Raylinks Technical specification

Q/BKBT1-1997

Non-pressurized Joint Splice Closure RSB 250

Shanghai Raylinks Heat Shrinkable Materials Company Limited
1. **Scope**
This Chapter details the technical requirements for heat shrinkable wraparound splice closure, for use in the main and distribution non pressurized cable networks.

2. **Applied standards and abbreviations**
The following unattached China national & international standard shall be applied & deemed to be an integral part of this specification.
YD/T590.1-92 Splice closure 1 part-General technology
YD/T590.1-92 Splice closure 2 part-Heat shrinkable sleeve

3. **Type and size**
3.1 RSB type shall be used in non pressurized network.
3.2 All closures shall be capable of in-line and branched applications up to three cables on each side.
3.3 Size
3.3.1 D/d-L
   - D: Maximum splice bundle diameter
   - d: Minimum cable diameter
   - L: Nominal sheath opening
3.3.2 Non-pressurized closures size shall be as shown

<table>
<thead>
<tr>
<th>Cable Pairs</th>
<th>Pairs Diameter</th>
<th>Size for B-type</th>
<th>Size for UR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.4-0.5</td>
<td>22/8-250</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0.4-0.5</td>
<td>22/8-250</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>0.4-0.5</td>
<td>32/10-250</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>0.4-0.5</td>
<td>42/15-300</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>0.4-0.6</td>
<td>50/18-350</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>0.4-0.6</td>
<td>50/18-350</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>0.4-0.6</td>
<td>62/22-500</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>0.4-0.6</td>
<td>75/25-500</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>0.4-0.6</td>
<td>75/25-500</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>0.4-0.6</td>
<td>92/30-500</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>0.4-0.6</td>
<td>92/30-500</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>0.4-0.6</td>
<td>100/35-500</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>0.4-0.6</td>
<td>100/35-500</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>0.4-0.5</td>
<td>122/38-500</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>0.4-0.5</td>
<td>122/38-500</td>
<td></td>
</tr>
</tbody>
</table>

3.3.3 For example "RSB 250 42/5-300", please see product installation sheet.
3.3.4 Accept special size ordered by customers

4. **Design requirements**
4.1 General description
4.1.1 Closure shall retain the electrical & mechanical properties in the working temperature range -30°C to 60°C and atmosphere pressure range 86kPa to 106kPa.
4.1.2 Closure shall be installed at temperatures between -10°C to 45°C.
4.1.3 Dimension of main parts shall meet YD/T590.2-4.1 requirements, please see documents (Q-Raylinks-09-01-1999
process control).

4.2 Heat shrinkable sleeve

4.2.1 The sleeve shall be homogenous and free of flaws, defects, pinholes, bubbles, cracks or inclusions visible with the unaided eye.

4.2.2 The sleeve shall be made from modified cross-linked polyolefin.

4.2.3 The sleeve shall be internally coated with a flexible heat activated adhesive which will melt and adhere to the cable to form an air and water tight seal.

4.2.4 The sleeve shall be coated externally with a heat sensitive thermo chromic indicator which changes colour when adequate heat has been applied.

4.2.5 A flexible channel to be used to wrap the sleeve shall be manufactured from corrosion resistant stainless steel.

4.3 Closure components

4.3.1 Following items shall be provided for straight and branch joints.

4.3.1.1 Wrap-around heat shrinkable sleeve as specified

4.3.1.2 A flexible stainless steel closure channel

4.3.1.3 A wrap-around metal support canister or cardboard liner

4.3.1.4 Branch-off clips (in Branch kits only)

4.3.1.5 Shield continuity hardware.

4.3.1.6 Silica gel desiccant in adequate quantity

4.3.1.7 Cleaning tissue

4.3.1.8 Abrasive strip(s)

4.3.1.9 Aluminum foil strips

4.3.1.10 Aluminum strip for closing canister

4.3.1.11 PVC tape

4.3.1.12 Installation gauge

4.3.1.13 Installation in English language

4.3.2 In addition to items, the following accessories shall also be provided.

4.3.2.1 For single branch (one each of following)

4.3.2.2 For double branch (two each of following)

4.3.2.3 Branch off clip small for: 10-200 pairs

4.3.2.4 Branch off clip medium for: 300-800 pairs

4.3.2.5 Branch off clip large for: 900-1200 pairs

4.3.2.6 Branch continuity wire

4.3.2.7 Continuity wire connecting clip

4.3.2.8 Tie wrap

4.3.2.9 Cleaning tissue

4.3.2.10 Aluminum foil

4.3.2.11 Abrasive strip
### 5. Performance requirements of completed joint closures

#### 5.1 Materials

<table>
<thead>
<tr>
<th>Test Condition and method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bursting Strength 23±5°C</td>
<td>Min 15Mpa</td>
</tr>
<tr>
<td>Thermal Ageing Bursting</td>
<td>Min 13.7Mpa</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>Min 12 KV/mm</td>
</tr>
<tr>
<td>Split Resistance 200±2°C</td>
<td>No split</td>
</tr>
<tr>
<td>Carbon Content Heating</td>
<td>Min 2.6±0.25%</td>
</tr>
<tr>
<td>UV Res of Outlayer</td>
<td>No cracking</td>
</tr>
<tr>
<td>Cold Crack Resistance</td>
<td>No cracking</td>
</tr>
<tr>
<td>Resistance to aggressive</td>
<td>Min 13.7Mpa</td>
</tr>
<tr>
<td>Stress cracking</td>
<td>No cracking</td>
</tr>
<tr>
<td>Environmental Stress cracking</td>
<td></td>
</tr>
<tr>
<td>Temp. indicating paint conversion</td>
<td>Completely conversion</td>
</tr>
</tbody>
</table>

#### 5.2 Hot melt adhesive

<table>
<thead>
<tr>
<th>Test method and conditions</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peel Strength -PE 23±2°C</td>
<td>Min 70N</td>
</tr>
<tr>
<td>-PE 23±2°C</td>
<td></td>
</tr>
<tr>
<td>-Pb 23±2°C</td>
<td></td>
</tr>
<tr>
<td>Shear Strength At 23±2°C</td>
<td>Min 120N</td>
</tr>
<tr>
<td>Corrosive Effect Copper Mirror test</td>
<td>No effect</td>
</tr>
<tr>
<td>Test time:16hrs Test temp:60±2°C</td>
<td></td>
</tr>
</tbody>
</table>

#### 5.3 Completed Closure

**Test environment conditions**
- Temperature: 15-35°C
- Relatively humidity: 45-75%
- Atmosphere pressure: 80-106kPa
<table>
<thead>
<tr>
<th>Test methods and conditions</th>
<th>Requirement</th>
</tr>
</thead>
</table>
| 5.3.2 Appearance | According to YD/T590-1 requirements  
The sleeve shall be homogenous and free of flaws, defects, pinholes, bubbles, cracks or inclusions visible with the unaided eye. | No defects which will affect the product performance |
| 5.3.3 Tightness test | According to YD/T590-1 requirements  
Immerse in water bath at  
Temp: 23±3°C Time: 15 min  
Internal Regulated  
Pressure: 35±2Kpa | No leakage |
| 5.3.4 Temperature cycling test | According to YD/T590-1 requirements  
Highest Temp: 60±2°C  
Lowest temp: -30°C±2°C  
Dwell time: 4 hours  
Cycle duration: 12 hours  
Internal regulated  
Pressure: 35±2Kpa  
Number of cycles: 10 | Tightness as per 5.3.3 |
| 5.3.5 High temperature tightness test | According to YD/T590-1-5.5 requirements  
Temp: 60±2°C  
Pressure: 35±2Kpa  
Time: 168h | Tightness as per 5.3.3 |
| 5.3.6 Axial tension test | According to YD/T590-1-5.6 requirements  
Time: 24 hours each cable  
Load: D/45×700N (700N±10N max)  
Internal Regulated  
Pressure: 35±2Kpa | Tightness as per 5.3.3 |
| 5.3.7 Bending test | According to YD/T590-1-5.7 requirements  
Clamping distance: 10×D from closure edge(min 250 mm)  
Force: max 500N or 30 deg  
Bend. Internal regulated  
Pressure: 35±2Kpa  
Bending cycle: 2  
cable cycle: bend cable & hold for 5 minutes, bring to normal & bend in opposite direction, hold 5 minutes & bring to normal position | Tightness as per 5.3.3 |
5.3.8 Tension test
According to YD/T590-1-5.7 requirements
Torque: 50 Nm. Or 90 deg rotation
Clamping distance: 10×D from closure edge
(D=outer dia Of cable)
2 complete torsion cycles per cable. Internal regulated Pressure: 35±2Kpa
cycle: Twist cable and hold for 5 minutes; bring cable back to starting position
Tightness as per 5.3.3

5.3.10 Static Load test
According to YD/T590-1-5.7 requirements
Load: 1000±10N/25sq cm
Load application: 90° from seam,
Internal regulated pressure: 35±2Kpa
Time: 5 min remove load, turn sample through 180°, reapply load for 5 min
Tightness as per 5.3.3

5.3.11 Impact test
Steel ball test
According to YD/T590-1-5.7 requirements
steel ball
Weight: 0.5Kg Drop height 1m
Impact: 90Deg. From seam (sleeve middle)
Internal regulated Pressure: 35±2Kpa
Temp: -15°C
Internal regulated Pressure: 35±2Kpa
(Channel closing)
Tightness as per 5.3.3

5.3.12 Vibration test
According to YD/T590-1-5.7 requirements
Vibration: 10Hz
Amplitude: 3mm (6mm peak to peak)
Time: 72 hours
Clamping distance: 10×D from closure edge.
(D=the cable outer dia)
Internal regulated Pressure: 35±2Kpa
Tightness as per 5.3.3

5.3.13 Resistance to stress cracking
According to YD/T590-1-5.7 requirements
Test temp: 50±2°C
Internal regulated pressure: 35±2Kpa
Test medium: 10% igeital
Solution test time: 7 days
Tightness as per 5.3.3

6. Inspection, please see documents (Q/Raylinks-12-01-1999 Inspection and Test Status)
7. Marking package transportation and storage
7.1 Printed marking shall be distinct even after shrinking.
7.1.1 On the outer surface of the sleeve, following shall be printed
   i) Product size
7.1.2 The closure shall be supplied in a kit form, marking and documentation within and outside the packages shall comply strictly with following requirements or shall be expressly provided for in the contract

v) Manufacturer
vi) Product name
vii) Size
viii) Manufacturing date or batch
ix) Manufacturing batch
x) Suitable cable's diameter
xi) Checker stamp

7.2 Package
7.2.1 The packing unit is paper case which shall be sufficient to withstand during transit and upon storage.
7.2.2 Packing case size and weight shall take into consideration, where appropriate, the remoteness of the goods final destination aid the absence of heavy handling faculties at all point in transit.
7.2.3 The packing list and operation instruction shall be inside.
7.2.4 The closure offered shall be proven one unit, marking and documentation within and outside the packages shall comply strictly with following requirements or shall be expressly provided for in the contract

xii) Manufacturer
xiv) Product name
xv) Size
xvi) Manufacturing date or batch
xvii) Marking for keeping from dry and hot

7.3 Transportation and storage
7.3.1 Package shall be prevented from exposure to extreme environment and precipitation during transit and upon storage.
7.3.2 Products shall be storage in house.