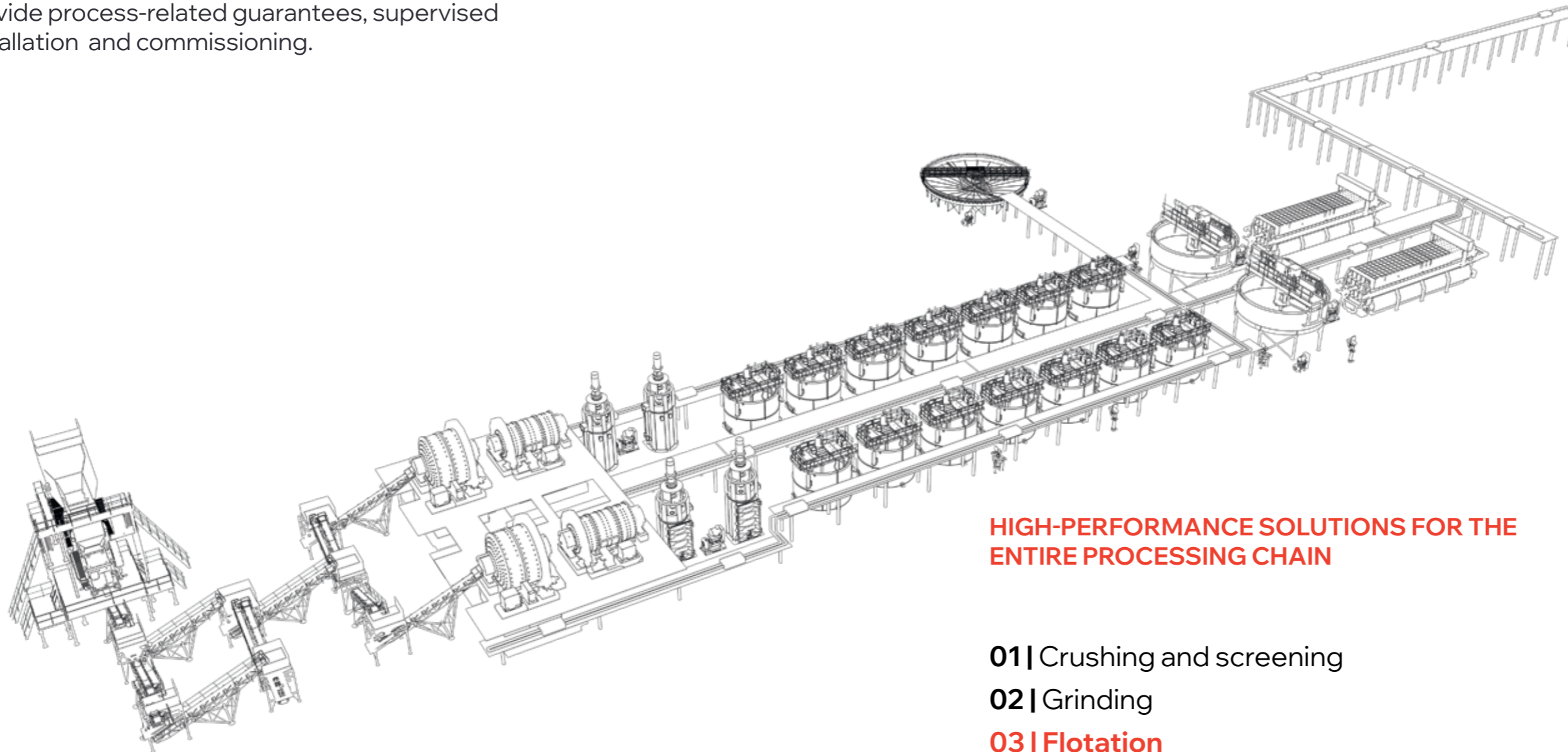


Flotation equipment



COMPANY PROFILE

TEM Partner® is a Russia-based developer and manufacturer of high-tech equipment for primary, flash and ejector flotation sections. We supply equipment, provide process-related guarantees, supervised installation and commissioning.



20+ YEARS OF SUCCESS

TEM Partner® is a team of specialists with over 20 years of experience working with miners around the world, with numerous projects successfully implemented in the mining industry.

HIGH-PERFORMANCE SOLUTIONS FOR THE ENTIRE PROCESSING CHAIN

- 01 | Crushing and screening
- 02 | Grinding
- 03 | Flotation**
- 04 | Thickening
- 05 | Filtering
- 06 | Slurry pumps
- 07 | Engineering | Automation | Service

-  Technology
-  Engineering
-  Equipment
-  Production
-  R&D Center
-  Automation
-  Service
-  Spare parts



Production of flotation cells with an operating volume from 5 to 630 m³



We manufacture flotation cells for flash and ejector floatation



Proprietary modern automation and control systems



Original TEM Partner® drawings



High-tech production facilities in Russia



Equipment selection using advanced software and technology



Complex supplies of equipment for the entire flotation cycle



20+ years of experience in flotation cell design

INTEGRATED APPROACH TO FLOTATION EQUIPMENT SELECTION

EQUIPMENT SELECTION

- Tests and pilot tests carried out in the laboratory or in production, to clarify process parameters
- Modeling and simulation of a flotation flow based on the obtained process parameters
- Experience of process and design engineers, comparative analysis of the data obtained to select the optimal composition and type of flotation equipment

FLOTATION TRIALS



1

Sampling



2

Determining mineralogical characteristics



3

Laboratory tests



4

Pilot tests

PILOT TESTS

TEM Partner® conducts pilot tests at processing plants using the TEMP FLASH 15 and TEMP JET 500 pilot installations.

Pilot plant tests allow obtaining the most reliable data for flotation cell design and selection, and simulate commercial operation.

Trials and research are conducted using the methodology developed in-house.



ENGINEERING AND DESIGN

When developing, manufacturing and supplying equipment, we focus primarily on the quality of the solutions offered — the equipment must be both efficient and reliable.

TEM PARTNER® FLOTATION CELL RANGE

TEMP CELL MECHANICAL-AIR TANK FLOTATION CELLS



Designed for processing of non-ferrous and precious metal ores, apatites, phosphorites, graphites, fluorites and other ore types.

- Leading flotation technology
- Chamber volume from 5 m³ to 630 m³
- Symmetrical design
- TEMP FLOW agitation mechanism
- TEMP DRIVE
- Special froth launder structures
- The cylindrical chamber yields excellent results of rougher, scavenger or cleaner flotation. This shape is currently the optimal and robust solution.

Excellent agitation and minimal volume of circulating material

The cylindrical chamber with the **TEMP FLOW** mechanism operates as an ideal agitator maximizing the amount of contacts between mineral particles and air bubbles and reducing the volume of the circulating material.

The **TEMP FLOW** flotation agitation mechanism improves process parameters, reduces power consumption and operation costs.

TEMP FLOW is the standard equipment for the range of **TEMP CELL** flotation cells. It is also suitable for upgrading flotation cells from other manufacturers.



TEMP FLOW mechanism with V-belt drive



TEMP FLOW mechanism with gear drive

OPTIMAL AERATION AND FROTH RECOVERY

TEMP CELL chambers provide the optimal froth surface area based on process parameters. The chamber structure is designed given the maximum load on the froth launder

RELIABILITY AND EFFICIENCY

Large chambers can withstand changes in power supply and large material without sandoff. Design features minimize vibration and stress, and wear parts are safe to maintain.

The heavy duty TEMP DRIVE combines easy maintenance, efficiency and compact size.

SIZE RANGE OF TEMP CELL FLOTATION CELLS

TEM Partner® is Russia's only company that produces large flotation cells with a tank volume of up to 630 m³.

14
standard sizes
with a chamber
volume
of **5 to 630** m³



TEMP CELL ADVANTAGES

Controlled forced air feeding

- Increased stability

Low driving power

- Reduced operation costs

Durable drive arrangement

- Increased efficiency

Flotation mechanism in the lower part

- Maximum air retention in the tank, optimum agitation
- Improved attachment of particles to bubbles
- Minimized sandoff

Простое основание, отсутствие плиты с ложным дном

- Increased tank volume
- Minimized clogging
- Minimized maintenance

Internal ball valves

- Reduced footprint
- Easy access for maintenance

Accurate and fast level control

- Constant froth speed
- Increased concentrate quality

Simple tank design, w/o ventilation tubes, dispersers or enclosures

- Increased tank volume
- Minimized maintenance

Launder edge length and froth area are changed depending on the technology applied

- Increased froth recovery

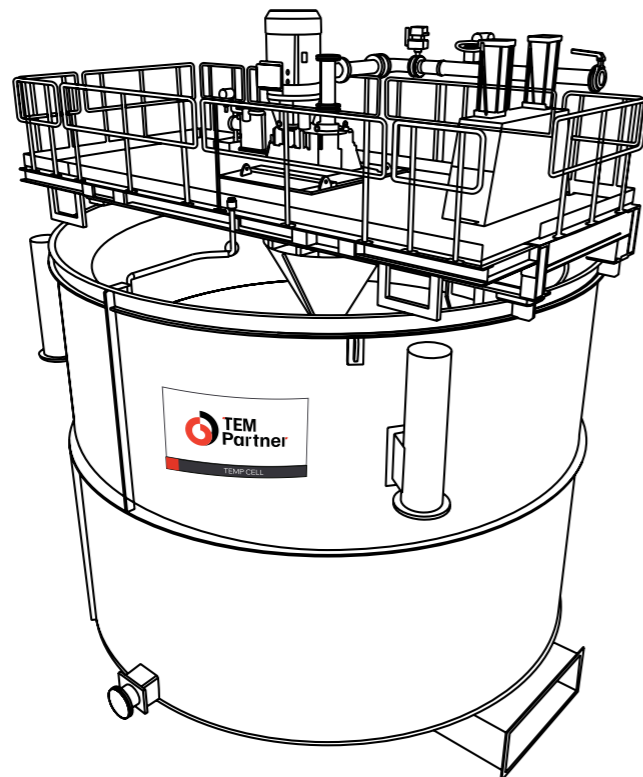
TEMP CELL TECHNICAL PARAMETERS

Parameter	TC 05	TC 10	TC 20	TC 30	TC 40	TC 50	TC 70	TC 100	TC 130	TC 160	TC 200	TC 300	TC 500	TC 630
Nominal chamber volume, m ³	5	10	20	30	40	50	70	100	130	160	200	300	500	630
Tank diameter, mm	2000	2500	3100	3600	3800	4600	5300	6000	6400	6800	7200	8000	10 000	11 000
Tank height, mm	2258	2758	3358	3913	4313	3815	4015	4515	5015	5315	5715	7010	7226	7426
Electric motor power, kW	11	22	37	45	55	55	75	110	132	160	185	250	400	500
Temp Flow agitation mechanism (standard size)	500	650	750	825	825	900	1050	1300	1300	1500	1500	1750	2200	2200
Drive type*	V-Belt	V-Belt	V-Belt	V-Belt	V-Belt	V-Belt	V-Belt	Gear	Gear	Gear	Gear	Gear	Gear	Gear
Level control**	PV/DART	PV/DART	PV/DART	DART	DART	DART	DART	DART	DART	DART	DART	DART	DART	DART
Laundry installation options***	IL/EL	IL/EL	IL/EL	IL/EL	IL/EL	IL/EL/CL	IL/EL/CL	IL/EL/CL	IL/EL/CL	IL/CL	IL/CL	IL/CL	IL/CL/DL	IL/CL/DL

*Drive type: V-Belt / Gear

**Level control: PV - pinch valves / DART - poppet valves for level control

*** IL - internal launder, EL - external launder, CL - central launder, DL - double launder (IL+CL)




TEMP FLASH FLASH FLOTATION CELLS

Used to recover opened valuable minerals in grinding and screening circuits.



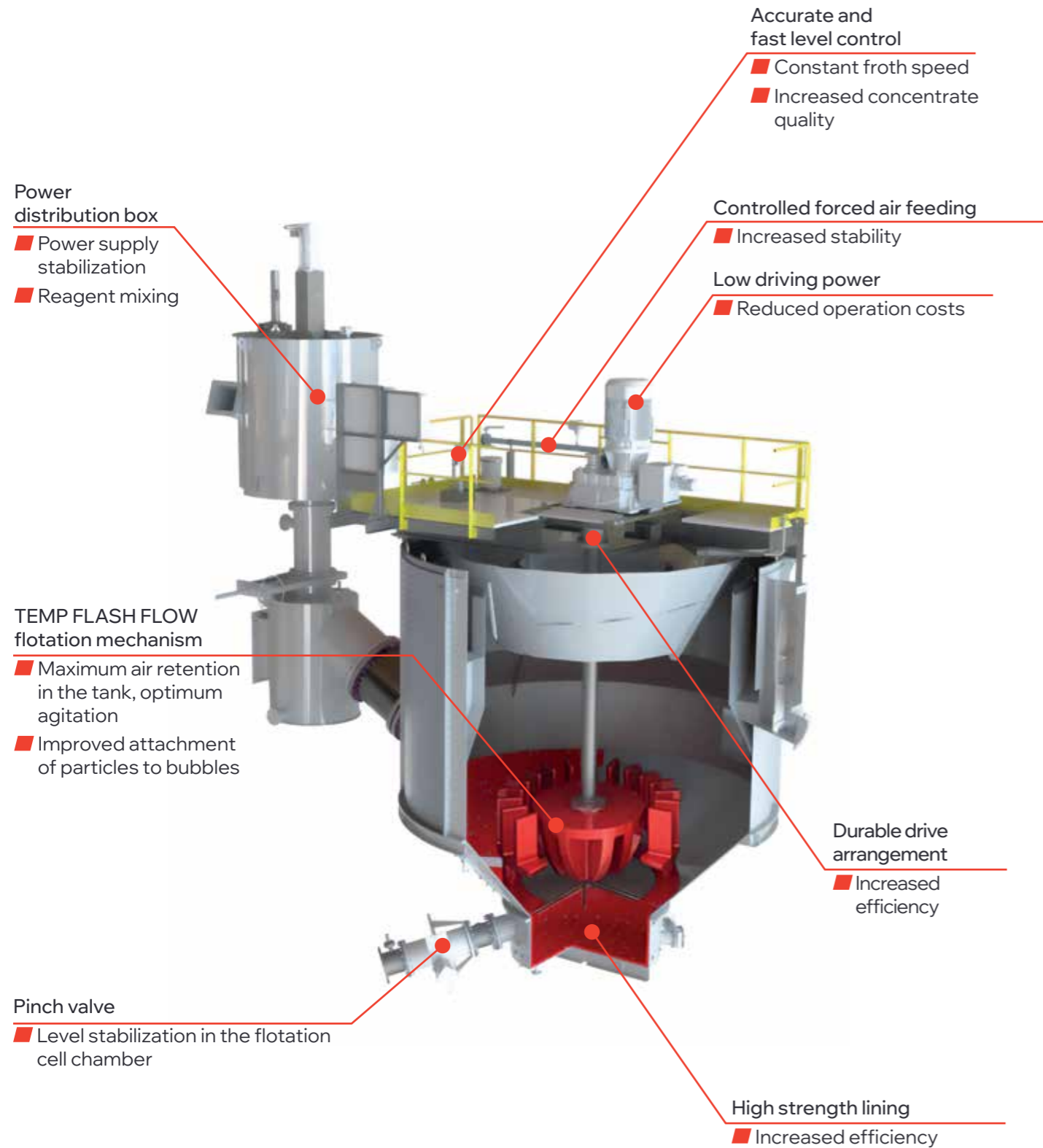
OPERATING PRINCIPLE

TEMP FLASH flotation cells are integrated in the grinding and screening circuit for processing cyclone underflow. These flotation cells are used for opened particle flotation. The concentrate obtained in the TEMP FLASH flotation cell can be either a final or an intermediate product.

 TEMP FLASH flash flotation cells are used to maximize cost-effectiveness of the grinding circuit.

- The special TEMP FLASH FLOW agitation mechanism is designed to work in aggressive environments with large particles of material and a high solid content
- Flash flotation of released mineral particles from the circulating load in the grinding and screening circuit
- Increased target metal yield
- Efficient particle extraction in particle size classes from 50 to 800 µm P80
- Reduced oversludging of valuable minerals
- Improved quality of finished concentrates
- Productivity of 80 to 1800 tons of ore per hour
- The TEMP FLASH double-yield technology optimizes operation of the grinding circuit with maximized production efficiency and minimized impact on water balance.

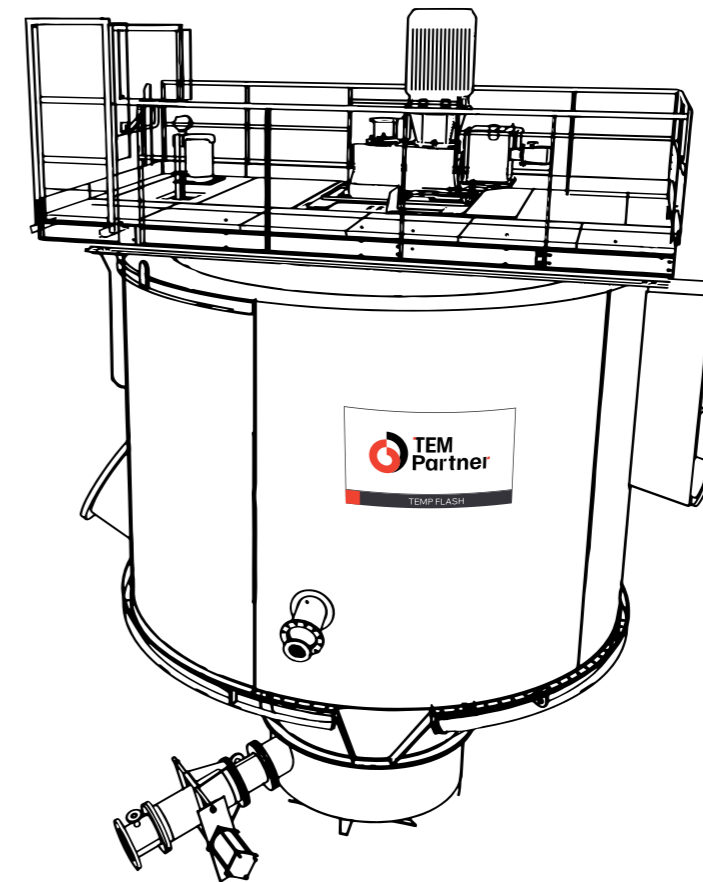
TEMP FLASH ADVANTAGES



TEMP FLASH TECHNICAL PARAMETERS

Description	TF 80	TF 240	TF 500	TF 1200	TF 1800
Capacity, t/h	80	240	500	1200	1800
Nominal chamber volume, m ³	2,4	6,3	25	53	85
Dimensions (HxLxW), mm	4,5x4,2x2,4	5,2x4,6x2,8	7,8x7,4x4,2	9,5x9,1x5,3	10,0x10,1x5,8
Weight, t	3	6	17	34	39
Drive type	V-Belt	V-Belt	V-Belt	V-Belt/Gear	Gear
Electric motor power, kW	11	22	55	132	150
TEMP FLASH FLOW agitation mechanism (standard size)	500	650	900	1200	1300
Minimum air pressure, kPa	14	26	40	46	51
Air flow, m ³ /min	0,1-1	0,2-2	0,4-4	1-10	1,5-15

*Drive type: V-Belt / Gear



TEMP JET EJECTOR FLOTATION CELLS

It is used in the beneficiation of coal, non-ferrous and precious metals.

Highly efficient flotation technology with low operating costs, stable operation and easy control. It is used in primary, control and recleaning flotation operations. The operating principle of TEMP JET is based on the hydraulic aeration method. Flotation froth is formed in a jet aerator when pulp with reagents is fed into it under pressure in the form of a free jet, which sucks in atmospheric air through the aerator inlet.

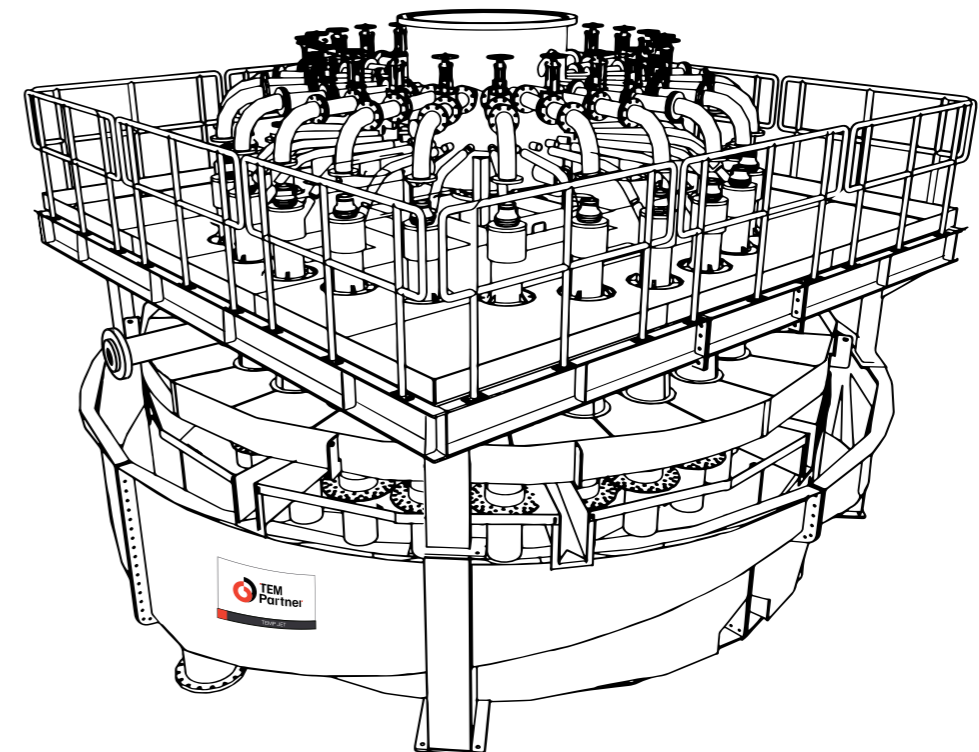


- High quality concentrate
- High performance with a small space occupied
- Easy process and parameter control
- Low maintenance costs
- Absence of major mechanical components typical of traditional flotation cells
- No forced air supply is required to carry out the process
- Easy flotation process adjustment
- Maintenance without stopping a flotation cell

TEMP JET TECHNICAL PARAMETERS

Description*	TJ 4500	TJ 5000	TJ 5400	TJ 6000	TJ 6500
Dimensions (D), m	4,5	5	5,4	6	6,5
Number of aerators, pcs	12	16	18	20	24
Feed rate**, m ³ /h	600	800	900	1000	1200

*Standard chamber sizes are shown. Chambers of different sizes and shapes are designed as per customer requirements.
 **Chamber sizes are based on volumetric flow rates and can be changed depending on applications, tasks and process flow patterns. Chamber sizes can be adjusted to suit the load-bearing capacity and actual load of the launder.



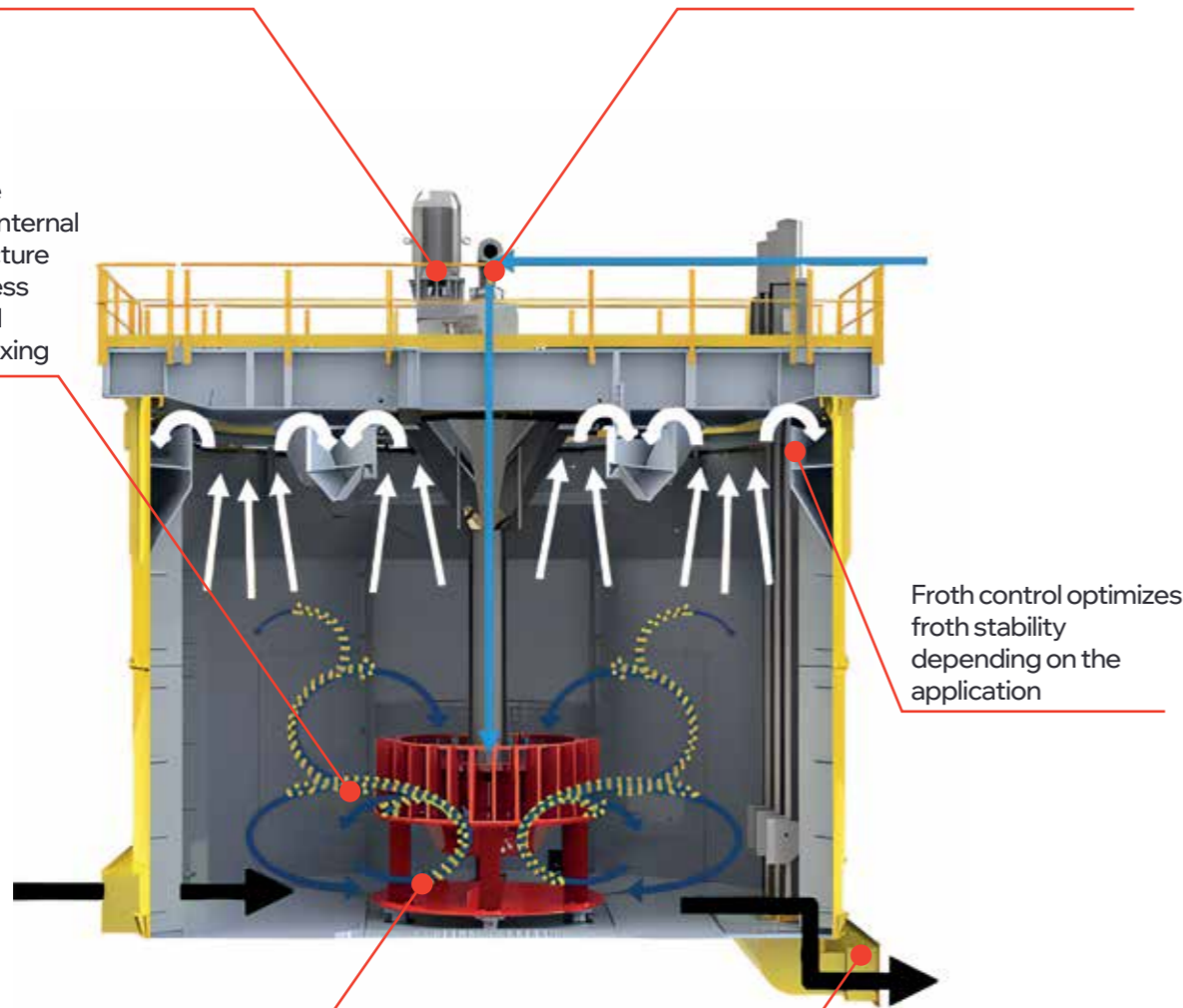
EQUIPMENT UPGRADE

Increased flotation efficiency without capital expenditures.

Upgraded drive simplifies maintenance when using a gearbox

Air control automatically regulates the air volume per flotation cycle

Upgrade with the installation of an internal TEMP CELL structure to optimize process performance and eliminate poor mixing



Froth control optimizes froth stability depending on the application

The TEMP FLOW agitation mechanism is energy-efficient, extends the service life, as well as helps optimize process performance

Upgrading Dart valves. Dart valve automation or resizing for improved stabilization

FLOTATION CIRCUIT OPTIMIZATION

TEM Partner® engineers optimize the flotation circuit, including froth carrying capacity and the time of pulp holdup in the chamber, to meet the plant's individual requirements.

THE SERVICE AND WORK PACKAGE INCLUDES

- Flotation kinetic tests
- Flotation circuit design
- Flotation process simulation
- Technical support

THE EFFECT TO ACHIEVE

- Improved process performance
- Improved availability ratio
- Simplified operation and maintenance
- Reduced maintenance costs
- Reduced equipment footprint
- Reduced energy costs



INTEGRATED SOLUTIONS FOR FLOTATION

TEM Partner® develops and delivers solutions for the entire flotation cycle.

MAIN EQUIPMENT SELECTION, DESIGN AND SUPPLY

- TEMP CELL mechanical-air tank flotation cells
- TEMP FLASH flash flotation cells
- TEMP JET ejector flotation cells

AUXILIARY EQUIPMENT SELECTION AND SUPPLY

- Pulp and froth pumps
- Air blowers
- Samplers

DEVELOPING AUTOMATED CONTROL SYSTEMS

All TEM Partner® flotation cells come with proprietary custom controls to improve performance, safety and energy efficiency.

FLOTATION CONTROL AND MEASUREMENT EQUIPMENT

- Main process control instruments
- On-stream analyzer of elements
- Froth control system with a chamber
- Particle size analyzer

CUSTOMER SUPPORT

- Supervised installation and commissioning works
- Service support during the warranty and post-warranty periods
- Training of enterprise employees
- Supplies of spare parts

- TECHNOLOGY
- EQUIPMENT
- MANUFACTURING
- PARTNER

+ 7 (800) 550 78 21
37 V Professora Popova Str.,
St. Petersburg tem-partner.ru
tem-partner.ru

