

Five key elements of successful **bar forming**



Drive more capacity with shorter,
efficient runs with these expert tips

A PTL eBook

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INTRODUCTION

The demand for variety and volume and resulting implications

As a result of our 35-plus year history and the knowledge and experience we've gained, we have witnessed trends and patterns - especially when it comes to the continually-evolving challenge of customer demand. A key trend we've noticed recently is brands needing to offer a greater variety of product types to meet consumers needs, and the pressure that builds on production..

The data we collected on SKU proliferation demonstrated that across the chocolate and bar manufacturing industry, businesses are adding to their inventory and product range in order to meet an increased and diversified demand.

So how do you deal with the production pressure that's inevitably associated with increasing the variety of your products?

The following sections outline best practice advice for bar manufacturers seeking to speed up their product lifecycles, deliver SKU variety to scale, and ultimately keep up with the competition.



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BAR FORMING OVERVIEW

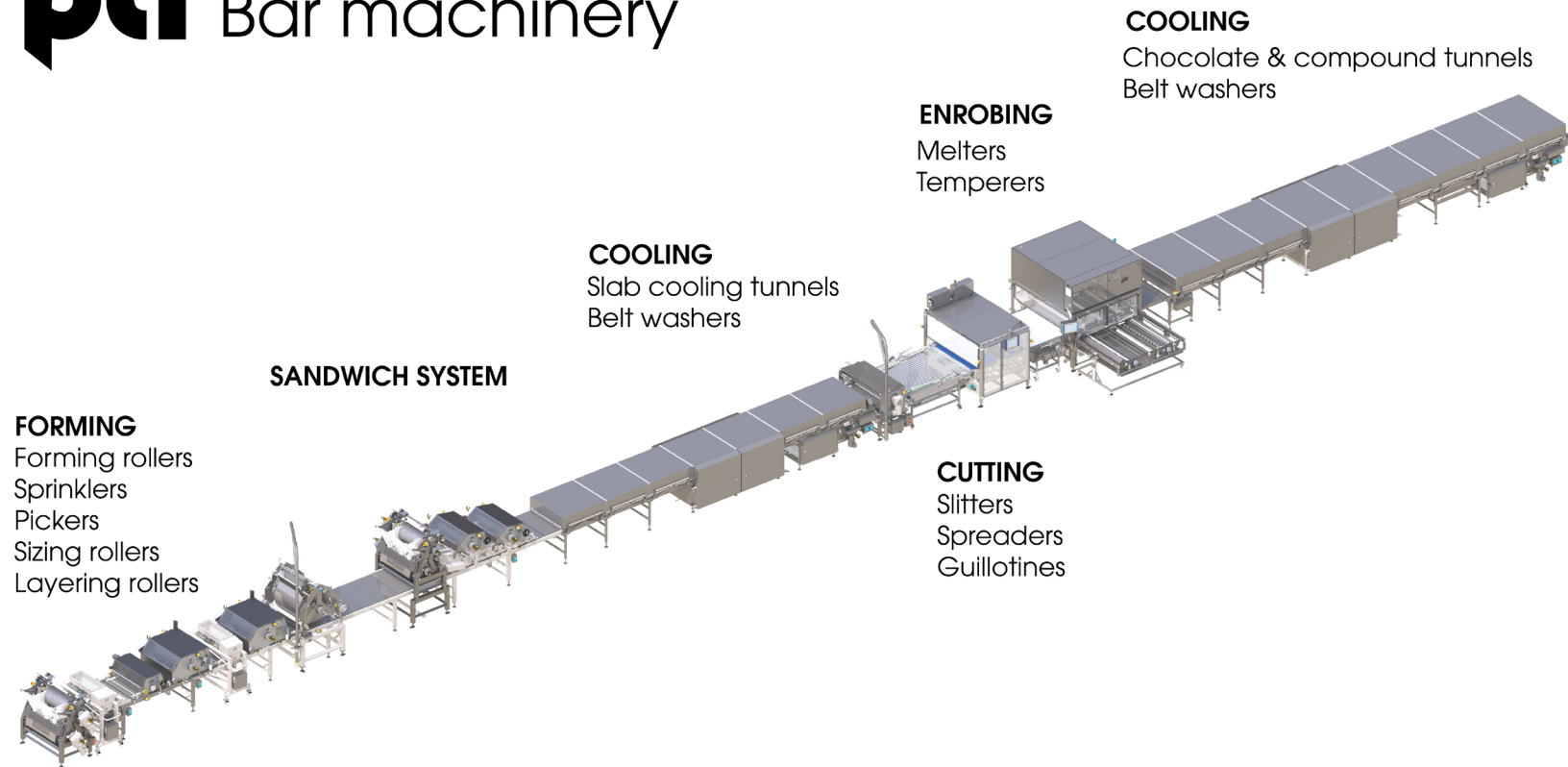
When it comes to bar forming, processes like application of different layers and particulates, slab cooling, slitting, spreading and guillotining are the most critical. And if required, enrobing.

A typical bar line process would usually involve:

- Product being fed into the forming hopper, either continuously or in batch form where rollers pull the product through into a continuous sheet. The thickness of the bar is defined at this stage.
- The product being compressed, with the addition of different layers as required.
- The product is run through cooling tunnels to temperatures suitable for cutting – this reduces stickiness.
- The product is then passed through a series of knives to create ‘ropes’, which are then spread apart to allow the necessary gap for packing or coating, and to prevent ropes from sticking together.
- Guillotines are used to cut the bars to the required length – some guillotines use ultrasonics to combat stickiness of product.
- If needed, the bars are then enrobed with chocolate or other coatings. They can be fully coated, or have the coat applied to just the bottom of the bar. This stage also includes decoration of the bar.
- The formed and coated bars are then cooled – times vary depending on whether compound or real chocolate has been used.
- Finally, the resulting bars are sent to packaging.



ptlTM Bar machinery



Those are the basics of the bar forming process, but what do you need to focus on to ensure its success?

KEY SUCCESS FACTORS IN THE BAR FORMING PROCESS

We've been designing and implementing chocolate and bar machinery for large multinationals and co-manufacturers around the world for over 35 years now.

Over that time, we've identified these five bar forming success factors to ensure your bar line is equipped to produce the necessary volume of high quality bars, to scale:

1. Mixing
2. Temperature control
3. Hopper level
4. Positive removal of mass
5. Speed relationship of rollers

1: Mixing consistency: the greater the accuracy, the better the results

The critical factor to keep in mind when mixing is the consistency of the mix. If you can ensure maximum accuracy when cooking the binder and mixing the mass of each batch or continuous process, you'll see it in the results.

Batch vs. Continuous mixing

Batch mixing is a process in which the ingredients for one batch are loaded (either at once or in a pre-defined sequence), mixed, and discharged from the mixer before another batch is introduced.



Continuous mixing is the process of continuously metering ingredients directly into the mixing chamber and as a result, generating a continuous stream of mixed product at the exit of the mixer.

TOP TIP: Once the mixing method and technique have been established, it's important to adhere to an exact mix time duration.

The gap between the top and bottom forming rollers is usually adjustable, and this needs to be set at a gap that provides the desired final product thickness, and density.

There's no rule-of-thumb when deciding which method to use, but if you're producing a small amount of SKUs but at a high volume, the continuous method is probably more efficient; however if your range of SKUs is higher, the more flexible approach of batch mixing will likely work better.

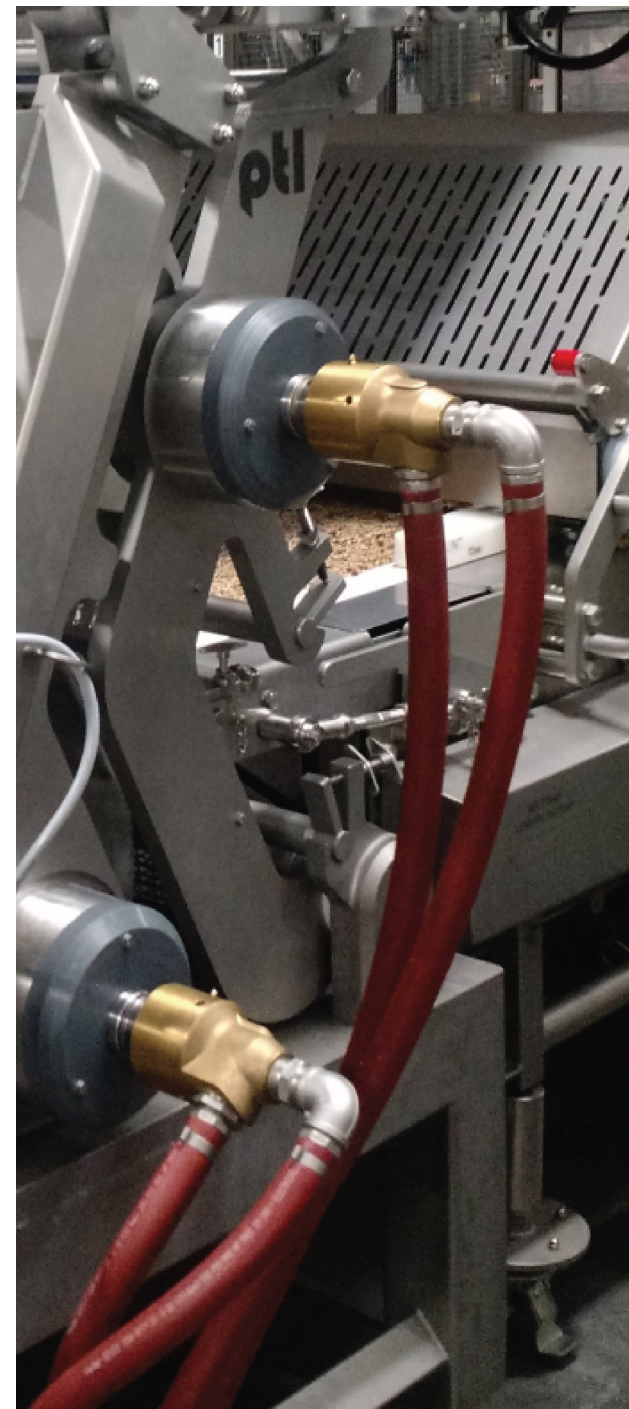
The storage of batch mixes must be held in a temperature-controlled state. This ensures no cooling or heating occurs between mixing and being fed in to the forming hopper. Each product mass will have an ideal mixing time, and will require either gentle or aggressive mixing.

2: Arrange proper temperature control for smoother and faster product flow

This is a critical element of the process, and there are three areas that require temperature control: the environment, the equipment, and most importantly the product.

Bar manufacturing typically requires a reasonably cool processing temperature. For that reason, it should be separated from other processes that requires a higher heat, such as a baking environment. It's important that the temperature of your product isn't affected by a heated area, as it could impact on how the product is formed, and on the product's moisture levels.

Effective temperature control ensures that the product mix and viscosity delivered to the forming hopper is accurately maintained at all times, whether it be continuous feeding, or batch feeding.



TOP TIP: The ability to heat and cool both forming rollers, evenly across the roller width, with individual temperature controls will ensure the best control required to match whatever product is being run.

Temperature adjustments are necessary in some cases, for example:

- Some products with hot binders such as muesli and granola bars require roller heating – typically the top roller is run hotter than the bottom
- Very sticky binders run well with chilled rollers on both top and bottom.

Remember, testing is required to identify the ideal running speeds and temperature conditions for each product, for example, some products will not drive through the smooth forming rollers without allowing a thin build up of syrup to form on the roller.

If a hopper heating option is fitted, it must be set and maintained at a temperature that is ideal for the product being used. The hopper level must be maintained at a constant level as required.

If you have a long incline conveyor feeding the former hopper, avoid having cold air blowing on it, as during downstream stoppages it will shorten the processing life of the mix.

Heated under belt beds are helpful for some difficult products.

3: Set up hopper level correctly for consistent layer density and size

When the mixed ingredients are poured into the forming roller hopper, it's critical from a pressure, and consistency of weight point of view, that the hopper level is maintained at a consistent height.



TOP TIP: Cut down on wastage and maintain bar length and weight consistency by using machines designed with slab tracking

This is achieved by even feeding of the mix into the hopper, and is typically done using an incline conveyer. The product should be continually 'chunked' into small clumps, and then fed into the hopper using a level control device to maintain an accurate hopper level.

The hopper level of the mass must be maintained at the same level at all times during production - typically around 50 to 60 percent of the hopper capacity. The key is to maintain a constant level once the ideal hopper level has been established, with minimum dead band and as little variation as possible.

By holding the level at a constant height, the contact surface on the top roller remains the same, giving a consistent push on the mass into the gap.

4: Positive removal of mass to reduce bar line waste.

Once the product is metered into the forming roller hopper, it must be gently removed from the top and bottom rollers. This is achieved with correct temperature control of the rollers, as well as the use of scrapers (stainless steel or teflon) to positively and gently remove the product.

TOP TIP: Select sizing roller types with your end product in mind. Options include stainless steel (which can be cooled or heated) or HDPE. Profile rollers can shape your bars to showcase a point of difference or add a filling like jam!



Each scraper action is crucial; firstly the top scraper ensures that the mass is removed from the top roller without pulling the slab sheet apart, or accumulating build-up.

Aim for a smooth and gentle transfer from the bottom roller over the peeler/scraper, and on to the forming table belt.

After any washdown/cleaning it is essential that all parts that have been removed for cleaning are inspected thoroughly to ensure no damage prior to reassembly.

5: Maintain the speed relationship of rollers according to the product

When the product is being formed between the two stainless steel rollers, quite often those rollers will run at the same surface speed. However they may need to run at different surface speeds, depending on the product. Ratios are difficult to define as some products run best with matched roller surface speeds, others run best with the top roller set at a higher surface speed.

However once established, maintaining the correct speed relationship between top and bottom forming rollers is critical.

PTL'S 'CREATING TOGETHER' SERVICE

PTL bar machinery is designed to be modular, flexible, hygienic and enable scale.

The one-size-fits-all approach is not a useful one for production machinery, particularly when you are trying to be agile and responding to market trends. Off-the-shelf equipment won't have the flexibility to adapt to the individual needs of a food processing facility. Every organisation has different requirements, meaning the equipment they use should be able to change to fit those requirements, not the other way around.

We invite you to be part of the process, meaning our experience and expertise is matched with your exact requirements.

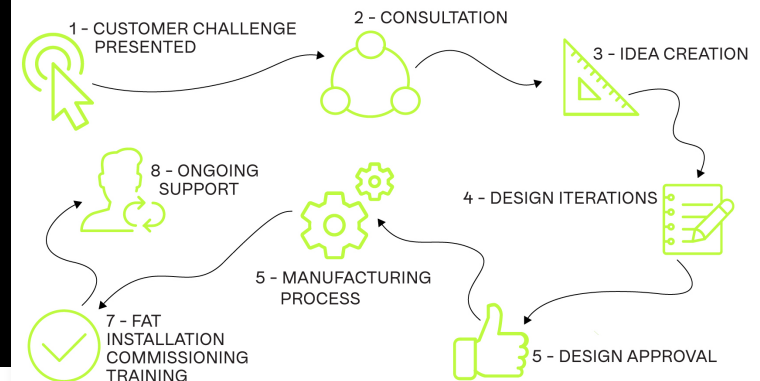
At PTL, we prefer to come at it from a collaborative angle - we call it 'Creating Together'. This approach combines our experience and expertise with your exact requirements, resulting in fit-for-purpose machinery every time. To ensure the best results, we provide direct access to those with know-how – from sales, to design to ongoing technical expertise.

A process that's collaborative, open and responsive

Once installed in your facility, the unique design of PTL equipment will enhance performance efficiency and will reduce production pressure, allowing you to support more SKUs as needed.

We've worked extensively with multinationals, large privately owned companies and large co-manufacturers. We invite our customers to be part of the process, because we know this is the best way to achieve the kind of outcome that will ensure your manufacturing process stays ahead of the game.

Get in touch and we'll start a discussion about your requirements.





Defining your challenge

Assessing your goals and challenges ensures we understand what you need from your equipment.



Consultation

You'll meet with PTL to discuss your application, contractual requirements, budgets, and timelines, all under strict confidentiality. You'll also be taken through how we approach unique design and build applications.



Designs

After a kick-off meeting with you, our team goes to work. They'll consider your space, workflow, goals, and existing equipment to produce basic models, sketches, layouts, and process-flow diagrams for you to review.



Iterations

You'll have the chance to review the designs, and work with the PTL team to make any adjustments, so you know it will suit you exactly..



Design approval

Happy? Give us your sign-off and we'll move on to the next step.



Manufacturing process

Using our refined and tested manufacturing processes, we'll manufacture your equipment to exact specifications.



Installation, commissioning, and training

We'll train your team and work with you to ensure the installation, testing, and production start-up run smoothly.



Ongoing support

Get help and support any time from our responsive team.

At PTL, we prefer to come at it from a collaborative angle - we call it **'Creating Together'**. Get in touch and we'll start a discussion about your requirements.