



# Maximizing Efficiency and Quality with Custom Toll Blending Services

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## WHITE PAPER

by Joel Eaton,  
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The goal for manufacturers is clear and simple: to achieve the highest efficiency possible while maintaining consistent quality in the products they create. Custom toll blending services are a key player in this mission, offering tailored and cutting-edge solutions for industries and applications that depend on precise blending for optimal performance.

⋮ **This white paper examines the many advantages manufacturers can gain by leveraging custom toll blending services ... and how they can transform operations in foundries, flooring, infrastructure, and more.**

Toll blending is similar to contract manufacturing, a form of supply chain management where a business outsources either a part or all of its production to a third-party manufacturer. This third party is known as a subcontractor or contracting company. Toll blending is a specialized form of contract manufacturing. In a tolling arrangement, a business supplies a specific formula to a subcontractor under a nondisclosure agreement (NDA). In some cases, raw materials are supplied with the formula; in other cases, the subcontractor supplies the raw materials (see Figure 1). In either case, the subcontracting company is also called the tolling company or toll manufacturer.

This white paper examines the many advantages manufacturers can gain by leveraging custom toll blending services — used to produce specialized blends of minerals, aggregates and additives — and how they can transform operations in foundries, flooring, infrastructure and more.

**Figure 1.** Toll manufacturing can be turnkey or service-based. In either arrangement, the intellectual property belongs to the manufacturer requesting the subcontracting agreement and is protected by an NDA.

|                    | TURNKEY ARRANGEMENT                      | SERVICE-BASED AGREEMENT               |
|--------------------|--|---------------------------------------|
| MANUFACTURER       | Intellectual Property                    | Intellectual Property + Raw Materials |
| TOLLING CONTRACTOR | Raw Materials + Manufacturing Operations | Manufacturing Operations              |

## Your Recipe, Expertly Blended and Delivered

Operational efficiency in manufacturing hinges on an intimate understanding of specialized processes. Engineers and product specialists perform experiments in research and development labs to determine the optimal combination of raw materials for their products or processes. This process may take years as companies fine-tune the precise mix of sand, minerals, plastics, chemicals, fillers or flux that meets their needs. After the formula is perfected, manufacturers must secure a consistent supply of their precise blend. Outsourcing the blending process can free manufacturers to focus on their core operations, increase cost-efficiency and facilitate scaling up production.

That's where custom toll blending comes in. Toll blending experts specialize in sourcing high-quality raw materials, mixing and packaging customers' custom blends, and delivering their recipes with the same consistent quality, batch after batch. Signed NDAs protect customers' intellectual property. Figure 2 illustrates the toll blending process typically seen at Covia's Black Lab operations.

## The Advantages of Partnering with a Custom Toll Blender

Outsourcing to a custom toll blender offers notable advantages. Manufacturers gain in-depth knowledge and extensive experience by working with a team of toll blending specialists. This know-how ensures precise formulation and blending, tailored to meet each client's specific requirements. Furthermore, professional toll blenders apply rigorous quality control protocols and adhere to standardized procedures to prioritize consistency and quality, contributing to enhanced operational efficiency and performance for the manufacturer. Additionally, by sourcing raw materials from reputable suppliers and maintaining a robust supply chain, custom toll blending services ensure reliability and minimize operational disruptions.



**Figure 2.** Toll blending brings together a company's proprietary formula with exacting specifications for raw materials. The toll manufacturer must deliver the final blended product accurately, confidentially and on time.

## BLENDING EXPERTISE

The toll blending experts at Black Lab possess a deep understanding of the science behind the materials they work with, including how various components fit and work together. For example, the shape and size of different materials affect how they move and settle. Suppose you're working with different kinds of sand or combining sand with other materials. In that case, it is essential to understand the attributes of the materials and how they influence the final product's performance. Working with customers, Black Lab's technical team will help design an efficient process to deliver the precise formula required. At the same time, the team only follows the recipe provided by the customer. They are not involved in developing formulas. The team members follow strict privacy policies and procedures to protect customers' intellectual property.

As blending specialists, toll blenders have both the experience and the equipment to produce custom blends with optimal efficiency while maintaining consistency. Black Lab has invested in cutting-edge scales and a variety of mixer types to enhance quality and batch-to-batch consistency. Its facilities are equipped to handle both small and large orders, with packaging solutions that include supersacks and totes, as well as bags, pails and drums of varied sizes.

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## THE RIGHT MIX OF MIXERS

Choosing the right mixer for the job depends on the attributes of the individual components in the mix, as well as how they need to integrate when blended together for the final product. Some of these attributes include how fragile, abrasive, free-flowing or cohesive the powder, grains or granules are within the blend. From there, expert toll blenders need to know how these different components will interact when mixed. After determining if the size, shape and consistency of the components might complicate the consistent distribution within the blend from batch to batch, toll blenders will select the right mixer to compensate.

- **Rotary paddle mixers** are an industry standard that blend by lifting the product on multiple paddles and letting it fall back into the rest of the product, an action which is gentle while delivering consistent blends.
- **Ribbon mixers** move ingredients simultaneously inward and outward to ensure a consistent mix with less shear. It can handle large batches of bulk materials, including powders, granules and pellets.
- **The tumble mixer**, as the name implies, tumbles the ingredients together. This is better for combining ingredients of different sizes or densities.

## STRINGENT QUALITY CONTROL

By partnering with a reliable toll blender, manufacturers can ensure that their products meet the highest quality standards, from the first bag to the last. The toll blending experts at Black Lab follow strict, standardized procedures to maintain consistent quality. All raw materials provided by parent company Covia have a certificate of analysis (COA) to ensure the quality, identity and purity of the raw materials. It's a central part of the company's quality assurance program.

- **Quality Testing:** Each Black Lab facility has a laboratory for quality testing. Customers may choose to use Black Lab's testing services, or Black Lab will send a sample of the blend to the customer's lab or a third-party lab.
- **New Blend Trials:** When onboarding new customers or starting a new product for existing customers, Black Lab will perform a trial run and invite customers to the facility to see the lab and how their products are blended, tested, packaged and shipped.



## RELIABLE SUPPLY OF RAW MATERIALS

As manufacturers seek new avenues for growth and expansion, maintaining a robust supply chain becomes increasingly important. Demand for raw materials is high. Finding suitable application-specific materials — which might include specific types of sand, lime, white cement, gray cement, fly ash, and specialty chemicals and minerals — can be challenging. Working with an experienced toll blender allows customers to focus on their business without worrying about the supply of their materials.

Custom toll blenders are raw materials experts and can help manufacturers optimize projects from the start by providing guidance, if needed, on the selection of components. Black Lab has access to more than 600 raw materials, including minerals, aggregates, and powders for epoxy and urethane systems, as well as polymer concretes, mortars, and grouts. Covia has a broad product portfolio for use in the glass, ceramics, coatings, foundry, polymers, construction, sports and recreation and specialty markets in North America and around the world. These products include:



### Silica

Silica (the name given to a group of minerals composed of silicon and oxygen) exists in many different forms. At Covia, we produce the crystalline forms of silica — quartz as both sands and flours.

Silica is hard, chemically inert and has a high melting point, making it a valuable material in a range of applications. For industrial use, pure deposits of silica capable of yielding products of at least 98% SiO<sub>2</sub> are required.



### Calcium Carbonate

Ground calcium carbonate (GCC) is a chemical compound with the formula CaCO<sub>3</sub>. Calcium carbonate is the active ingredient in agricultural lime and is created when calcium ions in hard water react with carbonate ions creating limescale. It is commonly used medicinally as a calcium supplement or as an antacid.

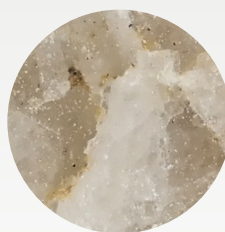
Precipitated calcium carbonate (PCC), also derived from lime, has many industrial applications. PCC is made by hydrating high-calcium quicklime and then reacting the resulting slurry, or “milk-of-lime,” with carbon dioxide. PCC can act as a functional additive in sealants, adhesives, plastics, rubber, inks, paper, pharmaceuticals, as well as nutritional supplements.



### Ball Clays and Kaolin

Kaolin (also known as china clay) is a white, soft, plastic clay mainly composed of fine-grained plate-like particles. It is chemically inert, non-abrasive and has low heat and electricity conductivity.

Plastic clays have a wide range of colors, but when fired, selected clays give results that are pure white. Plastic clays are used in the production of fine ceramics, for filling and coating of paper and in many other markets.

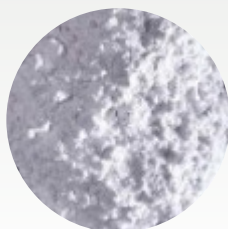


### Feldspar

Most of the products we use every day are made with feldspar, the most abundant group of minerals in the earth's crust. Feldspars have both alkali and alumina content, which makes them particularly valuable in industrial processes.

Feldspar aluminosilicates act as a flux to lower the temperature of vitrification and provide alumina, which promotes hardness, durability and resistance to chemical corrosion in ceramic wares, electrical porcelain and all types of glass and fiber insulation.

Feldspars play an important role as fluxing agents in ceramics and glass production and are also used as functional fillers in the paint, plastic, rubber and adhesive industries.



### Nepheline Syenite

Nepheline syenite is a quartz-free aluminum silicate consisting primarily of the minerals nepheline, microcline and albite.

Because of its extremely low melting point and high alumina content, nepheline syenite is used as a glass phase promoter, a ceramic flux and also as a functional filler in paint, plastics and other materials.

As a division within Covia, the world's premier high-end industrial sand producer, Black Lab can access deep supplies of all these materials to meet different customer needs. They can find or make material to meet a customer's specifications — whether they are looking for a particular size, shape or color of sand or other specialized raw material. The table on the following page (Figure 3) shows the range of materials available across our sites.



Figure 3. Covia has access to a wide range of minerals at its various North American sites.

|                     | Ball Clay | Casting Clay | Kaolin Clay | Silica | Crystalline Silica | Microcrystalline Silica | Nephele Syenite | Quartz | Monocrystalline Quartz | Resin-Coated | Calcium Carbonate |
|---------------------|-----------|--------------|-------------|--------|--------------------|-------------------------|-----------------|--------|------------------------|--------------|-------------------|
| Blue Mountain, ON   |           |              |             |        |                    |                         | ⬇               |        |                        |              |                   |
| Camden, TN          |           |              |             | ⬇      | ⬇                  | ⬇                       |                 | ⬆      |                        |              |                   |
| Chardon, OH         |           |              |             | ⬇      | ⬇                  |                         |                 |        |                        |              |                   |
| Cleburne, TX        |           |              |             |        | ⬇                  | ⬇                       |                 | ⬆      |                        |              |                   |
| Dividing Creek, NJ  |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      |                        |              |                   |
| Elco, IL            |           |              |             |        |                    | ⬇                       |                 | ⬆      |                        |              |                   |
| Emmett, ID          |           |              |             | ⬇      | ⬇                  | ⬇                       |                 | ⬆      |                        |              |                   |
| Fort Smith, AK      |           |              |             | ⬇      |                    |                         |                 |        |                        |              |                   |
| Gore, VA            |           |              |             | ⬇      | ⬇                  | ⬇                       |                 | ⬆      |                        |              |                   |
| Guion, AR           |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Hephzibah, GA       |           |              | ⬇           |        |                    |                         |                 |        |                        |              |                   |
| Huntingburg, IN     | ⬇         |              | ⬇           |        |                    |                         |                 |        |                        |              | ⬆                 |
| Junction City, GA   |           |              |             | ⬇      |                    |                         |                 | ⬆      | ⬆                      |              |                   |
| Lakeshore Sand, ON  |           |              |             | ⬇      | ⬇                  |                         |                 |        |                        |              |                   |
| Lugoff, SC          |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Marston, NC         |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      |                        |              |                   |
| McIntyre, GA        | ⬇         | ⬇            |             |        |                    |                         |                 |        |                        |              |                   |
| Mineral Visions, IL |           |              |             | ⬇      |                    |                         |                 | ⬆      |                        |              |                   |
| Nephton, CA         |           |              |             |        |                    |                         | ⬇               |        |                        |              |                   |
| Oregon, IL          |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Ottawa, MN          |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Pevely, MO          |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Portage, WI         |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Roff, OK            |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      |                        |              |                   |
| St Canut, QC        |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |
| Southern Beaver, OH |           |              |             | ⬇      |                    |                         |                 |        |                        |              |                   |
| Tamms, IL           |           |              |             |        |                    |                         | ⬇               |        |                        |              |                   |
| Troup, TX           | ⬇         | ⬇            | ⬇           |        |                    |                         |                 |        |                        |              |                   |
| Troy Grove, IL      |           |              |             | ⬇      | ⬇                  |                         |                 |        |                        | ⬆            |                   |
| Tuscaloosa, AL      |           |              |             | ⬇      |                    |                         |                 | ⬆      | ⬆                      |              |                   |
| Utica, IL           |           |              |             | ⬇      | ⬇                  |                         |                 | ⬆      |                        |              |                   |
| Wedron, IL          |           |              |             |        | ⬇                  |                         |                 | ⬆      | ⬆                      |              |                   |

## Toll Blending Applications

Custom toll blending plays a pivotal role in helping manufacturers in a variety of industries meet demands for increased quality and production. From optimizing metal casting processes to enhancing the durability of flooring materials and ensuring the longevity of critical infrastructure components, toll blending services are driving performance and efficiency across diverse sectors.

### Flooring

Commercial flooring must withstand significant wear and tear, and in manufacturing environments, it must meet specific demands unique to each industry. For instance, food and beverage production facility floors must be slip-resistant and easy to clean. In addition, there are other factors to consider, such as fryer temperatures and hot oil spills in potato chip production or non-stop damp conditions in meat-packing facilities. Breweries require floors that can

withstand bottling machinery and shattering glass, while pharmaceutical manufacturing requires sterile environments and subzero temperatures for drug storage.

Custom toll blenders can help builders meet these challenges by providing the essential components blended in exact proportions.



### Infrastructure

Custom toll blenders play an important role in large infrastructure projects. Companies that build and repair public roads, bridges and tunnels rely on toll blenders to provide high-quality materials that will meet performance standards for quality and reliability.

For example, consider what goes into building a cement base to anchor large industrial machines, such as wind turbines. The cement blend must be suitable to stabilize and support the weight of the turbine assembly in different temperatures and extreme weather conditions. It must last for decades while undergoing constant movement and vibration.

### Foundries

Flux optimization is essential in ensuring production efficiency and quality in foundries. Metal manufacturers use precise flux blends to attain optimal melt quality, slag formation, and cleanliness.

Partnering with a reliable custom toll blender allows manufacturers to achieve consistent results and maintain operational efficiency.



## Criteria for Selecting a Toll Blender

When choosing a custom toll blender for your business, it's essential to consider several crucial factors, including:

- **Depth of Industry Experience:** Collectively, the Black Lab team has more than 67 years of experience. Black Lab customers enjoy working with this tight-knit, knowledgeable team.
- **Equipment and Innovation:** Black Lab's capital investments secure state-of-the-art equipment for testing, weighing, mixing and packaging custom blends. The company's three production and storage facilities are updated regularly to ensure workplace safety and efficiency.
- **Confidentiality and Quality:** Because companies invest significant resources in creating their highly proprietary formulas, a custom toll blending partner must have measures in place to protect customers' intellectual property. Black Lab maintains strict security policies with mutual NDAs and standardized privacy procedures.
- **Shipping and Logistics:** Black Lab has the capacity to store 2,000 tons of raw materials and three strategically located production facilities in Serena, Illinois; Chardon, Ohio; and Fresno, Texas. This helps reduce shipping costs and time, providing access to customers nationwide. In addition, the facilities provide a built-in contingency plan. If one plant is compromised due to an extreme weather event, for example, another one can take on added production to meet customers' needs.



### 3 Locations

Chardon, OH, Fresno, TX, and Serena, IL



### 10 Years

Length of Average Supplier Relationship



### 35+ Years

Corporate Experience



### 600

Raw Materials Available for Blending



### 2,000+ Tons

Amount of Bulk Storage



## Choose the Right Partner

Custom toll blending can provide significant benefits for various industries and applications. Working with a toll blending company can strengthen your supply chain, enhance the consistency of your products and boost the efficiency of your operations.

Black Lab is your expert partner for custom toll blending services. The team of experts at Black Lab has deep industry knowledge and experience helping customers in various industries. Customers rely

on Black Lab to deliver high-quality custom blends on time and in full. Our experts are available to answer customers' questions and provide support as needed.

Contact us today to see what it's like to work with a trusted and experienced custom toll blender that can deliver the customer service and quality you expect.



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