

VeriFIT™ Splint Thermo-Adaptive Resin

FDA-Approved Next-Generation 3D Printed Splint

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Introduction

Splint therapy is a common clinical intervention for managing occlusal disorders, temporomandibular joint (TMJ) issues, and bruxism. However, traditional fabrication techniques using acrylic resins often present clinical challenges. The splint fabricated in the lab frequently fails to replicate the planned occlusal design once seated intraorally. This mismatch necessitates extensive chairside adjustment, increasing clinical time, reducing efficiency, and affecting patient comfort.

Advances in digital dentistry have transformed splint fabrication by introducing streamlined workflows that integrate intraoral scanning, CAD software, and additive manufacturing. These methods enable clinicians to deliver splints that are more precise, predictable, and efficient. At the core of this innovation is Whip Mix VeriFIT™ Splint resin—an FDA-approved, thermo-adaptive resin designed specifically for digital splint applications. In addition to the VeriFIT™ Splint resin, the workflow highlights the use of a 3Shape TRIOS intraoral scanner and 3Shape Splint Studio digital design software.

Unlike conventional rigid materials, VeriFIT™ Splint incorporates thermo-adaptive shape-memory technology. It is rigid under normal conditions but softens at elevated temperatures (~160 °F), allowing superior performance.

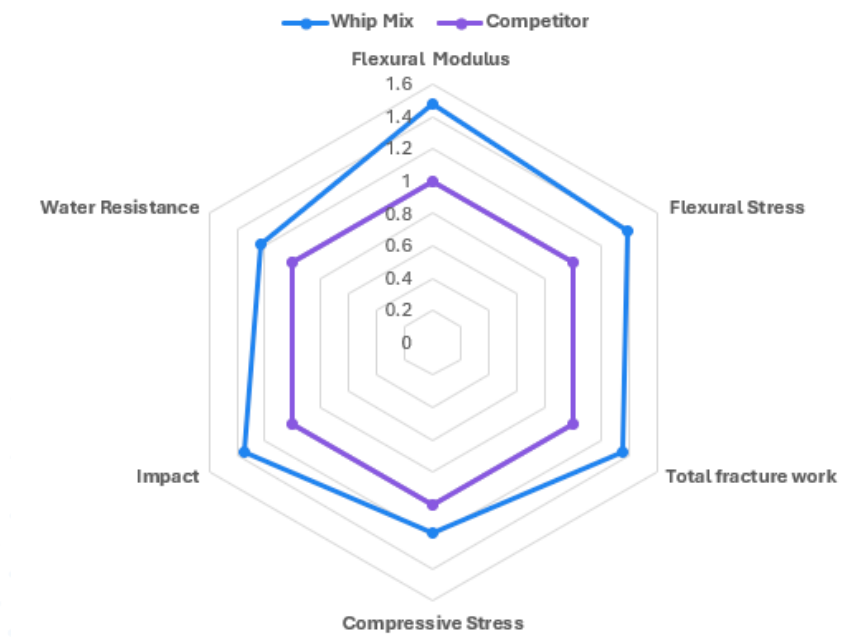
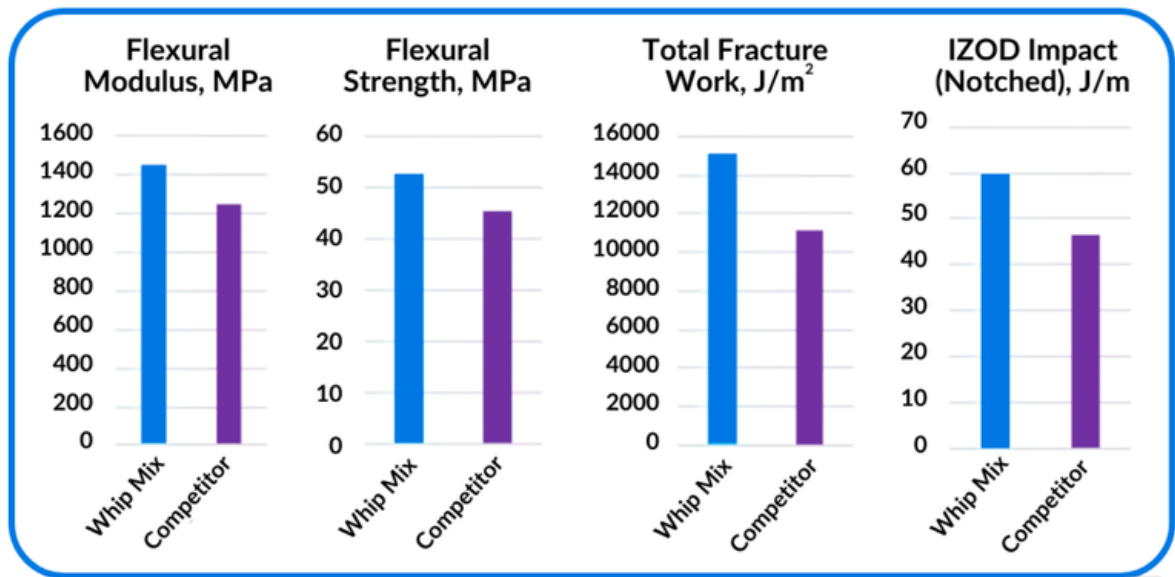
Material Compliance & Standards

The Whip Mix VeriFIT™ Splint resin is distinguished by its robust compliance with global standards and regulatory requirements:

- FDA Approved: Verified as safe and effective for dental use.
- ISO 10993: Meets international biocompatibility standards for materials in contact with human tissue.
- ASTM D790: Demonstrates high flexural strength and modulus, exceeding performance thresholds for plastics in medical applications.
- ISO 20795-2: Meets dental appliance polymer standards, ensuring durability and reliability in clinical settings.

Properties of VeriFIT™ Splint Thermo-Adaptive Resin

VeriFIT™ Splint Thermo-Adaptive Resin				
Physical Properties	Standard/Method	Passing Criteria	Competitor Results	VeriFIT Results
Flexural Modulus, MPa	ASTM D790	750-1500	1100 - 1400	1275 - 1625
Flexural Strength, MPa	ASTM D790	> 30	44 - 47	44 - 61
IZOD Impact (Notched), J/m	ASTM D256	> 35	45 - 48	57 - 62
Flexural Modulus, MPa	ISO 20795-2	> 100	135 - 200	300 ±100
Total Fracture Work, J/m²	ISO 20795-2		11158	15062



When benchmarked against leading competitor resins, VeriFIT™ Splint exhibits superior flexural modulus, toughness, and fracture resistance—critical factors for ensuring long-term performance under functional loading.

Digital Workflow Methodology

The following digital protocol was developed and clinically validated:

1. Digital Impression and Bite Registration

- A 3Shape TRIOS intraoral scanner was used to capture both arches.
- A leaf gauge ensured condylar seating in centric relation (CR).
- Digital bite registration was captured directly in the verified CR position.

2. Splint Design (3Shape Splint Studio)

- Occlusal contacts: 18 uniform contact points planned (6 per posterior quadrant opposing the buccal cusp tips of the first and second premolars and molars of the mandibular arch, 6 anterior opposing the incisal edges of the 6 anterior mandibular teeth).
- Anterior guidance: Ramp designed to allow canine-protected occlusion in lateral movements and incisal guidance in protrusion.
- Minimum occlusal thickness: 1.5 mm maintained by adjusting vertical dimension on the virtual articulator.

3. Design Recommendation

Minimum sidewall thickness	1.5 mm
Minimum occlusal surface thickness	1.5 mm
Internal offset	≥ 0.05 mm
Block out angle	0°
Retention amount	0 mm

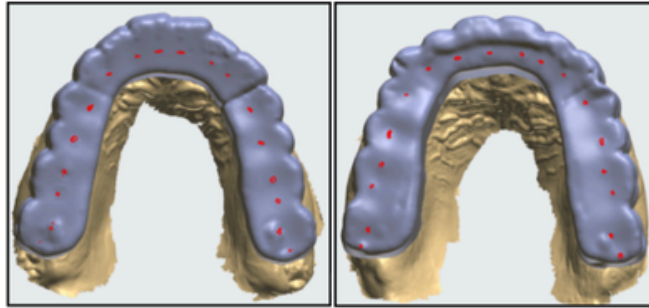
4. Additive Manufacturing

- Splints were fabricated using an Asiga Max UV 385/405 printer.
- Whip Mix VeriFIT™ Splint resin was selected for its thermo-adaptive properties.

5. Clinical Evaluation

- Splints were delivered and evaluated for seating accuracy and occlusal contact reproduction before adjustments.

Examples of contact points in 3Shape Splint Studio designed as previously defined



Results

The evaluation of 25 digitally fabricated VeriFIT™ splints demonstrated the following:

- Seating accuracy: All splints seated completely without unacceptable discrepancies.
- Occlusal contacts: All 18 planned contacts on all 25 splints were present upon first closure, prior to adjustment.
- CR accuracy: All digital bite registrations were accurate, confirmed by Dawson's bimanual manipulation technique.

These results illustrate the predictable accuracy of a fully digital workflow combined with shape-memory resin technology.

Examples of contact points upon first closure



Discussions

Complete Splint Seatings

One of the major challenges in splint therapy is ensuring complete intraoral seating. VeriFIT™ Splint's thermo-adaptive response enables the splint to soften at ~160 °F during initial placement, conform precisely to minor anatomical variations, and then harden in its adapted form. This eliminates the need for extensive internal adjustments, reducing chairside time and improving patient comfort.

Precision of Occlusal Design

Digital design in 3Shape Splint Studio allowed exact placement of contact points, confirmed intraorally with high fidelity. The transparency feature in the software facilitated precise cusp tip contact alignment—an outcome rarely achievable with conventional workflows.

Accuracy of CR Mounting

Using a leaf gauge protocol and digital bite registration, CR accuracy was consistently achieved and validated. The virtual articulator within Splint Studio closely replicated mandibular movements, ensuring accurate occlusal reproduction.

Competitive Differentiation

Compared to traditional acrylic resins and competitor digital splint resins, VeriFIT™ provides:

- Superior flexural modulus and toughness (ASTM D790 / ISO 20795-2 compliant).
- Biocompatibility assurance (ISO 10993, FDA-approved).
- Thermo-adaptive technology for reduced chairside adjustment and enhanced comfort.

Conclusion

The integration of digital workflows with Whip Mix VeriFIT™ Splint resin marks a significant advancement in splint fabrication. By combining intraoral scanning, precise CAD design, and additive manufacturing with a thermo-adaptive, FDA-approved, ISO- and ASTM-compliant resin, clinicians achieve:

- Predictable splint seating
- Accurate occlusal contact replication
- Reliable centric relation mounting
- Reduced chairside adjustment time
- Superior patient comfort and clinical outcomes

VeriFIT™ Splint resin not only meets stringent global regulatory standards but also outperforms competitor resins in durability and precision, setting a new benchmark for digital splint therapy.

One Fit. *Done.*

