MEDICLUS

Guideline for using

Medical Devices

Any-Com® Flow

Nano-hybrid zirconium flowable composite

ISO 13485

GMP

CE 0068

MAIN Biz

CONTENTS

Introduction

01

Any-Com Flow (Nano-hybrid flowable composite)

Any-Com Flow is an aesthetic restorative composite resin developed by MEDICLUS. Flowable resin plays a crucial role in dental treatments, particularly in narrow or complex filling areas. Due to its lower viscosity compared to conventional composite resins, it is ideal for treating fine cracks or small defects. Its adaptability to the tooth structure enhances bonding strength, making it suitable for applications where aesthetic demands, such as in anterior restorations, are paramount. These characteristics have made flowable resin increasingly essential in modern dentistry.

Flowable resin was introduced in the early 1990s and was initially used primarily for micro-restorations and crack repairs due to its reduced viscosity compared to hybrid composite resins. However, early products were less durable and had issues with shrinkage, leading to potential mismatches with teeth and unstable long-term results. Since the 2000s, research efforts have focused on improving strength and durability while addressing shrinkage issues. Modern flowable resins are not only highly adaptable to narrow and complex areas but also meet aesthetic requirements with natural shades for anterior teeth. Improved bonding properties ensure strong adhesion between the resin and the tooth, enhancing durability and guaranteeing long-term success.

Successful restorations offer numerous benefits to patients. When fine cracks or small defects are present, flowable resin can restore the tooth to a near original state. This allows patients to experience natural looking restorations, especially in aesthetically sensitive areas. The enhanced durability of flowable resin ensures the longevity of fillings, reducing the likelihood of retreatment or additional problems. Improved adhesion minimizes the risk of discomfort during chewing and reduces the chance of fillings detaching or fracturing. These features significantly enhance patient satisfaction and foster trust in dental treatments.

This guideline provides detailed information on Mediclus's Any-Com Flow aesthetic restorative composite resin and offers clinical application recommendations.

Product Information

Contents

Any-Com Flow Kit	
# 306	Any-Com Flow 2g x 4ea / Any-Etch 3ml x 1ea
# 306H	Any-Com Flow 2g x 4ea / Any-Etch 3ml x 1ea / Hi-Bond Universal 5ml x 1ea
# 306A	Any-Com Flow 2g x 4ea / Any-Etch 3ml x 1ea / Any-Bon 5ml x 1ea

Any-Com Flow Refill	
# 306-0	Any-Com Flow 2g x 2ea

SHADE Color

A1	A2	A3	A3.5	A4
B1	B2	C2	OA2	OA3
OWT	TL			

Compositions

Product compositions
Bis-GMA
UDMA
TEGDMA
0.7μm Ba glass
150-210nm Zr-containing glass
Fumed silica

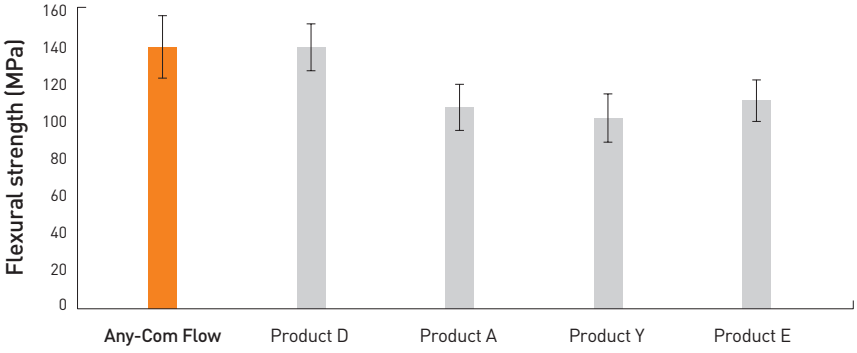
Properties

Flexural strength

- The flexural strength measurements showed significant differences among the evaluated products ($p < 0.05$), allowing them to be classified into two distinct groups. Products with relatively high flexural strength (140.98 - 141-23 MPa) included Any-Com Flow and Product D, while those with relatively low flexural strength (102.89-113.76 MPa) included Products A, Y, and E.

Product	Flexural strength (MPa)
Any-Com Flow	141.23 ± 16.81^{A}
Product D	140.98 ± 12.64^{A}
Product A	113.76 ± 12.53^{B}
Product Y	102.89 ± 13.00^{B}
Product E	113.12 ± 12.07^{B}

- Note : means ± standard deviation within columns with the same superscript letter were not significantly different ($p > 0.05$).



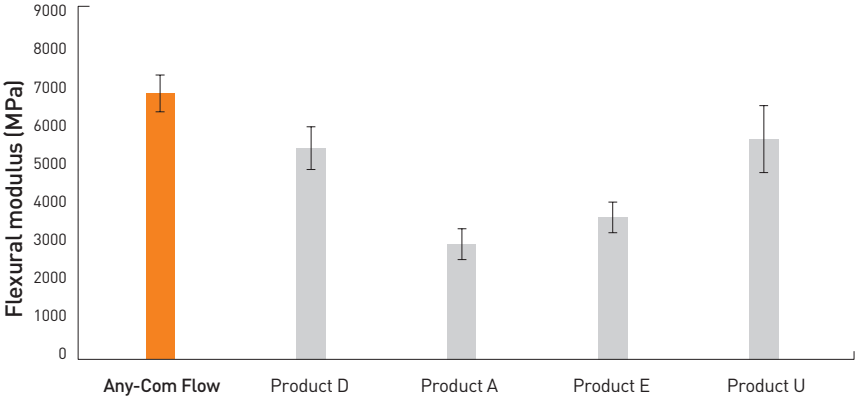
Properties

Flexural modulus

- The flexural modulus measurements showed significant differences among the evaluated products ($p < 0.05$). Any-Com Flow exhibited the highest flexural modulus at 6,834.36 MPa, whereas Product A had the lowest value at 3,152.90 MPa, demonstrating a significant contrast. The descending order of flexural modulus values was Product U (6,033.90 MPa), Product D (5,429.56 MPa), and Product E (3,675.60 MPa).

Product	Flexural modulus (MPa)
Any-Com Flow	6,834.36 ± 474.12^{A}
Product D	5,429.56 ± 547.36^{B}
Product A	3,152.90 ± 463.24^{C}
Product E	3,675.60 ± 406.08^{C}
Product U	6,033.90 ± 641.80^{B}

- Note : means ± standard deviation within columns with the same superscript letter were not significantly different ($p > 0.05$).



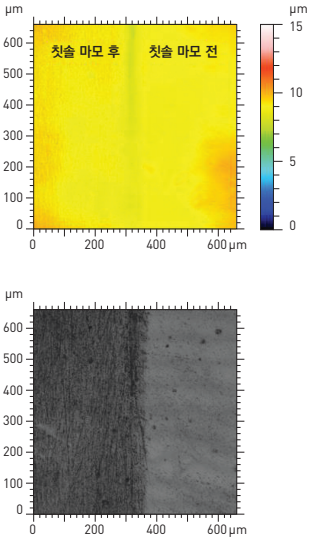
Wear test using toothbrush wear tester

- The degree of wear was assessed by measuring the difference in Ra values at the boundary between non-worn and worn areas using a confocal laser scanning microscope.
- Any-Com Flow (0.271μm) and Product D (0.286μm) exhibited relatively low wear, whereas Product U (0.466μm) and Product E (0.464μm) showed relatively high wear.
  Products Y (0.337μm) and F (0.351μm) exhibited moderate wear levels.

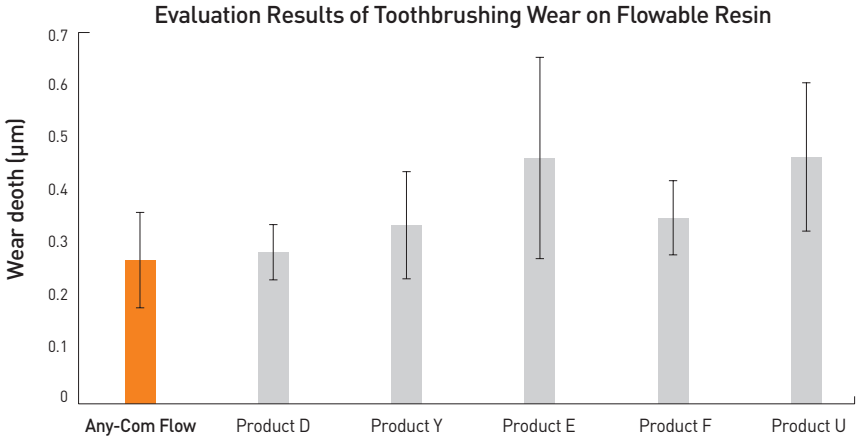
Product	Wear depth (μm)
Any-Com Flow	0.271 ± 0.090[a]
Product D	0.286 ± 0.052[a]
Product Y	0.337 ± 0.101[a, b]
Product E	0.464 ± 0.190[b]
Product F	0.351 ± 0.070[a, b]
Product U	0.466 ± 0.140[b]

- Note : means ± standard deviation within columns with the same superscript letter were not significantly different ($p > 0.05$).

Properties



- Example of Wear Evaluation Using Test Equipment and Confocal Laser Scanning Microscope

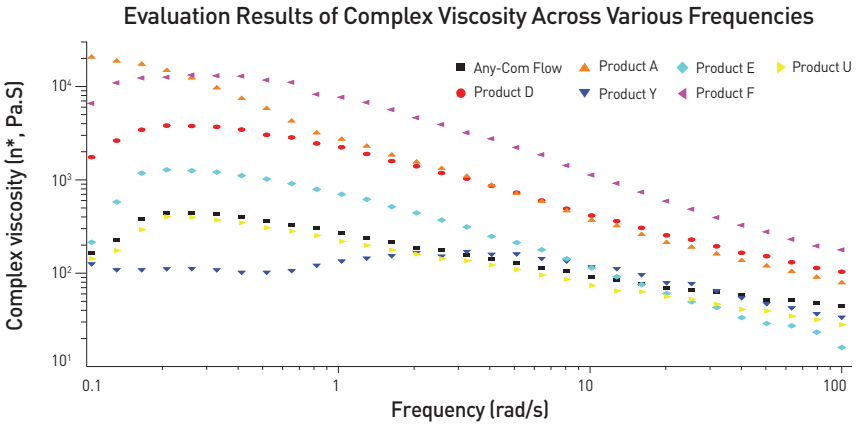


Viscosity

- Under conditions resembling clinical situations (ω = 10 rad/s), viscosity measurements showed the lowest values for Product E (16 Pa·s) and Product U (28 Pa·s).
  Relatively low viscosities were also observed in Product Y (34 Pa·s) and Any-Com Flow (44 Pa·s). On the other hand, higher viscosities were recorded for Product A (79 Pa·s), Product D (104 Pa·s), and Product F (178 Pa·s) in increasing.

Product	Frequency, ω (rad/s)			
	0.1	1	10	100
Any-Com Flow	165 ± 27^{a}	272 ± 63^{a}	91 ± 10^{a}	44 ± 3^{a}
Product D	1,753 ± 910^{a}	2,233 ± 541^{b,c}	415 ± 61^{b}	104 ± 8^{b}
Product A	20,695 ± 6,279^{b}	2,723 ± 1,550^{c}	369 ± 41^{b}	79 ± 4^{c}
Product Y	126 ± 6^{a}	135 ± 86^{a}	17 ± 30^{a}	34 ± 3^{a}
Product E	214 ± 36^{a}	700 ± 115^{a,b}	114 ± 11^{a}	16 ± 3^{d}
Product F	6,600 ± 460^{a}	7,676 ± 145^{d}	1,126 ± 57^{c}	178 ± 9^{e}
Product U	143 ± 22^{a}	219 ± 52^{a}	74 ± 14^{a}	28 ± 2^{d}

- Note : means ± standard deviation within columns with the same superscript letter were not significantly different (p > 0.05).



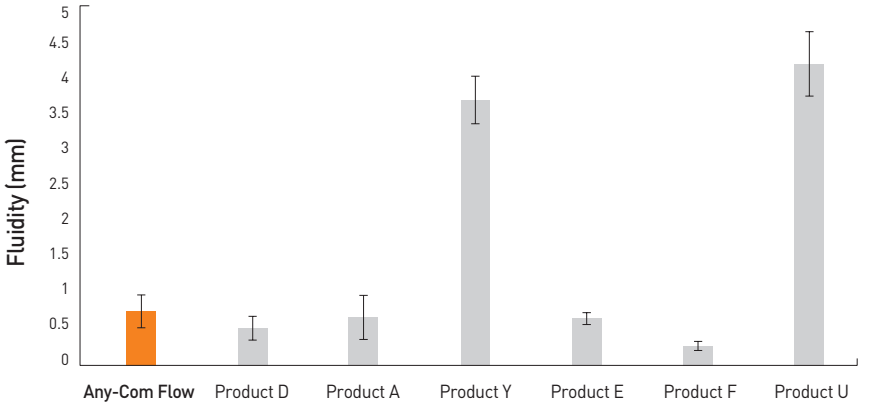
Properties

Fluidity

- The flowability of each resin was assessed by applying 0.3g of each resin along a straight line on a glass slide. The samples were then placed vertically in an oven at 37°C for 5minutes to allow them to flow. Measurements were made using a stereomicroscope.
- The evaluation results classified the products into two groups based on their flowability.
  - Low flowability products (0.217-0.750) included Product F, D, E, A, and Any-Com Flow.
  - High flowability products (3.683, 4.183) were Product Y and Product U.

Product	Fluidity (mm)
Any-Com Flow	0.750 ± 0.227[a]
Product D	0.517 ± 0.165[a]
Product A	0.667 ± 0.306[a]
Product Y	3.683 ± 0.330[b]
Product E	0.650 ± 0.082[a]
Product F	0.217 ± 0.062[a]
Product U	4.183 ± 0.448[b]

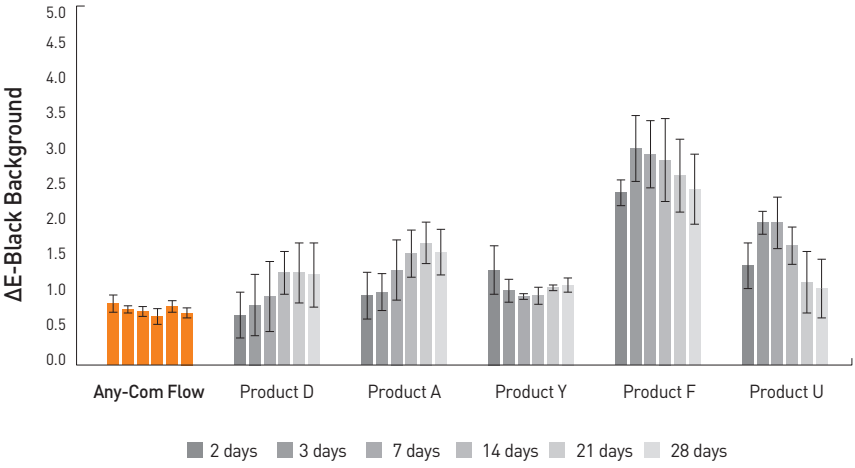
- Note : means ± standard deviation within columns with the same superscript letter were not significantly different (p > 0.05).



Optical Properties_Color changes(ΔE) in deionized water

- The specimens were immersed in deionized water for specific durations (2, 3, 7, 14, 21, and 28 days) to evaluate the color stability of the resins.
- With the exception of Product F, all six tested resins exhibited color changes (ΔE) below 2.0, demonstrating excellent color stability in distilled water.

	2 days	3 days	7 days	14 days	21 days	28 days
Any-Com Flow	0.86 ± 0.12	0.78 ± 0.05	0.75 ± 0.07	0.68 ± 0.11	0.82 ± 0.08	0.73 ± 0.07
Product D	0.70 ± 0.32	0.84 ± 0.43	0.96 ± 0.49	1.29 ± 0.30	1.29 ± 0.42	1.26 ± 0.45
Product A	0.97 ± 0.33	1.02 ± 0.26	1.33 ± 0.42	1.56 ± 0.33	1.71 ± 0.29	1.58 ± 0.32
Product Y	1.33 ± 0.34	1.04 ± 0.16	0.96 ± 0.04	0.97 ± 0.12	1.08 ± 0.04	1.12 ± 0.10
Product F	2.41 ± 0.18	3.03 ± 0.46	2.95 ± 0.47	2.87 ± 0.58	2.65 ± 0.51	2.46 ± 0.49
Product U	1.39 ± 0.32	1.99 ± 0.16	1.99 ± 0.36	1.67 ± 0.26	1.16 ± 0.43	1.07 ± 0.41

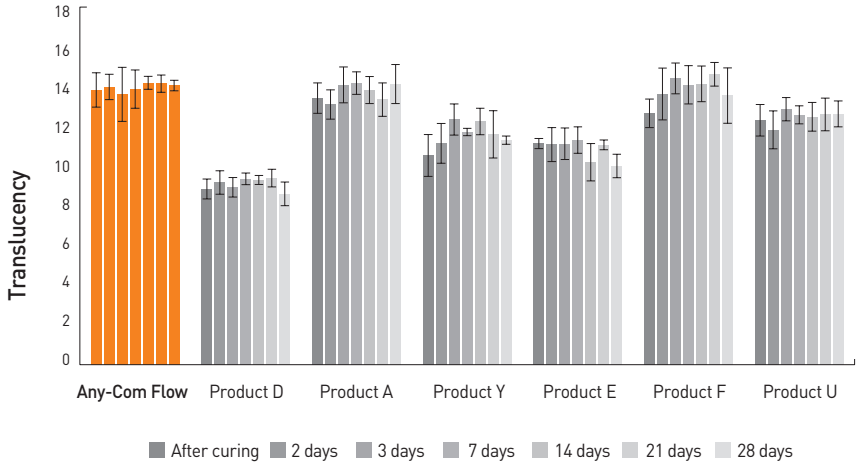


Properties

Translucency parameter changes (TP) in deionized water

- The specimens were immersed in distilled water for specific periods (2 days, 3 days, 7 days, 14 days, 21 days, and 28 days), after which the translucency of the resins was evaluated.
- After 28 days of immersion in distilled water, Products A (14.37), Any-Com Flow (14.31), and F (13.80) showed high translucency. Products U (12.86), Y (11.51), and E (10.19) displayed moderate translucency, while Product D (8.76) exhibited the lowest translucency.

	After curing	2 days	3 days	7 days	14 days	21 days	28 days
Any-Com Flow	14.09±0.88	14.24±0.65	13.86±1.38	14.13±0.98	14.45±0.33	14.41±0.44	14.31±0.27
Product D	9.01±0.51	9.34±0.6	9.10±0.50	9.53±0.30	9.47±0.23	9.57±0.45	8.76±0.61
Product A	13.67±0.78	13.34±0.75	14.35±0.92	14.44±0.58	14.08±0.69	13.59±0.86	14.39±1.00
Product Y	10.73±1.07	11.35±1.02	12.57±0.80	11.93±0.19	12.47±0.68	11.81±1.21	11.51±0.21
Product E	11.34±0.26	11.29±0.87	11.33±0.81	11.52±0.68	10.38±0.96	11.27±0.25	10.19±0.60
Product F	12.89±0.73	13.88±1.33	14.68±0.79	14.35±0.98	14.40±0.91	14.89±0.61	13.80±1.42
Product U	12.53±0.81	12.04±0.97	13.10±0.60	12.81±0.46	12.71±0.74	12.83±0.84	12.86±0.66



Instructions for Use

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Note before use

1. Product Verification

- **Expiration Date :** Before use, check the expiration date of the flowable resin. Do not use products that have passed their expiration date.
- **Storage Conditions :** Flowable resins can be sensitive to temperature and humidity, so verify the storage conditions. Always follow the manufacturer's storage instructions.
- **Package Condition :** Do not use products if the package is opened or damaged.

2. Treatment Area Preparation

- **Tooth Surface Cleaning :** Prior to use, clean the tooth to be treated thoroughly. This helps improve the adhesion of the flowable resin and ensures there are no contaminants.
- Drying : Ensure that the treatment area is properly dried. Any remaining moisture can prevent the resin from curing properly.

3. Material Preparation

- **Application Instrument Preparation :** Prepare the necessary instruments for applying the resin, such as a resin applicator.

Instructions for Use

How to use

1. Application of Flowable Resin

- **Proper Amount Application :** Apply a uniform layer of resin to the tooth surface. Use an appropriate amount, as excessive resin may leave unnecessary material after curing.
- **Shaping to Tooth Contour :** After applying the resin, shape it to fit the contours of the tooth and outline the area to be restored. If needed, add more resin to refine the shape.

2. Curing

- **Light Curing :** Any-Com Flow is a light curing resin, and curing is done using an LED light curing device. Cure for the recommended time as per the manufacturer's instructions.
  - For a light intensity of 900mW /cm², apply light for 10 seconds
  - For a light intensity of 540mW /cm², apply light for 20 seconds
  - For a light intensity of 450mW /cm², extend the curing time
- **Check Curing Status :** Verify if curing is complete before proceeding with further steps. Inadequate curing can lead to resin deformation or detachment.

3. Finishing

- **Polishing :** After curing, polish the resin surface or remove any excess material to smooth the surface. This ensures a clean and polished finish.
- **Cleaning :** After treatment, clean the tooth surface again and, if necessary, smooth out the treated area to ensure a uniform and finished result.

Caution when use

1. Patient Sensitivity Reactions

- **Flowable Resin is primarily a composite resin, and some of its ingredients may cause allergic reactions. Although these reactions are rare, it is important to be mindful of the following.**
  - **Ingredient Check :** Verify if the patient has allergies to any of the key ingredients in the flowable resin.
  - **Allergy Test :** For patients who may be at risk of allergic reactions, it is advisable to perform a skin test prior to use.
  - **Signs of Sensitivity :** If the patient experiences symptoms such as rashes, itching, or swelling during use, stop immediately and consult a healthcare professional.

2. Adherence to Proper Curing Time

- **Any-Com Flow is a light curing resin, so ensuring the correct curing time is crucial for optimal results.**
  - **Curing Time :** Follow the manufacturer's recommended curing time. Inadequate curing can lead to resin deformation or detachment.
  - **Appropriate Light Source :** Proper curing is essential to ensure the resin bonds well to the tooth and maintains durability. Verify that the light-curing device is functioning with the appropriate power output, and use the correct wavelength for the resin.
  - **Curing Time Check :** For larger areas where curing may be challenging, divide the curing process into multiple sessions or check the light's curing range to ensure full coverage.

3. Moisture Control and Drying Conditions

- **When applying Flowable Resin, any remaining moisture can interfere with the curing process. Areas in contact with moisture may result in improper curing or reduced adhesion. The following precautions should be observed.**
  - **Tooth Surface Drying :** Before applying the resin, ensure that the tooth surface is thoroughly dried. Special attention should be paid to avoid any saliva left on the tooth when working inside the mouth.
  - **Excessive Moisture Caution :** Avoid using resin on areas that are either excessively dry or overly moist, as this can reduce adhesion or prevent proper curing.
  - **Moisture Absorption :** Some resins have moisture-absorbing properties, which can lead to distortion after curing in a humid environment. Ensure that the areas in contact with the resin are completely dry.

Instructions for Use

4. Avoiding Excessive Resin Application and Unnecessary Reapplication

- **Applying Flowable Resin in excess can lead to several issues.**
  - **Shape Imbalance :** Using too much resin can put undue pressure on the tooth, which may cause the resin to crack or distort after curing.
  - **Incomplete Curing :** Applying resin too thick may prevent light from penetrating sufficiently, resulting in incomplete curing.
  - **Excess Resin Removal :** Any excess resin applied should be removed during the finishing and polishing process. Be cautious not to reapply unnecessary resin during this step.

5. Physical Pressure and Stress Before Curing

- **It is essential to avoid applying physical pressure to the resin before it cures.**
  - **Pressure on the Resin :** Applying unnecessary pressure on the resin surface before curing can lead to uneven curing or damage to the resin. Ensure that no undue stress is placed on the resin during this stage.

6. Proper Polishing and Finishing

- **After curing, Flowable Resin may require surface polishing. The following precautions should be taken.**
  - **Smooth Surface Polishing :** If the surface is not evenly polished after curing, friction with the tooth or food particles may accumulate. To prevent this, use fine polishing tools or diamond tips to create a smooth, polished surface.
  - **Avoid Excessive Polishing :** Over-polishing the resin can alter the thickness or shape of the restoration. Polish with moderate pressure to maintain the integrity of the restoration.

7. Storage and Reuse Precautions

- **Proper storage of Flowable Resin is critical to maintaining its safety and quality.**
  - **No Reuse :** Do not reuse leftover resin on other patients. Opened resin is likely contaminated and may have begun curing, which would compromise its effectiveness.
  - **Seal and Store :** After use, seal the remaining resin to minimize exposure to air. Follow the manufacturer's instructions regarding the temperature and humidity conditions for proper storage.

Condition for use

1. Environmental Conditions

- **Temperature :** The optimal temperature range for using Flowable Resin is generally between 18°C and 25°C. Using the resin at excessively high or low temperatures can affect the curing speed and workability.
- **Humidity :** In high humidity environments, the curing process of the resin may become inefficient. It is best to work in a dry environment to ensure proper curing.

2. Storage Conditions

- **Storage Temperature :** Most Flowable Resin products should be stored at temperatures between 15°C and 30°C. Avoid storing the resin in direct sunlight or in areas with high heat. If storing in a refrigerator, always follow the manufacturer's guidelines.
- **Sealed Storage :** After opening, store any leftover resin in a sealed container to minimize exposure to air. Increased contact with air can affect the curing rate and the quality of the resin.

3. Reuse Prohibition

- **Do Not Reuse :** Do not reuse Flowable Resin after it has been applied. It can undergo curing or contamination, which could compromise its quality and effectiveness.

Applications & Advantages

06

Applications

- Class I~IV restoration
- Base Liner
- Repair of composite resin, crown, bridge, and temporary restoration
- Pit & Fissure sealant
- Undercut block out
- Depth of cure : 3mm (10 sec.)

Advantages

- Excellent radiopacity
- Various shades matching with natural tooth
- Low polymerization shrinkage
- Improved abrasion resistance by Nano-hybrid fillers
- With optimum viscosity, excellent handling without stickiness

Clinical Guideline

07

Class I occlusal cavity : with packable resin

1. Tooth preparation

- After preparing the tooth surface, ensure that any debris or residual material from the tooth removal is thoroughly cleaned off with water.
- Dry the tooth surface, but avoid over drying it. Excessive drying can lead to incomplete bonding of the resin, which may increase the risk of Hypersensitivity due to insufficient adhesive strength.

2. Bonding

- Use a micro brush to evenly apply the bonding agent to the cavity surface.
- After application, gently agitate for 20seconds to ensure the bonding agent is evenly distributed.

3. Dry

- Gently use air to remove the solvent.
- After applying air, check if a uniform shine appears on the surface. (If shine does not appear, reapply the bonding agent using a micro brush.)
- Dry for 10seconds.

4. Curing

- Cure for 10 seconds using a light curing unit (465nm 800~1200mW /cm²)

5. Flowable resin lining

- Apply the flowable resin in the cavity.
- Use an explorer or similar tool to increase application to the interior or cusp areas.

Clinical Guideline

6. Curing

- Cure for 10 seconds using a light curing unit (For a light curing unit with a wavelength of 465nm and an intensity of 900mW /cm²)

7. Resin filling

- Use a resin applicator to dispense an appropriate amount of composite resin and fill the cavity.
- If the cavity is deeper than 2mm, layer the resin in increments of 2mm.

8. Curing

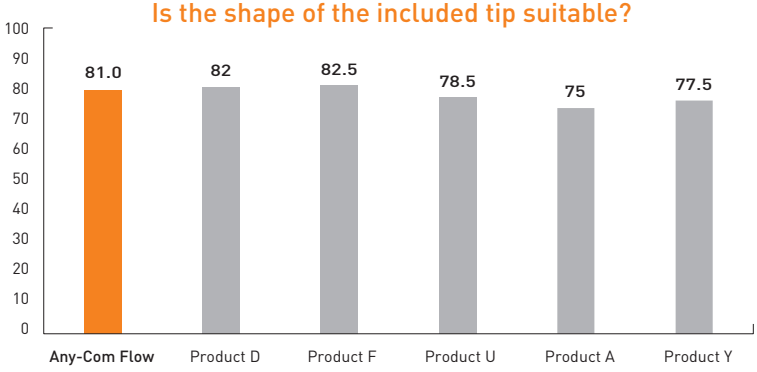
- Cure for 10 seconds using a light curing unit (For a light curing unit with a wavelength of 465nm and an intensity of 900mW /cm²)

9. Finishing and polishing

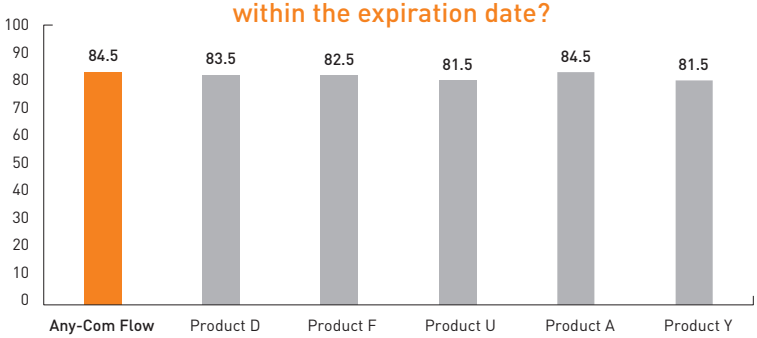
User convenience test

08

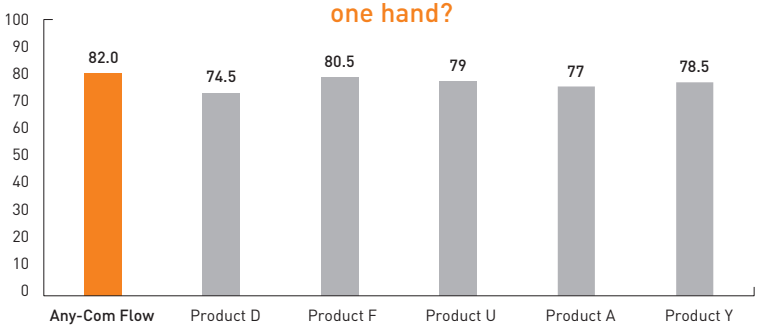
Is the shape of the included tip suitable?



Is the amount of the contents sufficient to be used within the expiration date?



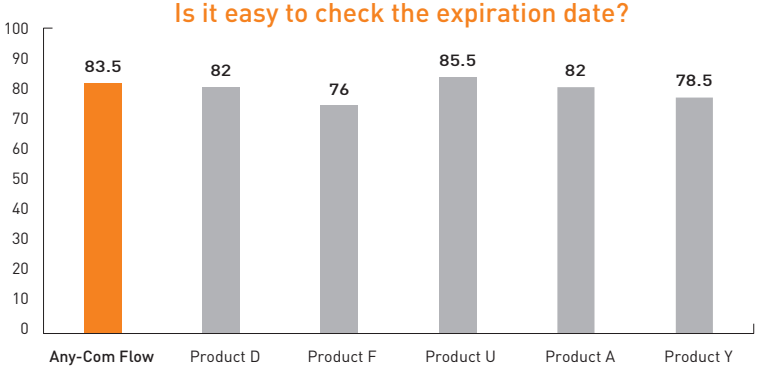
Is the external design convenient for holding with one hand?



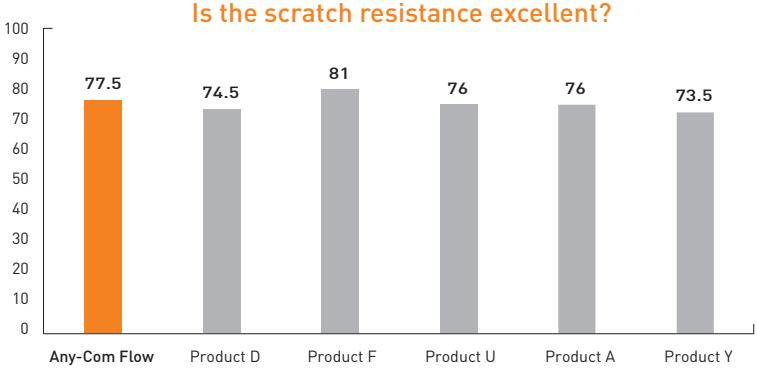
User convenience test

08

Is it easy to check the expiration date?



Is the scratch resistance excellent?



FAQ

Q Can problems occur if the curing time is too short?

A Yes, if the curing time is too short, the resin may not fully cure, leading to reduced durability or easy deformation On the other hand, an excessively long curing time can cause over-curing of the resin Therefore, it is important to follow the manufacturer's recommended curing time to ensure optimal results.

Q How long does Flowable Resin last?

A The durability of Flowable Resin depends on the environment in which it is used Generally, resin restorations in teeth can last for several years, but their durability may be affected by strong pressure or absorbed moisture Regular check-ups and maintenance are necessary.

Q Is it okay to use Flowable Resin with other dental materials?

A Yes, Flowable Resin can be used with other composite resins or adhesives However, it is important to check the manufacturer's guidelines to ensure compatibility between the products.

Q What are the chemical properties of Flowable Resin?

A Flowable Resin is primarily a composite resin, composed mainly of organic polymers and inorganic fillers It typically includes organic monomers such as Bis-GMA (Bisphenol A glycidyl methacrylate) and TEGDMA (Triethylene glycol dimethacrylate), along with inorganic fillers like barium or aluminum This resin has a low viscosity, allowing it to flow evenly It follows either a light cure or chemical-cure hardening method Light-cure resins harden when exposed to specific wavelengths of light, while chemical-cure resins harden through a chemical reaction between two mixed components.

FAQ

Q How is the viscosity characteristic of Flowable Resin utilized?

A The low viscosity of Flowable Resin allows for smooth application in narrow and complex spaces This makes it ideal for filling small cavities and micro gaps in teeth, particularly beneficial in endodontic or periodontal treatments Additionally, its high flowability helps minimize air bubbles inside after curing, improving adhesion and sealing properties.

Q How should the maintenance and aftercare of Flowable Resin be handled?

A The maintenance of Flowable Resin restorations requires regular check-ups and careful management. The restored teeth need periodic care or polishing, and in areas with high occlusal forces, the occlusion should be checked to prevent wear or damage to the restoration.

Q How can the discoloration potential of Flowable Resin be managed?

A Flowable Resin can discolor over time in the oral environment, primarily due to dye deposits from beverages or tobacco To manage this, newer products are formulated with additives that enhance discoloration resistance Additionally, regular maintenance and care by dental professionals are important for minimizing discoloration

Q How should the light curing properties of Flowable Resin be handled?

A The curing of light-cure Flowable Resin depends on factors such as the wavelength, output intensity, and curing time of the light source. Improper handling of these curing properties can result in incomplete curing, which may degrade the mechanical properties of the resin. The following methods can help set optimal light-curing conditions.

- Selection of Light Source : Use a blue light source (in the range of 400-500nm) to ensure even curing.
- Adjusting Light Intensity : Equipment with low light output may not provide sufficient curing, so it's important to use a light-curing unit with adequate intensity, and regularly check the equipment.
- Optimizing Curing Time : Typically, curing for 10-20 seconds is recommended, but this should be adjusted based on the size and location of the tooth.

Q What are the complications and side effects after the use of Flowable Resin?

A Flowable Resin is generally safe to use, but in rare cases, hypersensitive reactions can occur. The following measures can help prevent such reactions.

• Allergic Reactions : Some patients may experience hypersensitivity due to the resin's components. For patients at risk of allergic reactions, it is recommended to conduct a test prior to use.

Q What are the methods for occlusion testing and adjustment of Flowable Resin restorations?

A Flowable Resin restorations require occlusion testing and adjustment after curing. Immediately after curing, it's important to check the occlusal status and adjust any occlusal imbalances. Optimizing the height and shape of the restoration while considering the occlusal forces is crucial.

- Occlusion Testing : The occlusion test ensures that there are no premature contacts or interference during lateral or protrusive movements of the restoration. If needed, adjust the restoration through polishing.
- Polishing and Wear Testing : The restoration's surface should be polished to prevent roughness. Regular occlusion checks should be performed to prevent imbalances.