

# Dry Air Concentrators

Rare Metals LLC

## INTRODUCTION:

Because much of the world's mineral wealth exists in exceptionally small concentrations, the cost of recovering valuable minerals from natural concentrations, as well as from the tailings produced by other processes, has historically been unexpectedly high and often left large amounts of valuable materials to waste in the tailings piles. This is particularly true when the concentrations run trace levels and up.

The S-10 and S-100 Series Electrostatic Dry-Con Recovery Systems represent a new technology, recently made available to recover massive volumes of wealth from placer deposits, long abandoned tailings piles and material dumps. This equipment is now allowing the



*S-10 in bulk sampling in New Mexico*

accumulation and development of considerable wealth from what was previously considered “worthless material”. All this can now be accomplished under the harshest of conditions, in very dry areas, and without the difficult and sometimes crippling need for water!

The history of gold mining is littered with numerous attempts to develop both wet and dry recovery methods, particularly in the United States during the Gold Rush Days. Disappointment was common.

Conditions were harsh. The availability of materials was very limited, and technology often fell short of theory. A recovery rate of 80% would have been considered very acceptable.

Today we want 90% – and try to achieve 95%!

A good dry recovery was particularly difficult to achieve. Sufficient, even air flow was impossible, and the material available lacked the elements necessary for durability and control.

### **Why Dry ?**

When considering the economics of dry vs. wet recovery, it is difficult to make an effective case for wet recovery when dry recovery is possible. Dry recovery generally offers

*RARE METALS, LLC.*

greater volumes at lower costs, requires, minimal labor, and can provide a greater percentage of recovery. Moreover, dry recovery offers greater flexibility, and completely eliminates the costs of water treatment and licensing and permits associated with environmental legislation.

The impact of mining and processing ore upon the environment is a major factor in the industry today. We believe dry recovery offers many advantages over other methods. The elimination of water contamination and treatment is certainly a major advantage. Our dry recovery method greatly lessens the impact on the environment by eliminating the use of water and chemicals. Dry recovery can eliminate environmental impact problems relative to recovery and processing, and make it feasible to operate on low grade ores.

Here, indeed, we have cost effectiveness.

## **NEW TECHNOLOGY!**

NOW we have available sophisticated technology and materials that are changing and revolutionizing the industry.

These systems produce a bulk concentrate and are capable of concentrating at a ratio from 150/1 up to 300 /1, depending upon the characteristics of the gold and other elements.

The concentrates are then easily moved by truck to a location where water, security, and power are available for the final cleanup. Moreover, systems like our S-100-C, which is self-contained, with a closed circuit system, fully portable and easily moved, affords further advantages such as maintaining the shortest possible distance from the pit or mine to the processing plant. Portability adds unheard-of flexibility to any mining operation. With this system it is possible to do bulk testing over large areas involving large runs and at extremely low costs.

*S-100-T in Australia*



**Common Clay:**

Clay is an excellent placer gold carrier. Usually the clay is derived from the erosion of volcanics and rock types associated with gold deposition. However, when clay is introduced into wet placer systems, it creates an emulsionary effect allowing the fine gold to float off or adhere to the clay making recovery very difficult. Many times placer gold is coated with clays, manganese, iron and other elements. These coatings may affect wet placer systems and reduce efficiency. With the dry recovery process the coated gold is still effectively recovered in the bulk concentrate.

What happens using the dry recovery systems? Common clays, when quite dry, have a specific gravity from 1 to 2. Gold, at 19.3 specific gravity, will drop out and/or be attracted by the electro-static potential on the recovery belt. We have found that a small clay ball with a speck of gold inside is still retained due to the electro-static effect. With today's technology and new materials, we can effectively recover gold and other minerals using this dry system, even from clay. The dry recovery system eliminates many of the problems associated with water, and provides additional control factors and elements to the process which enhance recovery. Water itself is a heavy element. The absence of water allows more efficient separation of materials by specific gravity.

**Dry Electrostatic Recovery Systems:**

The Electrostatic Dry-Con Recovery System uses a sophisticated air-fluid suspension on a specially designed riffled belt. *Model S-100-C*



Basically this is how the system works:

Bank-run gravel, dirt, clay, or combination of materials is first screened to the appropriate size, dependent upon the gradation of the gold or the mineral deposition. This might result in a head ore feed of 1/2 inch or 3/8 inch (or even smaller) down to the control gate hopper mounted over the head end of the recovery deck. The feed is controlled by the hopper. The Electro air recovery belt is moving uphill at an even controlled speed (4 inches to 10 inches per minute travel time). A custom manufactured blower of appropriate size supplies air to the air chamber maintaining a high static pressure under the recovery belt. This air flow passes through the filter blanket which is an integral part of the recovery belt. The air flow holds the gold bearing material in a fluid semi-suspension. This allows the ore bearing material to flow like running water down across the recovery deck (which is moving slowly against the flow). The air gravity separation occurs very effectively.

A critical element of this recovery process is the induced static charge. The electro-static field is induced by the air blower and the recovery belt. These components create an electrostatic potential on the recovery belt. With the average conditions, we are building up a retained static field potential of 23,000 to 25,000 volts on the recovery belt. This potential attracts the gold to the belt and retains it there.

Gold has a natural high affinity to an electro-static charge, and this is one reason for the great success we have had in recovering fine gold.

*Placer Testing Pershing County, NV*



**Models Available:**

• **Model S-10-T**

Capacity up to 10 yards per hour(Bank Run)

• **Model S-100-C** Self-contained unit.

Handles up to 80 tons per hour. (Feed to the Belt)

• **Model S-100-T**

Capacity up to 100 tons per hour.  
(Feed to the Belt)

## **Bulk Testing**

The S-10 T was built for bulk testing – the backbone of the mining industry. It is run with a small electric generator (5,000 W) and can be hand fed by five or six men, a backhoe, or a bobcat loader. Set up time is about 20 minutes. The plant does the same basic recovery as the large unit and has a variable speed motor, a hopper with a vibrating screen, and a controlled feed gate. The S-10T with a steady feed can do 50 to 70 tons a day.

The Model S-100-C is also adaptable to large bulk testing. Trailer mounted and completely self contained, with screening closed circuit conveyors, concentrate conveyor, radial" tails stacker conveyor, and centralized control panel. Set up time is around 2 hours with a prepared pad and experienced crew. There is no more effective way to do bulk testing over a large geographical area.

## **Other Minerals:**

What about other minerals and hard rock ores? Research involving tungsten, tin, the platinum group, cinnabar, silver, and lead galena ores has shown excellent results. Also free gold such as crushed ores recover with excellent results. Each individual ore must be first tested to see if these other minerals can be isolated using the dry concentrator.

The Dry-Con System also has other applications, such as a contaminant separator.

## **Cold Climates:**

Freezing has little or no effect on the Dry-Con Recovery System. Even at 10 degrees above zero recovery has been excellent. The operation of a wet placer system in these conditions would be impossible.

## **Super-Con :**

We have employed Dry-Con Systems to cleanup the concentrates when we were in a remote field location with no water. We call this “super conning”. This is simply taking a possible 10 to 20 tons of concentrates extracted from 3,000 yards of head ore and re-running the concentrates over the Electro Dry-Con plant. We do this by resetting the speed of the belt to approximately double the speed and slowing the gate control feed. From 20 tons average cons, we end up with 1 to 1 ½ tons of gold and black sand high grade concentrate.

**Future and potential:**

The future of this technology seems unlimited. As a method of concentration and separation, the Electro Dry-Con system provides greater control and much greater volumes. The flexibility and economy which are major advantages of this system will eventually tend to displace other more traditional methods of recovery and separation.

Contact RMC if you feel this technology is of interest to you or your project. RMC is a small family owned business building 100% of our machines here in the U.S.A. We are here to



answer your questions but we don't have a sales force sitting around looking for a commission. We build and recondition the units, but of more importance we use the product on our own mining operations and simply would not use anything else for recovering gold from placer deposits.



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*Three S-100-T models Installed in Series*