



The Gentle and Green Answer to Whole Bean and Ground Coffee Transport

To ensure the best product possible, efficient and careful transport of coffee is essential and often overlooked and underestimated. (By Daniel Ephraim)

In any coffee processing or manufacturing facility, the transportation, or conveying, of whole bean and ground coffee is a key element in the process. This conveying of the coffee is not a process in itself, but it is the link that connects the other processes, such as roasting, grinding and packaging. In this regard, it is critical that the conveying method moves the product efficiently while maintaining the product integrity that has been previously

established by those other processes.

For instance, if coffee is going to be sold as whole bean, one of the quality points will be the amount of breakage evident in the final package; accordingly, it is vital that the conveying system neither damage nor break apart the whole beans as they are transported from the roaster to the packaging line, possibly with a whole bean storage hopper in between. Ordinarily, with a screw, bucket or other type of con-

veyor, there might be an unacceptable amount of breakage; conversely, with the Chain-Vey, the whole beans are transported with no compromise in quality.

Another, and possibly the most important element of the conveying process concerns the transport of ground coffee, wherein the maintenance of the product integrity, which is a function of particle segregation (declassification), is critical.

For instance, when coffee is ground, the resultant particle distribution is made up of a number of different particle sizes, which constitutes the “grind”. As shown as the blue line in Exhibit 1, this ro-tap result illustrates the actual grind exiting at the grinder.

Coffee is retained at specific percentages on each of the screen sizes and the key is to ensure that the ground coffee going into the final package has exactly the same grind, or particle distribution, as that which was discharged at the grinder. This sounds a lot simpler than it is.

With the above in mind, if a transport

system that is not specifically designed for maintaining grind integrity is utilized, the particle distribution after conveying might appear like the pink line in Exhibit 1.

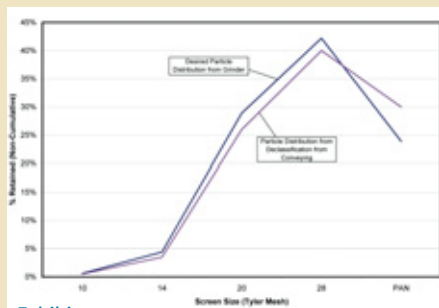


Exhibit 1

This is a huge problem, and solutions in the coffee industry have ranged over the years from bucket, screw, drag, dilute and dense phase pneumatic conveying systems. Each system has strengths and weaknesses, but there is no question that a void has existed in the marketplace for a conveying system that can move coffee, whole bean or ground, great distances without product degradation.

For this reason, MPE developed the Chain-Vey, a tubular drag chain system that utilizes 316 stainless steel chain to gently move the coffee utilizing molded food-grade “pucks” that are pulled by the chain through a stainless steel tube (see Exhibits 2A & 2B). The result is an extremely energy efficient system that protects the coffee from damage, oxidization and, in the critical case of ground coffee, declassification and segregation.

Exhibit 2B



Exhibit 2A



Typical Chain-Vey configurations are outlined below:

Case 1:

A whole bean Chain-Vey configuration will transport the coffee, from the de-stoner to a whole bean hopper, through the use of this gentle conveying method, as well as the “let down” ladder in the whole bean hopper. The result is an extremely high-quality whole bean product, with minimal breakage, in the package.



Case 2:

The typical ground coffee Chain-Vey system will transport the ground coffee directly from under the grinder to the ground coffee system, which is also designed for mass-flow to prevent ground coffee segregation and declassification.



In both of the above cases, the coffee moves gently through the Chain-Vey through the use of the “pucks” that are molded on the stainless steel chain. This chain is extremely durable, and will not stretch, fray or deteriorate in any other manner.

Turns, or corners, in the system are accommodated through the use of “sweeps” that can range from 10 – 90° and are designed to minimize friction. When necessary, “live corners” are utilized to facilitate long runs and multiple turn situations.

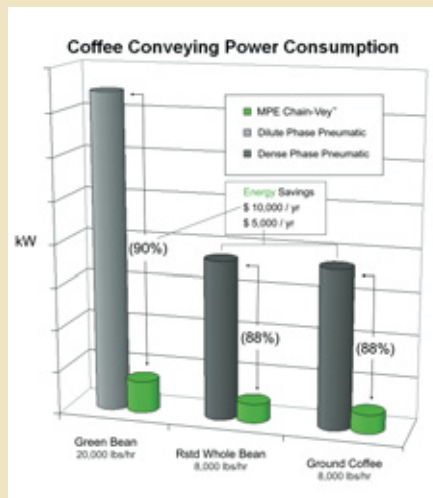
Once the coffee reaches one, or one of several, destination point(s), it is discharged utilizing a drop bottom valve

whose design maximizes product integrity and minimizes leakage.

Chain-Vey As a Green Alternative

Typical power requirements for the Chain-Vey are as little as 1 HP and, when compared to alternative conveying systems, such as dilute or dense-phase pneumatic systems, the energy savings can be as much as 90%. Assume that the requirement exists for a 100 foot conveyor length at a run rate of 12 hrs./day and 250 days/yr., a Chain-Vey will achieve electrical energy savings of up to 90%, or \$10,000 and \$5,000/yr., on the green and roasted coffee applications, respectively.

Summarizing, MPE’s development of the Chain-Vey conveyor technology meets the increasingly challenging demands of the modern coffee roaster and is a sustainable alternative for this element of the manufacturing process. Features of the new Chain-Vey include the protection of whole bean quality and grind integrity as well as the opportunity to reduce energy consumption by as much as 90%. ☕



With experience in the coffee business for over 30 years, **Daniel Ephraim** has been active in the development and design of coffee grinding and other related processing equipment. He has presented at numerous coffee conferences and symposiums and conducted hundreds of coffee grinding seminars at coffee manufacturing facilities in North America and overseas. His company, Modern Process Equipment, Inc., is based in Chicago, Illinois.