



SUGAR INDUSTRY

Permanent Solution for Final Masecuite Valve Failures

Case Study: Çumra Sugar Factory (Konya Sugar Inc.)

Customer: Konya Sugar Inc. – Çumra Sugar Factory

One of the largest integrated sugar plants in Türkiye and Europe

Industry: Sugar / Food Processing

Application: Final masecuite line – refinery department

Challenge

Final masecuite handling is one of the most critical processes in sugar production. At Çumra Sugar Factory, knife gate valves installed on the final masecuite line repeatedly became non-functional due to lump formation inside the valve body.

This issue had persisted for **approximately 21 years** and is widely recognized as a chronic problem across the sugar industry.

Under continuous 24/7 operation with **zero tolerance for downtime**, valve failures typically occurred **15–20 days after campaign start**, leading to:

- Inability to close the valve during pump failures
- Uncontrolled discharge of sugar concentrate
- Significant production and labor losses



- Environmental impact caused by mandatory product discharge
- Increased regulatory and inspection pressure

Despite multiple attempts, **no conventional valve design or supplier solution had been able to eliminate the problem.**

Why the Problem Was So Difficult

Final massecuite exhibits highly sensitive thermal behavior:

- Operating temperature: **40–45 °C**
- At this temperature, the fluid adheres to valve internal surfaces
- Over time, adhesion leads to stratification and lump formation
- Valve slideways and knife surfaces become blocked
- The valve loses all functionality

Heating the fluid itself is neither practical nor reliable, and conventional knife gate valves offer no protection against this adhesion mechanism.

ABO Solution

ABO developed an **original engineering solution** based on a controlled thermal approach that addresses the root cause of the problem: **fluid–surface interaction.**

Key Concept

Instead of heating the fluid, the solution maintains the **valve body surface temperature** within the range of **85–95 °C.**

Resulting Design

This approach led to the development of a **jacket-heated knife gate valve**, specifically engineered for final massecuite applications.

By thermally stabilizing the valve body:

- Adhesion of massecuite to internal surfaces is prevented
- Stratification is eliminated at the earliest stage
- Valve slideways and knife surfaces
- remain clean and functional
- Full operational reliability is maintained throughout the campaign



Innovation & Uniqueness

Among known commercial products, **no knife gate valve has been specifically designed or manufactured for final masecuite lines with integrated thermal stabilization.**

This solution represents:

- An **industry-first application**
- A **field-proven original design**, not a laboratory concept
- A scalable solution for sugar factories worldwide

Results

The solution was fully validated during consecutive production campaigns.

Performance Outcomes

- Complete elimination of lump formation
- Full valve functionality throughout the entire campaign
- Zero unplanned shutdowns related to the valve
- Improved process safety during pump failures
- Elimination of environmental discharge incidents

The problem was **completely resolved by the end of the second campaign.**

Customer Feedback & Reference Status

Following successful implementation, the solution was formally presented to:

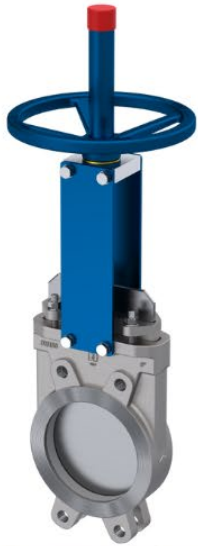
- Factory management
- Production managers and engineers
- Senior foremen and operators

The project received official recognition, and **Çumra Sugar Factory agreed to serve as a reference site.**

As a result:

- Procurement of **15 additional valves** based on this design is planned





Knife gate valves Series 200

are ideal for wastewater and liquids with suspended solids due to their low weight and short construction length. The blade with a circular facet pushes out sediments and handles fibrous materials, ensuring reliable leakage and long service life. This series also features excellent flow rates with minimal pressure drop.

DN50-DN1200

2/4/6/10 BAR

-10°C/+125°C



Strategic Importance

Çumra Sugar Factory is one of the most significant sugar production facilities in the region, with an annual industrial valve procurement volume of approximately **€800,000–900,000**.

Successfully solving one of the most critical and long-standing process problems at this plant represents a **strong reference for the entire sugar industry**, particularly for final massecuite line applications.

Conclusion

This project delivers a **permanent, sustainable, and scalable engineering solution** to a problem that had remained unresolved for decades.

By combining deep process understanding with original valve design, ABO valve has established a **new benchmark for reliability in final massecuite applications**.