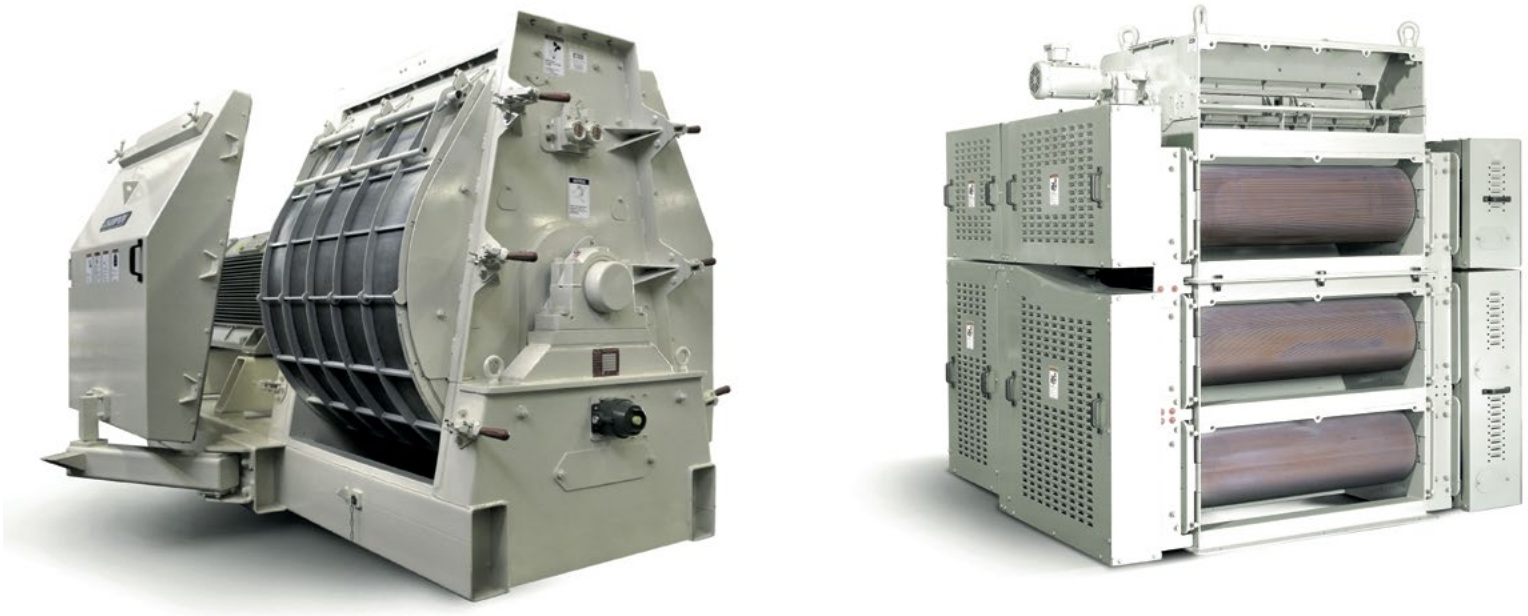
Doug Kitch, technical sales manager at CPM Industrial Solutions, outlines how greater productivity can be achieved when producing biofuels

How CPM works to improve biofuel feedstock processing efficiency



A hammermill and a roller mill

It takes a lot of inputs to convert a raw material into a usable biofuel. It requires specialised expertise, precision equipment, the correct materials and well-executed processes.

However, often, from a cost-perspective, the most significant expense in the process of converting raw materials to biofuel is energy.

That is why, at CPM, we have focused on developing products, solutions and expertise that can help our customers improve the efficiency of their biofuel production processes.

CPM's role in biofuel production

CPM's global brands touch biofuel production in many ways. Through its Crown brand, the company is one of the industry leaders in oilseed extraction technologies since the late 1800s, and it provides equipment and expertise to oilseed-based biofuel production facilities today.

Its automation capabilities improve these processes' automated efficiency.

Additionally, its legacy CPM brand provides equipment, services and expertise for the shredding, crushing, grinding, briquetting and pelletising processes that are essential to creating many biofuels.

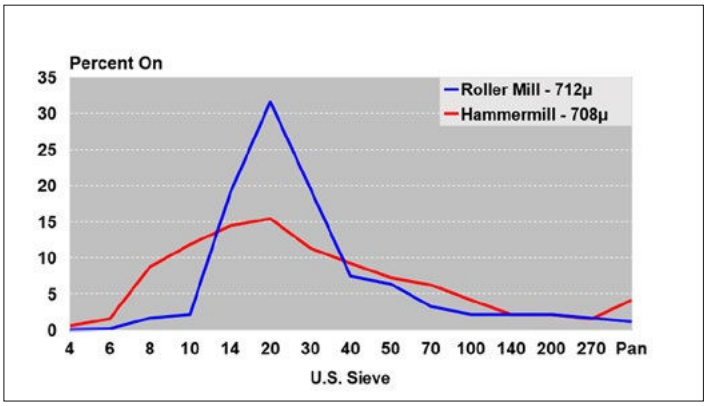
Improving feedstock efficiency

At CPM, Kitch and his team spend a lot of time working to improve the efficiency of feedstock size reduction processes in hammermills and roller mills.

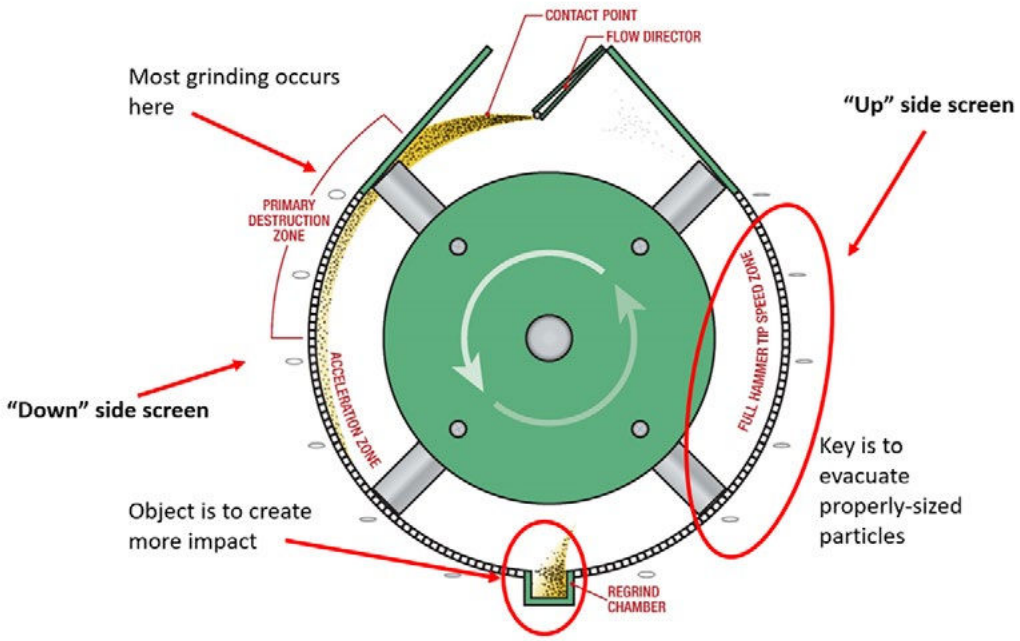
Reducing the size of feedstock is often a key step in the early stages of biofuel production. Hammermills and roller mills are frequently used to create biofuels based on corn, soybeans, biomass and other feedstocks.

Typically, in these processes, the ideal outcome has two qualities – a product that's ground as small as is feasibly possible and a product that is as uniform as possible.

There is, of course, the goal to achieve an end result as efficiently as possible.



Roller mill and hammermill – mean particle diameter: -710 microns



Picking the smartest trade-offs

Particularly when it comes to making a finer-ground final product, engineers and operators know that they often face a choice between a finer particle size and overall capacity.

In general, by making the particle size smaller, this will result in a lower throughput. A lower throughput with the same energy input means a less efficient grinding process. However, a finer grind can result in improvements in the rest of the production process.

It may sound like a zero-sum game, but luckily, it is not.

Both the complexity and opportunity come from the fact that there are dozens of different ways to tune a hammermill or roller mill to produce the desired grind, and finding the ideal setup can often reduce the energy required to achieve that grind by 30% or more.

What we "tune" for efficient feedstock processing

There are dozens of factors to consider when optimisng hammermills and roller mills, but there are a few of the factors to look at most commonly when working with customers on feedstock processing operations.

"Reducing the size of feedstock is often a key step in the early stages of biofuel production"

Optimising hammermill efficiency and performance

Hammer pattern
This should be matched to the horsepower of the mill, and can be customised to adjust for grind. The wrong pattern can be costly in terms of efficiency and wear parts.

Screen area
It is important to ensure an appropriate ratio of screen area to horsepower for the application.

Screen hole diameter
This can be adjusted to achieve a finer or coarser grind. However, often, hammer pattern and tip speed are a better place to start.

Hammer position
The "coarse" position is more energy efficient than the "fine" position.

Aspiration
Adequate air volume pulling through a mill is essential to the efficiency of the process.

Optimising roller mill efficiency and performance

Roll size
Bigger rolls mean larger throughput, but rolls can become too big.

Nip angle
Larger diameter rolls reduce the nip angle between the rolls, and this allows the rolls to more efficiently grab material and pull it through.

Roll surface area
A larger surface area can decrease the frequency and rolls have to be removed and corrugated, reducing the total operating cost of the mill.

Blue rolls
CPM offers a unique roll technology, Blue Rolls, which can increase the life span of a roll by between two and five times between recorrugation – reducing maintenance costs and downtime.

Roll deflection
As rolls become too wide, they can deflect at the centre, causing a reduction in uniformity of the grind. Avoid using rolls greater than 52" in length for grinding applications.

Corrugation
This needs to be matched to the application for optimal results and efficiency.

Speed differentials
Appropriate speed differentials create a shearing effect that produces a more uniform grind.

Roll parallel and tram
Rolls out of parallel or tram will produce an inconsistent product and wear prematurely.

Balance work between roll pairs
In double- or triple-pair machines, balance the work between each pair of rolls evenly.

Feedstock efficiency experts on call

Of course, if this all sounds a bit overwhelming, there is another option. Just reach out to the team that has been helping customers to appropriately specify, maintain and optimise crushing and grinding equipment for more than 100 years.

For more information:
Visit: cpm.net or email contact@onecpm.com for further information