

# Cost Pressure and Its Impact on Water Soluble Thread Dissolution

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## Process Constraints, Trade-Offs, and Control

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### 1. Introduction

Garment manufacturing operates under continuous cost pressure. Factories are required to:

- Reduce cycle times
- Lower energy consumption
- Minimize water usage
- Increase throughput

These pressures influence how washing processes are designed and executed.

Water soluble thread is designed to dissolve under defined conditions.

When process conditions are altered to reduce cost, dissolution performance may be affected.

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### 2. Nature of Cost Pressure in Garment Washing

Washing processes consume:

- Water
- Energy
- Time
- Machine capacity

Reducing any of these reduces cost.

Common cost-reduction actions include:

- Lowering water usage
- Reducing wash temperature
- Shortening cycle time
- Increasing machine load

Each of these changes affects dissolution conditions.

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### **3. Relationship Between Cost Reduction and Dissolution**

Water soluble thread requires:

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

Cost reductions typically reduce one or more of these.

### **3.1 Reduced Liquor Ratio**

Lower water volume:

- Reduces flow through garments
- Limits removal of dissolved material

Result:

- Increased risk of residue

### **3.2 Reduced Temperature**

Lower wash temperature:

- Slows dissolution rate
- Reduces effectiveness of removal

Result:

- Incomplete dissolution

### **3.3 Reduced Wash Time**

Shorter cycles:

- Reduce exposure time

- May leave partially dissolved material

Result:

- Residual thread

### **3.4 Increased Load Density**

More garments per cycle:

- Restricts water movement
- Increases fabric-to-fabric contact

Result:

- Reduced penetration and removal

### **3.5 Reduced Mechanical Action**

Gentler or limited movement:

- Reduces flushing of dissolved material

Result:

- Localised residue

## 4. Combined Effects

These factors often occur together.

For example:

- Lower water + shorter time + higher load

The combined effect is greater than each factor individually.

Small reductions across multiple variables can significantly reduce dissolution performance.

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## 5. Drying Before Complete Dissolution

In cost-driven processes, there may be pressure to move garments quickly to drying.

If dissolution is incomplete:

- Remaining material may solidify during drying
- Removal becomes more difficult or not possible through normal washing

Incomplete dissolution followed by heat exposure increases the risk of permanent residue.

## 6. Process Trade-Off

Cost reduction introduces a trade-off:

- Lower cost per cycle

versus

- Increased risk of incomplete dissolution

This trade-off must be recognized and managed.

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## 7. Practical Approach

Factories can manage this balance by:

- Identifying minimum conditions required for dissolution
  - Maintaining consistency in process parameters
  - Avoiding simultaneous reduction of multiple variables
  - Adjusting process based on garment type and construction
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## 8. Trial and Validation

Because processes vary, validation is required.

Before bulk production:

- Test under actual conditions
- Confirm dissolution performance
- Adjust process where necessary

Process changes made for cost reduction should always be revalidated.

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## 9. Engineering Perspective

Water soluble thread performance is dependent on system conditions.

It is not independent of the process environment.

Understanding the interaction between:

- Material behaviour
- Process conditions
- Cost constraints

is necessary to achieve reliable outcomes.

## 10. Summary

Cost pressure affects washing conditions.

Reduced:

- Water
- Temperature
- Time
- Movement

increase the likelihood of incomplete dissolution.

Reliable performance requires balancing cost efficiency with sufficient process conditions.

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## 11. Responsibility

Final performance depends on process conditions and system control.

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

## 12. Disclaimer

Performance depends on process conditions, garment construction, and system design.

Validation under actual production conditions is required.

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## 13. Contact for Technical Support

For technical queries:

**Email:** [info@durafil-group.com](mailto:info@durafil-group.com)