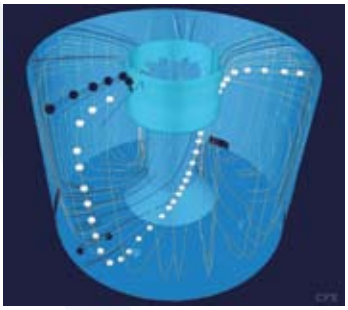
FLSmidth Dorr-Oliver Eimco Flotation Technology

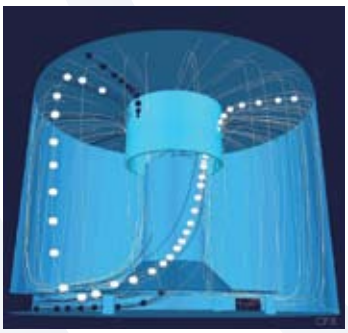
- Superior Metallurgy
- Higher Availability

FLSmidth MINERALS

FLSmidth Dorr-Oliver Eimco Flotation

Enhance your profits using the combined centuries of technical expertise available from FLSmidth Dorr-Oliver Eimco.





Computational fluid dynamic model of SmartCell™ Flotation Machine operation.

Based on sound metallurgical design principles and anchored in the world's most efficient designs, FLSmidth Dorr-Oliver Eimco has combined the expertise of two world leaders, Dorr-Oliver and Eimco to create ultimate flotation technology for process specific solutions. The result is high recovery, which translates into greater efficiency and increased profits.

Every project is custom engineered with application driven design for proper metallurgy: Each cell row is designed to provide the optimum process condition to the match minerals flotation characteristics and particle size distribution.

It is a heavy investment in money and time to develop and bring a new cell to market. FLSmidth Dorr-Oliver Eimco has years of experience and our specialized flotation equipment continues to prove efficient and successful in a variety of applications around the world.

The two factors having the strongest impact on a flotation circuit's financial performance are Metallurgical Recovery and Flotation Cell Availability. Our flotation machines surpass the performance of competing flotation machines in both of these important areas.

Superior Metallurgy

FLSmidth Dorr-Oliver Eimco flotation machine's metallurgical superiority has been proven in side-by-side comparative tests conducted by major mining companies. Results show that our flotation machines operate on superior grade recovery curves with respect to coarse and fine particle recovery.

The superior performance is related to flotation favorable hydro-dynamics which produce higher active cell volumes, provide longer residence times and complement froth removal.

Greater Availability

Competing equipment cannot match the availability of our Dorr-Oliver, Eimco and Wemco flotation machines. Our flotation mechanisms can be removed for maintenance without process interruption. Maintenance is minimized cutting down on availability loss due to failure. On our SmartCell models, rotors are located in an elevated position enabling, ease of start-up and reduced rotor and disperser wear relative to competitive machines.

FLSmidth Minerals is the World Leader in Large Cell Technology with the Greatest Installed Capacity of any Flotation Manufacturer

The first Wemco® Model No. 250 SmartCell® in commercial operation in Chile since April, 2004.

FLSmidth Dorr-Oliver Eimco pioneered the way for large cell technology. From its first Wemco 257m³ cell installed in 2003, to now even bigger **300m³ cells** being installed in Chile. These 26 x 300m³ Wemco cells will be the first major installation of 300's for a new plant and the first used in rougher/ scavenger duty!

Large Flotation Cell Benefits

Results exceed metallurgical, hydrodynamic, and mechanical performance of smaller cells

- **Side-by-side testing shows superior recovery especially with coarse particle flotation**
- **15% lower installed costs than 160 cubic meter cells**
- **Lower operating and maintenance costs**

Wemco® SmartCell® Rows located in Peru

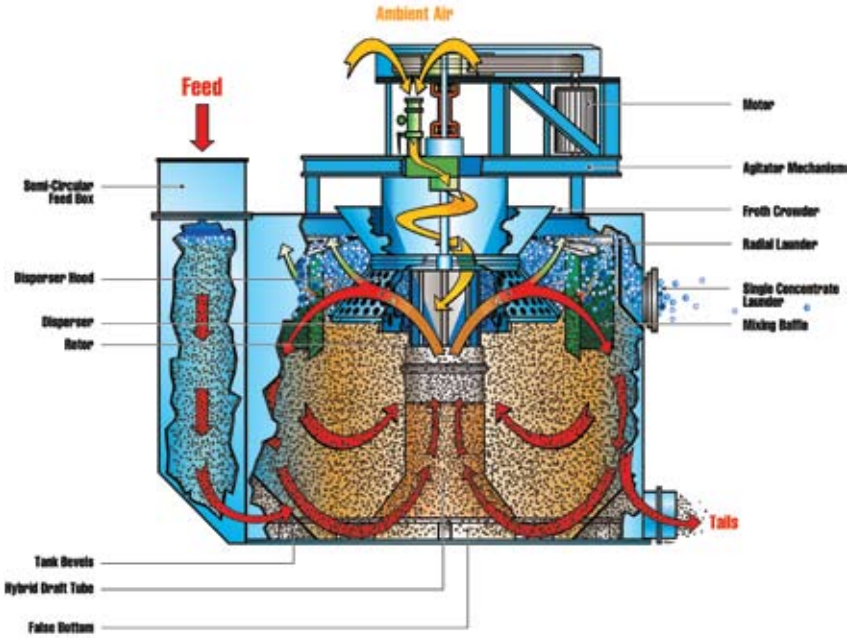
WEMCO® SmartCell™ Flotation Machines

Cylindrical Tank Design
- Improves mixing efficiency and air dispersion
- Better surface stability and less pulp turbulence
- Lower capital costs
- Reduced power consumption

Hybrid Draft Tube & Beveled Tank
- Improves hydrodynamic mixing
- Increases solids suspension
- Improves coarse particle recovery

Radial Launder & Mixing Baffles
- Increases froth mobility
- Decreases froth residence time
- Increases recovery
- Enhances froth stability

Application	[m³]	ft³
Pilot	0.05	1.8
Scale	0.15	5.3
Production SmartCell™ Flotation Machines	5	180
	10	350
	20	710
	30	1060
	40	1410
	60	2120
	70	2470
	100	3530
	130	4590
	160	5650
	200	7060
	250	8830
	300	10595



WEMCO® SmartCell™ Flotation

Wemco has long been a trusted and proven leader in flotation technology under the FLSmidth Dorr-Oliver Eimco brand.
The SmartCell Flotation series combines the proven Wemco mechanism with cylindrical cells to optimize energy input, aeration, and mixing. This configuration reduces pulp turbulence and improves froth stability. Additional standard features include a hybrid draft tube, beveled cell bottom, froth crowder, mixing baffles, and radial launders. Since the introduction of the SmartCell Flotation Machine in early 1996, most major base metal flotation developments have selected WEMCO SmartCell machines.

14 Standard Cell Sizes

We provide a wide range of SmartCell sizes from 0.05 m³ to 300 m³.

Pilot Units and Testing

The FCTR™ (Floatability Characterization Test Rig), has proven to be very reliable in many AMIRA pilot campaigns and is offered with 0.15 m³ roughers and 0.075 m³ cleaners.

Advanced & Proven Design

WEMCO® SmartCell™ Flotation Circuits are Custom Engineered to Meet Your Specific End-User Requirements.
Listed Below is a Sampling of Available Options

Connection and Discharge Boxes

Internally Hinged Dart Valves

We provide the connection and discharge box to meet your needs. The conventional box is preferred for applications where recycle streams are a consideration. The hinged dart valve, internal to the SmartCell flotation tank, provides the lowest cost option, and reduces the flotation footprint by allowing the SmartCell tanks to be spaced flange to flange. The circular box provides a significant availability advantage with respect to unscheduled maintenance and also allows flange-to-flange tank spacing.

Flat Versus Semi-Supported Tank Bottoms

An important engineering consideration is the support of the flotation cell. We provide both flat and semi-supported options. The flat option is the lowest cost when considering only the price of the cell; however, quite often the semi-supported option provides the lowest overall project cost.

Semi-Supported Tank Bottom on End-User Supplied Supports

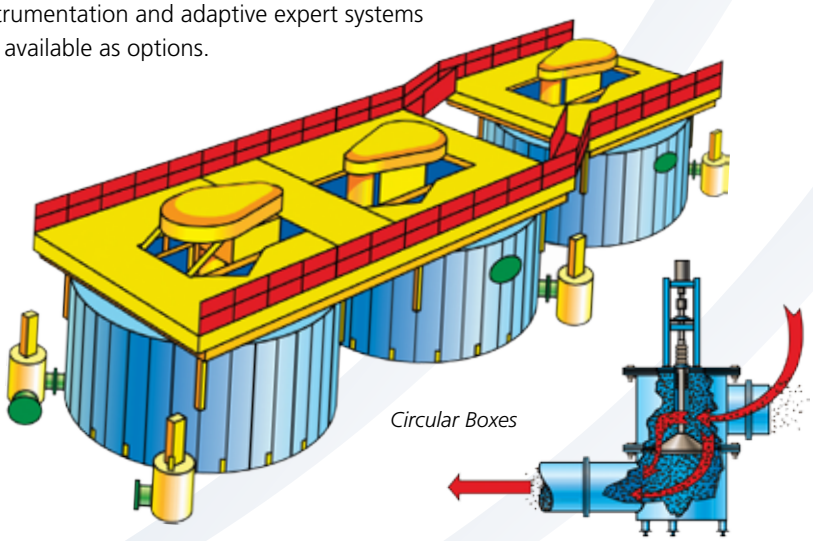
Air Control

A unique feature of the SmartCell flotation machine is the ability to self-adjust the air input rate to changing slurry conditions. For example, the SmartCell self-aspirating mechanism automatically reduces the air input rate as the slurry percent solids increase. There are applications; however, when metallurgical performance can be improved if this self-adjusting feature is overridden with automatic air control.

Air Control on Ambient Air Intake

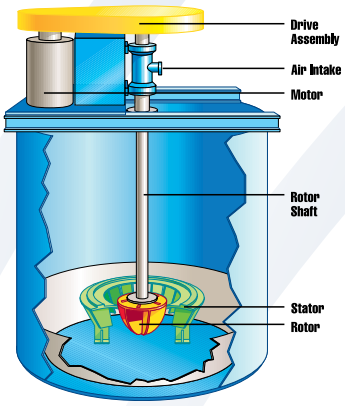
Instrumentation and Control

Every SmartCell flotation machine is provided with ultrasonic pulp level control as a standard feature. Advanced instrumentation and adaptive expert systems are available as options.



Circular Boxes

Dorr-Oliver® Flotation Cells



Every project is custom engineered with Application Driven Design for proper metallurgy.

Each cell is configured to provide the optimum process condition to match minerals flotation characteristics and particle size distribution. Our application engineers will generate the best solution by optimizing each component of your flotation challenge such as:

- **Air flow and pressure**
- **Rotor speed and size**
- **Launder design and lip length**
- **Tank geometry**
- **Rotor/stator clearance**

Increased Fines Recovery and improved Concentrate Grade.

FLSmidth Dorr-Oliver Eimco's advanced flotation technology has been re-engineered from the ground up. Based on sound metallurgical design principles, anchored in the world's most efficient rotor and stator design, Dorr-Oliver flotation cells are the ultimate in process specific solutions.
High recovery is guaranteed as a result of process specific design programs. Energy efficiency is well documented in the highly advanced pumping rotor. Advanced process control allows for simple efficient integration into the modern concentrator.

Rotor and Stator Design

Years of research have led to the most advanced rotor design in the world.
The pumping chambers are designed to minimize pumping energy while providing superior air dispersion, one of the keys to better flotation performance. Our stators have been engineered to provide the correct mix of particle momentum, trajectory and recirculation. This advanced technology is available for installation into any flotation machine. Let us show you the benefits!

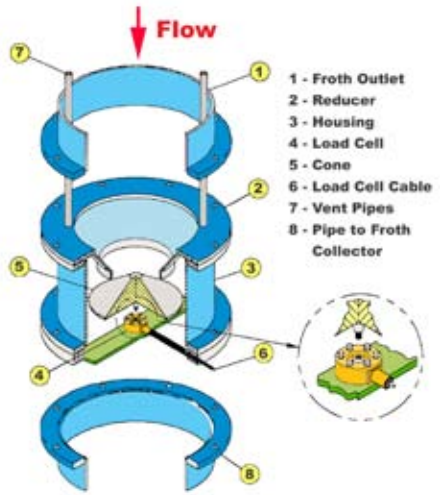
Dorr-Oliver's unique non-plugging rotor

Flash Flote Cell in a Brazilian gold mine

Flash Flotation

Flash flotation offers a unique opportunity to improve performance in many mineral processing circuits. Successes in metal recovery of the gold, lead, nickel, copper, and platinum group of metals are well documented.

Dorr-Oliver® Flotation Cell Measurement and Dimensions

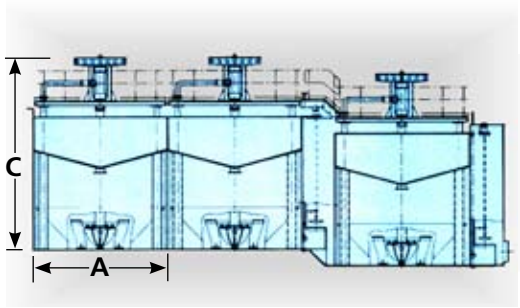


Patented Concentrate Mass Flow Measurement Device

Computer Control

Advanced process control is available for all of our flotation projects, both new and as a retrofit. We also offer consulting services and innovative solutions to flotation process control problems, such as novel Concentrate Mass Flow Measurement.

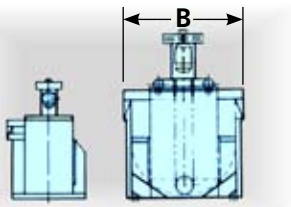
Cell tanks on all large Dorr-Oliver flotation cells are truncated, conical bottom, round tanks or U-shaped in cross-section. Corners are eliminated, and the conical bottom or U-shape helps to feed slurry into the pump action of the rotor and prevent short-circuiting.

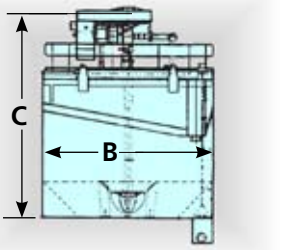


RT Series - Round Tank (Roughing Service)

Model*	B (in.) Width	C (in.) Height	HP (installed)
DO-200 RT	301	295	250
DO-160 RT	270	285	200
DO-130 RT	260	270	200
DO-100 RT	237	245	150
DO-70 RT	189	255	100
DO-60 RT	175	250	100
DO-50 RT	175	240	75
DO-40 RT	157	220	60
DO-30 RT	142	200	50
DO-20 RT	126	170	40
DO-10 RT	98	150	20
DO-5 RT	79	136	10

***Model designation shows: Active cell volume in m³**
RT=Round Tank





R & UT Series - Rectangular and U-Shaped Tanks

Model*	A(in.) Length	B (in.) Width	C (in.) Height	HP (installed)
DO-1550 UT	157	176	228	60
DO-1350 UT	150	162	228	50
DO-1000 UT	132	152	200	40
DO-600 UT	116	123	180	30
DO-300 UT	90	103	132	15
DO-100 R	60	64	107	7.5
DO-50 R	48	50	94	5
DO-25 R	36	38	81	3
DO-10 R	26	28	70	1.5
DO-1 R	12	13	52	0.75

***Model designation shows: Active cell volume in ft³**
UT=U-shaped Tank

Combined Flotation Solutions

North American concentrator with 150 m3 Wemco/Dorr Hybrid row. The Dorr-Oliver round tank cell includes many of the features developed for the world-leading Wemco® SmartCell™ flotation machines.

FLSmidth Dorr-Oliver Eimco Hybrid Rows

In the past, mineral producers had to choose between mechanical flotation systems that naturally ingest ambient air and others that require a blower. To meet today's specialized plant requirements, we introduced a flotation circuit that exploits the inherent and unique advantages of the Wemco® self aspirated and Dorr-Oliver® forced air technologies.

The hybrid flotation solution we have developed, means cells with different operating systems can work successfully, side-by-side, maximizing overall plant recovery and final concentrate grades.

Combining flotation cells with markedly different processing actions into a single process bank increases recovery rates. The Wemco design with the agitator near the top of the cells has excelled on coarse particle recovery and the Dorr-Oliver cells excelled on fines and concentrate grade.

On large cells, we have developed a "Universal Tank" that can accommodate either the Wemco induced-air cell or the Dorr-Oliver forced-air cell and are interchangeable. Both cells feature beveled bottoms, support structures, and a common radial launder design. Cell-to-cell connectivity is enhanced by patented, hinged dart valves which eliminate the need for a junction box and enable cells to be positioned closer together.
By supplying customized solutions to its mineral processing partners, FLSmidth Dorr-Oliver Eimco maintains its global industry leadership in the supply of flotation technology with over 53,000 flotation cells delivered to date.

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www.FLSmidthMinerals.com

For a complete listing of office locations, please visit:
www.flsmidthminerals.com