



## STRUCTURAL CALCULATIONS

### SL1500 PANEL

*Zimmerman Metals, Inc.*

*Over 60 years of Quality Workmanship and Service*

201 East 58<sup>th</sup> Avenue, Denver CO 80216  
303/294-0180 fax:303/292-5013 800/247-4202

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 12"            | 1                      | 370        | 208 | 133 | 92  | 68  | 52  |
|                   |                | 2                      | 178        | 112 | 75  | 52  | 39  | 30  |
|                   |                | 3                      | 202        | 128 | 87  | 61  | 45  | 35  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

3

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

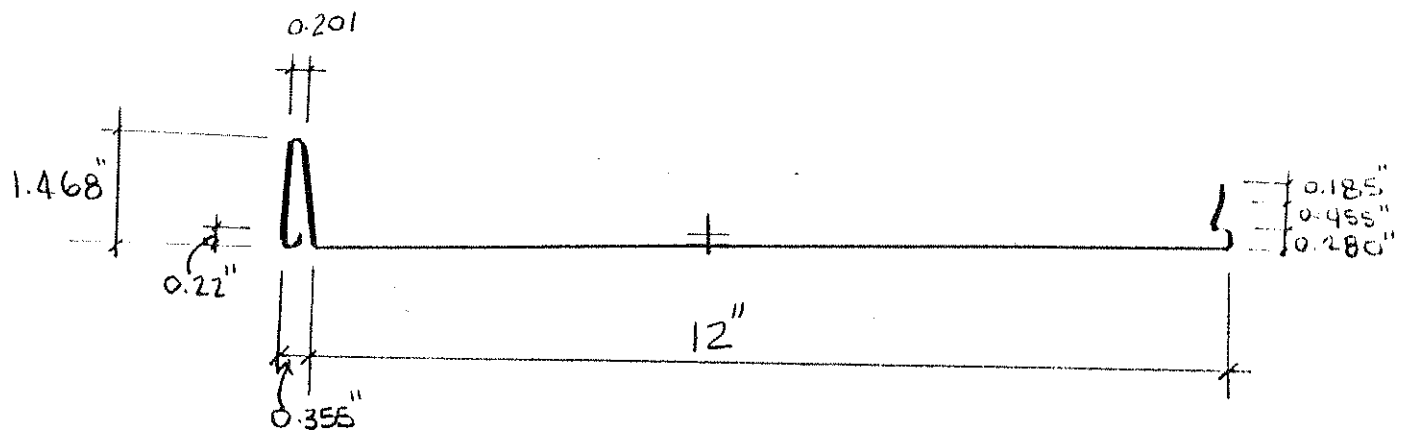
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 12"            | 1                      | 285        | 160 | 102 | 71  | 52  | 40  |
|                   |                | 2                      | 308        | 203 | 145 | 109 | 85  | 67  |
|                   |                | 3                      | 347        | 229 | 160 | 111 | 82  | 62  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 40 KSI

CFS Version 2.20

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 9550 FOREST LANE, SUITE 313  
 DALLAS, TEXAS 75243

Section: 12SL1524  
 Rev. Date 09-26-1996  
 Rev. Time 16:55:34  
 Rev. by YL  
 Phone (214) 340-0049  
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## Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole  | Distance |
|--------|---------|--------|-----|------|-------|----------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 | 0.093    |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 | 0.228    |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 | 0.144    |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 | 0.140    |
| 12.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 | 6.000    |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 | 0.734    |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 | 0.091    |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 | 0.734    |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 | 0.110    |



## Full Section Properties

|       |         |      |        |       |           |
|-------|---------|------|--------|-------|-----------|
| Area  | 0.3841  | Wt.  | 1.3060 | Width | 16.0714   |
| Ix    | 0.0480  | rx   | 0.3535 | Ixy   | -0.2229   |
| Sx(t) | 0.0373  | y(t) | 1.2868 | Alpha | 88.1191   |
| Sx(b) | 0.2702  | y(b) | 0.1777 |       |           |
| Iy    | 6.8270  | ry   | 4.2159 | Xo    | -3.3726   |
| Sy(l) | 1.2238  | x(l) | 5.5788 | Yo    | -0.3229   |
| Sy(r) | 1.0003  | x(r) | 6.8252 | jx    | 3.6787    |
|       |         |      |        | jy    | 9.6834    |
| I1    | 6.8343  | r1   | 4.2182 |       |           |
| I2    | 0.0407  | r2   | 0.3255 |       |           |
| Ic    | 6.8750  | rc   | 4.2307 | Cw    | 0.5108    |
| Io    | 11.2840 | ro   | 5.4201 | J     | 0.0000731 |

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Section: 12SL1524  
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### Fully Braced Allowables

|             |        |                 |                 |
|-------------|--------|-----------------|-----------------|
| Compression |        | Positive Moment | Positive Moment |
| Pao         | 2.1906 | Maxo            | 1.2488          |
| Ae          | 0.1050 | Ixe             | 0.0480          |
|             |        | Sxe(t)          | 0.0373          |
|             |        | Sxe(b)          | 0.2702          |
| Tension     |        |                 |                 |
| Ta          | 9.4320 |                 |                 |
|             |        | Negative Moment | Negative Moment |
|             |        | Maxo            | 0.7228          |
|             |        | Ixe             | 0.0305          |
| Shear       |        | Sxe(t)          | 0.0301          |
| Vay         | 0.5417 | Sxe(b)          | 0.0672          |
| Vax         | 0.0438 |                 |                 |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 24 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 12 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | LIVE LOAD   |
| FILE NAME  | L1S12L24    |

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| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 832.53  | 832.53  | 832.53 |
| 1.5  | 24        | 370.01  | 370.01  | 370.01 |
| 2    | 24        | 208.13  | 208.13  | 208.13 |
| 2.5  | 24        | 133.21  | 133.21  | 133.21 |
| 3    | 24        | 92.50   | 92.50   | 92.50  |
| 3.5  | 24        | 67.96   | 67.96   | 67.96  |
| 4    | 24        | 52.03   | 48.45   | 52.03  |
| 4.5  | 24        | 41.11   | 34.03   | 41.11  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 24 GA)

WIDTH: 12 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S12L24

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| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 327.34  | 327.34  | 327.34 |
| 1.5  | 24        | 177.94  | 177.94  | 177.94 |
| 2    | 24        | 112.65  | 112.65  | 112.65 |
| 2.5  | 24        | 75.26   | 75.26   | 75.26  |
| 3    | 24        | 52.64   | 52.64   | 52.64  |
| 3.5  | 24        | 38.85   | 38.85   | 38.85  |
| 4    | 24        | 29.83   | 29.83   | 29.83  |
| 4.5  | 24        | 23.62   | 23.62   | 23.62  |



## MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 24 GA)

WIDTH: 12 IN.  
CONDITION: THREE SPAN  
LOADING: LIVE LOAD  
FILE NAME: L3S12L24

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| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 369.19  | 369.19  | 369.19 |
| 1.5  | 24        | 201.97  | 201.97  | 201.97 |
| 2    | 24        | 128.44  | 128.44  | 128.44 |
| 2.5  | 24        | 87.33   | 87.33   | 87.33  |
| 3    | 24        | 61.21   | 61.21   | 61.21  |
| 3.5  | 24        | 45.22   | 45.22   | 45.22  |
| 4    | 24        | 34.75   | 34.75   | 34.75  |
| 4.5  | 24        | 27.53   | 27.53   | 27.53  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 24 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 12 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | WIND LOAD   |
| FILE NAME  | W1S12L24    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 642.33  | 642.33  | 642.33 |
| 1.5  | 24        | 285.48  | 285.48  | 285.48 |
| 2    | 24        | 160.58  | 160.58  | 160.58 |
| 2.5  | 24        | 102.77  | 102.77  | 102.77 |
| 3    | 24        | 71.37   | 71.37   | 71.37  |
| 3.5  | 24        | 52.43   | 45.96   | 52.43  |
| 4    | 24        | 40.15   | 30.79   | 40.15  |
| 4.5  | 24        | 28.83   | 21.62   | 31.72  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 24 GA)

WIDTH: 12 IN.  
 CONDITION: TWO SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W2S12L24

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| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 537.81  | 537.81  | 537.81 |
| 1.5  | 24        | 308.58  | 308.58  | 308.58 |
| 2    | 24        | 203.13  | 203.13  | 203.13 |
| 2.5  | 24        | 144.79  | 144.79  | 144.79 |
| 3    | 24        | 108.81  | 108.81  | 108.81 |
| 3.5  | 24        | 84.92   | 84.92   | 84.92  |
| 4    | 24        | 67.44   | 67.44   | 67.44  |
| 4.5  | 24        | 53.60   | 52.17   | 53.60  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12"WIDE X 24 GA)

|            |            |
|------------|------------|
| WIDTH:     | 12 IN.     |
| CONDITION: | THREE SPAN |
| LOADING:   | WIND LOAD  |
| FILE NAME: | W3S12L24   |

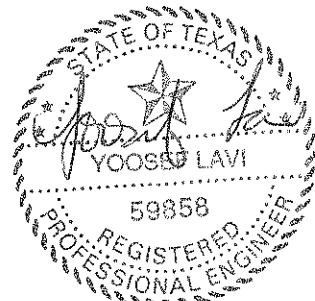
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| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 601.88  | 601.88  | 601.88 |
| 1.5  | 24        | 347.37  | 347.37  | 347.37 |
| 2    | 24        | 229.69  | 229.69  | 229.69 |
| 2.5  | 24        | 160.58  | 160.58  | 160.58 |
| 3    | 24        | 111.52  | 111.52  | 111.52 |
| 3.5  | 24        | 81.93   | 81.93   | 81.93  |
| 4    | 24        | 62.73   | 62.58   | 62.73  |
| 4.5  | 24        | 49.56   | 43.95   | 49.56  |

**STRUCTURAL CALCULATIONS FOR:**  
**12" WIDE X 26 GA STEEL**  
**ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
Denver, Colorado 80216

Prepared By:  
**YOOSEF LAVI, P.E.**  
Consulting Engineer  
9550 Forest Lane, Suite 313  
Dallas, Texas 75243



9-30-96

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ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 12"            | 1                      | 177        | 99  | 64  | 44  | 33  | 25  |
|                   |                | 2                      | 117        | 75  | 53  | 38  | 28  | 22  |
|                   |                | 3                      | 133        | 86  | 60  | 44  | 33  | 25  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

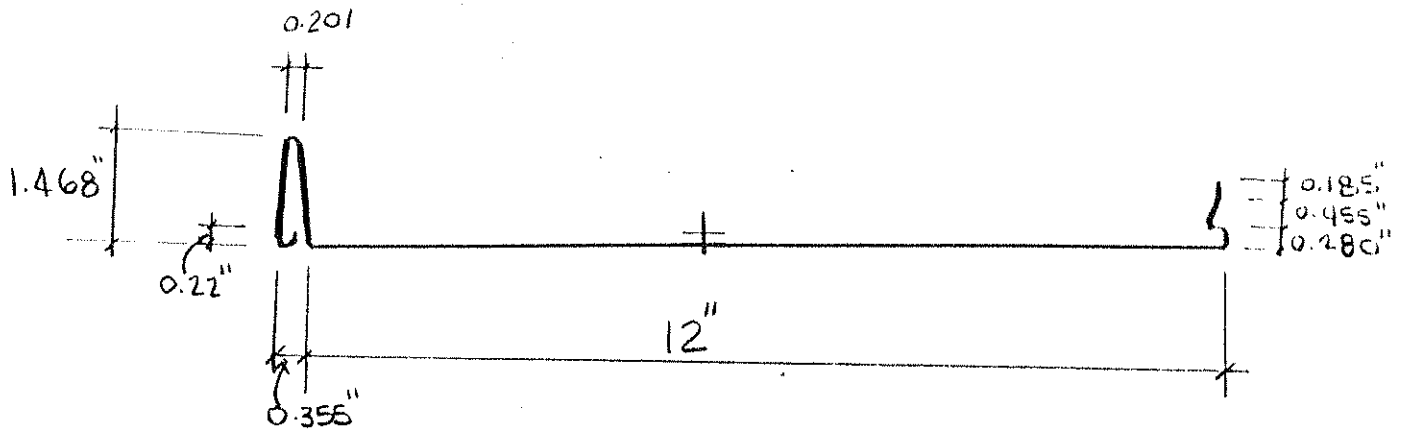
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 12"            | 1                      | 207        | 116 | 74  | 52  | 38  | 28  |
|                   |                | 2                      | 166        | 108 | 76  | 56  | 42  | 32  |
|                   |                | 3                      | 187        | 122 | 86  | 54  | 49  | 38  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 26 GA. (0.0179")

FY: 40 KSI



CFS Version 2.20

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Section: 12SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:13:19  
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### Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0179 26 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 12.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 6.000   |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



### Full Section Properties

|       |         |      |         |       |            |
|-------|---------|------|---------|-------|------------|
| Area  | 0.28874 | Wt.  | 0.98173 | Width | 16.13088   |
| Ix    | 0.03663 | rx   | 0.35618 | Ixy   | -0.16814   |
| Sx(t) | 0.02845 | y(t) | 1.28734 | Alpha | 88.1205    |
| Sx(b) | 0.20738 | y(b) | 0.17663 |       |            |
| Iy    | 5.15521 | ry   | 4.22540 | Xo    | -3.34354   |
| Sy(l) | 0.92310 | x(l) | 5.58468 | Yo    | -0.32813   |
| Sy(r) | 0.75523 | x(r) | 6.82601 | jx    | 3.65041    |
|       |         |      |         | jy    | 9.66534    |
| I1    | 5.16072 | r1   | 4.22766 |       |            |
| I2    | 0.03111 | r2   | 0.32826 |       |            |
| Ic    | 5.19184 | rc   | 4.24038 | Cw    | 0.39747    |
| Io    | 8.45086 | ro   | 5.40997 | J     | 0.00003084 |

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Fully Braced Allowables

|             |         |                 |                 |        |         |
|-------------|---------|-----------------|-----------------|--------|---------|
| Compression |         | Positive Moment | Positive Moment |        |         |
| Pao         | 1.4270  | Maxo            | 0.5992          | Mayo   | 7.6764  |
| Ae          | 0.06838 | Ixe             | 0.03259         | Iye    | 2.89929 |
|             |         | Sxe(t)          | 0.02496         | Sye(l) | 0.86644 |
|             |         | Sxe(b)          | 0.20527         | Sye(r) | 0.31985 |
| Tension     |         |                 |                 |        |         |
| Ta          | 7.0558  | Negative Moment | Negative Moment |        |         |
|             |         | Maxo            | 0.5246          | Mayo   | 10.5454 |
|             |         | Ixe             | 0.02116         | Iye    | 3.27935 |
| Shear       |         | Sxe(t)          | 0.02186         | Sye(l) | 0.43939 |
| Vay         | 0.3332  | Sxe(b)          | 0.04264         | Sye(r) | 0.66285 |
| Vax         | 0.0266  |                 |                 |        |         |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 26 GA)

WIDTH: 12 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME L1S12L26

---

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 399.47  | 399.47  | 399.47 |
| 1.5  | 26        | 177.54  | 177.54  | 177.54 |
| 2    | 26        | 99.87   | 99.87   | 99.87  |
| 2.5  | 26        | 63.91   | 63.91   | 63.91  |
| 3    | 26        | 44.39   | 44.39   | 44.39  |
| 3.5  | 26        | 32.61   | 32.61   | 32.61  |
| 4    | 26        | 24.97   | 24.97   | 24.97  |
| 4.5  | 26        | 19.73   | 19.73   | 19.73  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 26 GA)

WIDTH: 12 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S12L26

---

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 211.01  | 211.01  | 211.01 |
| 1.5  | 26        | 117.12  | 117.12  | 117.12 |
| 2    | 26        | 75.24   | 75.24   | 75.24  |
| 2.5  | 26        | 52.64   | 52.64   | 52.64  |
| 3    | 26        | 37.96   | 37.96   | 37.96  |
| 3.5  | 26        | 28.06   | 28.06   | 28.06  |
| 4    | 26        | 21.57   | 21.57   | 21.57  |
| 4.5  | 26        | 17.09   | 17.09   | 17.09  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 26 GA)

WIDTH: 12 IN.  
CONDITION: THREE SPAN  
LOADING: LIVE LOAD  
FILE NAME: L3S12L26

---

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 237.23  | 237.23  | 237.23 |
| 1.5  | 26        | 132.51  | 132.51  | 132.51 |
| 2    | 26        | 85.51   | 85.51   | 85.51  |
| 2.5  | 26        | 60.03   | 60.03   | 60.03  |
| 3    | 26        | 44.06   | 44.06   | 44.06  |
| 3.5  | 26        | 32.62   | 32.62   | 32.62  |
| 4    | 26        | 25.10   | 25.10   | 25.10  |
| 4.5  | 26        | 19.91   | 19.91   | 19.91  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 26 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 12 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | WIND LOAD   |
| FILE NAME  | W1S12L26    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 466.19  | 466.19  | 466.19 |
| 1.5  | 26        | 207.20  | 207.20  | 207.20 |
| 2    | 26        | 116.55  | 116.55  | 116.55 |
| 2.5  | 26        | 74.59   | 74.59   | 74.59  |
| 3    | 26        | 51.80   | 50.49   | 51.80  |
| 3.5  | 26        | 38.06   | 31.79   | 38.06  |
| 4    | 26        | 28.40   | 21.30   | 29.14  |
| 4.5  | 26        | 19.94   | 14.96   | 23.02  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12" WIDE X 26 GA)

WIDTH: 12 IN.  
 CONDITION: TWO SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W2S12L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 295.44  | 295.44  | 295.44 |
| 1.5  | 26        | 166.16  | 166.16  | 166.16 |
| 2    | 26        | 107.77  | 107.77  | 107.77 |
| 2.5  | 26        | 75.94   | 75.94   | 75.94  |
| 3    | 26        | 56.55   | 56.55   | 56.55  |
| 3.5  | 26        | 42.50   | 42.50   | 42.50  |
| 4    | 26        | 32.71   | 32.71   | 32.71  |
| 4.5  | 26        | 25.94   | 25.94   | 25.94  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (12"WIDE X 26 GA)

WIDTH: 12 IN.  
 CONDITION: THREE SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W3S12L26

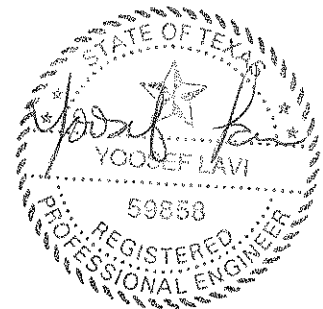
| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 331.49  | 331.49  | 331.49 |
| 1.5  | 26        | 187.60  | 187.60  | 187.60 |
| 2    | 26        | 122.23  | 122.23  | 122.23 |
| 2.5  | 26        | 86.43   | 86.43   | 86.43  |
| 3    | 26        | 64.54   | 64.54   | 64.54  |
| 3.5  | 26        | 49.34   | 49.34   | 49.34  |
| 4    | 26        | 38.03   | 38.03   | 38.03  |
| 4.5  | 26        | 30.18   | 30.18   | 30.18  |



**STRUCTURAL CALCULATIONS FOR:**  
**16" WIDE X 24 GA STEEL**  
**ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
Denver, Colorado 80216

Prepared By:  
**YOOSEF LAVI, P.E.**  
Consulting Engineer  
9550 Forest Lane, Suite 313  
Dallas, Texas 75243



9-30-96

8951-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 16"            | 1                      | 202        | 114 | 73  | 50  | 37  | 28  |
|                   |                | 2                      | 134        | 85  | 57  | 40  | 29  | 22  |
|                   |                | 3                      | 152        | 97  | 66  | 46  | 34  | 26  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

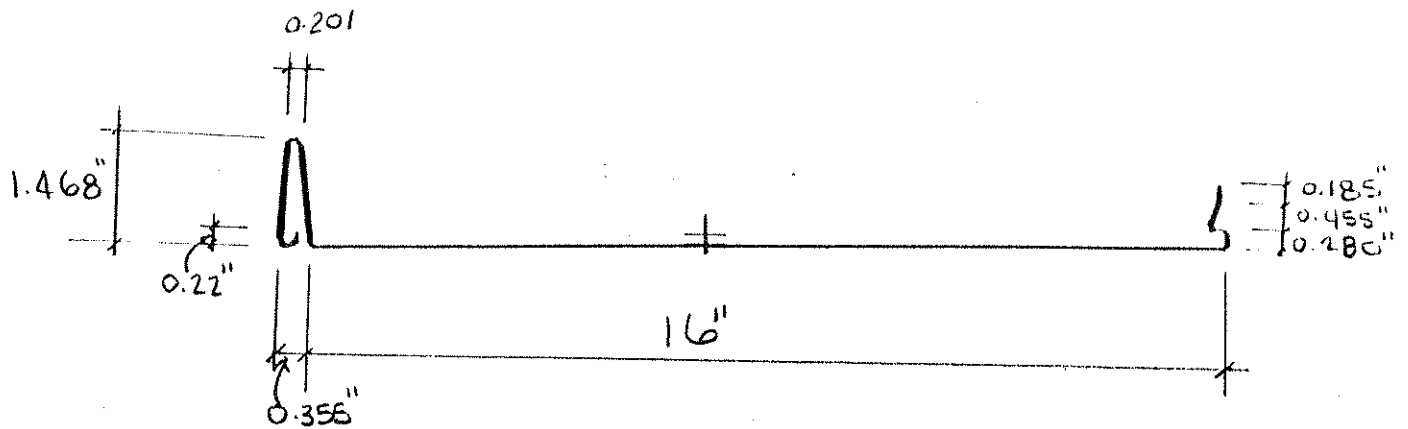
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 16"            | 1                      | 215        | 121 | 77  | 53  | 39  | 30  |
|                   |                | 2                      | 200        | 129 | 90  | 65  | 48  | 37  |
|                   |                | 3                      | 226        | 146 | 103 | 76  | 56  | 43  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 40 KSI

CFS Version 2.20

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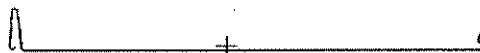
Section: 16SL1524  
Rev. Date 09-26-1996  
Rev. Time 17:11:12  
Rev. by YL  
Phone (214) 340-0049  
Fax (214) 340-0067

### Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 16.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 8.000   |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



### Full Section Properties

|       |         |      |        |       |           |
|-------|---------|------|--------|-------|-----------|
| Area  | 0.4797  | Wt.  | 1.6310 | Width | 20.0714   |
| Ix    | 0.0501  | rx   | 0.3232 | Ixy   | -0.3079   |
| Sx(t) | 0.0380  | y(t) | 1.3198 | Alpha | 88.7552   |
| Sx(b) | 0.3464  | y(b) | 0.1446 |       |           |
| Iy    | 14.2138 | ry   | 5.4434 | Xo    | -4.8703   |
| Sy(l) | 1.8863  | x(l) | 7.5353 | Yo    | -0.2672   |
| Sy(r) | 1.6027  | x(r) | 8.8686 | jx    | 5.1537    |
|       |         |      |        | jy    | 18.1827   |
| I1    | 14.2205 | r1   | 5.4446 |       |           |
| I2    | 0.0434  | r2   | 0.3009 |       |           |
| Ic    | 14.2639 | rc   | 5.4529 | Cw    | 0.9524    |
| Io    | 25.6767 | ro   | 7.3161 | J     | 0.0000913 |

CFS Version 2.20

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Section: 16SL1524  
Rev. Date 09-26-1996  
Rev. Time 17:11:12  
Rev. by YL  
Phone (214) 340-0049  
Fax (214) 340-0067

### Fully Braced Allowables

| Compression |         | Positive Moment |        | Positive Moment |         |
|-------------|---------|-----------------|--------|-----------------|---------|
| Pao         | 2.1942  | Maxo            | 0.9078 | Mayo            | 14.7221 |
| Ae          | 0.1051  | Ixe             | 0.0499 | Iye             | 7.4018  |
|             |         | Sxe(t)          | 0.0378 | Sye(l)          | 1.7065  |
|             |         | Sxe(b)          | 0.3463 | Sye(r)          | 0.6134  |
| Tension     |         |                 |        |                 |         |
| Ta          | 11.7264 |                 |        |                 |         |
|             |         | Negative Moment |        | Negative Moment |         |
|             |         | Maxo            | 0.7241 | Mayo            | 22.4180 |
|             |         | Ixe             | 0.0306 | Iye             | 9.2476  |
|             |         | Sxe(t)          | 0.0302 | Sye(l)          | 0.9341  |
|             |         | Sxe(b)          | 0.0677 | Sye(r)          | 1.4219  |
| Shear       |         |                 |        |                 |         |
| Vay         | 0.5417  |                 |        |                 |         |
| Vax         | 0.0438  |                 |        |                 |         |

### Fully Braced Allowables

| Compression |         | Positive Moment |        | Positive Moment |         |
|-------------|---------|-----------------|--------|-----------------|---------|
| Pao         | 2.1942  | Maxo            | 0.9078 | Mayo            | 14.7221 |
| Ae          | 0.1051  | Ixe             | 0.0499 | Iye             | 7.4018  |
|             |         | Sxe(t)          | 0.0378 | Sye(l)          | 1.7065  |
|             |         | Sxe(b)          | 0.3463 | Sye(r)          | 0.6134  |
| Tension     |         |                 |        |                 |         |
| Ta          | 11.7264 |                 |        |                 |         |
|             |         | Negative Moment |        | Negative Moment |         |
|             |         | Maxo            | 0.7241 | Mayo            | 22.4180 |
|             |         | Ixe             | 0.0306 | Iye             | 9.2476  |
|             |         | Sxe(t)          | 0.0302 | Sye(l)          | 0.9341  |
|             |         | Sxe(b)          | 0.0677 | Sye(r)          | 1.4219  |
| Shear       |         |                 |        |                 |         |
| Vay         | 0.5417  |                 |        |                 |         |
| Vax         | 0.0438  |                 |        |                 |         |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 24 GA)

WIDTH: 16 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME L1S16L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 455.04  | 455.04  | 455.04 |
| 1.5  | 24        | 202.24  | 202.24  | 202.24 |
| 2    | 24        | 113.76  | 113.76  | 113.76 |
| 2.5  | 24        | 72.81   | 72.81   | 72.81  |
| 3    | 24        | 50.56   | 50.56   | 50.56  |
| 3.5  | 24        | 37.15   | 37.15   | 37.15  |
| 4    | 24        | 28.44   | 28.44   | 28.44  |
| 4.5  | 24        | 22.47   | 22.47   | 22.47  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 24 GA)

WIDTH: 16 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S16L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 246.25  | 246.25  | 246.25 |
| 1.5  | 24        | 133.89  | 133.89  | 133.89 |
| 2    | 24        | 84.78   | 84.78   | 84.78  |
| 2.5  | 24        | 56.68   | 56.68   | 56.68  |
| 3    | 24        | 39.65   | 39.65   | 39.65  |
| 3.5  | 24        | 29.26   | 29.26   | 29.26  |
| 4    | 24        | 22.47   | 22.47   | 22.47  |
| 4.5  | 24        | 17.79   | 17.79   | 17.79  |



## MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 24 GA)

WIDTH: 16 IN.  
CONDITION: THREE SPAN  
LOADING: LIVE LOAD  
FILE NAME: L3S16L24

---

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 277.73  | 277.73  | 277.73 |
| 1.5  | 24        | 151.97  | 151.97  | 151.97 |
| 2    | 24        | 96.66   | 96.66   | 96.66  |
| 2.5  | 24        | 65.77   | 65.77   | 65.77  |
| 3    | 24        | 46.10   | 46.10   | 46.10  |
| 3.5  | 24        | 34.06   | 34.06   | 34.06  |
| 4    | 24        | 26.18   | 26.18   | 26.18  |
| 4.5  | 24        | 20.74   | 20.74   | 20.74  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 24 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 16 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | WIND LOAD   |
| FILE NAME  | W1S16L24    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 483.82  | 483.82  | 483.82 |
| 1.5  | 24        | 215.03  | 215.03  | 215.03 |
| 2    | 24        | 120.96  | 120.96  | 120.96 |
| 2.5  | 24        | 77.41   | 77.41   | 77.41  |
| 3    | 24        | 53.76   | 53.76   | 53.76  |
| 3.5  | 24        | 39.50   | 34.67   | 39.50  |
| 4    | 24        | 30.24   | 23.22   | 30.24  |
| 4.5  | 24        | 21.75   | 16.31   | 23.89  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 24 GA)

WIDTH: 16 IN.  
CONDITION: TWO SPAN  
LOADING: WIND LOAD  
FILE NAME: W2S16L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 360.52  | 360.52  | 360.52 |
| 1.5  | 24        | 200.53  | 200.53  | 200.53 |
| 2    | 24        | 129.02  | 129.02  | 129.02 |
| 2.5  | 24        | 90.37   | 90.37   | 90.37  |
| 3    | 24        | 65.64   | 65.64   | 65.64  |
| 3.5  | 24        | 48.56   | 48.56   | 48.56  |
| 4    | 24        | 37.35   | 37.35   | 37.35  |
| 4.5  | 24        | 29.60   | 29.60   | 29.60  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16"WIDE X 24 GA)

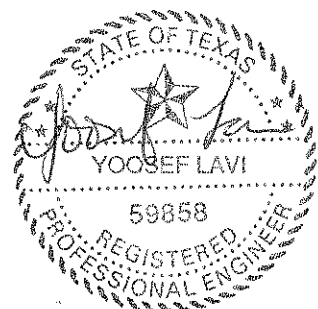
WIDTH: 16 IN.  
 CONDITION: THREE SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W3S16L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 405.18  | 405.18  | 405.18 |
| 1.5  | 24        | 226.80  | 226.80  | 226.80 |
| 2    | 24        | 146.59  | 146.59  | 146.59 |
| 2.5  | 24        | 103.03  | 103.03  | 103.03 |
| 3    | 24        | 76.12   | 76.12   | 76.12  |
| 3.5  | 24        | 56.42   | 56.42   | 56.42  |
| 4    | 24        | 43.44   | 43.44   | 43.44  |
| 4.5  | 24        | 34.46   | 33.16   | 34.46  |

**STRUCTURAL CALCULATIONS FOR:  
16" WIDE X 26 GA STEEL  
ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
Denver, Colorado 80216

Prepared By:  
**YOOSEF LAVI, P.E.**  
Consulting Engineer  
9550 Forest Lane, Suite 313  
Dallas, Texas 75243



9-30-96

pgs 1-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 16"            | 1                      | 132        | 74  | 47  | 33  | 24  | 18  |
|                   |                | 2                      | 88         | 57  | 40  | 29  | 21  | 16  |
|                   |                | 3                      | 100        | 64  | 45  | 33  | 25  | 19  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

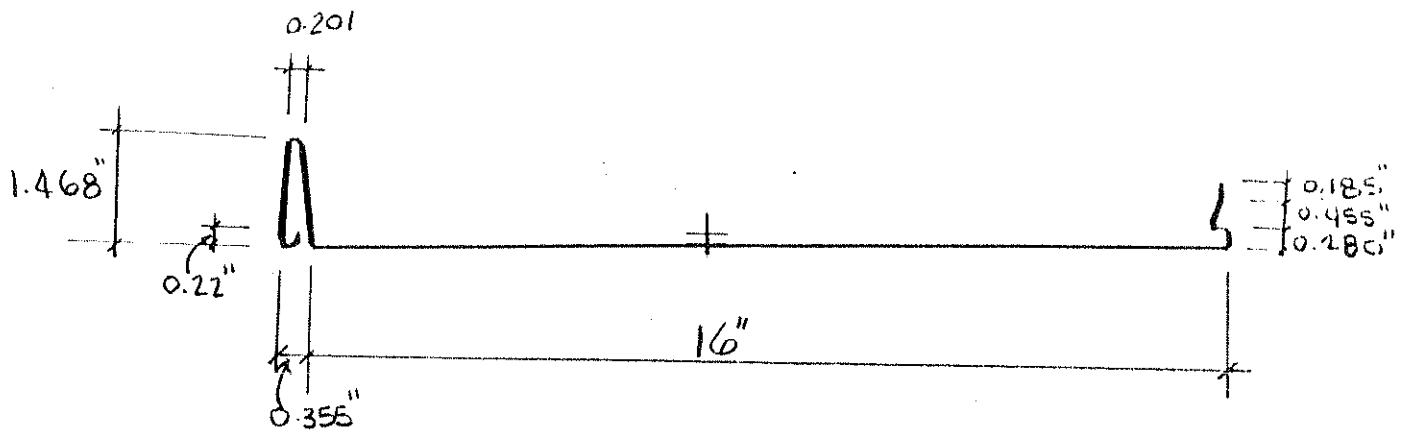
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 16"            | 1                      | 156        | 88  | 56  | 39  | 29  | 21  |
|                   |                | 2                      | 124        | 80  | 56  | 42  | 32  | 24  |
|                   |                | 3                      | 140        | 91  | 64  | 48  | 27  | 28  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 26 GA. (0.0179")

FY: 40 KSI



CFS Version 2.20

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DALLAS, TEXAS 75243

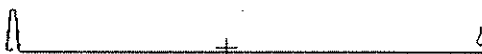
Section: 16SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:13:43  
Rev. by YL  
Phone (214) 340-0049  
Fax (214) 340-0067

## Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0179 26 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 16.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 8.000   |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



## Full Section Properties

|       |         |      |        |       |           |
|-------|---------|------|--------|-------|-----------|
| Area  | 0.3603  | Wt.  | 1.2252 | Width | 20.1309   |
| Ix    | 0.0382  | rx   | 0.3258 | Ixy   | -0.2323   |
| Sx(t) | 0.0290  | y(t) | 1.3207 | Alpha | 88.7546   |
| Sx(b) | 0.2669  | y(b) | 0.1433 |       |           |
| Iy    | 10.7186 | ry   | 5.4539 | Xo    | -4.8303   |
| Sy(l) | 1.4214  | x(l) | 7.5410 | Yo    | -0.2720   |
| Sy(r) | 1.2084  | x(r) | 8.8697 | jx    | 5.1149    |
|       |         |      |        | jy    | 18.1313   |
| I1    | 10.7236 | r1   | 5.4552 |       |           |
| I2    | 0.0332  | r2   | 0.3035 |       |           |
| Ic    | 10.7568 | rc   | 5.4637 | Cw    | 0.7408    |
| Io    | 19.1909 | ro   | 7.2978 | J     | 0.0000385 |

CFS Version 2.20

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6  
Section: 16SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:13:43  
Rev. by YL  
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### Fully Braced Allowables

|             |        |                 |                 |        |         |
|-------------|--------|-----------------|-----------------|--------|---------|
| Compression |        | Positive Moment | Positive Moment |        |         |
| Pao         | 1.4285 | Maxo            | 0.5923          | Mayo   | 10.2382 |
| Ae          | 0.0685 | Ixe             | 0.0330          | Iye    | 5.2413  |
|             |        | Sxe(t)          | 0.0247          | Sye(l) | 1.2709  |
| Tension     |        | Sxe(b)          | 0.2639          | Sye(r) | 0.4266  |
| Ta          | 8.7742 |                 |                 |        |         |
|             |        | Negative Moment | Negative Moment |        |         |
|             |        | Maxo            | 0.5252          | Mayo   | 14.1433 |
| Shear       |        | Ixe             | 0.0212          | Iye    | 6.1446  |
| Vay         | 0.3332 | Sxe(t)          | 0.0219          | Sye(l) | 0.5893  |
| Vax         | 0.0266 | Sxe(b)          | 0.0428          | Sye(r) | 1.0269  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 26 GA)

WIDTH: 16 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME L1S16L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 296.89  | 296.89  | 296.89 |
| 1.5  | 26        | 131.95  | 131.95  | 131.95 |
| 2    | 26        | 74.22   | 74.22   | 74.22  |
| 2.5  | 26        | 47.50   | 47.50   | 47.50  |
| 3    | 26        | 32.99   | 32.99   | 32.99  |
| 3.5  | 26        | 24.24   | 24.24   | 24.24  |
| 4    | 26        | 18.56   | 18.56   | 18.56  |
| 4.5  | 26        | 14.66   | 14.66   | 14.66  |

## MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 26 GA)

WIDTH: 16 IN.  
CONDITION: TWO SPAN  
LOADING: LIVE LOAD  
FILE NAME: L2S16L26

| SPAN: | THICKNESS | DEFL.   | DEFL.   | STRESS |
|-------|-----------|---------|---------|--------|
| FEET  | GA        | (L/180) | (L/240) |        |
| 1     | 26        | 158.70  | 158.70  | 158.70 |
| 1.5   | 26        | 88.09   | 88.09   | 88.09  |
| 2     | 26        | 56.60   | 56.60   | 56.60  |
| 2.5   | 26        | 39.60   | 39.60   | 39.60  |
| 3     | 26        | 28.56   | 28.56   | 28.56  |
| 3.5   | 26        | 21.11   | 21.11   | 21.11  |
| 4     | 26        | 16.23   | 16.23   | 16.23  |
| 4.5   | 26        | 12.86   | 12.86   | 12.86  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN NS100 (16" WIDE X 26 GA)

9

WIDTH: 16-IN.  
 CONDITION: THREE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L3S16S26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 178.42  | 178.42  | 178.42 |
| 1.5  | 26        | 99.67   | 99.67   | 99.67  |
| 2    | 26        | 64.32   | 64.32   | 64.32  |
| 2.5  | 26        | 45.16   | 45.16   | 45.16  |
| 3    | 26        | 33.15   | 33.15   | 33.15  |
| 3.5  | 26        | 24.55   | 24.55   | 24.55  |
| 4    | 26        | 18.89   | 18.89   | 18.89  |
| 4.5  | 26        | 14.98   | 14.98   | 14.98  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 26 GA)

WIDTH: 16 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: WIND LOAD  
 FILE NAME W1S16L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 350.92  | 350.92  | 350.92 |
| 1.5  | 26        | 155.97  | 155.97  | 155.97 |
| 2    | 26        | 87.73   | 87.73   | 87.73  |
| 2.5  | 26        | 56.15   | 56.15   | 56.15  |
| 3    | 26        | 38.99   | 38.14   | 38.99  |
| 3.5  | 26        | 28.65   | 24.02   | 28.65  |
| 4    | 26        | 21.45   | 16.09   | 21.93  |
| 4.5  | 26        | 15.07   | 11.30   | 17.33  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16" WIDE X 26 GA)

WIDTH: 16 IN.  
 CONDITION: TWO SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W2S16L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 221.18  | 221.18  | 221.18 |
| 1.5  | 26        | 124.25  | 124.25  | 124.25 |
| 2    | 26        | 80.52   | 80.52   | 80.52  |
| 2.5  | 26        | 56.71   | 56.71   | 56.71  |
| 3    | 26        | 42.21   | 42.21   | 42.21  |
| 3.5  | 26        | 31.61   | 31.61   | 31.61  |
| 4    | 26        | 24.32   | 24.32   | 24.32  |
| 4.5  | 26        | 19.28   | 19.28   | 19.28  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (16"WIDE X 26 GA)

|            |            |
|------------|------------|
| WIDTH:     | 16 IN.     |
| CONDITION: | THREE SPAN |
| LOADING:   | WIND LOAD  |
| FILE NAME: | W3S16L26   |

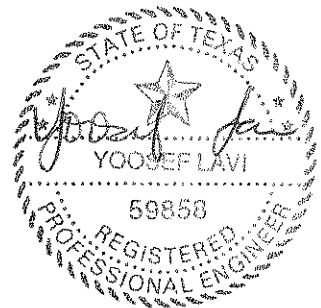
| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 248.21  | 248.21  | 248.21 |
| 1.5  | 26        | 140.31  | 140.31  | 140.31 |
| 2    | 26        | 91.34   | 91.34   | 91.34  |
| 2.5  | 26        | 64.55   | 64.55   | 64.55  |
| 3    | 26        | 48.18   | 48.18   | 48.18  |
| 3.5  | 26        | 36.70   | 36.70   | 36.70  |
| 4    | 26        | 28.28   | 28.28   | 28.28  |
| 4.5  | 26        | 22.44   | 22.44   | 22.44  |



**STRUCTURAL CALCULATIONS FOR:  
20" WIDE X 24 GA STEEL  
ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
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Prepared By:  
**YOUSEF LAVI, P.E.**  
Consulting Engineer  
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Dallas, Texas 75243



9-30-96  
pgs 1-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 20"            | 1                      | 162        | 91  | 58  | 40  | 30  | 23  |
|                   |                | 2                      | 107        | 68  | 45  | 32  | 23  | 18  |
|                   |                | 3                      | 121        | 77  | 52  | 37  | 27  | 21  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

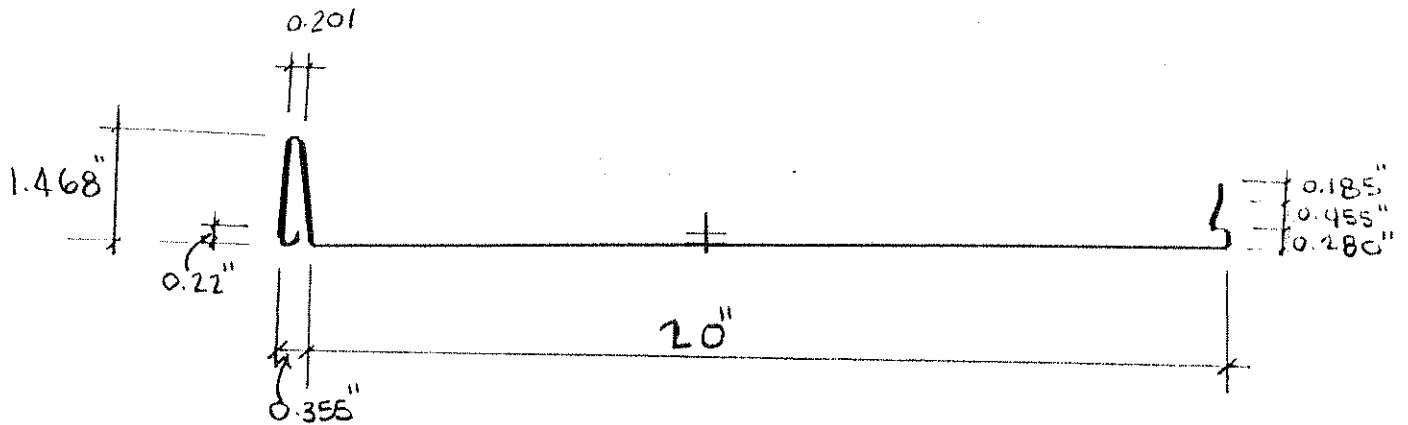
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 20"            | 1                      | 171        | 97  | 61  | 43  | 31  | 24  |
|                   |                | 2                      | 160        | 103 | 72  | 53  | 39  | 30  |
|                   |                | 3                      | 181        | 117 | 82  | 61  | 45  | 35  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 40 KSI

CFS Version 2.20

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## Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 20.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 10.000  |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



## Full Section Properties

|       |         |      |         |       |           |
|-------|---------|------|---------|-------|-----------|
| Area  | 0.5753  | Wt.  | 1.9560  | Width | 24.0714   |
| Ix    | 0.0515  | rx   | 0.2993  | Ixy   | -0.3939   |
| Sx(t) | 0.0384  | y(t) | 1.3419  | Alpha | 89.1113   |
| Sx(b) | 0.4202  | y(b) | 0.1226  |       |           |
| Iy    | 25.4370 | ry   | 6.6494  | Xo    | -6.4118   |
| Sy(l) | 2.6758  | x(l) | 9.5063  | Yo    | -0.2277   |
| Sy(r) | 2.3342  | x(r) | 10.8976 | jx    | 6.6723    |
|       |         |      |         | jy    | 29.5653   |
| I1    | 25.4431 | r1   | 6.6502  |       |           |
| I2    | 0.0454  | r2   | 0.2810  |       |           |
| Ic    | 25.4885 | rc   | 6.6561  | Cw    | 1.5424    |
| Io    | 49.1695 | ro   | 9.2448  | J     | 0.0001095 |

CFS Version 2.20

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Rev. Date 09-26-1996  
Rev. Time 17:12:19  
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Fully Braced Allowables

|             |         |                 |        |                 |         |
|-------------|---------|-----------------|--------|-----------------|---------|
| Compression |         | Positive Moment |        | Positive Moment |         |
| Pao         | 2.1963  | Maxo            | 0.9117 | Mayo            | 18.4159 |
| Ae          | 0.1052  | Ixe             | 0.0510 | Iye             | 11.7584 |
|             |         | Sxe(t)          | 0.0380 | Sye(l)          | 2.3146  |
| Tension     |         | Sxe(b)          | 0.4197 | Sye(r)          | 0.7673  |
| Ta          | 14.0208 | Negative Moment |        | Negative Moment |         |
|             |         | Maxo            | 0.7247 | Mayo            | 28.1556 |
| Shear       |         | Ixe             | 0.0306 | Iye             | 15.1187 |
| Vay         | 0.5417  | Sxe(t)          | 0.0302 | Sye(l)          | 1.1732  |
| Vax         | 0.0438  | Sxe(b)          | 0.0679 | Sye(r)          | 2.0114  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 24 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 20 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | LIVE LOAD   |
| FILE NAME  | L1S20L24    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 364.61  | 364.61  | 364.61 |
| 1.5  | 24        | 162.05  | 162.05  | 162.05 |
| 2    | 24        | 91.15   | 91.15   | 91.15  |
| 2.5  | 24        | 58.34   | 58.34   | 58.34  |
| 3    | 24        | 40.51   | 40.51   | 40.51  |
| 3.5  | 24        | 29.76   | 29.76   | 29.76  |
| 4    | 24        | 22.79   | 22.79   | 22.79  |
| 4.5  | 24        | 18.01   | 18.01   | 18.01  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 24 GA)

WIDTH: 20 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S20L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 196.58  | 196.58  | 196.58 |
| 1.5  | 24        | 106.89  | 106.89  | 106.89 |
| 2    | 24        | 67.69   | 67.69   | 67.69  |
| 2.5  | 24        | 45.27   | 45.27   | 45.27  |
| 3    | 24        | 31.67   | 31.67   | 31.67  |
| 3.5  | 24        | 23.37   | 23.37   | 23.37  |
| 4    | 24        | 17.94   | 17.94   | 17.94  |
| 4.5  | 24        | 14.21   | 14.21   | 14.21  |



MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 24 GA)

WIDTH: 20 IN.  
 CONDITION: THREE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L3S20L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 221.70  | 221.70  | 221.70 |
| 1.5  | 24        | 121.33  | 121.33  | 121.33 |
| 2    | 24        | 77.17   | 77.17   | 77.17  |
| 2.5  | 24        | 52.53   | 52.53   | 52.53  |
| 3    | 24        | 36.82   | 36.82   | 36.82  |
| 3.5  | 24        | 27.20   | 27.20   | 27.20  |
| 4    | 24        | 20.91   | 20.91   | 20.91  |
| 4.5  | 24        | 16.56   | 16.56   | 16.56  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 24 GA)

WIDTH: 20 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: WIND LOAD  
 FILE NAME W1S20L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 386.40  | 386.40  | 386.40 |
| 1.5  | 24        | 171.73  | 171.73  | 171.73 |
| 2    | 24        | 96.60   | 96.60   | 96.60  |
| 2.5  | 24        | 61.82   | 61.82   | 61.82  |
| 3    | 24        | 42.93   | 42.93   | 42.93  |
| 3.5  | 24        | 31.54   | 27.66   | 31.54  |
| 4    | 24        | 24.15   | 18.53   | 24.15  |
| 4.5  | 24        | 17.35   | 13.02   | 19.08  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 24 GA)

WIDTH: 20 IN.  
 CONDITION: TWO SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W2S20L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 288.18  | 288.18  | 288.18 |
| 1.5  | 24        | 160.36  | 160.36  | 160.36 |
| 2    | 24        | 103.21  | 103.21  | 103.21 |
| 2.5  | 24        | 72.31   | 72.31   | 72.31  |
| 3    | 24        | 52.59   | 52.59   | 52.59  |
| 3.5  | 24        | 38.91   | 38.91   | 38.91  |
| 4    | 24        | 29.93   | 29.93   | 29.93  |
| 4.5  | 24        | 23.72   | 23.72   | 23.72  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20"WIDE X 24 GA)

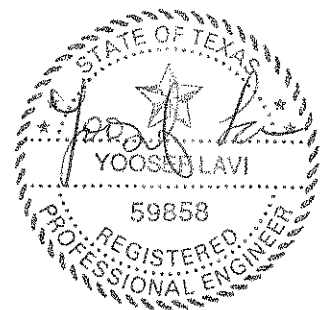
|            |            |
|------------|------------|
| WIDTH:     | 20 IN.     |
| CONDITION: | THREE SPAN |
| LOADING:   | WIND LOAD  |
| FILE NAME: | W3S20L24   |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 323.86  | 323.86  | 323.86 |
| 1.5  | 24        | 181.35  | 181.35  | 181.35 |
| 2    | 24        | 117.25  | 117.25  | 117.25 |
| 2.5  | 24        | 82.43   | 82.43   | 82.43  |
| 3    | 24        | 60.99   | 60.99   | 60.99  |
| 3.5  | 24        | 45.20   | 45.20   | 45.20  |
| 4    | 24        | 34.81   | 34.81   | 34.81  |
| 4.5  | 24        | 27.62   | 26.46   | 27.62  |

**STRUCTURAL CALCULATIONS FOR:  
20" WIDE X 26 GA STEEL  
ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
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Prepared By:  
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9-30-96  
figs 1-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 20"            | 1                      | 105        | 59  | 38  | 26  | 19  | 15  |
|                   |                | 2                      | 70         | 45  | 31  | 23  | 17  | 13  |
|                   |                | 3                      | 80         | 51  | 36  | 26  | 19  | 15  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

3

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

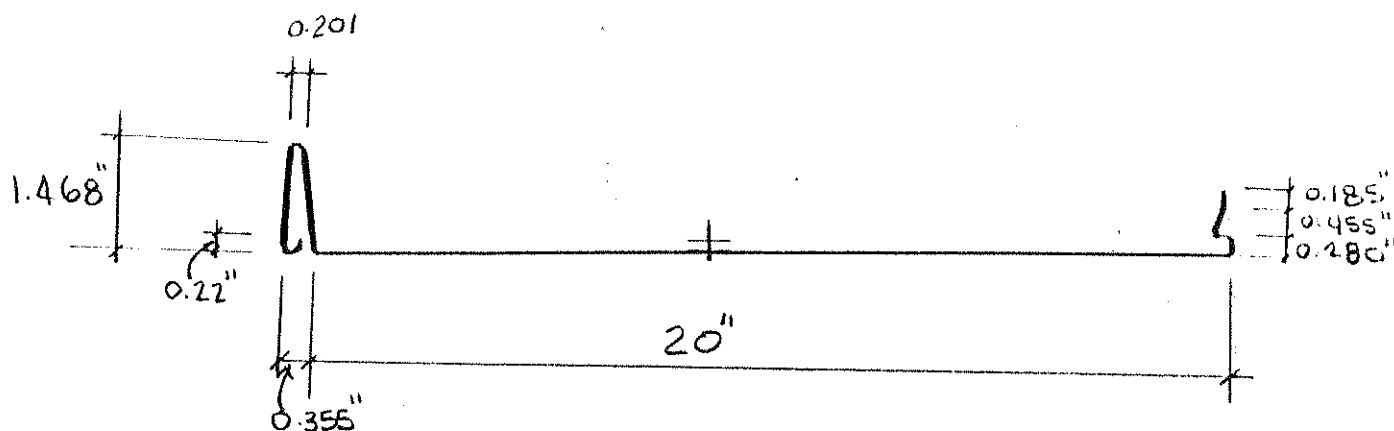
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 20"            | 1                      | 124        | 70  | 44  | 31  | 23  | 17  |
|                   |                | 2                      | 99         | 64  | 45  | 33  | 25  | 19  |
|                   |                | 3                      | 112        | 73  | 51  | 38  | 29  | 22  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 26 GA. (0.0179")

FY: 40 KSI



CFS Version 2.20

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Section: 20SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:14:21  
Rev. by YL  
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### Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0179 26 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 20.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 10.000  |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



### Full Section Properties

|       |         |      |         |       |           |
|-------|---------|------|---------|-------|-----------|
| Area  | 0.4319  | Wt.  | 1.4686  | Width | 24.1309   |
| Ix    | 0.0393  | rx   | 0.3017  | Ixy   | -0.2971   |
| Sx(t) | 0.0293  | y(t) | 1.3429  | Alpha | 89.1101   |
| Sx(b) | 0.3249  | y(b) | 0.1210  |       |           |
| Iy    | 19.1637 | ry   | 6.6608  | Xo    | -6.3614   |
| Sy(l) | 2.0147  | x(l) | 9.5118  | Yo    | -0.2320   |
| Sy(r) | 1.7583  | x(r) | 10.8989 | jx    | 6.6233    |
|       |         |      |         | jy    | 29.4681   |
| I1    | 19.1683 | r1   | 6.6616  |       |           |
| I2    | 0.0347  | r2   | 0.2835  |       |           |
| Ic    | 19.2031 | rc   | 6.6676  | Cw    | 1.1998    |
| Io    | 36.7061 | ro   | 9.2184  | J     | 0.0000461 |

CFS Version 2.20

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6  
Section: 20SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:14:21  
Rev. by YL  
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### Fully Braced Allowables

|             |         |                 |        |                 |         |
|-------------|---------|-----------------|--------|-----------------|---------|
| Compression |         | Positive Moment |        | Positive Moment |         |
| Pao         | 1.4294  | Maxo            | 0.5916 | Mayo            | 12.7971 |
| Ae          | 0.0685  | Ixe             | 0.0335 | Iye             | 8.3052  |
|             |         | Sxe(t)          | 0.0247 | Sye(l)          | 1.7178  |
|             |         | Sxe(b)          | 0.3209 | Sye(r)          | 0.5332  |
| Tension     |         |                 |        |                 |         |
| Ta          | 10.4926 | Negative Moment |        | Negative Moment |         |
|             |         | Maxo            | 0.5255 | Mayo            | 17.7652 |
|             |         | Ixe             | 0.0212 | Iye             | 9.9893  |
| Shear       |         | Sxe(t)          | 0.0219 | Sye(l)          | 0.7402  |
| Vay         | 0.3332  | Sxe(b)          | 0.0429 | Sye(r)          | 1.4444  |
| Vax         | 0.0266  |                 |        |                 |         |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 26 GA)

7

WIDTH: 20 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME L1S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 236.59  | 236.59  | 236.59 |
| 1.5  | 26        | 105.15  | 105.15  | 105.15 |
| 2    | 26        | 59.15   | 59.15   | 59.15  |
| 2.5  | 26        | 37.85   | 37.85   | 37.85  |
| 3    | 26        | 26.29   | 26.29   | 26.29  |
| 3.5  | 26        | 19.31   | 19.31   | 19.31  |
| 4    | 26        | 14.79   | 14.79   | 14.79  |
| 4.5  | 26        | 11.68   | 11.68   | 11.68  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 26 GA)

WIDTH: 20 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 126.67  | 126.67  | 126.67 |
| 1.5  | 26        | 70.32   | 70.32   | 70.32  |
| 2    | 26        | 45.18   | 45.18   | 45.18  |
| 2.5  | 26        | 31.61   | 31.61   | 31.61  |
| 3    | 26        | 22.81   | 22.81   | 22.81  |
| 3.5  | 26        | 16.86   | 16.86   | 16.86  |
| 4    | 26        | 12.96   | 12.96   | 12.96  |
| 4.5  | 26        | 10.27   | 10.27   | 10.27  |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 26 GA)

9

WIDTH: 20 IN.  
 CONDITION: THREE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L3S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 142.40  | 142.40  | 142.40 |
| 1.5  | 26        | 79.56   | 79.56   | 79.56  |
| 2    | 26        | 51.35   | 51.35   | 51.35  |
| 2.5  | 26        | 36.05   | 36.05   | 36.05  |
| 3    | 26        | 26.47   | 26.47   | 26.47  |
| 3.5  | 26        | 19.60   | 19.60   | 19.60  |
| 4    | 26        | 15.08   | 15.08   | 15.08  |
| 4.5  | 26        | 11.96   | 11.96   | 11.96  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 26 GA)

WIDTH: 20 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W1S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 280.19  | 280.19  | 280.19 |
| 1.5  | 26        | 124.53  | 124.53  | 124.53 |
| 2    | 26        | 70.05   | 70.05   | 70.05  |
| 2.5  | 26        | 44.83   | 44.83   | 44.83  |
| 3    | 26        | 31.13   | 30.43   | 31.13  |
| 3.5  | 26        | 22.87   | 19.17   | 22.87  |
| 4    | 26        | 17.12   | 12.84   | 17.51  |
| 4.5  | 26        | 12.02   | 9.02    | 13.84  |



MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20" WIDE X 26 GA)

WIDTH: 20 IN.  
 CONDITION: TWO SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W2S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 176.39  | 176.39  | 176.39 |
| 1.5  | 26        | 99.08   | 99.08   | 99.08  |
| 2    | 26        | 64.20   | 64.20   | 64.20  |
| 2.5  | 26        | 45.21   | 45.21   | 45.21  |
| 3    | 26        | 33.65   | 33.65   | 33.65  |
| 3.5  | 26        | 25.19   | 25.19   | 25.19  |
| 4    | 26        | 19.38   | 19.38   | 19.38  |
| 4.5  | 26        | 15.37   | 15.37   | 15.37  |



MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (20"WIDE X 26 GA)

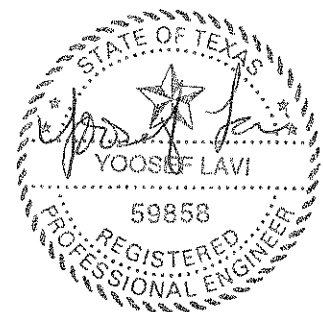
WIDTH: 20 IN.  
 CONDITION: THREE SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W3S20L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 197.95  | 197.95  | 197.95 |
| 1.5  | 26        | 111.88  | 111.88  | 111.88 |
| 2    | 26        | 72.83   | 72.83   | 72.83  |
| 2.5  | 26        | 51.47   | 51.47   | 51.47  |
| 3    | 26        | 38.41   | 38.41   | 38.41  |
| 3.5  | 26        | 29.25   | 29.25   | 29.25  |
| 4    | 26        | 22.54   | 22.54   | 22.54  |
| 4.5  | 26        | 17.89   | 17.89   | 17.89  |

**STRUCTURAL CALCULATIONS FOR:  
24" WIDE X 24 GA STEEL  
ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
Denver, Colorado 80216

Prepared By:  
**YOOSEF LAVI, P.E.**  
Consulting Engineer  
9550 Forest Lane, Suite 313  
Dallas, Texas 75243



9-30-96

pgs 1-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 24"            | 1                      | 135        | 76  | 48  | 34  | 25  | 19  |
|                   |                | 2                      | 89         | 56  | 38  | 26  | 19  | 15  |
|                   |                | 3                      | 101        | 64  | 44  | 31  | 23  | 17  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

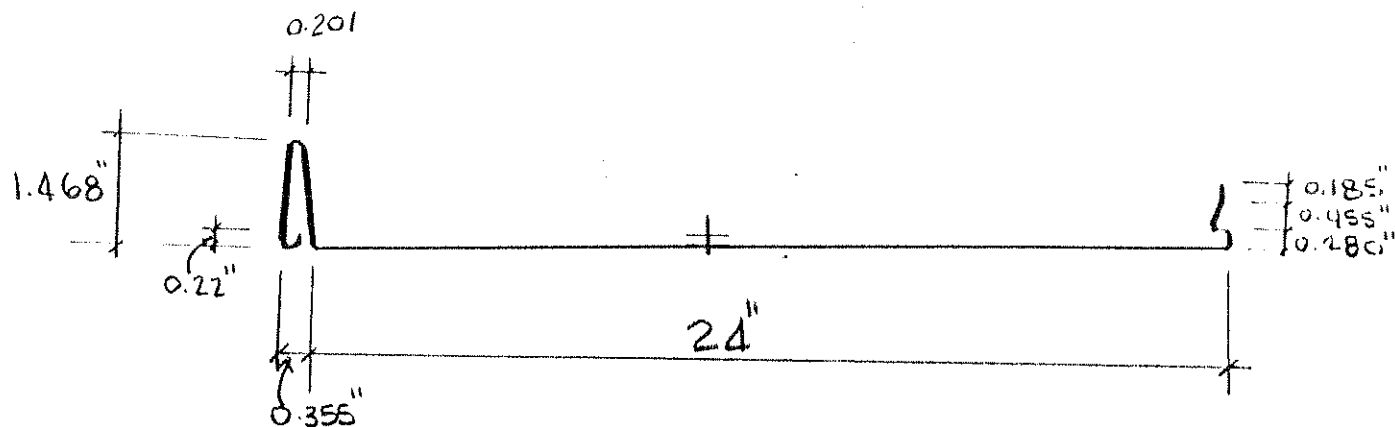
ALLOWABLE UPLIFT LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 24<br>GA<br>STEEL | 24"            | 1                      | 143        | 80  | 51  | 36  | 26  | 20  |
|                   |                | 2                      | 118        | 75  | 50  | 35  | 26  | 20  |
|                   |                | 3                      | 151        | 97  | 68  | 51  | 37  | 29  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.

## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 40 KSI

CFS Version 2.20

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Section: 24SL1524  
Rev. Date 09-26-1996  
Rev. Time 17:12:47  
Rev. by YL  
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### Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 24.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 12.000  |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



### Full Section Properties

|       |         |      |         |       |           |
|-------|---------|------|---------|-------|-----------|
| Area  | 0.6709  | Wt.  | 2.2811  | Width | 28.0714   |
| Ix    | 0.0525  | rx   | 0.2798  | Ixy   | -0.4804   |
| Sx(t) | 0.0387  | y(t) | 1.3577  | Alpha | 89.3322   |
| Sx(b) | 0.4917  | y(b) | 0.1068  |       |           |
| Iy    | 41.2620 | ry   | 7.8423  | Xo    | -7.9794   |
| Sy(l) | 3.5925  | x(l) | 11.4855 | Yo    | -0.1983   |
| Sy(r) | 3.1940  | x(r) | 12.9184 | jx    | 8.2191    |
|       |         |      |         | jy    | 43.8375   |
| I1    | 41.2676 | r1   | 7.8428  |       |           |
| I2    | 0.0469  | r2   | 0.2645  |       |           |
| Ic    | 41.3145 | rc   | 7.8473  | Cw    | 2.2827    |
| Io    | 84.0578 | ro   | 11.1933 | J     | 0.0001277 |

CFS Version 2.20

Section: 24SL1524  
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 Rev. Time 17:12:47  
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## Fully Braced Allowables

|             |                 |                 |
|-------------|-----------------|-----------------|
| Compression | Positive Moment | Positive Moment |
| Pao 2.1977  | Maxo 0.9102     | Mayo 22.1089    |
| Ae 0.1053   | Ixe 0.0516      | Iye 17.1679     |
|             | Sxe(t) 0.0379   | Sye(l) 2.9767   |
| Tension     | Sxe(b) 0.4904   | Sye(r) 0.9212   |
| Ta 16.3152  | Negative Moment | Negative Moment |
|             | Maxo 0.7252     | Mayo 33.9303    |
| Shear       | Ixe 0.0306      | Iye 22.5612     |
| Vay 0.5417  | Sxe(t) 0.0302   | Sye(l) 1.4138   |
| Vax 0.0438  | Sxe(b) 0.0681   | Sye(r) 2.6713   |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 24 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 24 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | LIVE LOAD   |
| FILE NAME  | L1S24L24    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 303.40  | 303.40  | 303.40 |
| 1.5  | 24        | 134.84  | 134.84  | 134.84 |
| 2    | 24        | 75.85   | 75.85   | 75.85  |
| 2.5  | 24        | 48.54   | 48.54   | 48.54  |
| 3    | 24        | 33.71   | 33.71   | 33.71  |
| 3.5  | 24        | 24.77   | 24.77   | 24.77  |
| 4    | 24        | 18.96   | 18.96   | 18.96  |
| 4.5  | 24        | 14.98   | 14.98   | 14.98  |



MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 24 GA)

WIDTH: 24 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S24L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 163.87  | 163.87  | 163.87 |
| 1.5  | 24        | 89.11   | 89.11   | 89.11  |
| 2    | 24        | 56.43   | 56.43   | 56.43  |
| 2.5  | 24        | 37.75   | 37.75   | 37.75  |
| 3    | 24        | 26.41   | 26.41   | 26.41  |
| 3.5  | 24        | 19.49   | 19.49   | 19.49  |
| 4    | 24        | 14.96   | 14.96   | 14.96  |
| 4.5  | 24        | 11.85   | 11.85   | 11.85  |

## MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 24 GA)

WIDTH: 24-IN.  
CONDITION: THREE SPAN  
LOADING: LIVE LOAD  
FILE NAME: L3S24L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 184.81  | 184.81  | 184.81 |
| 1.5  | 24        | 101.14  | 101.14  | 101.14 |
| 2    | 24        | 64.34   | 64.34   | 64.34  |
| 2.5  | 24        | 43.80   | 43.80   | 43.80  |
| 3    | 24        | 30.70   | 30.70   | 30.70  |
| 3.5  | 24        | 22.69   | 22.69   | 22.69  |
| 4    | 24        | 17.43   | 17.43   | 17.43  |
| 4.5  | 24        | 13.81   | 13.81   | 13.81  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 24 GA)

WIDTH: 24 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: WIND LOAD  
 FILE NAME W1S24L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 322.23  | 322.23  | 322.23 |
| 1.5  | 24        | 143.21  | 143.21  | 143.21 |
| 2    | 24        | 80.56   | 80.56   | 80.56  |
| 2.5  | 24        | 51.56   | 51.56   | 51.56  |
| 3    | 24        | 35.80   | 35.80   | 35.80  |
| 3.5  | 24        | 26.30   | 23.05   | 26.30  |
| 4    | 24        | 20.14   | 15.44   | 20.14  |
| 4.5  | 24        | 14.46   | 10.85   | 15.91  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 24 GA)

WIDTH: 24 IN.  
CONDITION: TWO SPAN  
LOADING: WIND LOAD  
FILE NAME: W2S24L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 217.95  | 217.95  | 217.95 |
| 1.5  | 24        | 118.52  | 118.52  | 118.52 |
| 2    | 24        | 75.05   | 75.05   | 75.05  |
| 2.5  | 24        | 50.32   | 50.32   | 50.32  |
| 3    | 24        | 35.20   | 35.20   | 35.20  |
| 3.5  | 24        | 25.98   | 25.98   | 25.98  |
| 4    | 24        | 19.95   | 19.95   | 19.95  |
| 4.5  | 24        | 15.79   | 15.79   | 15.79  |

## MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24"WIDE X 24 GA)

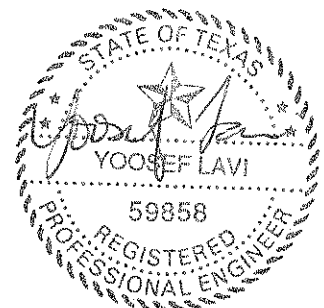
WIDTH: 24 IN.  
CONDITION: THREE SPAN  
LOADING: WIND LOAD  
FILE NAME: W3S24L24

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 24        | 269.72  | 269.72  | 269.72 |
| 1.5  | 24        | 151.01  | 151.01  | 151.01 |
| 2    | 24        | 97.62   | 97.62   | 97.62  |
| 2.5  | 24        | 68.62   | 68.62   | 68.62  |
| 3    | 24        | 50.75   | 50.75   | 50.75  |
| 3.5  | 24        | 37.61   | 37.61   | 37.61  |
| 4    | 24        | 28.96   | 28.96   | 28.96  |
| 4.5  | 24        | 22.98   | 22.05   | 22.98  |

**STRUCTURAL CALCULATIONS FOR:  
24" WIDE X 26 GA STEEL  
ZIMMERMAN METAL SL1500 ROOF PANEL**

Prepared For:  
**ZIMMERMAN METALS, INC.**  
201 E. 58TH Ave.  
Denver, Colorado 80216

Prepared By:  
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Consulting Engineer  
9550 Forest Lane, Suite 313  
Dallas, Texas 75243



9-30-96

pg 5 1-12

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 24"            | 1                      | 88         | 49  | 32  | 22  | 16  | 12  |
|                   |                | 2                      | 59         | 38  | 26  | 19  | 14  | 11  |
|                   |                | 3                      | 66         | 43  | 30  | 22  | 16  | 13  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. For full panel capacity, bearing must be checked using actual loads and bearing length.
7. Loads shown are limited by L/180 deflection.

3

ALLOWABLE LOAD TABLES FOR :  
ZIMMERMAN METAL SL1500 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

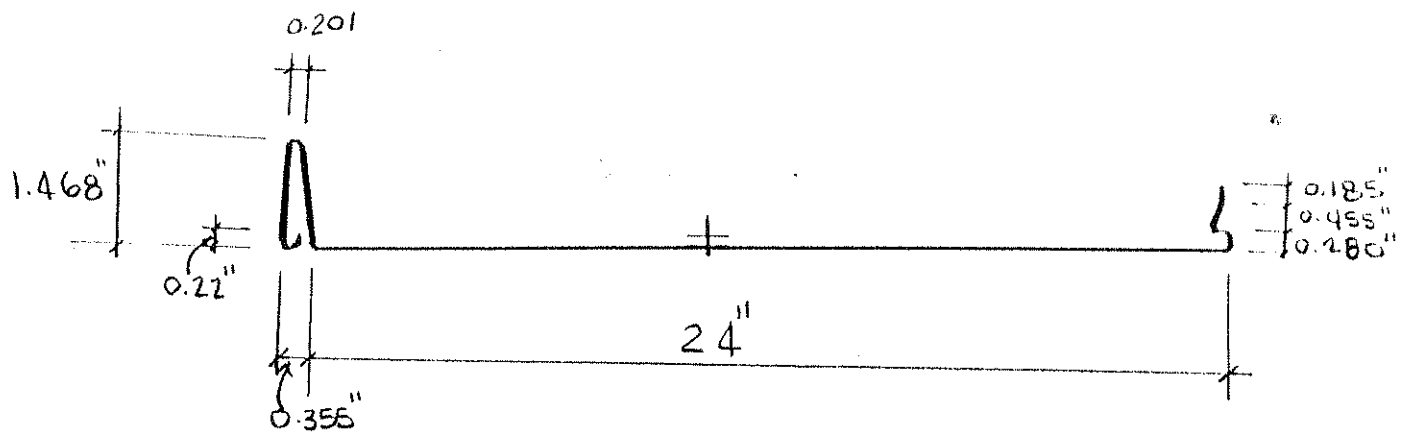
| PANEL<br>GAUGE    | PANEL<br>WIDTH | # OF<br>EQUAL<br>SPANS | SPAN (FT.) |     |     |     |     |     |
|-------------------|----------------|------------------------|------------|-----|-----|-----|-----|-----|
|                   |                |                        | 1.5        | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| 26<br>GA<br>STEEL | 24"            | 1                      | 104        | 58  | 37  | 26  | 19  | 14  |
|                   |                | 2                      | 82         | 53  | 38  | 28  | 21  | 16  |
|                   |                | 3                      | 93         | 61  | 43  | 32  | 24  | 19  |

NOTES:

1. All calculations for panel properties have been made in accordance with the 1986 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and steel institute.
2. Values for 3 or more spans are based on 4 equal spans.
3. These load capacities are for the panel itself. Frames purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.
4. Materials:  
FY = 40 ksi for steel panels
5. All loads are in PSF.
6. Above capacities have been increased by 33-1/3% as per AISI sec. A4.4.
7. For full panel capacity, bearing must be checked using actual loads and bearing length.
8. Loads shown are limited to L/180 deflection.
9. Clip testing must be conducted to verify that the capacity meets the loads indicated above.



## ZIMMERMAN METAL SL1500 ROOF PANEL



ALL INSIDE RAD. 0.06 U.N.O.

THICKNESS: 26 GA. (0.0179")

FY: 40 KSI

CFS Version 2.20

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9550 FOREST LANE, SUITE 313  
DALLAS, TEXAS 75243

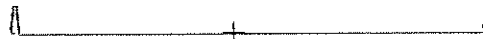
Section: 24SL1526  
Rev. Date 09-26-1996  
Rev. Time 17:21:00  
Rev. by YL  
Phone (214) 340-0049  
Fax (214) 340-0067

Section Input

|               |           |             |        |
|---------------|-----------|-------------|--------|
| Yield (Fy)    | 40.000    | Unit Weight | 3.4000 |
| Ultimate (Fu) | 55.000    | One Inch =  | 1.0000 |
| Modulus (E)   | 29500.000 | Cw Override | 0.0000 |
|               |           | J Override  | 0.0000 |

Part 1 Thickness 0.0179 26 GAGE X=0.000, Y=0.000

| Length | Angle   | Radius | Web | k    | Hole Distance |
|--------|---------|--------|-----|------|---------------|
| 0.185  | 270.000 | 0.0600 | No  | 0.00 | 0.000 0.093   |
| 0.455  | 250.000 | 0.0600 | No  | 0.00 | 0.000 0.228   |
| 0.288  | 0.000   | 0.0600 | No  | 0.00 | 0.000 0.144   |
| 0.280  | 270.000 | 0.0600 | Sgl | 0.00 | 0.000 0.140   |
| 24.000 | 180.000 | 0.0600 | No  | 0.00 | 0.000 12.000  |
| 1.468  | 95.000  | 0.0600 | Sgl | 0.00 | 0.000 0.734   |
| 0.183  | 180.000 | 0.0600 | No  | 0.00 | 0.000 0.091   |
| 1.468  | 265.000 | 0.0600 | No  | 0.00 | 0.000 0.734   |
| 0.220  | 20.000  | 0.0600 | No  | 0.00 | 0.000 0.110   |



Full Section Properties

|       |         |      |         |       |           |
|-------|---------|------|---------|-------|-----------|
| Area  | 0.5035  | Wt.  | 1.7120  | Width | 28.1309   |
| Ix    | 0.0401  | rx   | 0.2822  | Ixy   | -0.3624   |
| Sx(t) | 0.0295  | y(t) | 1.3589  | Alpha | 89.3308   |
| Sx(b) | 0.3815  | y(b) | 0.1051  |       |           |
| Iy    | 31.0640 | ry   | 7.8543  | Xo    | -7.9193   |
| Sy(l) | 2.7034  | x(l) | 11.4909 | Yo    | -0.2023   |
| Sy(r) | 2.4044  | x(r) | 12.9198 | jx    | 8.1604    |
|       |         |      |         | jy    | 43.6820   |
| I1    | 31.0682 | r1   | 7.8549  |       |           |
| I2    | 0.0359  | r2   | 0.2669  |       |           |
| Ic    | 31.1041 | rc   | 7.8594  | Cw    | 1.7758    |
| Io    | 62.7042 | ro   | 11.1591 | J     | 0.0000538 |

CFS Version 2.20

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Section: 24SL1526  
 Rev. Date 09-26-1996  
 Rev. Time 17:21:00  
 Rev. by YL  
 Phone (214) 340-0049  
 Fax (214) 340-0067

## Fully Braced Allowables

|             |         |                 |                 |
|-------------|---------|-----------------|-----------------|
| Compression |         | Positive Moment | Positive Moment |
| Pao         | 1.4300  | Maxo            | 0.5916          |
| Ae          | 0.0685  | Ixe             | 0.0339          |
|             |         | Sxe(t)          | 0.0246          |
|             |         | Sxe(b)          | 0.3761          |
| Tension     |         |                 |                 |
| Ta          | 12.2110 |                 |                 |
|             |         | Negative Moment | Negative Moment |
|             |         | Maxo            | 0.5258          |
|             |         | Ixe             | 0.0212          |
|             |         | Sxe(t)          | 0.0219          |
|             |         | Sxe(b)          | 0.0430          |
| Shear       |         |                 |                 |
| Vay         | 0.3332  |                 |                 |
| Vax         | 0.0266  |                 |                 |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 26 GA)

|            |             |
|------------|-------------|
| WIDTH:     | 24 IN.      |
| CONDITION: | SINGLE SPAN |
| LOADING:   | LIVE LOAD   |
| FILE NAME  | L1S24L26    |

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 197.20  | 197.20  | 197.20 |
| 1.5  | 26        | 87.64   | 87.64   | 87.64  |
| 2    | 26        | 49.30   | 49.30   | 49.30  |
| 2.5  | 26        | 31.55   | 31.55   | 31.55  |
| 3    | 26        | 21.91   | 21.91   | 21.91  |
| 3.5  | 26        | 16.10   | 16.10   | 16.10  |
| 4    | 26        | 12.33   | 12.33   | 12.33  |
| 4.5  | 26        | 9.74    | 9.74    | 9.74   |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 26 GA)

WIDTH: 24 IN.  
 CONDITION: TWO SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L2S24L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 105.60  | 105.60  | 105.60 |
| 1.5  | 26        | 58.63   | 58.63   | 58.63  |
| 2    | 26        | 37.67   | 37.67   | 37.67  |
| 2.5  | 26        | 26.36   | 26.36   | 26.36  |
| 3    | 26        | 19.02   | 19.02   | 19.02  |
| 3.5  | 26        | 14.06   | 14.06   | 14.06  |
| 4    | 26        | 10.81   | 10.81   | 10.81  |
| 4.5  | 26        | 8.56    | 8.56    | 8.56   |

MAXIMUM ALLOW. LIVE LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 26 GA)

WIDTH: 24 IN.  
 CONDITION: THREE SPAN  
 LOADING: LIVE LOAD  
 FILE NAME: L3S24L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 118.72  | 118.72  | 118.72 |
| 1.5  | 26        | 66.33   | 66.33   | 66.33  |
| 2    | 26        | 42.81   | 42.81   | 42.81  |
| 2.5  | 26        | 30.06   | 30.06   | 30.06  |
| 3    | 26        | 22.08   | 22.08   | 22.08  |
| 3.5  | 26        | 16.35   | 16.35   | 16.35  |
| 4    | 26        | 12.58   | 12.58   | 12.58  |
| 4.5  | 26        | 9.97    | 9.97    | 9.97   |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 26 GA)

WIDTH: 24 IN.  
 CONDITION: SINGLE SPAN  
 LOADING: WIND LOAD  
 FILE NAME W1S24L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 233.63  | 233.63  | 233.63 |
| 1.5  | 26        | 103.84  | 103.84  | 103.84 |
| 2    | 26        | 58.41   | 58.41   | 58.41  |
| 2.5  | 26        | 37.38   | 37.38   | 37.38  |
| 3    | 26        | 25.96   | 25.36   | 25.96  |
| 3.5  | 26        | 19.07   | 15.97   | 19.07  |
| 4    | 26        | 14.27   | 10.70   | 14.60  |
| 4.5  | 26        | 10.02   | 7.51    | 11.54  |

MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24" WIDE X 26 GA)

WIDTH: 24 IN.  
CONDITION: TWO SPAN  
LOADING: WIND LOAD  
FILE NAME: W2S24L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 147.02  | 147.02  | 147.02 |
| 1.5  | 26        | 82.58   | 82.58   | 82.58  |
| 2    | 26        | 53.51   | 53.51   | 53.51  |
| 2.5  | 26        | 37.68   | 37.68   | 37.68  |
| 3    | 26        | 28.05   | 28.05   | 28.05  |
| 3.5  | 26        | 20.99   | 20.99   | 20.99  |
| 4    | 26        | 16.15   | 16.15   | 16.15  |
| 4.5  | 26        | 12.81   | 12.81   | 12.81  |



MAXIMUM ALLOW. WIND LOAD IN PSF FOR ZIMMERMAN SL1500 (24"WIDE X 26 GA)

WIDTH: 24 IN.  
 CONDITION: THREE SPAN  
 LOADING: WIND LOAD  
 FILE NAME: W3S24L26

| SPAN | THICKNESS | DEFL.   | DEFL.   | STRESS |
|------|-----------|---------|---------|--------|
| FEET | GA        | (L/180) | (L/240) |        |
| 1    | 26        | 164.99  | 164.99  | 164.99 |
| 1.5  | 26        | 93.26   | 93.26   | 93.26  |
| 2    | 26        | 60.70   | 60.70   | 60.70  |
| 2.5  | 26        | 42.90   | 42.90   | 42.90  |
| 3    | 26        | 32.01   | 32.01   | 32.01  |
| 3.5  | 26        | 24.38   | 24.38   | 24.38  |
| 4    | 26        | 18.78   | 18.78   | 18.78  |
| 4.5  | 26        | 14.91   | 14.91   | 14.91  |