

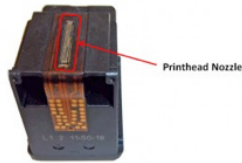
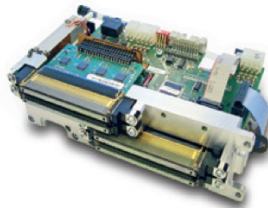
CASE STUDY

How to Get into Remanufacturing from Scratch: COE-ASM Identifies the Process for Durst US

Durst Image Technology US, LLC is a United States-based division of the Italian imaging company Durst Phototechnik AG. Durst AG manufactures and sells industrial inkjet printers known for their exceptional image quality, high print speed, and the diversity of materials and sizes on which they are able to print. Durst US employs 70 people across the country, with 30 employees in the Rochester area.

Client Challenge

Most contemporary inkjet printing systems use either aqueous or solvent-based inks that, while optimized for their flow through inkjet nozzles, are typically cured simply through thermal exposure or atmospheric drying. Because of this, these inks are quickly vulnerable to degradation of image quality after printing through both environmental evaporation and absorption of the ink into the printing substrate. In order to enable massive-scale, high-speed printing at exceptionally high quality, Durst products instead use proprietary inks that are cured by ultraviolet (UV) light. These inks cure almost instantaneously upon deposition onto the printing substrate, locking in image quality and maintaining a uniform surface.



(Top) Durst Rho printhead vs. (Bottom) traditional cartridge-integrated printhead

Still, just as thermal inkjet printer nozzles can become clogged by effective baking of the ink onto the nozzles themselves, UV curing systems can inadvertently solidify some ink onto the printhead nozzles, causing performance failures and image quality issues. In some cases, especially in traditional desktop printing systems, consumers (and, indeed, some manufacturers) consider these printheads to be consumable; that is, when one becomes empty, clogged, or fails, it can either be ignored at some cost to print quality or replaced with a newly manufactured printhead. However, because Durst equipment prints on an exceptionally large-scale (projects 20 feet high and 90 feet wide are not uncommon), the quality effects of even a single partially-clogged nozzle can be catastrophic. Replacing any of the up to 48 printheads on a given machine becomes economically disadvantageous, however, as each complex and precision-manufactured printhead can cost thousands of dollars.

In effort to maintain complete control over the quality of their premium brand, Durst US' European parent company (headquartered in Italy) carefully tests and certifies inks specifically designed for compatibility with Durst UV inkjet printing equipment, and offers a limited guarantee against printhead failure when they are used. When printheads do eventually fail, however, customers may send them back to Europe to be remanufactured. Aside from the economic and environmental costs of international transport, this creates

CLIENT CHALLENGE

- Durst US branch focuses primarily on sales of premium UV Inkjet printers
- Product components typically shipped overseas for service, causing potential delays for customers and transportation emissions
- Durst US sought to provide premium brand service with lower economic and environmental impacts

COE-ASM WORK PERFORMED

- Analyzed UV inkjet print head components to determine key challenges for service and remanufacturing
- Tested different remanufacturing technologies and techniques to assess effectiveness and impacts
- Identified necessary technical capabilities required to provide comprehensive domestic service
- Developed best-fit remanufacturing process for UV inkjet print heads that would be both scalable and deployable

RESULTS

- Durst US acquired critical technical knowhow to accelerate the development of a US-based remanufacturing business
- Identified a single cleaning solution effective for multiple ink types, reducing process complexity, costs, and environmental impacts
- Prepared Durst US to capture new market opportunity, improve customer support, and strengthen brand

unnecessary downtime for customer equipment, ultimately slowing their productivity. As a result, Durst US sought to expand its US sales business to include the support customers expect of a premium brand. To this end, Durst US asked the COE-ASM to develop a capability-building program in which the COE-ASM's expertise in remanufacturing would be applied to help develop a remanufacturing process to enable better service and quicker product turnaround for the US market.

COE-ASM Work Performed

COE-ASM team members leveraged years of experience in imaging technology engineering to identify the specific capabilities Durst would require in order to produce a high quality remanufactured printhead. The most challenging technical problem in this pursuit was cleaning old, cured ink from the printhead channels. To address this issue, COE-ASM engineers researched the particular physical and chemical properties of the UV-curable inkjet printing process and developed a clean, reliable, and reproducible process that enabled Durst US to continue their plans to remanufacture these printheads.

Inkjet printhead remanufacturing usually involves five basic stages: (1) disassembling the printhead and ink tank device, (2) removing residual ink buildup in a solvent bath, (3) ensuring that no solvent remains after cleaning in effort to minimize contamination of new ink, (4) precision alignment of each ink nozzle on the printhead plane, and (5) reassembly. This process requires solvent chemistries specific to residual ink characteristics and specialized cleaning equipment. In addition, the process requires precision nozzle alignment and verification tools, as each printhead plane can contain over a thousand individual nozzles, each about the diameter of a human hair. Researching and validating the necessary environmentally-responsible chemistries was a particular challenge, as Durst US uses eight different inks, each of which have unique characteristics that can differentiate solvent requirements. In consideration of these chemical challenges, the COE-ASM's work focused on developing a remanufacturing process that could be adjusted and applied to a wide range of Durst's products. The COE-ASM then worked directly with Durst US to transfer both the knowhow and the specifications for the technical infrastructure that would enable the company to deploy a lower-cost remanufacturing service as a part of its larger business model.

Results

Through this research, the COE-ASM was able to identify and validate a single cleaning solvent that was effective on three of the eight inks, saving Durst US the additional economic and environmental burdens of sourcing, using, and disposing of several different solvent types. Durst US is also testing this solvent on the remaining ink types (using the COE-ASM process) to determine its applicability and potential to further simplify the remanufacturing process. Developing the knowhow, infrastructure, and technical capability to remanufacture such sensitive, high-precision printheads was a ground-up process, as Durst US had previously focused almost exclusively on the sales and routine service of OEM Durst equipment. Through this collaboration with the COE-ASM, the company was able to accelerate their new remanufacturing venture, developing the cornerstones of a reproducible process in a short period of time. The resultant newly-established capabilities not only will improve the product support experience for U.S. customers, therein improving their loyalty to the premium brand, but will also create a completely new revenue stream for the previously specialized Durst US division. These developments will also lead the company to expand its local operations, bringing new jobs to COE-ASM's own backyard in Rochester, NY.

The Center of Excellence in Advance & Sustainable Manufacturing (COE-ASM)

is a specialized applied research and development center dedicated to helping emerging and existing NYS manufacturers to enhance productivity and become more competitive through innovation and technology in sustainable products and processes. COE-ASM is located at the Golisano Institute for Sustainability and is a New York State Center of Excellence, a NYSTAR partnership.



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