

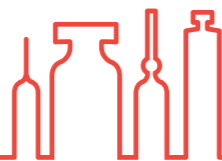
# LASER-BASED CUTTING

INNOVATIVE TECHNOLOGY FOR PRE-FILLABLE SYRINGES

Nipro PharmaPackaging is specialized in developing and manufacturing advanced pharma packaging products and complete packaging solutions for early development drugs or the enhancement of packaging solutions for existing drugs.

With a worldwide manufacturing footprint of 16 plants, multiple sales offices, and internal lab services, Nipro PharmaPackaging offers an exceptional service platform. Through our personnel, products, and services, Nipro PharmaPackaging enables you to provide a safer and healthier administration to your customers.

Nipro PharmaPackaging is part of the Japanese Nipro Corporation, established in 1954. As a leading global healthcare company with over 27,000 employees worldwide, Nipro serves the Pharmaceutical, Medical Device, and Pharmaceutical Packaging industries.



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# LASER-BASED CUTTING

INNOVATIVE TECHNOLOGY FOR PRE-FILLABLE SYRINGES

Nipro PharmaPackaging (NPP) is continuously working to bring to the world an innovative portfolio of superior quality products.

## CHALLENGE

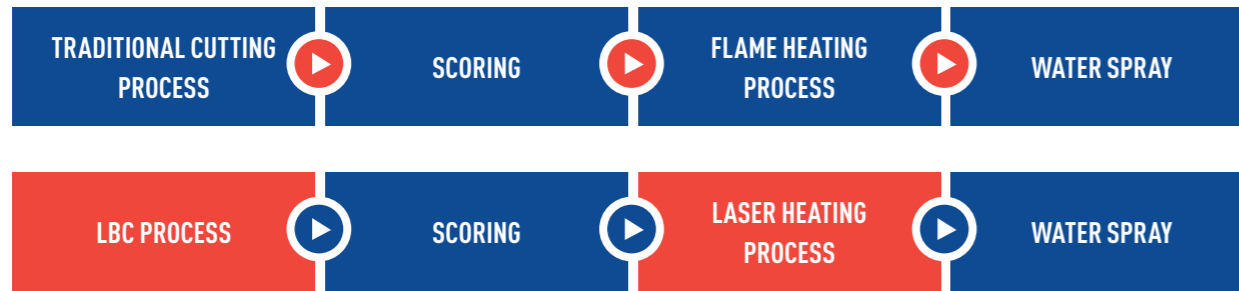
Quality issues are a serious matter for patients and pharmaceutical companies alike. Medications contaminated with particles or syringes with glass breakage are repeat headlines.

The FDA recalled 22% of sterile injectable drugs in the period between 2008-2012 due to the presence of visible particles.

Since 2006, nearly 50 medications have had glass breakage or glass particulate issues serious enough for FDA recalls, impacting more than 100 million units of medication.<sup>1</sup>

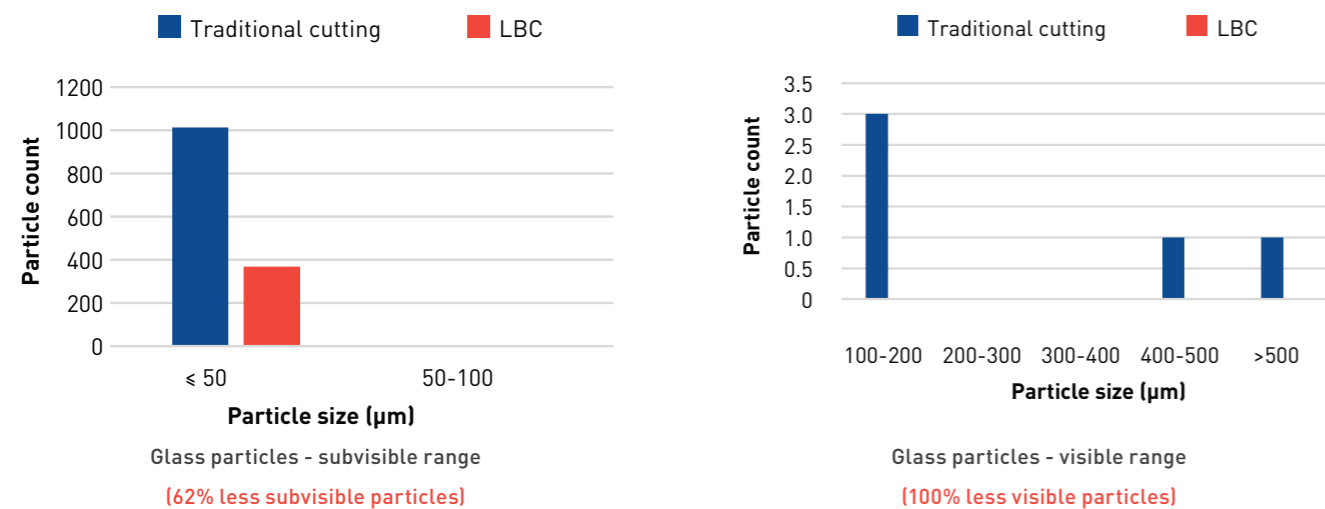
## INNOVATION

With patient safety foremost in mind, while also considering the economic impact for pharmaceutical companies, NPP installed the Nipro Laser-Based Cutting (LBC) technology in the forming process of our pre-fillable glass syringes (PFS). Our LBC technology, incorporating a laser heating process after scoring, offers you many advantages: substantial reduction of glass particles during the cutting process and more uniform finger flange thickness that results in the increased strength of the finger flange.

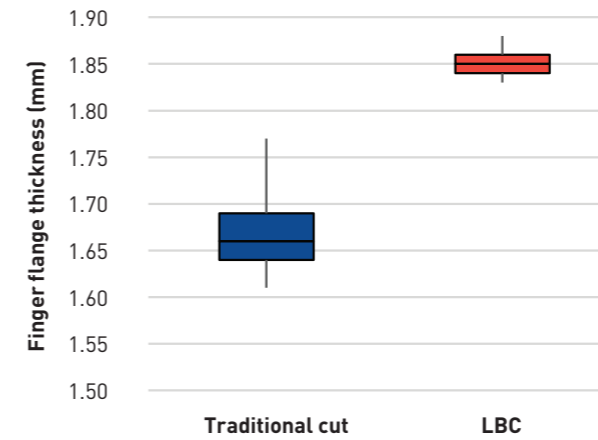


## EVIDENCE

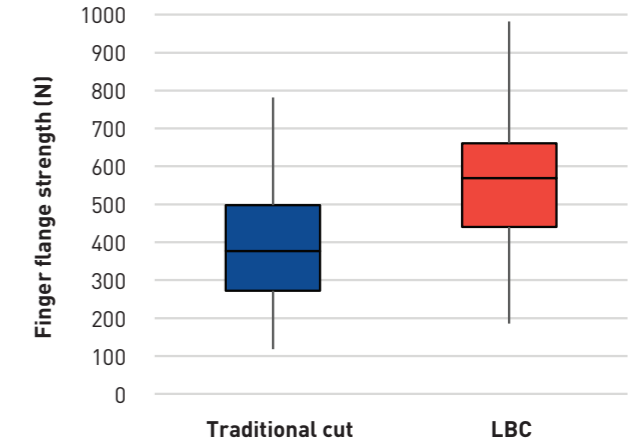
The implementation of our LBC technology resulted in a significant reduction of glass particles compared to traditional cutting:<sup>2</sup>



Nipro LBC technology also ensures a more uniform finger flange thickness and thereby increases the finger flange strength.<sup>2</sup>



Finger Flange Thickness - 1 ml Long Syringe  
(Nominal ±0.25 mm)<sup>3</sup>



Finger Flange Strength - 1 ml Long Syringe  
(AVG +40% & MIN +57%)



NPP continuously strives to innovate the converting process, ensuring the highest product quality and integrity.

We want to provide customers and patients with tangible benefits, thereby gaining and maintaining our position as the preferred business partner in primary packaging.

## BENEFITS

### LESS GLASS PARTICLES

- less risk of rejections at F&F sites
- less risk of market recalls due to glass particulates
- increased patient safety

### STRONGER FINGER FLANGES

- less risk of finger flange breakage during F&F operations
- less risk of market recalls due device functional failures
- more reliable and optimized integration between auto-injectors and PFSs

<sup>1</sup> Source: US Food and Drug Administration, Enforcement Reports

<sup>2</sup> Source: Study performed in collaboration with Centre for glass investigations and environmental analysis 3 ISO 11040-4: 1.9 mm ±0.5 mm)