can of course be protected in the usual manner.

What is more, in the case of elevators, it is often usual, due to the relatively high risk, to protect the first receiving elevator always as well in a preventive as in a constructive way.