



HOW YOUR COMPANY CAN BENEFIT FROM ONSITE SOLVENT DISTILLATION

IMPROVE PROCESSES, QUALITY, SAFETY, SUSTAINABILITY, ECONOMICS AND MORE



From production delays, increasing compliance documentation requirements and regulatory complexity (and its related demands), to internal process inefficiencies and significant solvent spend, [the signs that indicate your company should consider onsite solvent distillation](#) can be—and often are—extensive.

It's not surprising that onsite solvent recycling has the potential to positively impact many aspects of your company's operational plan and help you identify operational efficiencies that will ensure your company achieves its strategic goals. More specifically, onsite solvent recycling can:

- Bring major efficiencies to internal processes while enhancing the quality of your facility's deliverables
- Make your facility's environment safer for your employees
- Invigorate sustainability initiatives through solvent recovery and reuse
- Promote cost savings on the front and back ends



THE MOST COMMON INDUSTRIAL APPLICATIONS THAT BENEFIT FROM SOLVENT RECYCLING

Many types of manufacturers incorporate solvent recovery and recycling into their daily operations. However, certain industrial applications are worth highlighting as those that see particularly significant benefits from the practice.



PARTS CLEANING

Parts washers are prevalent in many manufacturing facilities. And most of these facilities are expected to produce pristine parts (like those producing parts for the medical device and aerospace industries). Using dirty solvents can—often and will—lead to expensive imperfections that could even require parts to be scrapped. This results in wasted raw materials and unnecessary solvent spend.



PAINTING AND COATING

Any manufacturing facility that uses paint sprayers, spray guns, powder coating equipment and other paint application systems to paint and coat products and/or parts benefits from having a constant supply of clean solvent on hand. Painting applications require thorough cleanings to help prevent equipment clogs or inconsistent results that can cause your company to spend a considerable amount of time and money—this can all be avoided if clean solvents are used during production.



INDUSTRIAL COMPOSITES MANUFACTURING

Various solvents are used during the manufacture of products that include fiberglass and other industrial composites. From recreational vehicles to hot tubs, the global market for composite end products continues to grow and is expected to top \$113 billion by 2022.¹



ADDITIVE MANUFACTURING

This technique is essentially the industrial version of stereolithographic (SLA) 3D printing. It involves building objects by adding thin layers of material one at a time. It's commonly used to manufacture niche items like medical implants as well as plastic prototypes for engineers, but this technology continues to rapidly expand. Recently, it was even used to create a complex fuel nozzle for a GE Aviation jet engine.² As its uses expand, so too does the need for solvent usage. Advanced additive manufacturing applications can—and often do—use costly engineered fluorinated solvents—the usage of which makes recycling solvent that much more advantageous in these applications.

¹ Mazumdar, Sanjay (2018). *The 2018 State of the Composites Industry Report*. Retrieved from the Composites Manufacturing Magazine website: <http://compositesmanufacturingmagazine.com/2018/01/2018-composites-manufacturing-state-of-the-industry-report/>

² 3D Printing Media Network (2017). *GE Reveals How Greg Morris Created the 3D Printed Nozzle for the Leap Jet Engine*. Retrieved from the 3D Printing Media Network website: <https://www.3dprintingmedia.network/ge-reveals-greg-morris-created-3d-printed-nozzle-leap-jet-engine/>

THE MAIN WAYS ONSITE SOLVENT DISTILLATION BENEFITS YOUR COMPANY

1. IT IMPROVES PROCESSES AND PARTS QUALITY.

Onsite solvent recycling has the potential to increase an entire enterprise's operational throughput. Throughput is improved because recycling solvents onsite usually includes some amount of automation. That automation leads to less downtime, reduced maintenance expenses and streamlined processes.

Why?

When a solvent distillation unit or still is integrated into a piece of equipment, such as a parts washer, it provides a continuous stream of fresh solvent to that piece of equipment, which enhances the thoroughness of the parts cleaning process. This also eliminates the prospect of equipment failing as a result of running dirty solvent. When you run impure solvent through your machines, build-up will accumulate on gaskets and contact points, resulting in more frequent remedial or emergency maintenance over time (which could potentially shut down an entire work cell or production line).

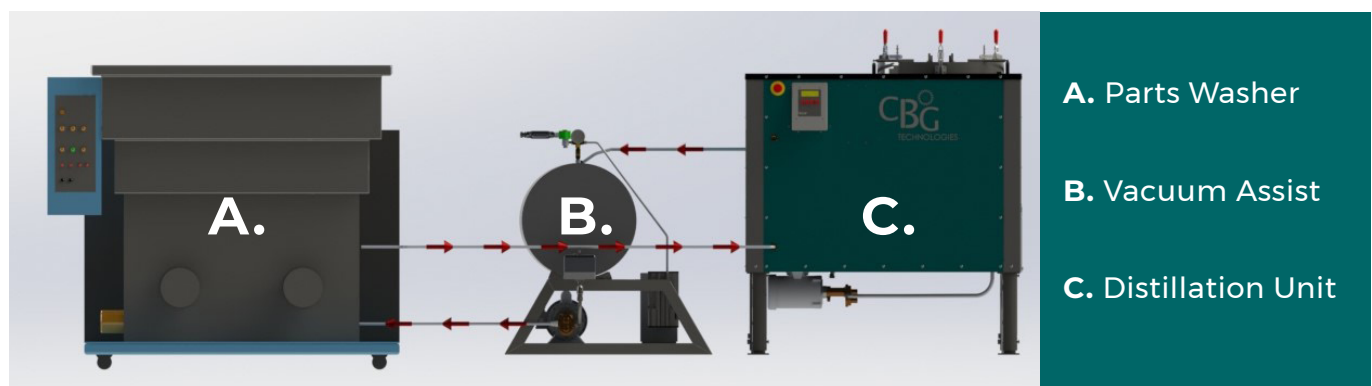
Additionally, automatic replenishment of clean solvent means facility downtime is reduced. This is because parts reprocessing impacts so many people and processes throughout a facility.

If your parts washer that's running dirty solvent doesn't properly clean a part, that part needs to be inspected, sorted and segregated from clean parts and then reworked or rejected. The additional and/or redundant man-hours involved in the rework will negatively impact a facility's operational throughput.

Prior to purchasing an onsite solvent distillation unit or still, you should consider whether you need continuous or batch recycling in your facility.

Continuous solvent recycling requires little manual intervention because it's built into an automated process.

In the example below, filling sensors in a distillation unit trigger an actuator and then a pump that automatically fills the machine with a dirty mixture from a parts washing system. Once the unit recovers the clean solvent, the solvent would automatically be deposited back into the parts washer, saving labor cost and time.



But when should a company consider continuous recycling versus batch recycling in one of its facilities?

1. WHEN TO CONSIDER CONTINUOUS

(CONT.)

RECYCLING: The ability to automate will be dictated by the type of equipment you're using. If you have a centralized parts washing facility, the ability to fully integrate a distillation unit or still is greater, as there is generally less of a need to physically move solvent within your facility. If you have a decentralized parts washing operation (more than one operation in different locations), the ability to integrate will be less likely. Continuous recycling is most beneficial within manufacturing cell configurations.

However, one primary reason a facility would choose automation is the reduction of man-hours. If you're seeing higher or variable labor costs tied to your parts washing operation, you should consider integrating solvent distillation units into your machines.

An added bonus of automation is employee safety—more on that later.

WHEN TO CONSIDER BATCH RECYCLING:

Again, if you have a decentralized parts washing operation, batch recycling is the more logical choice. Companies will often centrally locate a solvent distillation unit near a cell of four to six CNC machines so that solvent can be reclaimed on the spot, saving valuable time that otherwise would be spent retrieving clean solvent from a warehouse or storage area.

While batch recycling does require some manual interface, it's fairly minimal—you certainly won't need an additional staff member to operate an onsite solvent recycling machine. Assuming a unit is run every day, it's going to take an hour or less of an employee's workday to run it.

Since our CBG PW Series Recycler was integrated with our degreaser, our production cleaning process has been greatly improved in numerous ways. With clean production solvent available 24/7, we avoid routine shutdowns to drain our Baron-Blakeslee degreaser and replenish the solvent, which also reduces staff exposure to solvents and repeat runs due to part rejects.

- Jody Cook, Facilities Engineer, Jore Corporation

2. IT IMPROVES EMPLOYEE SAFETY.

Onsite solvent recycling positively impacts the safety of your employees, primarily because it reduces the frequency in which your employees will need to interface with solvent—after all, solvent units are contained, closed-loop systems that prevent harmful solvent vapors from escaping.

Employee safety is further improved with more automation in continuous recycling scenarios. When a solvent distillation unit or still is directly integrated into equipment, the automated process essentially eliminates the need for

employees to have direct contact with potentially hazardous solvents.

But even in semi-manual setups, like batch recycling scenarios, where standalone units are used, safety is greatly improved versus scenarios where no onsite recycler is present.

This is directly related to the fact that solvent handling is reduced compared to processes that involve solvent replacement (i.e., continually taking solvent waste to a location in your facility where it's aggregated before being disposed of

2. (CONT.) offsite). Manual solvent replacement exposes more employees and locations within your facility to potentially hazardous solvent vapors and significantly increases the chance of a spill.

In semi-manual setups, safety is promoted via the features that are built into every unit. Those include:

- **An automatic shutoff:** Units are programmed to internally monitor themselves; if a unit notices anomalies, it will shut off automatically. For example, a programmed unit will shut off if it's running too hot or if its waste drain is open. Units are also programmed to monitor their immediate environments. If a machine senses external

environmental conditions fall outside of what it's programmed to recognize as acceptable, it shuts off.

- **An emergency shutoff:** Operators also can shut off a unit immediately should they need to. Pressing the emergency shutoff instantaneously removes power from all machine outputs.

CBG Biotech solvent distillation units take safety one step further than the competition. Each machine is peer-reviewed by Underwriters Laboratories (UL). Not only do CBG experts determine each unit to be safe—so do renowned experts in the industry.



The [CBG] PW4 [Recycler] allows us to use very specialized/expensive materials for a longer period of time and reduces our environmental footprint.

- Luke Pincince, Data Processing Director, Norpin Manufacturing

3. IT IMPROVES SUSTAINABILITY INITIATIVES.

Recycling is the cornerstone of most sustainability initiatives; and solvent recycling greatly reduces the volume of hazardous waste generated by an industrial facility, making it an essential element of any recycling program.

When you reclaim solvent, you become your own solvent supplier, reducing both your solvent spend and the amount of waste you generate, which, in turn, means you pay less in U.S. Environmental Protection Agency (EPA) regulatory costs and fines.

The laws and regulations set forth by the EPA's Resource Conservation and Recovery Act (RCRA) serve as the foundation for what's considered proper waste management in the U.S. The RCRA

groups waste generators—essentially any person who produces hazardous waste—into three categories: Very Small Quantity Generators (VSQGs), Small Quantity Generators (SQGs) and Large Quantity Generators (LQGs). There are strict definitions for each of these categories as well as increasingly strict fines and waste-management compliance requirements as you move up in classification (from VSQG to SQG and SQG to LQG).

The EPA has made it highly beneficial from both a cost and operational perspective to reduce the amount of hazardous solvent waste your facility disposes of, making onsite solvent distillation the logical solution.

The CBG PW Series has provided an array of benefits throughout our company, including improved production quality and efficiency, safety, sustainability and significant savings in solvent and disposal costs.

- Jody Cook, Facilities Engineer, Jore Corporation

4. IT IMPROVES ECONOMICS.

Solvent spend reduction is the most obvious economic benefit of onsite solvent distillation. If you only use moderate amounts of fairly inexpensive solvent, you'll save tens of thousands of dollars on solvent alone.

Consider the following modest example where we assumed a company has a solvent need of 15 gallons per day of both acetone and toluene. Large-volume solvent users will pay less for solvent purchases depicted below and small-volume users will spend more on a per-gallon basis.

	Acetone	Toluene
Assumed solvent cost per gallon Assumed volume of solvent used daily	\$5.00/G 15 G	\$7.00/G 15 G
Total solvent cost per day Working days/year	\$75.00/day 200 days	\$105.00/day 200 days
Total solvent cost/year Solvent recovery yield	\$15,000.00 90+%	\$21,000.00 90+%
Solvent cost recovered (direct cost)	\$24,300.00	\$18,900.00

Using these numbers, we can estimate that the payback period—or the time it will take to recoup the initial cost of the 15-gallon standard recycler—will be less than 18 months in both cases.

4. This example only accounts for the savings attached to direct solvent spend. Onsite solvent recycling will also help you save on:

(CONT.)

- **Waste collection:** Your facility likely pays monthly fees for waste removal by a third-party, and this waste-disposal process typically involves multiple employees transporting solvent waste from one area of your facility to another, often transferring it from small containers into drums.
- **Stocking of solvent:** Typically, local fire codes require areas within a facility that contain significant amounts of solvent be located at the perimeter of the structure or in another structure altogether on the premises. It's not as if workers are always traveling short distances to access these areas. These hazardous areas also cost more. They typically need to be equipped with:
 - Concrete diking reinforcements that ensure spills are properly contained
 - Explosion-proof fixtures and electrical connections (depending on the amount of solvent you're storing)
 - Special sprinkler systems capable of extinguishing solvent-fueled fires
 - Reinforced entrances and exits for optimal containment
 - Designated forklifts and/or pallet jacks that are exclusively used within the space (due to the reinforced entrances and exits, you can't typically take a standard forklift into these areas)
- **Labor:** From writing purchase orders (POs) to production man-hours to safety, multiple departmental employees and budgets within your facility are impacted by solvent usage. Onsite solvent distillation will reduce the amount of time your company's employees spend:
 - Issuing purchase orders and processing inbound receipts in receiving
 - Managing solvent transactions, logistics and shipping costs
 - Transporting solvent waste internally and accessing solvent storage areas
 - Managing the effort associated with having a higher EPA waste generator status
- **Quality issues:** Using clean solvents will improve your first time through (FTT) yield and the quality of your facility's output. This means you will reduce costs associated with additional inspections and man-hours associated with reworking and rewashing parts. You also save on raw materials, since parts may need to be scrapped if severe quality issues are found.
- **Maintenance:** Dirty solvent can cause build-up within your equipment's gaskets and contact points, which, over time, will likely lead to equipment malfunction and downtime—greatly impacting your facility's productivity. Clean solvent will help lessen shutdowns and costly emergency maintenance repairs.

We expect to reduce our overall solvent usage by at least 50% in the first year, but our production personnel noticed cleaner parts and solvent right away. The immediate result was a significant reduction in cleaning process cycles and overall cycle times.

- Luke Pincince, Data Processing Director, Norpin Manufacturing

RECYCLING YOUR OWN SOLVENTS ONSITE BREAKS A CONTINUOUS CYCLE OF WASTE AND INEFFICIENCY

Many industrial manufacturers get trapped in a continuous cycle of purchasing large quantities of solvents and disposing of them after one use—incurring the additional costs and inconveniences associated with this inefficient and wasteful cycle.

Often, the cycle begins because companies don't want to make an initial capital investment for solvent recycling equipment. For all the reasons previously mentioned, CBG industrial solvent recycling units usually yield a significant ROI and companies, on average, recoup the cost of the initial investment in less than 18 months.

Additionally, the passage of the Tax Cuts and Jobs Act of 2017 should likely provide companies with enough of an incentive to make smart capital investments today. Among other benefits, the act permanently doubles Section 179 levels to \$1 million. This means that any business can now spend up to \$1 million on a capital expense and deduct it all in the current fiscal (tax) year.

FIND OUT HOW YOUR COMPANY CAN BENEFIT

The benefits of onsite solvent recycling are vast and depend on many variables, such as industry, application, company size and solvent usage.

However, solvent recycling will generally help every company save in a variety of immediate and long-term ways.

Find out how much your company will save and how long it will take to pay back the initial cost of the solvent recycling unit that's right for your needs. [Request a CBG Biotech payback summary today.](#)