### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Introduction</td>
<td>1/2</td>
</tr>
<tr>
<td>Expandable Dia. Bolt Features and Benefits</td>
<td>3</td>
</tr>
<tr>
<td>SL50101 Expandable Dia. Bolts</td>
<td>4</td>
</tr>
<tr>
<td>SLT50015 Installation Tool - Expandable Dia. Bolts &amp; Shafts</td>
<td>5</td>
</tr>
<tr>
<td>Expandable Dia. Blind Bolt Features and Benefits</td>
<td>6</td>
</tr>
<tr>
<td>SL51101 Expandable Dia. Blind Bolts</td>
<td>7/8</td>
</tr>
<tr>
<td>Expandable Dia. Shafts Features and Benefits</td>
<td>9</td>
</tr>
<tr>
<td>SL52101 Expandable Dia. Shafts</td>
<td>10</td>
</tr>
</tbody>
</table>
## TABLE OF CONTENTS CONTINUED

**Expandable Dia. Clamp - Up Bolt Features and Benefits** 11

| SL53101 | Expandable Dia. Clamp - Up Bolts | 12 |

**Expandable Dia. Cam Actuated Features and Benefits** 13/15

| SL54101 | Pin Expandable Dia. Cam Actuated | 16/17 |
GENERAL INTRODUCTION

EXPANDABLE BUSHING CONCEPT

Expandable bushings provide a means of accomplishing a specific cylindrical fit of a round object in a round hole by a simple mechanical adjustment rather than the usual reliance upon expensive, close-tolerance machining, press or "freeze" fits, etc.

Expandable bushings are basically mechanical sleeve type bushings, capable of creating a variable wall thickness which can be adjusted at the time of the initial installation or at any desired time thereafter. Such bushings are made up of an assembly of short bushing elements, alternately tapered on the I.D. and O.D. so as to mate with each other as illustrated. An axial slot thru one wall of each element permits easy diametrical adjustment.

A compressive force applied against the ends of such an assembly, i.e., to shorten its overall length, forces the female segments to expand, creating a larger effective O.D. on the assembly. At the same time the male segments are forced inwards to create a smaller I.D.; the net result being a thicker wall on the bushing assembly. Each individual segment is free to find its own seat or diametrical limit when adjusted, permitting use in stepped or slightly tapered holes.

This design provides a mechanical sleeve type bushing which installs freely and easily and can be adjusted for virtually any desired tightness of cylindrical fit. When the adjusting force is relaxed, the bushing segments return to their original diameters, are easily removed and readily reusable.

Made of appropriate materials they make a plain sleeve bearing that (a) requires no machining at the time of installation in order to establish the proper fit; (b) can be adjusted at any time for a looser or tighter fit, or to compensate for wear; (c) makes replacement simpler to accomplish than with an ordinary pressed fit bushing; (d) when properly arranged with an adjusting mechanism, readily functions as an intermittent clutch, brake, mechanical fuse, etc.

EXPANDABLE BUSHING APPLICATIONS

The expandable bushing performs successfully when utilized as an improved method of mounting anti-friction bearings in applications previously considered impossible due to high inertia or dynamic loads, as in crank journals or other reciprocating machinery applications.

Similarly, expandable bushings are commonly utilized as shaft clamps, or means of securing machine elements such as gears, sprockets, pulleys, etc., onto shafts. Properly arranged, extremely high torque loads can be transmitted in this manner while providing fatigue capabilities superior to more conventional shaft mounting methods. Removal, relocation and indexing of such hub devices on a shaft are simplified.

This expandable bushing concept has been utilized to create a family of expandable diameter fasteners, including expandable diameter bolts, expandable diameter blind bolts, expandable diameter quick-acting pins, and others.

EXPANDABLE DIAMETER BOLTS

An expandable bushing assembly installed on the shank of an ordinary bolt creates an expandable diameter bolt that installs freely and easily in a hole. When the nut is tightened against the bushing assembly it becomes radially tight in the hole. Such expandable diameter bolts are as easy to remove as an ordinary nut and bolt and every bit as reusable.

Expandable diameter bolts provide the capability of fabricating demountable rigid (minimum deflection under load) structural joints. The extremely tight radial fit of these fasteners makes them ideal for resisting shock loads, severe vibration, reversing, and cyclic shear fatigue type loading.
GENERAL INTRODUCTION

EXPANDABLE DIAMETER BLIND BOLTS

Modifying an expandable bolt slightly by reducing the head of the core bolt so that it will pass freely thru the structure hole and adding a means by which the core bolt may be restrained against rotation while wrenching the nut gives one a true expandable diameter blind bolt. This type fastener can be installed and tightened from one side of the structure and is ideal for use in blind holes. Further, it is easily removed and readily reusable.

EXPANDABLE DIAMETER QUICK-ACTING PINS

When the blind bolt is modified to utilize a cam type handle to expand the bushings rather than a threaded nut, you have a quick-acting expandable diameter pin. Such a pin can be tightened or relaxed by one simple, quick, easy motion, yet when installed, provides a tight radial fit in the hole. When relaxed, there is ample clearance for installation and removal. This type fastener offers high shear capability and, being radially tight in the hole, is applicable in areas of high shear fatigue, high shock loading, and difficult vibration. Its capability in this area is exhibited by its growing popularity for attaching the blades to the rotor on helicopters where it has provided hundreds of thousands of hours of satisfactory service.

Being hole filling, expandable diameter pins make ideal tooling aids by providing good alignment of attached parts. Additionally, since these pins shorten slightly on being tightened in the hole, they provide a clamp-up capability that is often utilized where a quick-acting clamping method is required such as the closing of hand operated molds, tooling clamps and fixtures, etc.

The radial tightness developed by these installed pins results in their ability to resist a fair tensile load and they are therefore utilized in tensile applications such as anchoring or hoisting operations. Since they are installed and removed entirely from one side of the structural joint they are truly blind fasteners and function perfectly in blind holes.
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.

LIMITATIONS

- Limited axial clamp-up capability.
- Reusability limited only by thread wear.

STANDARD NOMINAL HOLE SIZES

.1900 through 1.500 inch

SPECIAL OPTIONS

- Captive Segments- To prevent removal of the bushing segments from the core bolt when the nut and washer are removed, thus eliminating loss of the individual segments.
- Lanyard - To secure the removed fastener nears its hole to prevent loss and provide for easier installation.
- Impedance Ring- Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking features such as cotter pins, lock wires, etc.

METRIC SIZES AVAILABLE ON REQUEST
EXPANDABLE DIA. BOLTS

 TABLE I

<table>
<thead>
<tr>
<th>DASH NO.</th>
<th>NOM. DIA.</th>
<th>MIN.</th>
<th>MAX.</th>
<th>L长EST STD. LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3/16</td>
<td>.109</td>
<td>.193</td>
<td>.188</td>
</tr>
<tr>
<td>4</td>
<td>1/4</td>
<td>.249</td>
<td>.254</td>
<td>.246</td>
</tr>
<tr>
<td>5</td>
<td>5/32</td>
<td>.312</td>
<td>.317</td>
<td>.307</td>
</tr>
<tr>
<td>6</td>
<td>1/8</td>
<td>.437</td>
<td>.462</td>
<td>.431</td>
</tr>
<tr>
<td>7</td>
<td>7/32</td>
<td>.505</td>
<td>.499</td>
<td>.493</td>
</tr>
<tr>
<td>8</td>
<td>5/32</td>
<td>.576</td>
<td>.568</td>
<td>.556</td>
</tr>
<tr>
<td>9</td>
<td>3/16</td>
<td>.624</td>
<td>.630</td>
<td>.617</td>
</tr>
<tr>
<td>10</td>
<td>1/4</td>
<td>.749</td>
<td>.757</td>
<td>.742</td>
</tr>
<tr>
<td>11</td>
<td>1/8</td>
<td>.874</td>
<td>.882</td>
<td>.866</td>
</tr>
<tr>
<td>12</td>
<td>5/32</td>
<td>.999</td>
<td>.101</td>
<td>.991</td>
</tr>
<tr>
<td>13</td>
<td>3/16</td>
<td>1.124</td>
<td>1.125</td>
<td>1.116</td>
</tr>
<tr>
<td>14</td>
<td>7/32</td>
<td>1.249</td>
<td>1.262</td>
<td>1.241</td>
</tr>
<tr>
<td>15</td>
<td>1/4</td>
<td>1.374</td>
<td>1.385</td>
<td>1.366</td>
</tr>
<tr>
<td>16</td>
<td>1/8</td>
<td>1.490</td>
<td>1.510</td>
<td>1.491</td>
</tr>
</tbody>
</table>

FOR SHADOWED SIZES CONSULT SHUR-LOK FOR MINIMUM ORDER QUANTITY

EXAMPLE OF PART NUMBER WITH EXPLANATION OF CODING:

SL50101-6 R 24

L STRUCTURE LENGTH
IN 1/16 INCH INCREMENTS
(0.31 mm)

MATERIAL: STEEL

DIA. DESIGNATION: STANDARD
EXPANDABLE DIAMETER BOLT

TABLE II

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>HEAT TREAT</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NUT-SELF LOCKING</td>
<td>CRES 17-4PH</td>
<td>COND. H-1000</td>
</tr>
<tr>
<td>2</td>
<td>WASHERS</td>
<td>CRES 17-7 PH</td>
<td>PASSIVATE &amp; DRI-FILM LUBE</td>
</tr>
<tr>
<td>3</td>
<td>BUSHINGS</td>
<td>CRES 17-4PH</td>
<td>COND. H-900</td>
</tr>
<tr>
<td>4</td>
<td>CORE BOLT</td>
<td>CRES 17-4PH</td>
<td>PASSIVATE</td>
</tr>
</tbody>
</table>

NOTES:

1. USE OF INSTALLATION TOOL FACILITATES INSTALLATION AND REMOVAL OF EXPANDABLE DIAMETER BOLTS. SEE SHUR-LOK DRAWING NO. SLT 50015

2. NUT DIMENSIONS PER MS 21044. THREAD LOCKING PER MIL-N-25027.

SHUR-LOK ENGINEERING IS AVAILABLE TO ASSIST IN THE APPLICATION OR ADAPTATION OF EXP. DIA. FASTENERS TO SPECIFIC APPLICATIONS.
INSTALLATION TOOL

SLT50015

EXPANDABLE DIA. BOLTS AND SHAFTS

INSTALLATION AND REMOVAL PROCEDURE
EXPANDABLE DIAMETER BOLTS & SHAFTS

1) INSTALLATION:
   A) REMOVE NUT AND WASHER FROM BOLT ASSEMBLY.
   B) THREAD APPROPRIATE INSTALLATION TOOL ON END OF CORE BOLT UNTIL SNUG WITH END OF RELAXED BUSHING ASSEMBLY. (DO NOT EXPAND SEGMENTS).
   C) INSERT ASSEMBLY THRU STRUCTURE. MANIPULATE STRUCTURAL PARTS TO BRING HOLES INTO SUFFICIENT ALIGNMENT TO PERMIT BOLT ASSEMBLY TO INSTALL FREELY.
   D) UNTHREAD INSTALLATION TOOL AND REPLACE WASHER AND NUT.
   E) TORQUE NUT AS REQUIRED TO PROVIDE THE DESIRED RADIAL TIGHTNESS OF THE BOLT ASSEMBLY.

2) REMOVAL:
   A) REMOVE WASHER AND NUT FROM BOLT ASSEMBLY.
   B) THREAD APPROPRIATE INSTALLATION TOOL ON END OF CORE BOLT UNTIL SNUG WITH END OF RELAXED BUSHING ASSEMBLY.
   C) IF BUSHING ASSEMBLY SHOULD REMAIN TIGHT IN STRUCTURE AFTER WASHER AND NUT ARE REMOVED, PROCEED WITH STEP 3B EXCEPT ALLOW APPROX. 1/8 INCH GAP BETWEEN INSTALLATION TOOL AND TIGHT BUSHING ASSEMBLY. TAP LIGHTLY ON END OF INSTALLATION TOOL WHILE SHIFITNG STRUCTURE TO RELAX THE BUSHING ASSEMBLY.
   D) MANIPULATE THE STRUCTURAL PARTS WHILE REMOVING THE BOLT ASSEMBLY. THIS RELIEVING THE RESIDUAL LOAD ON THE STRUCTURAL JOINT SO EXPANDABLE BOLT IS LOOSE (NOT UNDER A BIND) AND CAN BE FREELY REMOVED FROM THE HOLE.

SHUR-LOK ENGINEERING IS AVAILABLE TO ASSIST IN THE APPLICATION OR ADAPTATION OF EXP. DIA. FASTENERS TO SPECIFIC APPLICATIONS.

SHUR-LOK CORPORATION IRVINE, CALIFORNIA 92614
TELEPHONE: (949) 474-5000

SHUR-LOK INTERNATIONAL S.A. PETIT-FECHAIN, BELGIUM
TELEPHONE: (32) 87-32-0711

INSTALLATION TOOL, EXPANDABLE DIA. BOLTS AND SHAFTS

SLT50015

SHEET 1 OF 1

5
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- Useable in applications where access is limited to one side, or a blind hole is required.
- Provides quick installation and removal.

LIMITATIONS

- Limited axial clamp-up capability.
- Reusability limited only by thread wear.

STANDARD NOMINAL HOLE SIZES

- .1900 through 1.500 inch

SPECIAL OPTIONS

- Lanyard - to secure the removed fastener near installation hole to prevent loss and provide easier installation.
- Lock Ring - A bushing segment that is designed to provide limited expansion greater than the hole diameter. This segment is located outside the hole to enhance the ability of the fastener to resist tensile loads.
- Impedance Ring - Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking features such as cotter pins, lock wires, etc.

METRIC SIZES AVAILABLE ON REQUEST
## Table I

<table>
<thead>
<tr>
<th>DASH NO.</th>
<th>NOM. DIA.</th>
<th>RECOMMENDED HOLE DIA. MIN.</th>
<th>RELAXED FASTENER DIA. MAX.</th>
<th>CORE BOLT DIA.</th>
<th>N NOSE LENGTH MAX.</th>
<th>L LONGEST STD. LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9/32</td>
<td>.183</td>
<td>.190</td>
<td>.106</td>
<td>.136</td>
<td>.19</td>
</tr>
<tr>
<td>4</td>
<td>1/8</td>
<td>.249</td>
<td>.254</td>
<td>.246</td>
<td>.190</td>
<td>.25</td>
</tr>
<tr>
<td>5</td>
<td>5/32</td>
<td>.312</td>
<td>.317</td>
<td>.307</td>
<td>.216</td>
<td>.31</td>
</tr>
<tr>
<td>6</td>
<td>3/16</td>
<td>.374</td>
<td>.379</td>
<td>.369</td>
<td>.25</td>
<td>.38</td>
</tr>
<tr>
<td>7</td>
<td>1/4</td>
<td>.437</td>
<td>.442</td>
<td>.431</td>
<td>.29</td>
<td>.44</td>
</tr>
<tr>
<td>8</td>
<td>5/32</td>
<td>.505</td>
<td>.493</td>
<td>.493</td>
<td>.35</td>
<td>.50</td>
</tr>
<tr>
<td>9</td>
<td>9/32</td>
<td>.562</td>
<td>.568</td>
<td>.556</td>
<td>.41</td>
<td>.56</td>
</tr>
<tr>
<td>10</td>
<td>5/16</td>
<td>.624</td>
<td>.630</td>
<td>.617</td>
<td>.50</td>
<td>.60</td>
</tr>
<tr>
<td>12</td>
<td>3/8</td>
<td>.749</td>
<td>.757</td>
<td>.742</td>
<td>.59</td>
<td>.75</td>
</tr>
<tr>
<td>14</td>
<td>7/32</td>
<td>.874</td>
<td>.882</td>
<td>.866</td>
<td>.64</td>
<td>.88</td>
</tr>
<tr>
<td>16</td>
<td>1.00</td>
<td>1.000</td>
<td>1.010</td>
<td>.991</td>
<td>.75</td>
<td>1.00</td>
</tr>
<tr>
<td>18</td>
<td>1 1/8</td>
<td>1.124</td>
<td>1.135</td>
<td>1.115</td>
<td>.87</td>
<td>1.12</td>
</tr>
<tr>
<td>20</td>
<td>1 1/4</td>
<td>1.249</td>
<td>1.260</td>
<td>1.241</td>
<td>1</td>
<td>1.25</td>
</tr>
<tr>
<td>22</td>
<td>1 3/8</td>
<td>1.374</td>
<td>1.385</td>
<td>1.360</td>
<td>1 1/8</td>
<td>1.35</td>
</tr>
<tr>
<td>24</td>
<td>1 1/2</td>
<td>1.690</td>
<td>1.710</td>
<td>1.691</td>
<td>1 1/4</td>
<td>1.50</td>
</tr>
</tbody>
</table>

For shaded sizes consult Shur-Lok for minimum order quantity.

### Example of Part Number with Explanation of Coding:

**SL5101 - 6 R 24**

- **L**: Grip length in 1/16 inch increments (24 = 1 1/2 inch nom. length)
- **R**: Material — see list of materials, Table II
- **D**: Dia. designation nom. diameter in 1/16 inch increments (6 = 3/8 inch nom dia.)

**Basic Part Number**: Standard Expandable Diameter Blind Bolt

### Table II

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>HEAT TREAT</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NUT-SELF LOCKING</td>
<td>CRES 17-4PH</td>
<td>COND. H-1000</td>
</tr>
<tr>
<td>2</td>
<td>WASHER</td>
<td>CRES 17-7 PH</td>
<td>CRES 17-4PH</td>
</tr>
<tr>
<td>3</td>
<td>BUSHINGS</td>
<td>CRES 17-4PH</td>
<td>COND H = 900</td>
</tr>
<tr>
<td>4</td>
<td>CORE BOLT</td>
<td>CRES 17-4PH</td>
<td>COND H = 900</td>
</tr>
</tbody>
</table>

### Notes:

1. See Sheet 2 for optional features
2. NUT dimensions per MS 21044, THREAD LOCKING PER MIL-N-25027
3. OTHER DIAMETERS, LENGTHS, MATERIALS, ETC. ON SPECIAL ORDER.

Shur-Lok Engineering is available to assist in the application or adaptation of exp. dia. fasteners to specific applications.

**SHUR-LOK**

**EXPANDABLE DIA. BLIND BOLTS**

**SL5101 SERIES**

**SHUR-LOK CORPORATION**

**SHUR-LOK INTERNATIONAL, S.A.**

**PETIT-RECHAIN, BELGIUM**

**8306 HAWTHORNE, IRVINE, CALIFORNIA 92614**

**TELEPHONE: (949) 474-6000**

**TEL. 011-32-2-3636711**

**SHUR-LOK**

**UNLESS OTHERWISE SPECIFIED**

**INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5M, ALL DIMENSIONS APPLY AFTER PLATING AND PRIOR TO THE ADDITION OF SOLID FILM LUBRICANT.**

**SHUR-LOK TOLERANCES:**

- ALL SURFACES ± .003
- XX .010 ± .005
- XXX ± .002
- DIMENSIONS IN: INCHES/MILLIMETERS
EXPANDABLE DIA. BLIND BOLTS

LANYARD FEATURE

EXAMPLE OF PART NUMBER WITH EXPLANATION OF CODING:
SL51101 - 6R 24 L 10

TABLE III

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WASH</td>
<td>CRES</td>
<td>PASSIVATE &amp; CHI. FILM LUBE</td>
</tr>
<tr>
<td>2 SLEEVE</td>
<td>CRES</td>
<td>PASSIVATE</td>
</tr>
<tr>
<td>3 TERMINAL</td>
<td>CRES</td>
<td>NYLON COATED</td>
</tr>
<tr>
<td>4 CABLE / X</td>
<td>CRES</td>
<td></td>
</tr>
</tbody>
</table>

SHUR-LOK ENGINEERING IS AVAILABLE TO ASSIST IN THE APPLICATION OR ADAPTATION OF EXP. DIA. FASTENERS TO SPECIFIC APPLICATIONS.

CAPTIVE FEATURE

EXAMPLE OF PART NUMBER WITH EXPLANATION OF CODING:
SL51101 - 6R 24 C 6

TABLE IV

<table>
<thead>
<tr>
<th>DASH NO.</th>
<th>CORE BOLT DIA</th>
<th>RECOMMENDED HOLE DIA</th>
<th>MIN.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>.138</td>
<td>.140</td>
<td>.145</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.190</td>
<td>.190</td>
<td>.198</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.216</td>
<td>.210</td>
<td>.224</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.250</td>
<td>.255</td>
<td>.260</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>.315</td>
<td>.310</td>
<td>.320</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>.377</td>
<td>.382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>.440</td>
<td>.445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>.440</td>
<td>.445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>.560</td>
<td>.570</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>.630</td>
<td>.635</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>.705</td>
<td>.760</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FOR SHADED SIZES CONSULT SHUR-LOK FOR MINIMUM ORDER QUANTITY

NOTES:
1. TO INSTALL, REMOVE NUT & WASHER FROM ASSY. INSERT THE CORE BOLT THRU THE HOLE IN THE STRUCTURAL MEMBER TO WHICH THE BOLT ASSY. IS TO BE CAPTIVATED. REINSTALL WASHER AND NUT.
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- Bushing assembly is tightened from both ends.

LIMITATIONS

- Limited axial clamp-up capability.
- Reusability limited only by thread wear.

STANDARD NOMINAL HOLE SIZES

- .1900 through 1.500 inch

SPECIAL OPTIONS

- Captive Segments - To prevent removal of bushing segments from the core shaft when the nuts and washers are removed, eliminating loss of individual segments.
- Lanyard - To secure the removed fastener near installation hole to prevent loss and provide for easier installation.
- Impedance Ring - Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking features such as cotter pins, lock wires, etc.

METRIC SIZES AVAILABLE ON REQUEST
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- Designed to provide axial clamp-up of the structure.

LIMITATIONS

- Reusability limited only by thread wear.
- Nuts need to be tightened equally from both ends.

STANDARD NOMINAL HOLE SIZES

- .1900 through 1.500 inch

SPECIAL OPTIONS

- Lanyard - To secure the removed fastener near installation hole to prevent loss and provide for easier installation.
- Dual locking features such as cotter pins, lock wires, etc.

METRIC SIZES AVAILABLE ON REQUEST
## EXPANDABLE DIA. CLAMP-UP BOLTS

### TABLE I

<table>
<thead>
<tr>
<th>DASH NO. NOM. DIA.</th>
<th>RECOMMENDED HOLE DIA. (MIN)</th>
<th>RELAXED FASTENER DIA.</th>
<th>CORE BOLT DIA. (MIN)</th>
<th>L STRUCTURE LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9/16</td>
<td>1/16</td>
<td>1/16</td>
<td>3/16</td>
</tr>
<tr>
<td>4</td>
<td>3/8</td>
<td>1/8</td>
<td>9/32</td>
<td>1/2</td>
</tr>
<tr>
<td>5</td>
<td>7/16</td>
<td>5/32</td>
<td>3/4</td>
<td>5/8</td>
</tr>
<tr>
<td>6</td>
<td>5/8</td>
<td>7/32</td>
<td>1</td>
<td>7/8</td>
</tr>
<tr>
<td>7</td>
<td>9/16</td>
<td>1/2</td>
<td>1 1/2</td>
<td>1 1/8</td>
</tr>
<tr>
<td>8</td>
<td>11/16</td>
<td>13/32</td>
<td>1 3/4</td>
<td>1 7/8</td>
</tr>
<tr>
<td>9</td>
<td>13/16</td>
<td>15/32</td>
<td>2 1/4</td>
<td>2 1/8</td>
</tr>
<tr>
<td>10</td>
<td>15/16</td>
<td>17/32</td>
<td>2 3/4</td>
<td>2 3/8</td>
</tr>
<tr>
<td>11</td>
<td>17/16</td>
<td>19/32</td>
<td>3 1/4</td>
<td>3 1/8</td>
</tr>
<tr>
<td>12</td>
<td>19/16</td>
<td>21/32</td>
<td>3 3/4</td>
<td>3 3/8</td>
</tr>
<tr>
<td>13</td>
<td>21/16</td>
<td>23/32</td>
<td>4 1/4</td>
<td>4 1/8</td>
</tr>
<tr>
<td>14</td>
<td>23/16</td>
<td>25/32</td>
<td>4 3/4</td>
<td>4 3/8</td>
</tr>
<tr>
<td>15</td>
<td>25/16</td>
<td>27/32</td>
<td>5 1/4</td>
<td>5 1/8</td>
</tr>
<tr>
<td>16</td>
<td>27/16</td>
<td>29/32</td>
<td>5 3/4</td>
<td>5 3/8</td>
</tr>
<tr>
<td>17</td>
<td>29/16</td>
<td>31/32</td>
<td>6 1/4</td>
<td>6 1/8</td>
</tr>
<tr>
<td>18</td>
<td>31/16</td>
<td>33/32</td>
<td>6 3/4</td>
<td>6 3/8</td>
</tr>
<tr>
<td>19</td>
<td>33/16</td>
<td>35/32</td>
<td>7 1/4</td>
<td>7 1/8</td>
</tr>
<tr>
<td>20</td>
<td>35/16</td>
<td>37/32</td>
<td>7 3/4</td>
<td>7 3/8</td>
</tr>
<tr>
<td>21</td>
<td>37/16</td>
<td>39/32</td>
<td>8 1/4</td>
<td>8 1/8</td>
</tr>
<tr>
<td>22</td>
<td>39/16</td>
<td>41/32</td>
<td>8 3/4</td>
<td>8 3/8</td>
</tr>
<tr>
<td>23</td>
<td>41/16</td>
<td>43/32</td>
<td>9 1/4</td>
<td>9 1/8</td>
</tr>
<tr>
<td>24</td>
<td>43/16</td>
<td>45/32</td>
<td>9 3/4</td>
<td>9 3/8</td>
</tr>
</tbody>
</table>

### TABLE II

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>HEAT TREAT</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NUT-Self Locking</td>
<td>CRES 17-4PH</td>
<td>COND. H-1000</td>
</tr>
<tr>
<td>2</td>
<td>WASHERS</td>
<td>CRES 17-4PH</td>
<td>COND. H-900</td>
</tr>
<tr>
<td>3</td>
<td>BUSHINGS</td>
<td>CRES 17-4PH</td>
<td>COND. H-900</td>
</tr>
</tbody>
</table>

### NOTES:

1. USE OF INSTALLATION TOOL FACILITATES INSTALLATION AND REMOVAL OF EXPANDABLE DIAMETER BOLTS. SEE SHUR-LOK DRWG. NO. SL 56015.

2. NUT DIMENSIONS PER MS 21944. THREAD LOCKING PER MIL-STD-25027.

3. OTHER DIAMETERS, LENGTHS, MATERIALS, ETC. ON SPECIAL ORDER.

SHUR-LOK ENGINEERING IS AVAILABLE TO ASSIST IN THE APPLICATION OR ADAPTATION OF EXP. DIA. FASTENERS TO SPECIFIC APPLICATIONS.

---

**Example of Part Number with Explanation of Coding:**

SL53101 - 6 R 24

**INTERPRET DIMENSIONS & TOLERANCES PER ASME Y14.5M. ALL DIMENSIONS APPLY AFTER FLATTENING AND PRIOR TO THE ADDITION OF SOLDER OR LUBRICANT.**

---

**SHUR-LOK CORPORATION**

**SHUR-LOK INTERNATIONAL S.A.**

**Furniture, California 92614**

**Petit-Rechain, Belgium**

**Telephone:** (949) 476-6000

**Telephone:** (32) 87-32-07-11

**SL53101 SERIES**

**Sheet 1 of 1**

**12**
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- After initial adjustment for desired radial tightness, no tools are required for subsequent installation or removal in same hole.
- Provides quick installation and removal.

LIMITATIONS

- Limited axial clamp-up capability.
- Less mechanical advantage available to achieve desired radial tightness than other EDF types.
- Core pin must be adjusted for desired radial tightness at initial installation and readjusted if used in another hole.

STANDARD NOMINAL HOLE SIZE

- .1900 through 1.500 inch

SPECIAL OPTIONS

- Lanyard - To secure the removed fastener near installation hole to prevent loss and provide easier installation.
- Lock Ping - A bushing segment that is designed to provide limited expansion greater than the hole dia. This segment is located outside the hole to enhance the ability of the fastener to resist tensile loads.
- Impedance Ping - Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking features such as Locking Cam Handles.

METRIC SIZES AVAILABLE ON REQUEST
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- Useable in applications where access is limited to one side, or a blind hole is required.
- Provides quick installation and removal.
- Factory adjusted to accommodate specific hole diameter and tolerance.
- Spring Clip over cam pin retains cam in located position.

LIMITATIONS

- Requires close tolerance hole.
- Limited clamp-up capability.
- Not adjustable by customer after factory setting.

STANDARD NOMINAL HOLE SIZES

- .375 through 1.500 inch

SPECIAL OPTIONS

- Lanyard-To secure the removed fastener near installation hole to prevent loss and provide for easier installation.
- Lock Ring-A bushing segment that is designed to provide limited expansion greater than the hole diameter. This segment is located outside the hole to enhance the ability of the fastener to resist tensile loads.
- Impedance Ring-Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking feature such as cotter pins, lock wires etc.

METRIC SIZES AVAILABLE ON REQUEST
FEATURES AND BENEFITS

- Eliminates all radial clearance.
- Creates a rigid joint.
- Eliminates wear in the joint.
- Provides hole alignment and repeatability.
- Provides high reusability.
- After initial adjustment for desired radial tightness, no tools are required for subsequent installation or removal in the same hole.
- Provides quick installation and removal.
- Spring clip over pin nose retains handle in closed position.

LIMITATIONS

- Limited axial clamp-up capability.
- Less mechanical advantage available to achieve desired radial tightness than other EDF types.
- Nut must be adjusted for desired radial tightness at initial installation, and readjusted if used in another hole.

STANDARD NOMINAL HOLE SIZES

- .375 through 1.500 inch

SPECIAL OPTIONS

- Lanyard - To secure the removed fastener near its hole to prevent loss and provide for easier installation.
- Lock Ring - A bushing segment that is designed to provide limited expansion greater than the hole diameter. This segment is located outside the hole to enhance the ability of the fastener to resist tensile loads.
- Impedance Ring - Prevents loss of the fastener from the hole even if radial tightness is lost.
- Dual locking features such as cotter pins, lock wires, etc.

METRIC SIZES AVAILABLE ON REQUEST
EXPANDABLE DIA. CAM ACTUATED

LANYARD FEATURE

CAPTIVE FEATURE

EXAMPLE OF PART NUMBER WITH EXPLANATION OF CODING:

SL54101 - 6R24 L 10

LANYARD LENGTH IN INCHES
LANYARD DESIGNATION
BASIC PART NUMBER INCLUDING DIAMETER, MATERIAL AND GRIP LENGTH (SEE SHEET 1)

TABLE III

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WASHER</td>
<td>PASSIVATE &amp; DRI-FILM LUBE</td>
</tr>
<tr>
<td>2</td>
<td>SLEEVE</td>
<td>PASSIVATE</td>
</tr>
<tr>
<td>3</td>
<td>TERMINAL</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CABLE 2 X 7</td>
<td>CRES NYLON-COATED</td>
</tr>
</tbody>
</table>

SHUR-LOCK ENGINEERING IS AVAILABLE TO ASSIST IN THE APPLICATION OR ADAPTATION OF EXP. DIA. FASTENERS TO SPECIFIC APPLICATIONS.

EXAMPLE OF PART NUMBER WITH EXPLANATION OF CODING:

SL54101 - 6R 24 C 6

C STRUCTURE THICKNESS IN 1/16 INCH INCREMENTS (3/32"
CAPTIVE DESIGNATION
L GRIP LENGTH
BASIC PART NUMBER INCLUDING DIAMETER AND MATERIAL (SEE SHEET 1)

TABLE IV

<table>
<thead>
<tr>
<th>DASH NO</th>
<th>CORE BOLT DIA</th>
<th>RECOMMENDED HOLE DIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>.158</td>
<td>.190 - .193 - .199</td>
</tr>
<tr>
<td>4</td>
<td>.190</td>
<td>.216 - .219 - .224</td>
</tr>
<tr>
<td>5</td>
<td>.216</td>
<td>.255 - .260</td>
</tr>
<tr>
<td>6</td>
<td>.5/16</td>
<td>.315 - .320</td>
</tr>
<tr>
<td>7</td>
<td>.3/8</td>
<td>.377 - .382</td>
</tr>
<tr>
<td>8</td>
<td>7/16</td>
<td>440 - 445</td>
</tr>
<tr>
<td>9</td>
<td>5/16</td>
<td>480 - 481</td>
</tr>
<tr>
<td>10</td>
<td>9/16</td>
<td>565 - 570</td>
</tr>
<tr>
<td>11</td>
<td>3/4</td>
<td>630 - 633</td>
</tr>
<tr>
<td>12</td>
<td>9/8</td>
<td>700 - 760</td>
</tr>
</tbody>
</table>

FOR SHADED SIZES CONSULT SHUR-LOCK FOR MINIMUM ORDER QUANTITY

NOTES:

1. TO INSTALL: UNTHREAD CORE PIN FROM THE BARREL NUT. INSERT THE CORE PIN THRU THE HOLES IN THE STRUCTURAL MEMBER TO WHICH THE PIN IS TO BE CAPTIVATED. RETHREAD THE CORE PIN INTO THE BARREL NUT. ADJUST TIGHTNESS (NOTE 2).

2. TO ADJUST TIGHTNESS, THREAD CORE PIN IN OR OUT OF THE BARREL NUT UNTIL THE DESIRED RADIAL TIGHTNESS IN HOLE IS ACHIEVED. WHEN CAN HANDLE IS ACTUATED TO INSTALLED POSITION, TIGHTEN SET SCREW TO LOCK SETTING.

UNLESS OTHERWISE SPECIFIED:

INTERPRET DIMENSIONS & TOLERANCES PER ASME Y14.5M. ALL DIMENSIONS APPLY AFTER PLATING AND PRIOR TO THE ADDITION OF SOLID FILM LUBRICANT. 125 [32] ALL SURFACES TO BE REFINISHED. 125 34 OR [.020, X X X X] +.03 -.010 +.02 -.005 [+.035, X X X X] \(1.00\) [0.25]

DIMENSIONS IN: [1.00 MILLIMETERS]

SHUR-LOCK CORPORATION
SHERWOOD, CALIFORNIA 90624
TELEPHONE: (213) 744-6000

SHUR-LOCK INTERNATIONAL, S.A.
PETIT-RECHAIN, BELGIUM
TELEPHONE: (02) 73-32-07-19

SL54101 SERIES

PIN EXPANDABLE DIA. CAM ACTUATED
OPTIONAL FEATURES