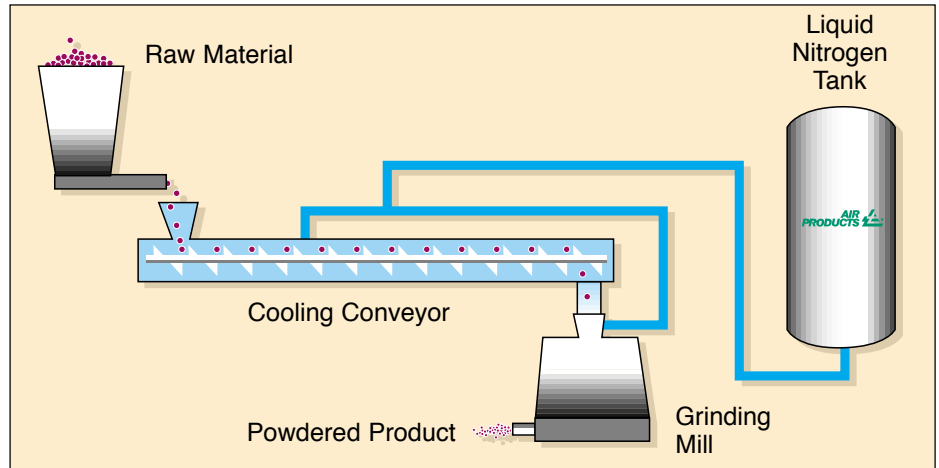


## *Cryo-Grind Size Reduction Systems For recycling rubber materials*



Air Products' Cryo-Grind systems enable high value rubber materials as well as scrap rubber materials to be ground into fine particles for reuse in compounding for new rubber and plastic products. The cryogenic temperatures used ensure that the rubbers are brittle enough to be ground to below 400 micron particle size at normal operation and even to below 100 micron particle size with an improved process. The low temperature also ensures the rubber is protected from thermal degradation.

The Cryo-Grind process is not new, but the improvements made by Air Products, working in conjunction with the grinding mill manufacturers, mean that the nitrogen ratios and particle sizes achievable are now better than ever. Further benefits of quality and surface characteristics can also be realised.

### *How it works*

By lowering the temperature of the rubber to below its glass transition temperature (the temperature below which the rubber exhibits glass-like properties), the grinding equipment is then able to produce high quantities of finely ground material without damaging the product.

As the rubber cools its structure becomes under stress so when subjected to impact (or other action) from a grinding mill shatters into small, regular-sized crystal-type structures. These differ depending on how the rubber was originally manufactured, but the cryogenic temperature

ensures that the weaker points in the rubber are exposed, whatever the structure.

Air Products' cooling conveyor feeder provides the most efficient method of using liquid nitrogen to cool the rubber crumb.

### *Advantages*

- **Smaller particles**  
Achieving sub 400 micron particles (or even down to 100 micron) means that rubber can be introduced into higher performance material compounds with negligible physical and visible trace of recycled rubber.
- **More uniform particle size distribution**  
Cryogenically ground rubber has a narrower more consistent size distribution.
- **Efficient process**  
Nitrogen usage is minimised and throughput maximised by using Air Products Cryo-Grind systems.
- **Trial facilities**  
Call your local Air Products representative to find out about Air Products' trial and demonstration facilities appropriate to your application.

**Cryo-Grind system cooling conveyors**



*Foam-insulated cooling conveyor  
– ideal for applications that require frequent material changes*



*Vacuum-insulated cooling conveyor  
– this cylindrical conveyor is designed for maximum operating efficiency*

**Overview of the vacuum-insulated cooling conveyors**

Type	Screw Dia. (inner) [mm]	Outer Dia. [mm]	Overall Length [mm]	Mid. Inlet Outlet [mm]	Height (Flange) Inlet-Outlet [mm]	Approx. Weight (Incl. Frame) [kg]
E-100	100	219	4000	3000	600	270
E-150	150	256	4000	3000	600	300
E-300	300	406	4000	3000	600	400
E-300XL	300	406	7000	6000 (max.)	700	650

**Utility Requirements:**

Electrical motor: between 1.1 and 3 kW, 400V, 3 phase

Instrumentation: 220V single phase

Instrument air: (GAN) 6 bar

**About Air Products**

Air Products is a leading international gases and chemicals group, with turnover of approximately \$10 billion and operations in over 40 countries worldwide. We have more than 60 years' cryogenics experience and three decades of research data on cryogenic grinding techniques.

**State-of-the-art systems**

The Cryo-Grind systems have been developed using the expertise of Air Products' in-house cryogenic grinding research facilities, together with those of our associates, the grinding mill manufacturers, to provide the optimum rubber and rubber scrap recycling solutions.

**tell me more**  
**www.airproducts.com/**  
**cryogenics**

**The next step**

For more information on Cryo-Grind technology and details about demonstrations, please contact your local Air Products office.

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