

L&L eXtrude in Place Technology (XiP®).

The Versatile, Dry-to-the-Touch Solution

L&L eXtrude in Place Technology (XiP®): The Versatile, Dry-to-the-Touch Solution

L&L PRODUCTS SEALANTS + AUTOMATION: VS MANUALLY APPLIED MATERIAL

- Increased production capacity and lights out manufacturing
- Precision and repeatability for consistent quality
- Proper adhesion of materials to help eliminate washout in the E-coat oven
- Reduced operator exposure to hazards, fatigue, or repetitious operations
- Processes compatible with Industry 4.0 and smart factories

Introduction.

Now more than ever, automotive manufacturers and suppliers are under tremendous pressure to remain competitive in the market. New competition and new technologies are driving these manufacturers to look for opportunities to produce vehicles more efficiently and more economically.

Traditionally, sealant materials, critical for keeping out water, dust, and fumes and reducing cavity-borne noise, have been applied manually in the form of tapes and baffles.

Today, we see increased interest in adding automated processes. This automated or robotic application of the material helps manufacturers to overcome a variety of limitations and challenges, from ergonomics to precision and repeatability in complex applications, along with all the efficiencies that automation brings.

While some manufacturers have pursued pumpable technologies, they are often faced with a new set of challenges. Pumpable materials are typically shipped in drums with inner liners that contribute to plastic and chemical waste. In the plant, material may be wasted in purging and can be messy to handle. The dispensed material must be undisturbed in place and used relatively quickly after application.

With the potential for material disturbance, wash-out, and waste, especially where the parts or materials are not properly applied or where the material cannot bond to contaminated substrates, manufacturers are seeking solutions that enable more control over the process to determine when the material is applied, where the material is applied, and how the material is applied.

L&L Products offers such a solution: XiP®.



What is XiP®?

L&L XiP® (eXtrude-in-Place™) technology combines heat-activated sealant materials with a fully automated application process for extruding the material directly onto a substrate by robotic application or CNC system. L&L XiP® compatible materials are dry-to-the-touch immediately after being extruded onto the substrate, which allows for easy handling over pumpable paste materials.

With this L&L solution, customers can stack or nest the parts, resulting in minimized packaging costs at a tier supplier or an offline cell. The material can also be robotically applied inline for high repeatability, efficiency, and worker safety. Manufacturers also appreciate that XiP materials have little odor or emissions, resist wash-out in the E-coat bath, and, in the end, have a low risk of read-through.

Let's look at four ways that XiP® is the solid solution.

XiP®: Flexibility in Sealant Materials

Activated and cured by the heat of the E-coat oven, XiP® sealant materials are designed to seal gaps in a cavity or frame structure. They are typically solvent free, dry to touch, and don't wash out in the successive E-coat baths. To suit the application conditions, the material is available in a wide range of volumetric expansion, bringing the design flexibility needed to accommodate to varying build conditions.

In practice, the sealing material and foaming rate are selected based on the gap jumping, sealing, and sound damping requirements, in addition to the cavity geometry, assembly process, bake conditions, and service life. The closed cell structure makes them excellent choices for sealing large cavities that require acoustic treatment.

Let's look at how XiP enables flexibility in a dry-to-touch solution.

XiP®: Flexibility in WHEN the material is applied

With XiP®, the sealant material is shipped in pellet form, minimizing the associated packaging and logistics cost. The pellets have a longer shelf life than many pumpable materials in drums, which is a plus for manufacturers.

When it's time to dispense the material, the substrate is heated and the material is extruded onto a part or the frame. As the material cools, it becomes dry-to-the-touch, no longer sticky or tacky. In this form, there is no short working time to contend with, and it is difficult to disturb or remove the material compared to messy pumpable materials. Because the sealant has dried in place, the parts are stackable, transportable, and usable for up to three months.



XIP®: Flexibility in WHERE the material is applied

With flexibility in when the material is applied, we have even greater flexibility to determine where the material is applied. Because the XIP® materials are solid before and after extrusion, significant flexibility is added to the application and handling process.

To start, the sealant pellets are shipped in returnable containers to reduce packaging waste. The reusable bulk bags or gaylords enable centralized, clean, and efficient transport and storage.

In the past, many tier suppliers took advantage of this technology to apply the sealant material to stamped metal parts at their facilities. The material was applied in a production cell, and the parts were stacked, stored, and shipped to the assembly plants, keeping the sealant application off the assembly plant floor.

Today, we find that manufacturers are also implementing in-line XIP® applications in the assembly plant. With a stand-alone system, the sealant can be extruded directly onto the frame. Keep in mind that the material is still dry-to-the-touch for additional handling and wash-out resistant, minimizing any mess at the facility.

XIP®: Flexibility in HOW the material is applied

As with all automated solutions, XIP® provides automated, precise dispensing and application for complex geometry, and the automation aspect enables smart factories, where the equipment is on a network and all aspects of production are quantified and displayed on a monitor.

The sealant material is transported in pellet form to the extruder. Specialized software sets the dispensing parameters for precise application. The automated system is operated by a wide variety of CNC or robot controllers using industrial protocols.

As a stand along solution on the assembly floor, the system typically consists of a heating device to warm the substrate, a robot extruder that heats and dispenses the L&L sealant material, a robot or CNC system to position the extruder, and a base unit controller.

At a tier supplier, production cells are designed for dispensing on parts. The system may consist of a robot-mounted 7th axis servo-controlled extruder. Operators can program multiple part configurations of similar geometry and automatic tooling change based on part selection. In a production cell, throughput rates in the range of 330 parts per hour.

In either case, the ease of programming allows relatively quick adjustments for fine tuning, new part geometries, and more.

Conclusion.

L&L XiP® is a solid solution for automotive manufacturers and suppliers. Because the material remains stable on the part and is dry enough to handle, the material can be applied on the assembly line or onto parts at Tier suppliers. XiP brings the flexibility you need to control when the material is applied, where the material is applied, and how the material is applied. Contact the L&L Products team to custom engineer a solution for your application.

KEY BENEFITS

DRY-TO-THE-TOUCH MATERIAL. The material is solid for easy handling and enables stacking of parts for minimized packaging costs and convenient transport.

AUTOMATION. Flexibility to adjust where and when the material is applied, enabling versatile design capability.

LOGISTICS. The material used in the L&L XiP® process is shipped in convenient pellet form to OEMs for inline application or to Tier 1 plant for production in an offline cell.

REDUCED WASTE. L&L XiP® eliminates waste from purging pumpable materials, offal from die-cut parts, and wash-off in the E-coat bath.

