



SAVAY
Polyurethane Industries Co.

FLOTATION CELL

Mechanisms Engineered by SVY

Reverse Engineering • CFD Optimization • Advanced Polyurethane Materials

Introduction to Flotation Cells and Their Industrial Importance

Flotation cells are the core separation units in mineral processing plants, widely used in iron ore and copper concentrators to recover valuable minerals from finely ground slurry. Their performance directly determines:

- recovery rate and grade
- stability of the flotation circuit
- energy consumption
- reagent efficiency
- and downstream process performance

At the heart of every flotation cell is the mechanism—the rotor, stator, diffuser, and associated air dispersion system.

This mechanism is responsible for generating:

- turbulent shear for bubble generation
- uniform air dispersion
- stable slurry circulation
- optimal bubble–particle attachment
- and a controllable froth structure

Because ~70% of the flotation cell's hydrodynamic performance is governed by its mechanism design, **precision engineering of this component is essential.**

At SVY, we focus on delivering high-precision reverse-engineered mechanisms that not only replicate the functional behavior of the world's leading designs but also integrate modern computational optimization tools to enhance efficiency under the specific operating conditions of Iranian mining plants.

In addition, our engineering advantage extends to advanced material selection:

we utilize high-performance polyurethane systems—formulated with optimized additives and reinforcements—to ensure superior wear resistance, chemical stability, and dimensional accuracy. This combination of precise geometry, CFD-validated hydrodynamics, and engineered polyurethane materials allows our mechanisms to achieve long service life, stable performance, and exceptional reliability in the abrasive and chemically aggressive environments of flotation circuits.



Why We Focus on FLSmidth Mechanisms (Wemco & Dorr-Oliver)

SVY's engineering focus on Wemco and Dorr-Oliver mechanisms is rooted in:

- Their decades-long global validation in iron ore and copper industries
- Clear and complementary performance boundaries (coarse/coarse vs fine/fine)
- Widely replicated design principles, enabling accurate reverse engineering
- Strong compatibility with operating conditions of Iranian concentrators
- Mature geometries that allow analytical improvement using CFD



These two designs together cover nearly the entire operational envelope of flotation requirements in Iran's mining industry.

Importance of Material Engineering in Flotation Mechanisms

Why Polyurethane Matters

Flotation mechanisms operate under exceptionally aggressive conditions:

- continuous abrasion by fine and coarse particles
- corrosive chemical environments
- high-velocity slurry impacts
- cyclic mechanical stresses
- cavitation and micro-erosion around rotor blades
- vibrations induced by high-speed rotation

For these reasons, selecting the right polyurethane formulation is not merely a manufacturing decision—it is a core engineering requirement.

Advantages of SVY's Engineering-Grade Polyurethane

SVY uses high-performance polyurethane systems tailored specifically for flotation environments:

- High abrasion resistance against hard iron ore and copper sulfide particles
- Excellent tear strength under rotating mechanical loads
- Superior hydrolysis resistance, preventing material degradation
- Elastic recovery, reducing crack propagation and impact fatigue
- Precision molding, ensuring geometrical accuracy for critical curved surfaces

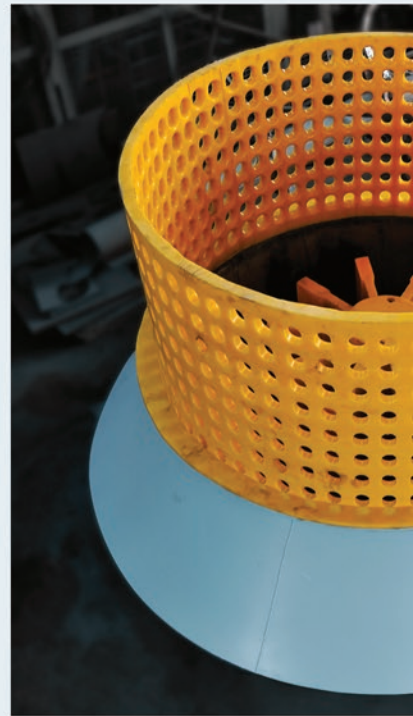
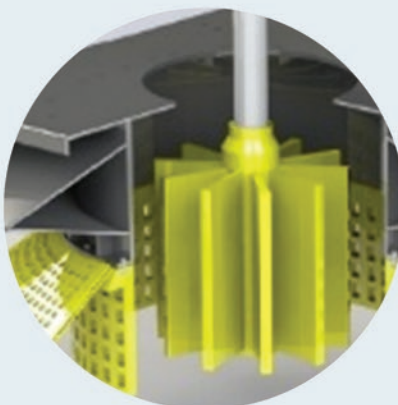
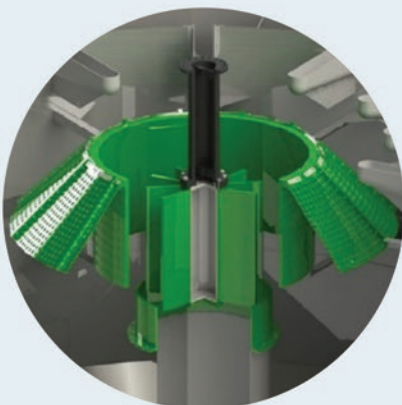
This material optimization translates directly into:

- longer service life
- reduced downtime
- more stable hydrodynamic performance over time

SVY's High-Accuracy Reverse Engineering Approach

Our reverse engineering framework integrates:

- Dimensional scanning & geometric reconstruction
- CAD modeling with controlled tolerances
- Material optimization—high-performance polyurethanes and steels
- CFD simulations for hydrodynamic validation and enhancement





Why We Use CFD (Computational Fluid Dynamics)

When reverse engineering an industrial flotation mechanism, even extremely small deviations—caused by manual measurements, old OEM documentation, or complex curved surfaces—can lead to significant hydrodynamic changes such as:

- non-uniform velocity fields
- inefficient pumping rates
- incorrect bubble dispersion
- wear concentration in unwanted areas
- energy losses
- bubble coalescence due to altered shear zones

These deviations cannot be detected merely through dimensional measurements.

CFD is used as an engineering assurance tool to confirm that any deviation from the original OEM geometry—whether caused by measurement errors, curvature distortion, or scaling limitations—does NOT alter the fundamental hydrodynamic behavior of the mechanism.



Why This Is Critical

- The hydrodynamics of Wemco and Dorr-Oliver are extremely sensitive to blade curvature, stator spacing, and air dispersion ports.
- Even a few millimeters of geometric distortion can shift:

shear
intensity

vortex
stability

bubble
breakup
zone

air holdup
distribution

pumping
profile

- These changes can lead to loss of recovery, even if the mechanism “looks” identical.



Therefore

CFD serves as an independent validation layer that guarantees our reproduced designs behave with the same hydrodynamic signature as the original OEM system. This level of engineering assurance is what separates SVY from ordinary reproduction workshops.



Application Matrix – Wemco vs Dorr-Oliver

ASPECT	WEMCO (SELF-ASPIRATED)	DORR-OLIVER (FORCED-AIR)
Capacity Range	Very large: 70–300+ m ³	Medium to large: 20–130 m ³
Best Particle Size Range	Medium–coarse	Fine–medium
Air Induction	Natural, self-aspirated	Controlled, forced-air
Maintenance	Lower	Moderate
Energy Distribution	Strong pumping, less uniform	Highly uniform & distributed
Key Advantage	Robustness + high coarse recovery	Precision + fine particle efficiency
Typical Use	Copper porphyry roughers	Iron ore & copper cleaning circuits

SVY's Value Proposition

SVY delivers flotation cell mechanisms that integrate:

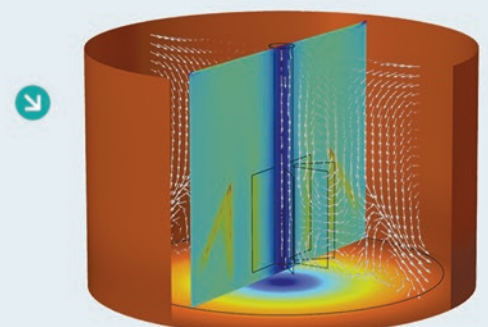
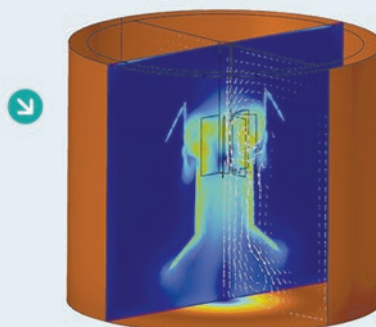
- Reverse engineering with precision validation (CFD)
- Hydrodynamic performance equivalent or improved vs OEM
- Customized designs for actual Iranian mine geometries
- High-end polyurethane materials with superior life
- Reduced operational cost & increased reliability

The result is a next-generation flotation mechanism that is durable, efficient, and engineered for superior metallurgical performance.

National-level localization and production of flotation components

PROJECT	EQUIPMENT LIST
Gol Gohar Concentrate Plant (Lines 4, 5, 6, and 7)	70 m ³ flotation cell equipment
Sarcheshmeh Copper Complex and Madvar Industrial & Manufacturing Company	Impeller and diffuser equipment for 500-ton cleaner and rougher flotation cells
Gohar Zamin Concentrate Plant (Lines 1, 2, and 3)	70 m ³ flotation cell equipment
Phases 2 and 3 of the Miduk Concentration Complex	250 m ³ flotation cell equipment
Phase 2 Concentration at Sarcheshmeh and Daralou Copper Complex.	160 m ³ and 50 m ³ flotation cell equipment
Phase 2 Concentration at the Sungun Copper Complex	160 m ³ and 10 m ³ flotation cell equipment
Sirjan Iranian Steel Company (SISCO) Concentrate Plant (Lines 1, and 2)	70 m ³ flotation cell equipment
Tose-e Faragir Sanabad	70 m ³ flotation cell equipment
Concentration plant at Darre-zar Copper Complex	250 m ³ flotation cell equipment

Hydrodynamic analysis of flotation cells using Computational Fluid Dynamics (CFD)



About us

Savay Polyurethane Industries Company is proud to be manufacturer in the field of producing parts and equipment needed in mining industries with more than 20 years of experience. It is currently known as the advanced manufacturer and designer of polyurethane parts and equipment in the country.



Knowledgebase
Certificate



IMS



ISO 9001:2015

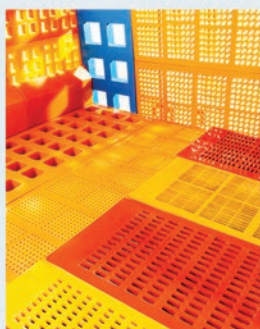


ISO 14001:2015



ISO 45001:2018

Products



Panel Screen



Trommel Screen



Flotation Cell



Hydrocyclone



Roller

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