Introduce JIS for Textile Products

JIS standard overview and The procedure for Casual Wear & Bed Sheets

Japan Textile Products Quality and Technology Center (QTEC)
Dhaka Lab, Deputy General Manager & Overseas Coordination Department, Manager

Kei Funaki

What is JIS ?

JIS stands for:
Japan Industrial Standards (Japan’s national standards)

JIS is: A basis of Japan Quality.

JIS is: What QTEC lab works with.

Japan Quality?

A few examples:
- Think of automobiles from Japan.
- Think of electric appliances of Japan.
- Think of optical apparatuses of Japan.
- Think of office appliances from Japan.

--- They all give you some idea about what Japan Quality is meant to be, in the textile & garment industry as well.

Where does Japan quality come from?

- The clue: The Japanese consumers. Traditionally, the Japanese consumers are highly quality-conscious. They always look for quality, not just appearance or price. Therefore it is advisable that you ensure and prove the quality of your products. Most of the Japanese retailers may ask test results report before shipment.
How can we ensure satisfying quality?

- First, better understand the market. (There are some regulations to understand.)
- Secondly, must learn requirements of each customer. (They may vary.)
- Thirdly, better be familiarized with JIS tests for textiles and evaluation process.
- Lastly, apply for JIS tests and have the products evaluated.

JIS which is used for quality evaluation of casual wears is mentioned only test method.

Each retailers set up their quality criteria about their selling products, respectively. So you need follow your buyer’s quality requirement.

### Fabric Test

1. Color Fastness
2. Physical Properties
3. Safety
4. Fiber Composition
5. Special functional Properties

### Garment Test

1. Labeling
2. Inspection (check of appearance & sewing)
3. Washing durability

### Fabric Test 1

**Color Fastness**
Primary Test Item and Test Method for color fastness of JIS

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>JIS L 0842 Test method for color fastness to enclosed carbon arc lamp light No.3 exposure method (Grade 3 or 4)</td>
</tr>
<tr>
<td></td>
<td>JIS L 0843 Test method for color fastness to xenon arc lamp light No.3 exposure method (Grade 3 or 4)</td>
</tr>
<tr>
<td>Washing</td>
<td>JIS L 0844 Test method for color fastness to washing and laundring Method A-1 or A-2</td>
</tr>
<tr>
<td>Perspiration</td>
<td>JIS L 0848 Test method for color fastness to perspiration</td>
</tr>
<tr>
<td>Rubbing</td>
<td>JIS L 0849 Test method for color fastness to rubbing Type Ⅱ (Gakushin-type tester)</td>
</tr>
</tbody>
</table>

Primary Test Item and Test Method for color fastness of JIS

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light &amp; Perspiration</td>
<td>JIS L 0888 Test method for color fastness to light and perspiration Method B</td>
</tr>
<tr>
<td></td>
<td>ATTS method <em>(not JIS)</em></td>
</tr>
<tr>
<td></td>
<td>(ATTS Association for Textile Technical Study)</td>
</tr>
</tbody>
</table>

Primary Test Item and Test Method for color fastness of JIS

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorinated Water</td>
<td>JIS L 0884 Test method for color fastness to chlorinated water Method A (10 ppm)</td>
</tr>
<tr>
<td>Sublimation</td>
<td>JIS L 0854 Test method for color fastness to transfer of dye</td>
</tr>
<tr>
<td>Bleeding</td>
<td>Daimaru method <em>(not JIS)</em></td>
</tr>
<tr>
<td>Solution Stain</td>
<td>Evaluation of washing or dry cleaning solution stain</td>
</tr>
</tbody>
</table>

Test specimen & Adjacent fabrics

- Composite specimen
  Specimen which is sewn with adjacent fabrics
- Standard adjacent fabrics for staining of color fastness test (JIS L 0803)
  Requested from retailer’s standard.
  In general,
  - Washing/Perspiration  □ Cotton & Silk
  - Cotton & Nylon
  - Dry cleaning  □ Multi fiber fabric
  - Sublimation  □ Cotton & Polyester

Multi fiber fabric
Gray Scale for assessing

- Gray scale for assessing change in color (JIS L 0804)

- Gray scale for assessing staining (JIS L 0805)

Light: JIS L 0842 Test method for color fastness to enclosed carbon arc lamp light

No.3 exposure method (Grade 3 or 4)

<table>
<thead>
<tr>
<th>Specimen folder</th>
<th>(After test specimen)</th>
<th>(After test blue scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure part</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Passing Grade (in general) | Outer wear: Grade 4 or more | Inner wear: Grade 3 or more | Bed sheet: Grade 3 or more |
For Grade 3 | For Grade 4 |
**Washing**: JIS L 0844 Test method for color fastness to washing and laundering

**Method A-1 (for Wool or Silk), A-2**
- Specimen size: 4cm x 10cm
- Solution condition: 5gm Soap/1L
  - Modified solution
    - Kao Attack (synthetic detergent)
    - Kao Emal (neutral detergent)
- Solution quantity: 100ml
- Washing Time: 30min.
- Temperature: 40°C (A-1), 50°C (A-2)

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stain</td>
<td>Grade 3 or more</td>
</tr>
</tbody>
</table>

**Passing Grade (in general)**
- Color change: Grade 4 or more
- Stain: Grade 3 or more

**Perspiration**: JIS L 0848 Test method for color fastness to perspiration

- Specimen size: 4cm x 10cm or 6cm x 6cm
- Artificial perspiration solution: Acid & Alkali
- Wetting procedure: 30min.
- **Test condition**
  - Load: 12.5kPa
  - Temperature: 37 ± 2°C
  - Storage time: 4 hours

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stain</td>
<td>Grade 3 or more</td>
</tr>
</tbody>
</table>
### Perspiration: JIS L 0848 Test method for color fastness to perspiration

<table>
<thead>
<tr>
<th>Acid (pH 5.5)</th>
<th>Alkali (pH 8.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 gm of L-Histidine hydrochloride monohydrate</td>
<td>0.5 gm of L-Histidine hydrochloride monohydrate</td>
</tr>
<tr>
<td>5.0 gm of NaCl</td>
<td>5.0 gm of NaCl</td>
</tr>
<tr>
<td>2.2 gm of sodium dihydrogenphosphate dehydrate</td>
<td>5 gm of sodium dihydrogenphosphate dodecahydrate</td>
</tr>
<tr>
<td>approximately 15 ml of 0.1 mol/L NaOH</td>
<td>approximately 25 ml of 0.1 mol/L NaOH</td>
</tr>
<tr>
<td>total volume 1L by adding water</td>
<td>total volume 1L by adding water</td>
</tr>
</tbody>
</table>

### Drying test specimens

- **Type**: Gakushin-type tester
- **Test condition**
  - Rubbing cloth: Cotton
  - (Dry) the standard condition: 20 ± 2℃, 65% ± 4%
  - (Wet) 100% wet
  - Loading arm: Load 2N
  - Reciprocate 100 times at a speed of 30 reciprocations per minute

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Dry</th>
<th>Wet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3-4 or more</td>
<td>Grade 2-3 or more</td>
<td></td>
</tr>
</tbody>
</table>

### Rubbing: JIS L 0849 Test method for color fastness to rubbing

- **Type**: Gakushin-type tester
- **Test condition**
  - Rubbing cloth: Cotton
  - (Dry) the standard condition: 20 ± 2℃, 65% ± 4%
  - (Wet) 100% wet
  - Loading arm: Load 2N
  - Reciprocate 100 times at a speed of 30 reciprocations per minute

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Dry</th>
<th>Wet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3-4 or more</td>
<td>Grade 2-3 or more</td>
<td></td>
</tr>
</tbody>
</table>

### Testing machine and Perspiration test specimen
Rubbing: JIS L 0849 Test method for color fastness to rubbing

Evaluate a stain of Rubbing cloth

Testing machine

Water: JIS L 0846 Test method for color fastness to water

- Specimen size: 4cm x 10cm or 6cm x 6cm
- Solution: Water

**Test condition**
- Test machine: The Same machine of JIS L 0848 (Perspiration)
- Load: 12.5 kPa
- Temperature: 37 ± 2 ℃
- Storage time: 4 hours

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stain</td>
<td>Grade 3 or more</td>
<td></td>
</tr>
</tbody>
</table>

Dry cleaning: JIS L 0860 Test method for color fastness to dry cleaning

<table>
<thead>
<tr>
<th>Test method</th>
<th>Solvent</th>
<th>Surfactant &amp; water</th>
<th>Stainless steel ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>T-chloroethylene</td>
<td>Addition</td>
<td>Use 20 balls</td>
</tr>
<tr>
<td>A-2</td>
<td>T-chloroethylene</td>
<td>No addition</td>
<td>No use</td>
</tr>
<tr>
<td>B-1</td>
<td>Petroleum</td>
<td>Addition</td>
<td>Use 20 balls</td>
</tr>
<tr>
<td>B-2</td>
<td>Petroleum</td>
<td>No addition</td>
<td>No use</td>
</tr>
</tbody>
</table>

**Test condition**
- Test machine: The Same machine of JIS L 0844 (Washing)
- Temperature: 30 ± 2 ℃
- Time: 30min.

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stain</td>
<td>Grade 3 or more</td>
<td></td>
</tr>
</tbody>
</table>
### Light & Perspiration: JIS L 0888 Test method for color fastness to light and perspiration & ATTS method

1. **Method B of JIS L 0888**
   - A specimen which is wetted into the artificial perspiration solution of JIS L 0848 is tested by the same procedure of color fastness test to light (Grade 3 of No.3 exposure method).
   - **Applied articles**: Summer season wear made from cellulose fiber etc.

2. **ATTS method**
   - Use the ATTS artificial perspiration solution instead of JIS L 0888.
   - **Applied articles**: Men’s pants or Sports wear made from cellulose fiber etc.

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 3-4 or more</th>
</tr>
</thead>
</table>

### Chlorinated water: JIS L 0884 Test method for color fastness to chlorinated water

1. **Method A (10ppm)**
   - **Test condition**
     - Test machine: The Same machine of JIS L 0844 (Washing)
     - NaClO Solution: the amount of Chlorine 10mg/L (with buffer, pH 7.0±0.2)
     - Bath ratio: 200:1 (Sample size 1.0 gm and test solution 200ml respectively.)
     - Temperature: 25°C
     - Time: 30min.
   - **Applied articles**: Cellulose fiber products

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 3-4 or more</th>
</tr>
</thead>
</table>

### Sublimation: JIS L 0854 Test method for color fastness to transfer of dye

1. **Test condition**
   - **Specimen size**: 4cm x 10cm or 6cm x 6cm
   - **Test machine**: The Same machine of JIS L 0848 (Perspiration)
   - **Load**: 12.5kPa
   - **Temperature**: 120±2°C
   - **Storage time**: 80min.
   - **Adjacent Fabrics**: Cotton & Polyester
   - **Applied articles**: Polyester fiber products

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Color change</th>
<th>Grade 4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stain</td>
<td>Grade 4 or more</td>
</tr>
</tbody>
</table>

### Light & Perspiration: ATTS method

- **ATTS Artificial perspiration solution**
  - Acid (pH 3.5)
    - 0.5 gm of L-Histidine hydrochlorohydrate
    - 5.0 gm of NaCl
    - 2.2 gm of disodium hydrogenphosphate
    - 5.0 gm of Sodium D- pentothenate
    - 5.0 gm of D(+) Glucose
    - approximately 10~13 ml of 99% Acetic Acid
  - Alkali (pH 8.0)
    - 0.3 gm of L-Histidine hydrochlorohydrate
    - 5.0 gm of NaCl
    - 2.2 gm of disodium hydrogenphosphate
    - 5.0 gm of D(+) Glucose
    - approximately 28~34 ml of 5% NaOH
  - The total volume 1L by adding water

### Passing Grade (in general)

- Color change: Grade 3-4 or more
- Stain: Grade 4 or more
### Breeding: Daimaru method

**Test condition**
- Solution: 0.05% of nonionic surfactant solution
- Running Time: 2 hours

**Applied articles**: Deep and Light color combination fabric or garments

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Stain</th>
<th>Grade 4-5 or more</th>
</tr>
</thead>
</table>

### Solution stain: Evaluation of Washing or Dry cleaning solution stain

**Test procedure**
Compare the after test solution with before test solution by gray scale for assessing staining.

### Fabric Test 2

**Physical Properties**

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength</td>
<td>JIS L 1096 Testing method for woven and knitting fabrics Method A (Ravelled Strip Method)</td>
</tr>
<tr>
<td>Tearing strength</td>
<td>JIS L 1096 Testing method for woven and knitting fabrics Method D (Pendulum Method)</td>
</tr>
<tr>
<td>Seam slippage</td>
<td>JIS L 1096 Testing method for woven and knitting fabrics Method B</td>
</tr>
<tr>
<td>Bursting strength</td>
<td>JIS L 1096 Testing method for woven and knitting fabrics Method A (Muellen-type tester)</td>
</tr>
</tbody>
</table>
Primary Test Item and Test Method for physical properties of JIS

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilling</td>
<td>JIS L 1076 Testing methods for pilling of woven fabrics and knitting fabrics Method A (ICI-type pilling tester)</td>
</tr>
<tr>
<td>Fiber adhesion</td>
<td>QTEC NTM-1 (not JIS)</td>
</tr>
<tr>
<td>Dimensional change</td>
<td>JIS L 1096 Testing method for woven and knitting fabrics</td>
</tr>
</tbody>
</table>

Tensile strength: JIS L 1096 Testing method for woven and knitting fabrics

Method A (Ravelled Strip Method)

Test condition
Specimen size: 5cm x 30cm
Warp and Weft
Velocity: 20 cm/min.

Applied articles: Woven fabrics

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Thick fabric</th>
<th>Thin fabric</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 N</td>
<td>150 N</td>
</tr>
</tbody>
</table>

Tearing strength: JIS L 1096 Testing method for woven and knitting fabrics

Method D (Pendulum Method)

Test condition
Specimen size: 6.3cm x 10cm, Warp and Weft
Give the test specimen a perpendicular cut of 2 cm at its middle.

Applied articles: Woven fabrics

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Thick fabric or Outer wear</th>
<th>Thin fabric or Inner wear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 N</td>
<td>7 N</td>
</tr>
</tbody>
</table>

Tearing strength: JIS L 1096 Testing method for woven and knitting fabrics
**Seam slippage:** JIS L 1096 Testing method for woven and knitting fabrics

**Method B**

**Test condition** (Summary)
- Specimen size: 10cm x 17cm, Warp and Weft
- Seam allowance: 1 cm
- No. of stitches: 5 stitches/cm (plain stitch)
- Load: 49.0N (Thin fabric)
- 117.7N (Thick fabric)
- Velocity: 30 cm/min.

**Applied articles:** Woven fabrics

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>Thick fabric</th>
<th>Up to 5mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin fabric</td>
<td>Up to 3mm</td>
<td></td>
</tr>
</tbody>
</table>

**Bursting strength:** JIS L 1096 Testing method for woven and knitting fabrics

**Method A (Muellen-type tester)**

**Test condition**
- Specimen size: 15cm x 15cm

**Applied articles:** Knit fabrics

<table>
<thead>
<tr>
<th>Applied articles</th>
<th>Bursting Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer wear</td>
<td>500 kPa</td>
</tr>
<tr>
<td>Inner wear</td>
<td>400 kPa</td>
</tr>
<tr>
<td>Under wear</td>
<td>300 kPa</td>
</tr>
<tr>
<td>Bed sheet</td>
<td>400 kPa</td>
</tr>
</tbody>
</table>

**Pilling:** JIS L 1076 Testing methods for pilling of woven fabrics and knitting fabrics

**Method A** (ICI-type pilling tester)

**Test condition**
- Specimen size: 10cm x 12cm
- Warp 2pcs & weft 2pcs
- Running time: 10hours (Woven fabrics)
- 5hours (Knit fabrics)

**Passing Grade (in general)**
- Grade 3 or more
- (If synthetic fiber mix fabrics, Grade 2 or more)
Fiber adhesion : QTEC NTM-1

Test procedure (Summary)
1. Stick a cellophane tape on the fabric, and add the prescribed load (3.9 ± 0.1 kPa) on the cellophane tape.
2. Remove the tape and load after 5 seconds promptly.
3. Use the same tape, and repeat 5 times above procedure.

Applied articles : Fuzzy fabrics

Dimensional change : JIS L 1096 Testing method for woven and knitting fabrics

Dimensional change (%) = \( \frac{(B) - (A)}{(A)} \times 100 \)

A : Before treatment measurement
B : After treatment measurement
Plus(+) means elongation, Minus(-) means shrinkage.

Primary test method
Method G (Use electronic washing machine, Accordance with JIS L 0217 No.103)
Method H-2 (Steam press)

Dimensional change : JIS L 1096 Testing method for woven and knitting fabrics

Passing Grade (in general)

<table>
<thead>
<tr>
<th>Washing condition</th>
<th>Outer wear</th>
<th>Inner wear</th>
<th>Bed sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method G (Washing machine)</td>
<td>Woven</td>
<td>Knit</td>
<td>Woven</td>
</tr>
<tr>
<td>Tumble dry</td>
<td>-3%~0%</td>
<td>-5%~0%</td>
<td>-4%~0%</td>
</tr>
<tr>
<td>Flat dry</td>
<td>-3%+2%</td>
<td>-4%+5%</td>
<td>-5%+3%</td>
</tr>
<tr>
<td>Line dry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Washing condition: JIS L 0217 No.103,104,105 or 106

Method H-2 (Steam press)

| Woven fabric | ±2% |
| Knit fabric  | ±3% |
**Fabric Test 3**

### Safety

**Test Procedure** (Summary)

1. Extract formaldehyde from fabric in 40 ± 2 °C water.
2. Add acetylacetone solution to the extracted solution for reacted to yellow color.
3. Measure Yellow color strength of solution by spectrophotometer, and calculate Free formaldehyde concentration.

### Free formaldehyde: Ordinance No.34 of the Ministry of Welfare

<table>
<thead>
<tr>
<th>Passing Grade (in the ordinance)</th>
<th>Infants and babies textile products</th>
<th>Under wear, Night wear, Sox etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not detective</td>
<td>[Up to 0.05 (A-A0)] or Up to 16 μg/g</td>
<td>Up to 75 μg/g</td>
</tr>
</tbody>
</table>

### Surface flash: JIS L 1917 Testing method for burning due to surface flash of textiles

Surface flash means rapid spread of flame on the surface of the cloth, except for the ignition of the cloth.

**Applied articles:** Fuzzy fabrics of cellulose fiber

<table>
<thead>
<tr>
<th>Passing Grade (in general)</th>
<th>No flash (Flash distance up to 10cm)</th>
</tr>
</thead>
</table>

**Test machine**

**Burner**

**Fabric Test 4**

### Fiber composition: JIS L 1030-1,2

Fiber composition test is required to determine the composition labeling.

**Test procedure**

1. Fiber identification: Analysis of the type of fiber that is used in the textile products.
2. Fiber composition: Calculation of the percentage of fibers that are used in the textile products.


**JIS L 1030-2 Testing method for quantitative analysis of fiber mixtures – Part 2: Testing method for quantitative analysis of fiber mixtures**
**Fabric Test 5**

**Special Functional Properties**

- Antibacterial
- Deodorant
- Water resistance
- Soil resistance
- Electrostatic propensity
- UV shielding
- Quick dry (Water absorbency & Dry speed)
- Contact cool sensation (Q-max)
- Heat insulating

etc.

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**Garment Test**

### Primary Test Item

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Label check</td>
<td>Conformity assessment of labeling according to law and JIS</td>
</tr>
<tr>
<td>Inspection</td>
<td>Check of material, appearance and sewing of the garment, and measurement of dimension</td>
</tr>
<tr>
<td>Washing durability</td>
<td>After practical washing, check as follow items. Color change, appearance change, dimensional change, puckering, twist</td>
</tr>
</tbody>
</table>

---

**Garment Test : Label check**

- Size labeling
- Composition labeling
- Care labeling
- Country of origin labeling

1. Composition labeling
2. Care labeling
3. County of origin
4. Size labeling
5. Name & Address

**Garment Test : Inspection & Washing durability**

- Tumble dryer
- Washing machine
- Inspection
### Garment Test: Inspection & Washing durability

**Washing method**: According to care label or buyer’s request

<table>
<thead>
<tr>
<th>Care Code No.</th>
<th>Water Temp.</th>
<th>Bath ratio</th>
<th>Washing procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>40℃</td>
<td>1:30</td>
<td>Wash 5min.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>□ Rinse 2min. (Up to 30℃)</td>
</tr>
<tr>
<td>104</td>
<td>40℃</td>
<td>1:60</td>
<td>□ Rinse 2min. (Up to 30℃)</td>
</tr>
<tr>
<td>105</td>
<td>30℃</td>
<td>1:60</td>
<td>□ Extraction</td>
</tr>
<tr>
<td>106</td>
<td>30℃</td>
<td>----</td>
<td>Hand wash 2min.</td>
</tr>
</tbody>
</table>

**Dry method**: Tumble dry, Line Dry or Flat dry

5 times Repeat washing for print part durability:
- Pigment print or Rubber print applied

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### Reference

**JSA home page** (JIS online shop)
Japan Standard Association (JSA)
URL [http://www.jsa.or.jp](http://www.jsa.or.jp)

Please feel free to ask to QTEC.
Thank you for your attention.

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[http://www.qtec.or.jp](http://www.qtec.or.jp)