

**Lucas A. Turner, P.E., MBA**

2428 Old Natchez Trc. Trl.  
Camden, TN 38320  
Ph. 941-380-1574

**Supplemental Calculations**

**DP50 Equal Leg / Flange Frame Anchorage (Shear) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

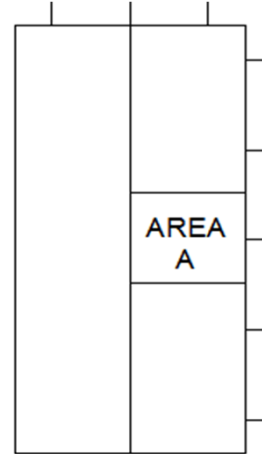
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 21 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 13 | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>50</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 2.44      |  |  |
| Total Load, lb  | 121.9     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 121.9     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#10 Screw into Wood

|   |               |                                 |               |
|---|---------------|---------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005), Modes Im, II, III, and IV |               |                                 |               |
| Main Member   | Southern Pine | Dowel Bearing $F_{em}$          | 5550 psi      |
| Side Member Mat'l   | PVC           | Dowel Bearing $F_{es}$          | 9500 psi      |
| Side Member Thick:  | 0.07 in.      | Anchor Bending Strength         | 92000 psi     |
| Anchor Diam.:   | 0.130 in.     | Load Duration Factor            | 1.6           |
| Embedment   | 1.375 in.     | Calculated Allowable Shear Load | <b>131</b> lb |

3/16" Elco Ultracons into 2.85 ksi Conc or C-90 CMU

|   |               |
|---|---------------|
| Elco Miami-Dade County NOA #11-0406.01                              |               |
| 3" O.C. 1" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear      | <b>155</b> lb |
| 3" O.C. 2.5" Edge Dist., 1.25" Embed. in Block, NOA Allowable Shear | <b>124</b> lb |

3/16" ITW Tapcons into 2 ksi Conc or 117 PCF CMU

|  |               |
|--|---------------|
| ITW Buildex Miami-Dade County NOA #12-0816.06                      |               |
| 3" O.C. 1.125" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>126</b> lb |
| 3" O.C. 2" Edge Dist., 1" Embed. in Block, NOA Allowable Shear     | <b>135</b> lb |

#10-16 ITW TEKS or Hilti Kwik-Flex Self-Drilling Screw

|  |               |
|--|---------------|
| ICC-ES Evaluation Reports ESR-1976 and ESR-3332 for .060" 33ksi yield steel, also qualifies 6063-T5 Alum. .125" min. |               |
| 1/2" Edge Dist., ESR Allowable Shear   | <b>139</b> lb |

**Summary:**

The calculations above comply with the 2018 IBC and IRC. The anchors analyzed are acceptable to meet the design pressures indicated above for this product (calculations not applicable to other products). Other anchors of greater strength may be used however anchor spacing listed above must not be exceeded.



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**Supplemental Calculations**

**DP55 Equal Leg / Flange Frame Anchorage (Shear) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

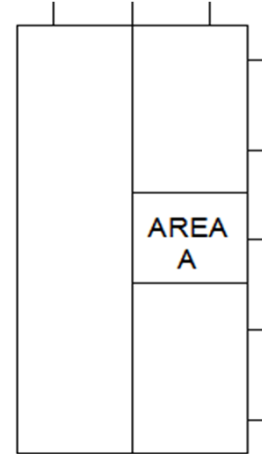
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 12 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 12 | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>55</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 2.25      |  |  |
| Total Load, lb  | 123.8     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 123.8     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#10 Screw into Wood

|   |               |                                 |               |
|---|---------------|---------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005), Modes Im, II, III, and IV |               |                                 |               |
| Main Member   | Southern Pine | Dowel Bearing $F_{em}$          | 5550 psi      |
| Side Member Mat'l   | PVC           | Dowel Bearing $F_{es}$          | 9500 psi      |
| Side Member Thick:  | 0.07 in.      | Anchor Bending Strength         | 92000 psi     |
| Anchor Diam.:   | 0.130 in.     | Load Duration Factor            | 1.6           |
| Embedment   | 1.375 in.     | Calculated Allowable Shear Load | <b>131</b> lb |

3/16" Elco Ultracons into 2.85 ksi Conc or C-90 CMU

|  |  |               |
|--|--|---------------|
| Elco Miami-Dade County NOA #11-0406.01 | 3" O.C. 1" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>155</b> lb |
|--|--|---------------|

3/16" ITW Tapcons into 2 ksi Conc or 117 PCF CMU

|   |  |               |
|---|--|---------------|
| ITW Buildex Miami-Dade County NOA #12-0816.06 | 3" O.C. 1.125" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>126</b> lb |
|   | 3" O.C. 2" Edge Dist., 1" Embed. in Block, NOA Allowable Shear     | <b>135</b> lb |

#10-16 ITW TEKS or Hilti Kwik-Flex Self-Drilling Screw

|  |                                      |               |
|--|--------------------------------------|---------------|
| ICC-ES Evaluation Reports ESR-1976 and ESR-3332 for .060" 33ksi yield steel, also qualifies 6063-T5 Alum. .125" min. | 1/2" Edge Dist., ESR Allowable Shear | <b>139</b> lb |
|--|--------------------------------------|---------------|

**Summary:**

The calculations above comply with the 2018 IBC and IRC. The anchors analyzed are acceptable to meet the design pressures indicated above for this product (calculations not applicable to other products). Other anchors of greater strength may be used however anchor spacing listed above must not be exceeded.



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**Supplemental Calculations**

**DP50 Equal Leg / Flange Frame Anchorage (Shear) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

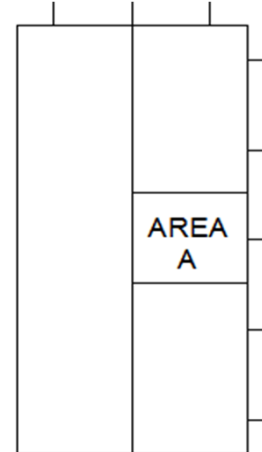
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 12 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 12 | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>60</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 2.25      |  |  |
| Total Load, lb  | 135.0     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 135.0     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#10 Screw into Wood

|   |               |                                 |               |
|---|---------------|---------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005), Modes Im, II, III, and IV |               |                                 |               |
| Main Member   | Southern Pine | Dowel Bearing $F_{em}$          | 5550 psi      |
| Side Member Mat'l   | PVC           | Dowel Bearing $F_{es}$          | 9500 psi      |
| Side Member Thick:  | 0.07 in.      | Anchor Bending Strength         | 92000 psi     |
| Anchor Diam.:   | 0.130 in.     | Load Duration Factor            | 1.6           |
| Embedment   | 1.5 in.       | Calculated Allowable Shear Load | <b>135 lb</b> |

3/16" Elco Ultracons into 2.85 ksi Conc or C-90 CMU

Elco Miami-Dade County NOA #11-0406.01

3" O.C. 1" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear **155 lb**

3/16" ITW Tapcons into 2 ksi Conc or 117 PCF CMU

ITW Buildex Miami-Dade County NOA #12-0816.06

3" O.C. 1.125" Edge Dist., 1.5" Embed. in Conc., NOA Allowable Shear **186 lb**

3" O.C. 2" Edge Dist., 1" Embed. in Block, NOA Allowable Shear **135 lb**

#10-16 ITW TEKS or Hilti Kwik-Flex Self-Drilling Screw

ICC-ES Evaluation Reports ESR-1976 and ESR-3332 for .060" 33ksi yield steel, also qualifies

6063-T5 Alum. .125" min.

1/2" Edge Dist., ESR Allowable Shear **139 lb**

**Summary:**

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**Supplemental Calculations**

**DP50 Equal Leg / Flange Frame Anchorage (Shear) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

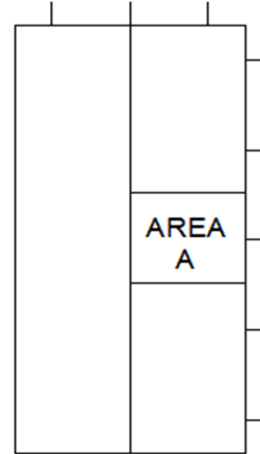
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |      |     |
|-----------------------|------|-----|
| Head/Sill from Corner | 6    | in. |
| Head/Sill On Center   | 10.5 | in. |
| Jambs from Corner     | 6    | in. |
| Jambs On Center       | 10.5 | in. |

72"  
x 72"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>50</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 2.43      |  |  |
| Total Load, lb  | 121.7     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 121.7     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#10 Screw into Wood

|   |               |                                 |               |
|---|---------------|---------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005), Modes Im, II, III, and IV |               |                                 |               |
| Main Member   | Southern Pine | Dowel Bearing $F_{em}$          | 5550 psi      |
| Side Member Mat'l   | PVC           | Dowel Bearing $F_{es}$          | 9500 psi      |
| Side Member Thick:  | 0.07 in.      | Anchor Bending Strength         | 92000 psi     |
| Anchor Diam.:   | 0.130 in.     | Load Duration Factor            | 1.6           |
| Embedment   | 1.375 in.     | Calculated Allowable Shear Load | <b>131</b> lb |

3/16" Elco Ultracons into 2.85 ksi Conc or C-90 CMU

|  |  |               |
|--|--|---------------|
| Elco Miami-Dade County NOA #11-0406.01 | 3" O.C. 1" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>155</b> lb |
|--|--|---------------|

3/16" ITW Tapcons into 2 ksi Conc or 117 PCF CMU

|   |  |               |
|---|--|---------------|
| ITW Buildex Miami-Dade County NOA #12-0816.06 | 3" O.C. 1.125" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>126</b> lb |
|   | 3" O.C. 2" Edge Dist., 1" Embed. in Block, NOA Allowable Shear     | <b>135</b> lb |

#10-16 ITW TEKS or Hilti Kwik-Flex Self-Drilling Screw

|  |                                      |               |
|--|--------------------------------------|---------------|
| ICC-ES Evaluation Reports ESR-1976 and ESR-3332 for .060" 33ksi yield steel, also qualifies 6063-T5 Alum. .125" min. | 1/2" Edge Dist., ESR Allowable Shear | <b>139</b> lb |
|--|--------------------------------------|---------------|

**Summary:**

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**Supplemental Calculations  
DP50 Fin Frame Anchorage (Pullout) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

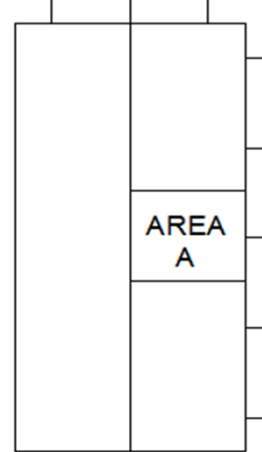
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 21 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 13 | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>50</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 2.44      |  |  |
| Total Load, lb  | 121.9     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 121.9     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#8 Screw into Wood

|  |                 |                              |               |
|--|-----------------|------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005) |                 |                              |               |
| Wood Type  | Spruce-Pine-Fir | Tabulated Pullout per Inch   | 82 lb         |
| Wood Spec. Grav. G                               | 0.42            | Threaded portion factor      | 0.667         |
| Anchor Size:                                     | #8              | Load Duration Factor         | 1.6           |
| Embedment  | 1.5 in.         | Calc. Allowable Pullout Load | <b>131</b> lb |

**Summary:**

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**Supplemental Calculations**

**DP80 Equal Leg / Flange Frame Anchorage (Shear) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

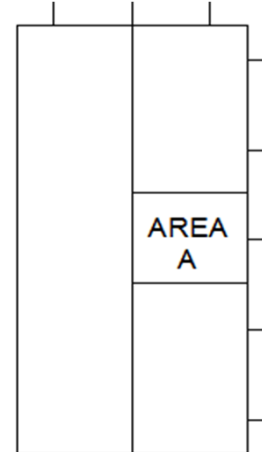
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 21 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 8  | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>80</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 1.50      |  |  |
| Total Load, lb  | 120.0     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 120.0     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#10 Screw into Wood

|   |               |                                 |               |
|---|---------------|---------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005), Modes Im, II, III, and IV |               |                                 |               |
| Main Member   | Southern Pine | Dowel Bearing $F_{em}$          | 5550 psi      |
| Side Member Mat'l   | PVC           | Dowel Bearing $F_{es}$          | 9500 psi      |
| Side Member Thick:  | 0.07 in.      | Anchor Bending Strength         | 92000 psi     |
| Anchor Diam.:   | 0.130 in.     | Load Duration Factor            | 1.6           |
| Embedment   | 1.375 in.     | Calculated Allowable Shear Load | <b>131 lb</b> |

3/16" Elco Ultracons into 2.85 ksi Conc or C-90 CMU

|   |               |
|---|---------------|
| Elco Miami-Dade County NOA #11-0406.01                              |               |
| 3" O.C. 1" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear      | <b>155 lb</b> |
| 3" O.C. 2.5" Edge Dist., 1.25" Embed. in Block, NOA Allowable Shear | <b>124 lb</b> |

3/16" ITW Tapcons into 2 ksi Conc or 117 PCF CMU

|  |               |
|--|---------------|
| ITW Buildex Miami-Dade County NOA #12-0816.06                      |               |
| 3" O.C. 1.125" Edge Dist., 1" Embed. in Conc., NOA Allowable Shear | <b>126 lb</b> |
| 3" O.C. 2" Edge Dist., 1" Embed. in Block, NOA Allowable Shear     | <b>135 lb</b> |

#10-16 ITW TEKS or Hilti Kwik-Flex Self-Drilling Screw

|  |               |
|--|---------------|
| ICC-ES Evaluation Reports ESR-1976 and ESR-3332 for .060" 33ksi yield steel, also qualifies 6063-T5 Alum. .125" min. |               |
| 1/2" Edge Dist., ESR Allowable Shear   | <b>139 lb</b> |

**Summary:**

The calculations above comply with the 2018 IBC and IRC. The anchors analyzed are acceptable to meet the design pressures indicated above for this product (calculations not applicable to other products). Other anchors of greater strength may be used however anchor spacing listed above must not be exceeded.



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**Supplemental Calculations  
DP80 Fin Frame Anchorage (Pullout) Verification**

2/19/2021

**Manufacturer:** Northeast Building Products

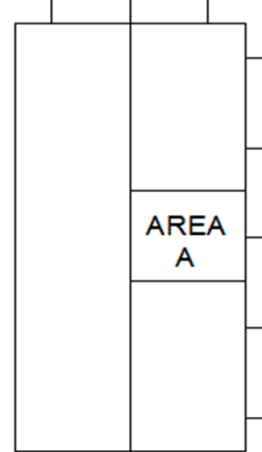
**Product:** WinForce PW

**Drawing:** TDI-WinForce-PW Impact and Non-Impact

**Anchor Through Frame Max. Spacing:**

|                       |    |     |
|-----------------------|----|-----|
| Head/Sill from Corner | 6  | in. |
| Head/Sill On Center   | 21 | in. |
| Jambs from Corner     | 6  | in. |
| Jambs On Center       | 8  | in. |

54"  
x 77"



|                         |           |     |
|-------------------------|-----------|-----|
| <b>Design Pressure:</b> | <b>80</b> | psf |
|-------------------------|-----------|-----|

**Area Load Analysis:**

|                 |           |  |  |
|-----------------|-----------|--|--|
| Area Region     | A         |  |  |
| Area, ft^2      | 1.50      |  |  |
| Total Load, lb  | 120.0     |  |  |
| Qty. Anchors    | 1         |  |  |
| Load/Anchor, lb | 120.0     |  |  |
| Result          | <b>OK</b> |  |  |

**Fastener Allowable Shear Load Calculations:**

#8 Screw into Wood

|  |                 |                              |               |
|--|-----------------|------------------------------|---------------|
| NDS For Wood Construction (ANSI/ AF&PA NDS-2005) |                 |                              |               |
| Wood Type  | Spruce-Pine-Fir | Tabulated Pullout per Inch   | 82 lb         |
| Wood Spec. Grav. G                               | 0.42            | Threaded portion factor      | 0.667         |
| Anchor Size:                                     | #8              | Load Duration Factor         | 1.6           |
| Embedment  | 1.5 in.         | Calc. Allowable Pullout Load | <b>131</b> lb |

**Summary:**

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