

Water Soluble Yarn in Lace and Open Structure Fabrics

Temporary Base Systems and Controlled Removal

1. Introduction

Certain textile structures cannot be formed as free-standing fabrics during production.

Examples include:

- Lace
- Embroidery-based fabrics
- Open mesh structures
- Decorative and patterned textiles with large voids

These structures require a temporary base to hold the design during formation.

Water soluble yarn (20°C, Ne 40/1) can be used to create this temporary base.

After formation, the base is removed through water dissolution, leaving only the intended structure.

2. Purpose of This Application

The purpose of using water soluble yarn in this context is to:

- Provide a temporary foundation for structure formation
- Enable production of designs that cannot exist independently during processing
- Allow complete or partial removal of supporting elements after formation

The final product is defined by what remains after removal.

3. Core Principle

The structure is built with support, then revealed by removing the support.

The water soluble yarn is not part of the final fabric.

It enables formation and is then removed.

4. Why Temporary Base Systems Are Required

In lace and open structures:

- Yarns may not be interconnected across the entire fabric
- Large open areas reduce structural integrity
- Elements of the design may be isolated or loosely connected

Without a base:

- The structure cannot be formed
- The design collapses during production
- Handling becomes impossible

A temporary base provides stability during:

- Formation
 - Handling
 - Finishing preparation
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5. Role of Water Soluble Yarn

Water soluble yarn is used to create a base or scaffold.

Its functions include:

- Holding yarns in position
- Supporting embroidery or decorative work
- Enabling formation of open patterns

- Maintaining dimensional stability before finishing

After dissolution:

- Only the intended pattern or structure remains
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6. Application Modes

6.1 Full Base Fabric for Lace Construction

Water soluble yarn is used to create a complete base fabric.

Function:

- Supports embroidery or lace formation
- Holds the entire design during processing

After dissolution:

- Base disappears
 - Lace structure remains
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6.2 Partial Base or Grid Systems

Instead of a full base, a grid or partial structure is created.

Function:

- Supports selected areas
- Reduces total amount of removable material

After removal:

- Structure becomes more open
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6.3 Pattern Formation Through Removal

Water soluble yarn is placed in specific areas to define patterns.

Function:

- Temporarily occupies space
- Defines where voids will appear

After dissolution:

- Open patterns are created
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6.4 Combination with Permanent Yarn Systems

Water soluble yarn is combined with permanent yarns.

Function:

- Supports formation of composite structures

After dissolution:

- Permanent yarn defines final design
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7. Structural Design Considerations

Successful application depends on:

- Balance between support and openness
 - Accessibility of the soluble yarn for removal
 - Integrity of the remaining structure
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7.1 Minimum Effective Support

The base should provide sufficient support without:

- Excessive density
- Unnecessary complexity
- Restricted water access

7.2 Final Structure Independence

After removal, the remaining structure must:

- Hold its shape
- Maintain design integrity
- Withstand handling

If the structure depends on the base after removal, the design is not complete.

8. Fabric Accessibility and Dissolution

Dissolution depends on:

- Openness of the structure
- Water flow
- Movement during washing
- Duration of exposure

Highly compact or layered areas may slow removal.

9. Moisture Sensitivity Before Use

As a 20°C soluble yarn, the material is sensitive to moisture prior to intended removal.

Exposure to:

- Humidity
- Wet environments
- Prolonged open storage

may affect strength before use.

This can lead to:

- Premature weakening
 - Loss of support function
 - Instability during formation
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10. Handling and Storage

To maintain performance:

- Keep yarn dry before use
- Avoid exposure to humid environments
- Minimize handling after opening

- Maintain consistent storage conditions
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11. Removal Process

The base is removed through water-based processing.

Key requirements include:

- Sufficient water volume
- Adequate temperature
- Effective movement
- Sufficient time

Incomplete removal may result in:

- Residue
 - Local stiffness
 - Visual defects
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12. Risk of Residue

Residue may occur if:

- Base is too dense
- Water flow is insufficient
- Washing conditions are reduced
- Dissolution time is too short

In lace and open fabrics, residue is highly visible and may affect quality significantly.

13. Risk of Drying Before Complete Removal

If the structure is exposed to heat before complete dissolution:

- Remaining material may solidify
- Removal becomes difficult or not possible

Complete dissolution must be confirmed before drying.

14. Process Sensitivity

This application is sensitive to:

- Design of the base
- Environmental conditions
- Washing process
- Handling consistency

Small variations may affect final appearance.

15. Trial Strategy

A structured trial approach is recommended.

Stage 1 — Design Trial

Confirm that the base supports formation

Stage 2 — Formation Trial

Evaluate:

- Structural stability
- Handling behaviour

Stage 3 — Dissolution Trial

Confirm:

- Complete removal
- No residue

- No drying before full dissolution

Stage 4 — Final Evaluation

Assess:

- Visual clarity of pattern
 - Softness
 - Structural integrity
 - Absence of defects
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16. Advantages of This Application

When applied correctly:

- Enables complex lace and open structures
- Allows high design freedom
- Removes need for permanent base materials
- Produces clean, lightweight fabrics

17. Limitations

Potential limitations include:

- Sensitivity to moisture before use
 - Requirement for controlled washing conditions
 - Risk of residue if conditions are not met
 - Need for careful design of base structure
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18. Engineering Perspective

Water soluble yarn in this application acts as a **temporary structural system**.

It allows the formation of fabrics that cannot exist during production without support.

Its value lies in:

- Enabling formation
- Controlling structure
- Disappearing without trace when conditions are correct

19. Summary

Water soluble yarn (20°C, Ne 40/1) can be used as a temporary base in lace and open structure fabrics.

It supports formation during production and is removed through water dissolution.

Successful application depends on:

- Appropriate base design
 - Controlled handling
 - Validated removal process
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20. Responsibility

Final performance depends on process conditions and system control.

Users are responsible for testing, process adjustment, and validation before production.

21. Disclaimer

Performance depends on yarn system, structure design, environmental conditions, and process control.

Validation under actual production conditions is required.

22. Contact for Technical Support

For technical queries:

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