#### MINING & MINERAL PROCESSING



# Mixing solutions for all Mining and Mineral processing applications



# The Experts in Mining

### **Extract Wealth from Our Expertise**

For over 50 years, Hayward Gordon has been actively involved in selecting and manufacturing mixers for the mining and mineral process industry. We have developed an expertise and installation portfolio that is second to none. Hayward Gordon has been at the forefront of many of the world's largest and most innovative projects.

Discover how our expertise can improve your process result.

#### **APPLICATIONS:**

- Gold Leaching
- Conditioning
- Non-metallic Extraction
- Cyanide Destruction
- Slurry Storage
- Solvent Extraction
- Pumping Loaded Organics
- Attrition Scrubbing
- High-density Sludge Storage
- Pumping Thickener Underflow
- Electrolyte Recirculation
- Autoclaving

#### GOLD LEACH/CIL & CIP

Hayward Gordon designed and installed Canada's first draft tube CIP and leach mixers. Over the years, as technology has changed, we led the market with larger and larger open tank installations. With hundreds of mixers successfully operating on tanks from 20' to 59' in diameter, Hayward Gordon is a clear leader in this market.

# Applications





#### PIPELINE FEED AND SLURRY STORAGE

In South America, the copper mines are typically located high up in the remote regions of the Andes. Copper ore is concentrated, slurried, and pumped to a port or railhead, where it is dewatered. At both ends of the pipeline, large mixers maintain a uniform suspension of the concentrate slurry in feed and storage tanks. Hayward Gordon was chosen to supply mixers to many of the largest systems in South America. Our units were selected for their rugged, reliable design and efficient maximization of tank surge capacity.

#### NON-METALLIC EXTRACTION

With massive potash deposits in Central Canada, diamonds in the far north, and a mature phosphoric acid business, non-metallic extraction processes have been a large market for our mixers. Phosphoric attack tanks, scrubbers for potash slurries, leach mixers for sylvite, sylvinite, and schoenite slurries, kaolin storage mixers, and asbestos leaching – Hayward Gordon's expertise has been successfully used to extract a wide variety of non-metallic minerals.





#### AUTOCLAVE MIXERS

In the late 1960s, Hayward Gordon was involved in the first commercial copper leach circuit. This capability has subsequently led to many mixer installations for high-pressure, high-temperature oxidation, leach, and reduction autoclaves.

With installations in these processes, we have established ourselves as a market leader in high-pressure mineral extraction.

## > Applications



#### **CYANIDE DESTRUCTION**

One of the more demanding applications encountered in mineral processing combines the three major categories of agitation: blending, solid suspension, and gas dispersion. It is essential to provide the appropriate type and amount of mixing to each category to ensure the desired process result – destroy all the cyanide before releasing the slurry to the tailings pond. With dozens of successful installations, we have the experience to optimally size the mixer for your application.

#### HIGH-DENSITY SLUDGE MIXER PROCESS

The treatment of acid mine water and sludge disposal is critical in recovering and discharging the water into the surrounding environment. Hayward Gordon has successfully supplied mixers into these applications for many years. The photo depicts a Smith Turbine impeller and a bottle-cap-style air sparging device. This combination



will effectively incorporate the lime and disperse the gas, promoting acid neutralization and the precipitation of the heavy metals from the solution.

#### ATTRITION SCRUBBERS

A suitable line extension to our successes with conditioning and high-intensity conditioning agitator applications. Hayward Gordon's approach to attrition scrubbers combines our experience in mixing and mining applications to provide a complete solution. As mixing specialists, Hayward Gordon, can choose the optimum impeller style from our large selection and identify the spacing and number of blades suitable for your application. In addition, the ideal cell and baffle geometry and configuration are selected by our experienced mixing application engineers.



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#### SOLVENT EXTRACTION PROCESS

In Solvent Extraction Mixer/Settler systems, the selection and design of a suitable "Primary" (Pump) mixer is crucial to the investment of the optimum level of applied power to generate the necessary head while mixing the aqueous and organic liquid phases. The Primary mix tank is often followed by a "Secondary" (Auxiliary) mixer, which provide vigorous low shear mixing and residence time to the droplet dispersion prior to phase disengagement in the settler. Hayward Gordon uses powerful customized software developed with years of first-hand experience to provide an optimized system.





#### CONDITIONING

Hayward Gordon worked closely with one of Canada's leading metallurgical research facilities on high-intensity conditioning of fine grind ores. This patented process includes the use of Hayward Gordon developed impellers. We have provided highintensity conditioners in North and South America with excellent process improvements. Standard conditioners are also available from our heavy-duty line of mixers.





#### PUMP MIXERS:

Hayward Gordon designs pumps and mixers. Pump Mixers combine both our areas of expertise. Installations in North and South America have provided us with the process and mechanical background to provide pump mixers that meet head and flow requirements while minimizing entrainment.



#### AUXILIARY MIXERS:

Hayward Gordon Auxiliary Mixers maintain the ideal dispersions created by the pump mixer.

### Mixer Engineering



#### COMPUTATIONAL FLUID DYNAMICS

Computational Fluid Dynamics (CFD) is a powerful fluid flow analysis software tool that simulates many aspects of mixing applications. It can predict operating parameters such as fluid velocities, flow patterns, blend times, power draw, shear, and strain rates. With the ability to predict mixing performance, optimum impeller/tank/baffle selection and configuration can lead to more efficient mixing systems and better process control. CFD can also be used to improve the performance of existing equipment.

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#### LAB SERVICES

We offer a state-of-the-art lab to measure and determine the appropriate level of mixing required for your application. We can ensure reliable results at the full-scale plant size with scale-up procedures. We have a complete inventory of lab-sized impellers ensuring the most efficient mixing. Testing and scale-up services are provided at no cost or obligation to the customer.

Hayward Gordon's modern, 60,000 square foot headoffice and factory located just outside Toronto, Canada, is fully equipped with design engineering, manufacturing, assembly, and testing facilities to ensure your equipment performs to expectations.



# Installations



LHX-10S supplied with anchor impeller, tank and tank furnace on Uranium Denitration.



LHX-160 with 150 HP drives operating on zinc and copper concentrate tanks.



Large AH series impeller on 250 HP drive manufactured in 316SS material with Neoprene rubber covering



200 HP mixers operating on 59 ft CIL tanks.



200 HP, LHX-160 mixers on 52.5 ft diameter gold leach tank.

#### About Hayward Gordon

When it comes to manufacturing high-performing, long-lasting, cost-effective pumps, mixers, and mixing systems, we at Hayward Gordon are the gold standard – trusted by hundreds of companies around the world.

No matter how challenging or demanding your pumping and mixing application might be, we have the experience, expertise, and equipment to deliver an ideal processing solution that meets all your needs.

Our trained experts work closely with you to determine the best equipment and system to give you the perfect solution.

We're here to make your job easier, your products better, and your operation more efficient.





Hayward Gordon and Hayward Gordon Group are part of EBARA Corporation. In October 2022, EBARA Corporation acquired the Hayward Gordon Group. Integrating Hayward Gordon Group into EBARA'S Global Group of Companies expands the range of complimentary products, global manufacturing facilities, worldwide sales network, and solid financial standing.

Founded in 1912, EBARA Corporation is recognized as a world leader in the design, development, and manufacture of industrial machinery.



EBARA PUMPS AUSTRALIA PTY.LTD.

0499 627 575 | sales.epa@ebara.com www.ebara.com.au www.haywardgordon.com

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