

## Rebar Connection System Performance Comparison

PERFORMANCE CRITERIA	CONNECTION TYPE / PERFORMANCE																																																								
	Adjusta JointLOCK System	Threaded Ferrule Anchors	Pull-Out Starter Bars																																																						
<b>GENERAL DESCRIPTION</b>	Engineered system with embedded Hook Bar anchor and matching JointLOCK & Starter bar.	Ferrule anchors cast into concrete section for site screw-in fitment of threaded starter bars.	12mm reinforcement starter bars bent into rebate box & cast into wall for re-bending.																																																						
<p><b>DESIGN:</b> <i>Issues for assured strength of starter bar connections to carry the design loads</i></p> <p>ULTIMATE TENSILE STRENGTH CAPACITY + WALL ANCHORAGE PULLOUT RESISTANCE</p> <p>(Note: Tensile strength determines the connection's capacity to carry axial tensile loads, transfer shear forces, and resist flexural loads and bending moments at the joint)</p>	<table border="1"> <thead> <tr> <th rowspan="2">Starter Bar</th> <th colspan="4">Ultimate Strength kN per bar</th> </tr> <tr> <th colspan="4">Bar Spacing Centres (mm)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">N16</td> <td>300</td> <td>250</td> <td>200</td> <td>150</td> </tr> <tr> <td>108kN</td> <td>108kN</td> <td>108kN</td> <td>108kN</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>✓ The JointLOCK System utilises a unique double loop Hook Bar that does not produce shear cone failure in the concrete, and does not slip and deform under the ultimate tensile loads.</li> <li>✓ JointLOCK can be specified in any spacing or layout for single row starter bars central or dual layer top and bottom of slab.</li> <li>✓ All load bearing components in the JointLOCK System can carry 100% capacity of the N16 reinforcing bar.</li> </ul>	Starter Bar	Ultimate Strength kN per bar				Bar Spacing Centres (mm)				N16	300	250	200	150	108kN	108kN	108kN	108kN	<table border="1"> <thead> <tr> <th rowspan="2">Starter Bar</th> <th colspan="4">Ult. Strength kN per bar *</th> </tr> <tr> <th colspan="4">Bar Spacing Centres (mm)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">N16</td> <td>300</td> <td>250</td> <td>200</td> <td>150</td> </tr> <tr> <td>82kN</td> <td>69kN</td> <td>56kN</td> <td>43kN</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>✗ Reduced ultimate tensile capacity per bar / coupler connection due to pullout capacity of the embedded anchor caused by shear cone rupture of the concrete. *Ancon KS16 Threaded Anchor 32Mpa concrete &amp; 129mm embedment.</li> <li>✗ Designed as single row of starter bars only.</li> <li>✗ Lower pullout capacity of the anchor (P) less than the ultimate tensile strength (N) of the reinforcing bar, ie; <math>P &lt; N</math> and P reduces significantly with closer bar spacings due to overlapping shear cones.</li> </ul>	Starter Bar	Ult. Strength kN per bar *				Bar Spacing Centres (mm)				N16	300	250	200	150	82kN	69kN	56kN	43kN	<table border="1"> <thead> <tr> <th rowspan="2">Starter Bar</th> <th colspan="4">Ult. Strength kN per bar</th> </tr> <tr> <th colspan="4">Bar Spacing Centres (mm)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">N12</td> <td>300</td> <td>250</td> <td>200</td> <td>150</td> </tr> <tr> <td>61kN</td> <td>61kN</td> <td>61kN</td> <td>61kN</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>✗ Lower tensile strength capacity of the 12mm rebate compared to N16, due to less reinforcement steel cross sectional area to carry the maximum design loads.</li> <li>✗ Not practical to use N16 pull-out bars due to the depth of rebate box required for housing 16mm bar bent at minimum allowable diameter of <math>4d_b</math>. The rebate depth is excessive for practical wall / slab design.</li> </ul>	Starter Bar	Ult. Strength kN per bar				Bar Spacing Centres (mm)				N12	300	250	200	150	61kN	61kN	61kN	61kN
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<p><b>CONSTRUCTION:</b> <i>Issues for assured provision &amp; quality control of starter bar connection</i></p> <p>CONNECTION PROCESS + COST/TIME EFFICIENCY</p>	<ul style="list-style-type: none"> <li>✓ JointLOCK connector / starter bar attached to Hook Bar &amp; secured with retaining clip/cap, no skilled labour required to install.</li> <li>✓ Adjusta factory fit the threaded starter bar onto the JointLOCK connector with tight tolerances and interference fit on the internal thread. Machine tight fitting ensures 100% thread engagement depth to eliminate connector uncoupling or movement.</li> <li>✓ Easy to inspect and ensure correctly fitted connection for quality assurance purposes.</li> </ul>	<ul style="list-style-type: none"> <li>✗ Requires manual screw-in of threaded bar.</li> <li>✗ Reidbar ferrules require large tolerances for hand tightening risking creep / slip at the joint.</li> <li>✗ Damaged threads or installer error increases chance of inadequate thread fitment, ie; required turns of bar into coupler.</li> <li>✗ Risk of loose connection uncoupling during vibrations during second pour.</li> <li>✗ Difficulty installing 90° cog (L-shape) wall anchors if required for strength due to congestion with wall reinforcement.</li> </ul>	<ul style="list-style-type: none"> <li>✗ Requires manual re-straightening of bars.</li> <li>✗ Labour intensive and time-consuming.</li> <li>✗ Deformation (S-shaped) at the re-bent section results in elongation under load and subsequent creep / movement at the joint.</li> <li>✗ Loss of strength due to re-bending of bar.</li> <li>✗ Risk of substitution with imported reinforcing bar non-conforming to AS1302, containing significant differences in metallurgical and physical properties that do not achieve nominated design strengths.</li> </ul>																																																						