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# PRO·CESS

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**ASHISH KHANNA**

Ex Chief of Corporate Contracts,  
Tata Power Company Ltd and  
Current CEO & Executive Director,  
Tata Power Solar Systems Ltd

“I believe that the renewable  
energy sector especially the solar  
energy segment will become a  
critical and important contributor to  
India’s green imprint.”

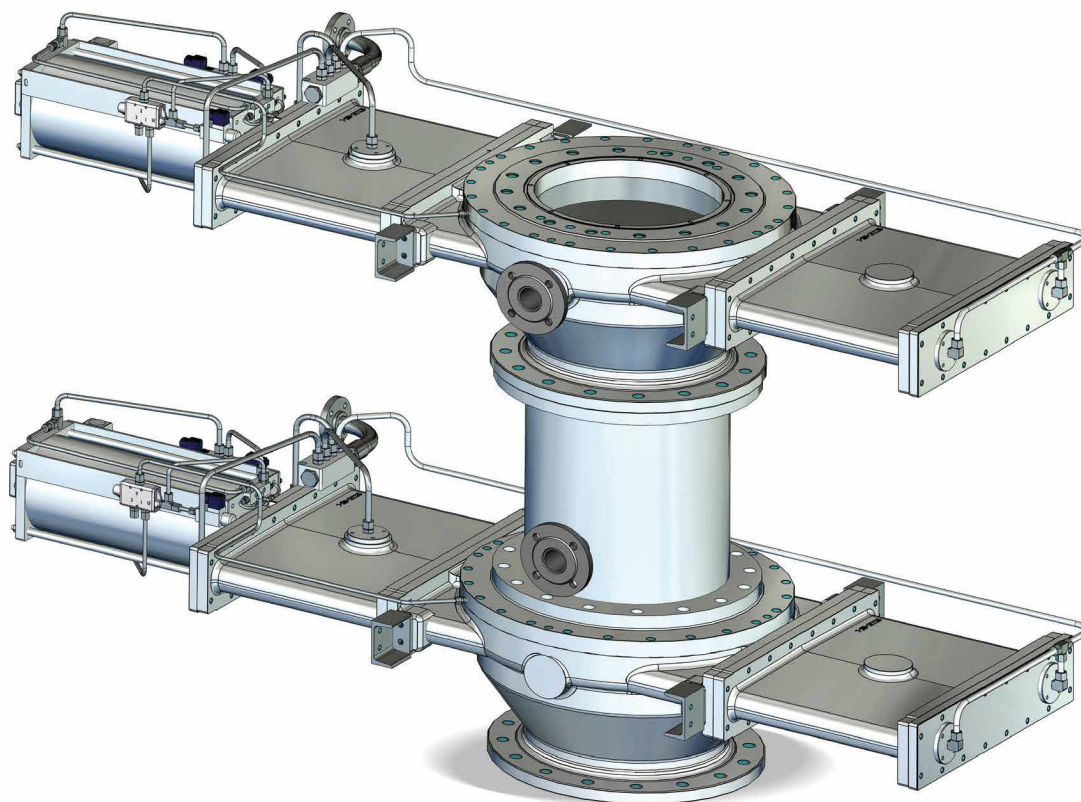


Pneumatic vacuum weighing systems

# Production in a Closed System

# Magnitude of Slide Gate Valves

Use of slide gate valves in the extraction of glycerin



CAD-image of the discharging valve system.

Source: Emil Kammerer GmbH

Emil Kammerer GmbH showcases shut-off valves that prove beneficial as a discharging valve when glycerin is extracted from the waste product compound.

**●** Glycerin is a by-product of biodiesel which is produced from the oil of raw plants. It can be sold in a freshly extracted form or can also be refined according to the various grades of purity. In order to extract glycerin from the waste product compound, it is necessary to ensure that the compound is discharged safely. For this purpose, there is a need to make use of a suitable slide gate valve.

During the acquisition of glycerin from the biodiesel process, a waste product is produced that primarily contains salt as well as a small amount of glycerin. The glycerin-free portion of the waste product is called MONG (matter organic non-glycerol). Discharging this waste product proves to be a challenge for shut-off solutions in two

aspects. Firstly, the shut-off valve must maintain the vacuum in the system in an absolutely reliable way, i.e., create a perfect seal. Secondly, the slide gate valve must enable MONG to be discharged with minimum residue – without the valve being damaged by the properties of the product being discharged so that the seal is absolutely tight.

The characteristics of MONG are thus crucial, as it is not always easily free-flowing, instead at times it can be highly abrasive as well as chemically aggressive. It also displays an aggregate state from moist and paste-like substances as well as solid ones. As the product is abrasive and fast-drying, it can lead to slight blockages or even result in complete damaging of the



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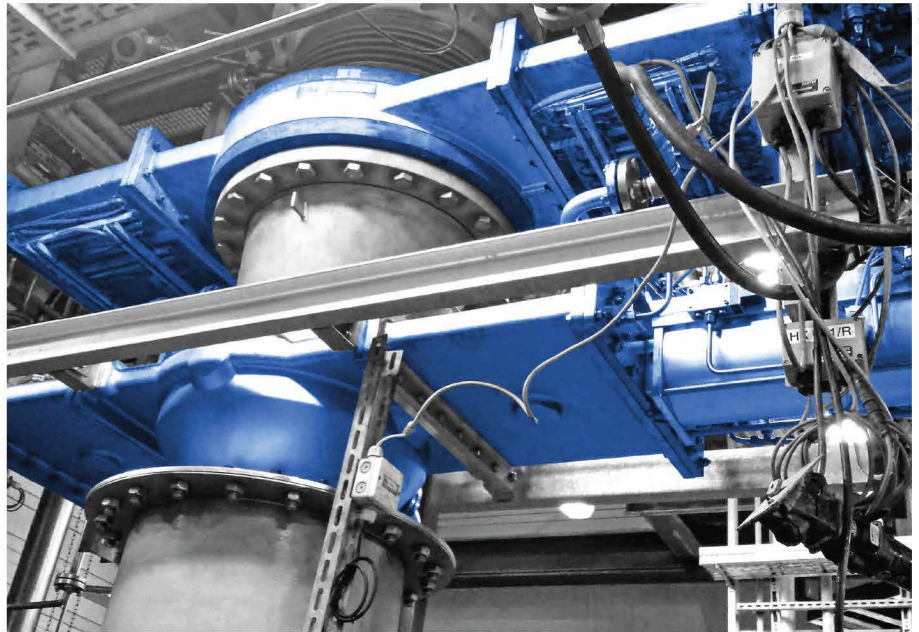
shut-off equipment. Hence, the latter brings the risk of shutting down the plant and thus a complete stoppage in production.

The consistency of MONG can fundamentally be influenced by its glycerin content. This, in turn, is a cost-based decision on the part of the plant operator: for every amount of glycerin that is discharged in the waste product, so that it can flow easily, cannot be reused or resold.

### Automated discharging valve

For the first time in 1988, Emil Kammerer GmbH designed a semi-valve that enabled MONG to be discharged in a relatively automated manner. During the past 26 years, the valve system was further developed in cooperation with the respective clients. This initiative was undertaken so that the various customer-specific operating parameters could be taken into account without a loss of quality or function. The discharging valve is thus optimally-adapted to the operating conditions of the respective plant so that the customers can achieve the best possible results from a technical, chemical and commercial viewpoint. The modifiable shut-off solution has since proved itself to be very successful in various customer plants in Germany and abroad.

The Kammerer discharging valve is typically installed under a thin film evaporator or dryer that possesses a vacuum in the range of 3–10 mbar absolute. Through evaporation and various distillation stages, majority of the glycerin is extracted. Also, a residue of MONG, combined with the remaining glycerin, is deposited at the bottom. The valve directly underneath consists of two sealing Kammerer shut-off valves that are connected to each other via a valve container and are locked against each other. The product reaches the upper slide gate valve and is saved. This slide gate valve is then opened so that the remaining products can pass through a valve container to the lower slide gate valve; the upper slide gate valve is closed. The space between both the shut-off valves is then placed under atmospheric conditions. Only then can the MONG be discharged. The waste or salt residues usually have a glycerin content of around 3–10 per cent.



Source: Emil Kammerer GmbH

Discharge valve installed in the plant beneath a thin Film Evaporator.

### Slide gate valves for special applications

In practice, the slide gate valve models – FK and FDK with integrated rinsing devices from Kammerer have proved themselves in this specialist area. The first or two letters refer to the sealing system, while the last letter indicates the model of the shut-off valve. The K housing prevents possible depositing of the product and, as a result, the build-up of the product due to its downward funnel-shaped, tapered construction. The F and FD sealing systems are particularly favored for gas-tight shut-off requirements: There is an active pressing of the respective impermeable material here and, afterwards, also an active pushing back of the seal in the FD version. This mechanism ensures that the seals are as gentle as possible while also being completely reliable.

### Results

First of all, the Kammerer discharging valves guarantee a reliably continuous discharge every 4–5 minutes. Secondly, the glycerin can be extracted in a significantly higher quantity for reuse as the waste product can be discharged in a drier form, thus containing less glycerin. Thirdly, a significant increase in the service life of up

to 12 months has been achieved in all plants. The investment in a Kammerer discharging valve system usually pays for itself within one or two years.

### Options

Customers who work with vacuum chambers have used the Kammerer shut-off valve in the simple version. The residual products that are used pass through the shut-off valve into a container. Once this container is filled to a certain level, the vacuum chamber is evacuated, enabling the container to be replaced with an empty one.

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