

Quinn Process Equipment Co.

3400 Brighton Blvd.
Denver, CO 80216
Phone: 303 295 2872
Fax: 303 295 2706
e-mail: quinnproc@aol.com
Website: www.quinnprocess.com

Re: Quinn Process Equipment Company History and Experience in Flotation and related equipment

Gentlemen:

The following is a summary of Quinn Process Equipment Company's history and experience in the design and manufacture of flotation plants.

Many of these plants also including other equipment such as materials handling, crushing, grinding, classification, agitators, thickeners, filters, etc. So, please, advise of your complete equipment requirements so that we may make our best recommendation.

Flotation Cells

In regards to the flotation cells, the units we are offering are of the Sub "A" (Low Entry Aeration) design basis. Our flotation cells are designed with the impeller suspended low in the tank to facilitate handling of coarse heavy slurries.

The T-BR design provides for the addition of a recirculation well to pull some of the lighter slurry fraction from the upper zone of the cell down into the lower zone of the cell to help in suspending the coarse heavy fraction.

The following segment is a short description of our history and experience which details some of our capabilities in the area of mechanical froth flotation cells.

Quinn Process Equipment Company General Flotation Equipment Information

QPEC manufactures "Sub-A" type flotation cells in both "cell to cell" and "open-flow" design, in sizes from 0.3 cubic feet per cell (#5) to 24 cubic feet per cell (18 Spl.). These cells do not require blower added air as they are self aspirating. QPEC's "cell to cell" design allows for a great deal of "slurry to air" contact in the impeller/diffuser region, and also, with our slurry recycle design, provides much greater control over the air addition to the cell, which can be critical in the efficiency and performance of the actual flotation and also in the ability to suspend the solids within the cell to avoid sanding in the cell.

The above cells are also available as "Open Flow" T-BR units by the simple addition of a recirculation well positioned around the diffuser hood to assist in re-circulating the pulp from the

upper zone of the cell to the lower zone to assist in the suspension of the heavier coarser fraction in the lower part of the cell.

QPEC's larger "T-BR" (Top and Bottom Recirculating) 50, 100 and 180 cubic foot cells require blower added air and are designed to recirculate finer pulp from the upper regions of the cell to the lower region to assist in the suspension of coarser particles. They are also designed to lift and keep suspended the coarser fraction which tends to settle in the cell.

QPEC utilizes all urethane impellers, impeller shaft sleeves, diffuser feed pipes and diffusers for exceptional wearing life. Other materials of construction are available as necessary for the process.

QPEC Flotation Cells have been furnished for a wide range of applications throughout the world. Many of these applications included unique features in either design or materials of construction to suit the needs of extremely abrasive or corrosive processes. Cells have been provided in mild steel, 316SS, 304SS, chlorobutyl lined, natural rubber lined, neoprene lined, polyurethane lined, with covers for sealed atmospheric control, Fiberglass Reinforced Polyester, etc.

QPEC has provided numerous flotation pilot plants, small commercial flotation plants and specialty flotation plants and has used its flexibility and capabilities to design the equipment to suit the particular application.

Installations

QPEC Flotation Cells are in use throughout the world for applications such as the following partial listing of installations:

- 28 cells, Climax Molybdenum, USA molybdenum producer
- 18 cells, Henderson Molybdenum, USA molybdenum producer
- 10 cells, urethane lined T-BR, Sierra Rutile, Ltd., Sierra Leone, Africa
Titanium, Rutile, and Ilmenite Processing Plant
- 14 cells, chlorobutyl lined T-BR, Sierra Rutile, Ltd. Sierra Leone, Africa
Titanium, Rutile, and Ilmenite Processing Plant
- 10 cells, 316SS T-BR, Unimin Corp.
- 10 cells, urethane lined T-BR, Unimin Corp.
- 10 cells, FRP construction T-BR, P.T. Petrokujang, Indonesia
- 18 cells, rubber lined, Togolais des Phosphates, Togo, Africa
- 12 cells, chlorobutyl lined T-BR pilot scale, Unimin Corp.
- 20 cells, Rosario Dominicana, Dominican Republic
- 8 cells, American Westmin
- Numerous cells for AMAX Research and Development
- Numerous cells for Hazen Research, Inc.
- Numerous cells for Owens Corning Fiberglass
- 12 cells, Cominco, Vancouver, BC
- 8 cells, BHP Minerals Research, Reno, NV
- 10 cells, 316SS T-BR, Minera Tabacoa, Brazil

- 12 cells, 316SS with double froth overflows, Celite Corp., California
- 8 cells, PVC specials, Cominco Engineering Services, British Columbia
- 8 cells, Fallon Mining, Nevada
- 3 cells 18 Spl. , Stillwater Mining, Montana
- Unit cell, Newmont Mining
- 8 cells T-BR Quadra Mining, Nevada
- 8 cells #100 T-BR Stillwater Mining, Montana
- 22 cells, #5,7,8 and 15 T-BR, confidential client
- 15 cells #180 T-BR Flotation Cells, Formation Capital, Idaho
- 41 cells #180 T-BR and #18 Specials, Gold Resources Corp.
- 6 cells #7, DSM Co. Ltd., South Korea
- 4 cells #15 T-BR, 316SS construction SNC Lavalin
- 10 cells, #5 and #7, Greenleaf Corp., Pennsylvania
- 4 cells #50, Golden Trump Resources, Mexico
- 4 cell #18 Spl., Sepro Systems, Canada
- 12 cells #100 and #18 Spl., Mohawk Garnet, Canada
- 4 cells #180, Intrepid Potash, New Mexico
- 15 cells #50 and #15, ISR Capital, Idaho
- 16 cells #180, Don David Gold, Mexico
- 10 cells #100, Owyhee Gold Trust, Oregon
- Complete flotation pilot plant, Altnymas, Kazakstahn

- Numerous #5, #7 and #8 QPEC Pilot plant flotation machines in plants throughout the world on all continents, for a wide range of minerals and applications

The dollar range of our orders for complete items of equipment over the past 5 years has ranged from \$3,500.00 for a single pump to over \$1,000,000.00 for a complete plant including classifiers, scrubbers, flotation cells, agitators, thickeners, grinding mills, etc..

Our equipment has been used in a wide range of mineral recovery including precious metals, high grade quartz, rare earths, clays, environmental applications such as ink removal from recycled paper, molybdenum, phosphates, etc. etc.

Note: The above listed installations are the names of the clients at the time of sale. If any specific information is requested, we can attempt to determine the current operator's information for your reference. As is the nature of this industry, many plants have a limited life and the operation may have changed hands or have ceased production due to limited resources to be worked.

We look forward to working with you on this project and welcome any questions regarding our offering. If it would be of assistance, we would be pleased to meet with you at your location as necessary during the evaluation process.

Regards,

Rick Quinn