THIRD ANGLE PROJECTION

IIIHS SIDE IMPACT CART

WEIGHT: 1900 KG

SCALE: 1:48

DIMENSIONS:

UNLESS OTHERWISE SPECIFIED:

MATERIAL

N/A

DO NOT SCALE DRAWING

DESIGN/ENGR

C. O'BRIEN 2/2020

DRAWN

W. SPIVEY 9/2020

CHECKED

R. JONES 9/2020

COMMENTS:

Insurance Institute for Highway Safety

988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

9/2020
### Exploded View

**Scale:** 1:24

**Comments:**

**Material:**

1. **Z CHANNEL**
2. **Z CHANNEL**
3. **LOWER CONTROL ARM FRAME MOUNT ASSEMBLY, R REAR, L FRT**
4. **LOWER CONTROL ARM FRAME MOUNT ASSEMBLY, L REAR, R FRT**
5. **BARRIER STANCHION, LEFT**
6. **BARRIER STANCHION, RIGHT**
7. **REAR UPPER CROSSMEMBER**
8. **CHASSIS CROSSMEMBER SQUARE**
9. **CHASSIS CROSSMEMBER NOTCHED**
10. **CHASSIS CROSSMEMBER NOTCHED SHORT LEG**
11. **GREENHOUSE FRONT TAB**
12. **GREENHOUSE FRONT TAB**
13. **GREENHOUSE REAR TAB**
14. **GREENHOUSE TUBING, RIGHT**
15. **GREENHOUSE TUBING, LEFT**
16. **FRONT CAM PLATE CROSSMEMBER**
17. **REAR CAM PLATE CROSSMEMBER**
18. **CAMERA MOUNT PLATE**
19. **BARRIER STANCHION FILLER PLATE**
20. **UPPER FLANGE REINFORCEMENT**
21. **LOWER BARRIER STANCHION GUSSET**
22. **FLOOR PAN ASSEMBLY**
23. **AXLE HOLE LWR CHANNEL REINFORCEMENT**
24. **UPPER CONTROL ARM FRAME MOUNT, R REAR, L FRT**
25. **UPPER CONTROL ARM FRAME MOUNT, L REAR, R FRT**

**Drawn by:** W. SPIVEY
**Checked by:** R. JONES

---

**Third Angle Projection**

**Insurance Institute for Highway Safety**
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

**Weldments**

**Sheet 4 of 63**
THIRD ANGLE PROJECTION

SCALE 1:32

45.00°

CUT AFTER BENDING

2X φ .750 [19.05] THRU ALL

36X φ .625 [15.88] THRU ALL

SCALE 1:20

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS:
INCHES [MILLIMETERS]

A4

Drawing:
Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

LEFT Z-CHANNEL

SCALE: VARIES
WEIGHT: 197 KG
SHEET 6 of 63
ALL CROSSMEMBERS WELDED ALL AROUND AT CONNECTION TO Z-CHANNELS

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

DRAWING NOT FOR PRODUCTION USE
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
CHASSIS CROSSMEMBER SQUARE
ASTM A36
SCALE: 1:8
WEIGHT: 20 KG

FROM 5X3.5X.5 ANGLE
DRAWING NOT FOR PRODUCTION USE

DIMENSIONS:

1047.75 [41.250]
12.70 [.500]
88.90 [3.500]
127 [5.000]

UNLESS OTHERWISE SPECIFIED:
MATERIAL: ASTM A36

DESIGN/ENGR: C. O'BRIEN 2/2020
DRAWN: W. SPIVEY 9/2020
CHECKED: R. JONES 9/2020

COMMENT:

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

SHEET 8 of 63
THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

CHASSIS CROSSMEMBER
NOTCHED SHORT LEG

ASTM A36

SCALE: 1:8
WEIGHT: 17 KG
SHEET 9 of 63

FROM 5X3.5X.5 ANGLE

DRAWING NOT FOR PRODUCTION USE

DIMENSIONS:
INCHES [MILLIMETERS]

A4

UNLESS OTHERWISE SPECIFIED:
MATERIAL
ASTM A36

DESIGN/ENGR
C. O'BRIEN
2/2020

DRAWN
W. SPIVEY
9/2020

CHECKED
R. JONES
9/2020

COMMENTS:

99.21
3.906

[127] 5.000

2X Ø 1.000 [25.40] THRU

[244.48] 9.625

[558.80] 22.000

[920.75] 36.250

1047.75
41.250

[12.70] .500

[88.90] 3.500

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

WEIGHT: 17 KG
FROM 5X3.5X.5 ANGLE

CHASSIS CROSSMEMBER
NOTCHED

DRAWING NOT FOR PRODUCTION USE
THIRD ANGLE PROJECTION

WEIGHT: 26 kg

DIMENSIONS:

INCHES [MILLIMETERS]

10X ø .563[14.29] THRU ALL

FROM 5X3.5X.5 ANGLE

DO NOT SCALE DRAWING

REAR UPPER CROSSMEMBER

SCALE: 1:24

DESIGN/ENGR: C. O'BRIEN
DRAWN: W. SPIVEY
CHECKED: R. JONES

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

UNLESS OTHERWISE SPECIFIED:

MATERIAL
ASTM A36

DO NOT SCALE DRAWING
DRAWING NOT FOR PRODUCTION USE

$[112.71]$ \[4.438\]
$[793.75]$ \[31.250\]

\[\phi \ 0.625" \ [15.88]\] ROD WELDED ALONG CENTER BACK OF FLOOR PAN

$3.364$

$24 \times \phi \ 0.563[14.29] \text{THRU}$

$1019.18$

$793.75$

$31.250$

$[1828.80] \ [72.000]$
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
BARRIER STANCHION ASSEMBLY
WEIGHT: 30 KG
SCALE: 1:24

<table>
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<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>PAGE NUMBER</th>
<th>QTY.</th>
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<td>1</td>
<td>BARRIER STANCHION TUBE</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>BARRIER STANCHION END CAP</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>BARRIER STANCHION BOTTOM PLATE</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>BARRIER STANCHION HOLE REINFORCEMENT</td>
<td>18</td>
<td>1</td>
</tr>
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</table>

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

DESIGN/ENGR: C. O'BRIEN
DRAWN: W. SPIVEY
CHECKED: R. JONES
DATE: 2/2020

DIMENSIONS:
INCHES [MILLIMETERS]

DRAWING NOT FOR PRODUCTION USE

12X 3/4-16 THRU AFTER ASSEMBLY
WELD
PLUG WELD
WELD
SECTION A-A
SCALE 1:10

UNLESS OTHERWISE SPECIFIED:
MATERIAL: N/A

DO NOT SCALE DRAWING
FROM 5 X 5 X .375 TUBE

DRAWING NOT FOR PRODUCTION USE

THIRD ANGLE PROJECTION

DIMENSIONS: INCHES [MILLIMETERS]

UNLESS OTHERWISE SPECIFIED:
MATERIAL: ASTM A500

DO NOT SCALE DRAWING

Insurance Institute for Highway Safety
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BARRIER STANCHION TUBE

SCALE: 1:16 | WEIGHT: 24 KG | SHEET 16 of 63
BARRIER STANCHION END CAP

UNLESS OTHERWISE SPECIFIED:
MATERIAL: ASTM A500

DIMENSIONS:

INCHES [MILLIMETERS]

- 38.10 [1.500]
- 20.64 [.813]
- 19.05 [.750]
- 127 [5000]
- 9.53 [.375]
- 3.18 [1.25]

DRAWING NOT FOR PRODUCTION USE

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988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

DESIGN/ENGR: C. O'BRIEN  2/2020
DRAWN: W. SPIVEY  9/2020
CHECKED: R. JONES  9/2020

SCALE: 1:2  WEIGHT: 1.5 KG  SHEET 17 of 63
BARRIER STANCHION
HOLE REINFORCEMENT

DIMENSIONS:

INCHES [MILLIMETERS]

A4

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

MATERIAL

ASTM A36

UNLESS OTHERWISE SPECIFIED:

INSURANCE INSTITUTE FOR HIGHWAY SAFETY

988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

DESIGN/ENG: C. O'BRIEN  2/2020

CHECKED: R. JONES  9/2020

DRAWN: W. SPIVEY  9/2020

WEIGHT: 3.8 KG  SHEET 18 of 63

SCALE: 1:8

DO NOT SCALE DRAWING

DRAWING NOT FOR PRODUCTION USE

12X Ø .688 [17.46] THRU

12X Ø .688 [17.46] THRU

[19.05] .750

[38.10] 1.500

[744.54] 29.313

[29.313]
**THIRD ANGLE PROJECTION**

**BARRIER STANCHION BOTTOM PLATE**

**DIMENSIONS:**
- **INCHES** [MILLIMETERS]
  - 19.05 [48.42]
  - 38.10 [96.83]
  - 13.49 [34.26]
  - 82.55 [209.69]
  - 1.500 [3.81]
  - 4.250 [10.79]
  - 0.531 [1.35]

**MATERIAL**
- ASTM A36

**UNLESS OTHERWISE SPECIFIED:**
- 2X 3/8-16 UNC TAPPED HOLE

**DRAWN**
- W. SPIVEY 9/2020

**CHECKED**
- R. JONES 9/2020

**NAME**
- C. O’BRIEN

**DATE**
- 2/2020

**SCALE:** 1:2

**WEIGHT:** 0.4 KG

**SHEET:** 19 of 63

**Insurance Institute for Highway Safety**
- 988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600
<table>
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<tr>
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<th>QTY.</th>
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<td>Z CHANNEL</td>
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<td>1</td>
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<tr>
<td>2</td>
<td>BARRIER STANCHION</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>UPPER FLANGE REINFORCEMENT</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>LOWER BARRIER STANCHION GUSSET</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>LOWER AXLE HOLE REINFORCEMENT</td>
<td>22</td>
<td>2</td>
</tr>
</tbody>
</table>

WELD ALL AROUND
ALIGN HOLES CONCENTRIC

DRAWING NOT FOR PRODUCTION USE
DRAWING NOT FOR PRODUCTION USE

WELD ALONG TANGENT EDGES OF HOLES

WELD ALONG TANGENT EDGES OF HOLES

---

**ITEM NO.** | **PART NUMBER** | **PAGE NUMBER** | **QTY.**
---|---|---|---
1 | LOWER AXLE HOLE REINFORCEMENT CHANNEL | 23 | 1
2 | RIB | 24 | 2

---

DIMENSIONS:

INCHES [MILLIMETERS]

---

MATERIAL

UNLESS OTHERWISE SPECIFIED:

N/A

---

DESIGN/ENG. | NAME | DATE
---|---|---
C. O'BRIEN | 2/2020
W. SPIVEY | 9/2020
R. JONES | 9/2020

CHECKED

COMMENTS:

---

WEIGHT: 9 KG

SCALE: 1:8

SHEET 22 of 63

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

LOWER AXLE HOLE REINFORCEMENT ASSEMBLY
THIRD ANGLE PROJECTION

FROM C4X7.25 CHANNEL

4X Ø .563 [14.29] THRU ALL

DIMENSIONS:

[101.60] 4.000
[50.80] 2.000
[18.60] 4.669
[271] 10.669
[423.40] 16.669
[575.80] 22.669
[694.40] 27.338

DO NOT SCALE DRAWING

WEIGHT: 7 KG

DESIGN/ENG: C. O'BRIEN 2/2020
DRAWN: W. SPIVEY 9/2020
CHECKED: R. JONES 9/2020

LOWER AXLE HOLE REINFORCEMENT CHANNEL

UNLESS OTHERWISE SPECIFIED: ASTM A36

DIMENSIONS: INCHES [MILLIMETERS]

Insurance Institute for Highway Safety
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SHEET 23 of 63
THIRD ANGLE PROJECTION

2X 17.45°

[457.28] 18.003

[35.56] 1.400

[667.11] 26.264

[6.35] .250

LOWER AXLE HOLE
REINFORCEMENT RIB

UNLESS OTHERWISE SPECIFIED:

MATERIAL
ASTM A36

DIMENSIONS:

INCHES [MILLIMETERS]

667.11 26.264

457.28 18.003

35.56 1.400

6.35 .250

NAME
C. O'BRIEN

DATE
9/2020

CHECKED
R. JONES

9/2020

DESCRIPTION
LOWER AXLE HOLE
REINFORCEMENT RIB

DO NOT SCALE DRAWING

DESIGN/ENGR
W. SPIVEY

2/2020

WEIGHT: 1 KG

SHEET 24 of 63

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

Scale: 1:8
THIRD ANGLE PROJECTION

DIMENSIONS: INCHES [MILLIMETERS]

ITEM NO. | PART NUMBER | PAGE NUMBER | QTY.
--- | --- | --- | ---
1 | Z CHANNEL | N/A | 2
2 | LOWER CONTROL ARM FRAME MOUNT | 28 | 4

RIGHT OUTSIDE CHANNEL SHOWN, LEFT SIMILAR

DRAWING NOT FOR PRODUCTION USE

DO NOT SCALE DRAWING

Insurance Institute for Highway Safety
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DESIGN/ENGR: C. O'BRIEN 2/2020
CHECKED: R. JONES 9/2020
DRAWN: W. SPIVEY 9/2020

LOWER CONTROL ARM MOUNT PLACEMENT

SCALE: 1:48  WEIGHT: N/A  SHEET 27 of 63
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
LOWER CONTROL ARM FRAME MOUNT ASSEMBLY
WEIGHT: 0.8 KG
SCALE: 1:2
DIMENSIONS:
INCHES [MILLIMETERS]

WELDED AROUND OUTSIDE

RIGHT REAR, LEFT FRONT SHOWN, LEFT REAR, RIGHT FRONT OPPOSITE

SEE VENDOR LIST PAGE 62 FOR SUPPLIERS. PART DETAILED FOR PRODUCTION.

DRAWING NOT FOR PRODUCTION USE

QUESTIONS? CONTACT THE DESIGN ENGINEER.
**LEFT INSIDE CHANNEL SHOWN, RIGHT SIDE SIMILAR**

**DRAWING NOT FOR PRODUCTION USE**

---

### Upper Control Arm Placement

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>PAGE NUMBER</th>
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<tr>
<td>1</td>
<td>Z CHANNEL</td>
<td>5, 6</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>UPPER CONTROL ARM FRAME MOUNT</td>
<td>32</td>
<td>4</td>
</tr>
</tbody>
</table>

---

**DIMENSIONS:**

- **INCHES [MILLIMETERS]**
  - 2847.96 [112.124]
  - 897.02 [35.316]
  - 2708.02 [106.615]
  - 240.81 [9.481]
  - 1036.95 [40.825]

---

**Insurance Institute for Highway Safety**

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**DESIGN/ENGR:** C. O'BRIEN

**DRAWN:** W. SPIVEY

**CHECKED:** R. JONES

**DATE:**

- 2/2020
- 9/2020
- 9/2020

---

**UNLESS OTHERWISE SPECIFIED:**

- MATERIAL: N/A

---

**SCALE:** 1:8

**WEIGHT:** N/A

**SHEET:** 31 of 63
UPPER CONTROL ARM FRAME MOUNT

DIMENSIONS: INCHES [MILLIMETERS]

LEFT REAR, FRONT RIGHT SHOWN
RIGHT REAR, FRONT LEFT SIMILAR

SEE VENDOR LIST PAGE 62 FOR SUPPLIERS. PART DETAILED FOR PRODUCTION.

DRAWING NOT FOR PRODUCTION USE

THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING

WEIGHT: 0.4 KG
SHEET 32 of 63

 scales: 1:2

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

DESIGN/ENGR
C. O'BRIEN
DATE
2/2020

CHECKED
R. JONES
DATE
9/2020

MATERIAL
AISI C1018

UNLESS OTHERWISE SPECIFIED:

NOT FOR PRODUCTION USE

DO NOT SCALE DRAWING
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<th>PAGE NUMBER</th>
<th>QTY.</th>
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<tr>
<td>1</td>
<td>3500# 4&quot; DROP 66&quot; HUB-HUB AXLE ASSEMBLY W/ DISC BRAKES</td>
<td>63</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>LOWER SHOCK MOUNT ASSEMBLY</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>UPPER CONTROL ARM TAB</td>
<td>35</td>
<td>4</td>
</tr>
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</table>
RECOMMEND ATTACHING CONTROL ARM TABS IN-SITU WITH CONTROL ARMS ATTACHED RESPECTIVE ENDS

CONTROL ARM TAB

SECTION E-E

SECTION H-H

LOWER SHOCK MOUNT

DIMENSIONS:

INCHES [MILLIMETERS]

[618.41] 24.347
[563.59] 22.188
[557.51] 21.949
[608.19] 23.945

37.21°

[76.20] 3.000°

[15.88] .625
THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

UPPER CONTROL ARM TAB

DIMENSIONS:

INCHES [MILLIMETERS]

A4

UNLESS OTHERWISE SPECIFIED:

MATERIAL: AISI C1018

WEIGHT: 0.08 KG

DRAWING NOT FOR PRODUCTION USE

DIMENSIONS: 1:1

DO NOT SCALE DRAWING

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DESIGN/ENGR
C. O'BRIEN 2/2020
R. JONES 9/2020

DRAWN
W. SPIVEY 9/2020

CHECKED
R. JONES 9/2020

COMMENTS:

© Insurance Institute for Highway Safety 2020

Sheet 35 of 63
WELD ALL AROUND

DO NOT WELD THIS FACE

DRAWING NOT FOR PRODUCTION USE

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>PAGE NO.</th>
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<tbody>
<tr>
<td>1</td>
<td>LOWER SHOCK MOUNT PLATE</td>
<td>37</td>
<td>1</td>
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<tr>
<td>2</td>
<td>HEX BOLT 5/8-11X4.5</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>MOD HEX BOLT 5/8-11X5.5 CUT OFF HEX HEAD</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>SHOCK SPACER</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>ROD END SPACER</td>
<td>38</td>
<td>1</td>
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</table>
THIRD ANGLE PROJECTION

ASTM A36

DIMENSIONS:

FROM .75" PLATE

DRAWING NOT FOR PRODUCTION USE

3.60°

LOWER SHOCK MOUNT PLATE

WEIGHT: 1.2 KG SHEET 37 of 63
TYP IIHS TEST POSITION

**ITEM NO.** | **PART NUMBER** | **PAGE NUMBER** | **QTY.**
--- | --- | --- | ---
1 | BARRIER STANCHION | 15 | 1
2 | BARRIER BACKING PLATE | 40 | 1
3 | SCHSCREW 0.75-16X1.5X1.5-HX-N | 8 |
4 | REGULAR FW 0.375 | 28 |
5 | HBOLT 0.375-16X2X1-N | 14 |
6 | HNUT 0.375-16-D-N | 14 |
7 | BARRIER CLAMP BAR | 43 | 2
8 | DEFORMABLE BARRIER |  | 1

BARRIER BACKING PLATE HEIGHT ADJUSTABLE IN 2" INCREMENTS, FLIP FOR 1" INCREMENT

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**FRONT BARRIER ASSEMBLY**

**SCALE:** 1:15  **WEIGHT:** 238 KG  **SHEET** 39 of 63
<table>
<thead>
<tr>
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<tr>
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<td>BARRIER BACKING PLATE</td>
<td>40</td>
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</tr>
<tr>
<td>2</td>
<td>BACKING PLATE RIB</td>
<td>41</td>
<td>2</td>
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</tbody>
</table>

WELDED ALONG LEGS OF C-CHANNEL TO BARRIER BACKING PLATE

ITEM NO. | PART NUMBER      | PAGE NUMBER |
1        | BARRIER BACKING PLATE | 40          |
2        | BACKING PLATE RIB   | 41          |

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

BARRIER MOUNTING PLATE RIB PLACEMENT

DIMENSIONS:

INCHES [MILLIMETERS]

[64.25] 2.530
[302.31] 11.902
[483.35] 19.030

DRAWING NOT FOR PRODUCTION USE
THIRD ANGLE PROJECTION

8X φ .781  [19.84] THRU ALL


DIMENSIONS:

INCHES [MILLIMETERS]

A4

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

BARRIER MOUNTING PLATE

SCALE: 1:12  WEIGHT: 176 KG  SHEET 41 of 63

MATERIAL

ASTM A36

UNLESS OTHERWISE SPECIFIED:

X: C. O’BRIEN
D: W. SPIVEY
C: R. JONES

DATE

2/2020
9/2020
9/2020

NAME

DESIGN/ENG

DRAWN

CHECKED

COMMENTS:

DO NOT SCALE DRAWING

DRAWING NOT FOR PRODUCTION USE
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<th>PART NUMBER</th>
<th>PAGE NUMBER</th>
<th>QTY.</th>
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<td>1</td>
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<td>GREENHOUSE REAR TAB</td>
<td>47</td>
<td>1</td>
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<td>3</td>
<td>GREENHOUSE TUBING LEFT</td>
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<td>1</td>
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<td>4</td>
<td>GREENHOUSE TUBING, RIGHT</td>
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<td>5</td>
<td>FRT CAM PLATE CROSSMEMBER</td>
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<td>1</td>
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<td>REAR CAM PLATE CROSSMEMBER</td>
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<td>HBOLT 0.3125-18X1X0.875-N</td>
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<td>LEFT SIGN PLATE</td>
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<tr>
<td>10</td>
<td>RIGHT SIGN PLATE</td>
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<td>1</td>
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</table>

**Insurance Institute for Highway Safety**
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

**GREENHOUSE ASSEMBLY**

**Scale:** 1:12  **Weight:** 42 KG  **Sheet:** 44 of 63
THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

GREENHOUSE REAR TAB

AISI 1018

SCALE: 1:2
WEIGHT: 0.6 KG

DIMENSIONS:

INCHES [MILLIMETERS]

101.60 [257.00] 4.000
25.40 [1.000]

76.20 [3.000]
9.53 [.375]

.422 [10.72] THRU ALL
1/2-13 UNC THRU ALL

UNLESS OTHERWISE SPECIFIED:

MATERIAL

AISI 1018

DESIGN/ENGR
C. O'BRIEN 2/2020

DRAWN
W. SPIVEY 9/2020

CHECKED
R. JONES 9/2020

DO NOT SCALE DRAWING

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

GREENHOUSE REAR

TAB

SHEET 47 of 63

DRAWING NOT FOR PRODUCTION USE
THIRD ANGLE PROJECTION

48.70°
13.39°

DO NOT SCALE DRAWING

SIGN PLATE
16 GA ASTM A653

SCALE: 1:8
WEIGHT: 0.1 KG
SHEET 49 of 63

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

DESIGN/ENG: C. OBREIN
DRAWN: W. SPIVEY
CHECKED: R. JONES

DIMENSIONS:

INCHES [MILLIMETERS]

[958.08] 37.720
[782.71] 30.815
[330.20] 13.000
[18.98] .747
[17.84] .702
[41.28] 1.625
[206.08] 8.114
[12.70] .500
[3.57]

4X R.141 THRU

UNLESS OTHERWISE SPECIFIED:
MATERIAL
16 GA ASTM A653

RIGHT SIDE SHOWN
LEFT SIDE SIMILAR

DRAWING NOT
FOR PRODUCTION USE

DO NOT SCALE DRAWING

NAME
C. OBREIN
DATE
2/2020

NAME
W. SPIVEY
DATE
9/2020

NAME
R. JONES
DATE
9/2020

Comments:
ENTIRE CART CG AND MOMENTS AS MEASURED BEHIND AND ABOVE FRONT AXLE AT TIRE CONTACT POINT WITH GROUND

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<th>ITEM NO.</th>
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<th>PAGE NUMBER</th>
<th>QTY.</th>
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<td>1</td>
<td>BALLAST PLATE FRONT</td>
<td>58</td>
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<tr>
<td>2</td>
<td>BALLAST PLATE REAR</td>
<td>59</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>BALLAST WEIGHT STACK</td>
<td>51</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Z CHANNEL</td>
<td>5, 6</td>
<td>2</td>
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CGX (MM) | CGY (MM) | CGZ (MM) | IXX (KG/M²) | IYY (KG/M²) | IZZ (KG/M²) |
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UNLESS OTHERWISE SPECIFIED:

DIMENSIONS: INCHES [MILLIMETERS]  X MATERIAL N/A

DESIGN/ENG: C. O'BRIEN  DATE: 2/2020
DRAWN: W. SPIVEY  9/2020
CHECKED: R. JONES  9/2020
COMMENTS:

DO NOT SCALE DRAWING

DRAWING NOT FOR PRODUCTION USE
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<td>20 KG PLATE</td>
<td>52</td>
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<td>10.1 KG PLATE</td>
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<td>4</td>
<td>8.1 KG PLATE</td>
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<td>5</td>
<td>1&quot;-5 X 7.25&quot; ACME THREADED ROD</td>
<td>54</td>
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<tr>
<td>7</td>
<td>FLAT WASHER 1&quot;</td>
<td></td>
<td>2</td>
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<tr>
<td>8</td>
<td>HNUT 1.0000-5 ACME</td>
<td></td>
<td>2</td>
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<tr>
<td>6</td>
<td>SCHCSCREW 0.5-13X2.5X1.5-HX-N</td>
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<td>4</td>
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</table>

**DIMENSIONS:**

**INCHES [MILLIMETERS]**

**DRAWING NOT FOR PRODUCTION USE**

**UNLESS OTHERWISE SPECIFIED: MATERIAL: N/A**

**DESIGN/ENG: C. O’BRIEN 2/2020**

**DRAWN: W. SPIVEY 9/2020**

**CHECKED: R. JONES 9/2020**

**COMMENTS:**

**DO NOT SCALE DRAWING**

**Insurance Institute for Highway Safety**

988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

**BALLAST WEIGHT STACK**

**SCALE: 1:8  WEIGHT: 79 KG  SHEET 51 of 63**
Ballast Plate Base

T-Angle Projection

Dimensions: Inches [Millimeters]

- 4x Ø .594 [15.08] Thru All
- √ Ø .938 [23.83] x 82°
- 2x Ø .875 [22.23] Thru All
- 1-5 Acme Thru All

Material: HR A36

Design/Engr: C. O'Brien
Drawn: W. Spivey
Checked: R. Jones

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

Scale: 1:8
Weight: 20 KG
Sheet 52 of 63

NOT FOR PRODUCTION USE
**THIRD ANGLE PROJECTION**

**DO NOT SCALE DRAWING**

**BALLAST PLATE 20KG**

**Material:** HR A36

**Scale:** 1:8

**Weight:** 20 KG

**Insurance Institute for Highway Safety**

988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

---

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<th>PAGE NUMBER</th>
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<td>BALLAST PLATE</td>
<td>56</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>HANDLES LONG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dimensions:**

- 2X $\phi 1.125$ [28.58] THRU ALL
- [152.40] 6.000
- [76.20] 3.000
- 4.719
- 16.719
- 21.438
- [31.75] 1.250
- [6.35] .250
- [544.51] 21.438

**Comments:**

- UNLESS OTHERWISE SPECIFIED:
- DRAWN: W. SPIVEY 9/2020
- CHECKED: R. JONES 9/2020
- COMMENTS:

**BEVEL TOP EDGE OF PLATE, WELD PLATE HANDLES TOP AND BOTTOM**

**DRAWING NOT FOR PRODUCTION USE**
BEVEL TOP EDGE OF PLATE, WELD PLATE HANDLES TOP AND BOTTOM

BALLAST PLATE 10.1KG
BEVEL TOP EDGE OF PLATE, WELD PLATE HANDLES TOP AND BOTTOM

ITEM NO. | PART NUMBER | PAGE NUMBER | QTY.
--- | --- | --- | ---
2 | BALLAST PLATE HANDLE SHORT | 57 | 2
THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

BALLAST PLATE

HANDLES SHORT

ASTM A36

SCALE: 1:1

WEIGHT: 0.11 KG

COMMENTS:

MATERIAL

UNLESS OTHERWISE SPECIFIED:

SHEET 57 of 63

DESIGN/ENGR

CHECKED

DRAWN

W. SPIVEY

R. JONES

DATE

NAME

2/2020

9/2020

9/2020

988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

Insurance Institute for Highway Safety

DRAWING NOT FOR PRODUCTION USE

DIMENSIONS: INCHES [MILLIMETERS]

25.40 [645.00]

12.70 [322.00]

3.18 [.0125]

1.000 [25.40]

5.000 [127.00]

2X R.500

[3.18] .500

[3.18] .125
BALLAST PLATE REAR

Material: ASTM A36

Dimensions:
- 29X Ø.563 [14.29] THRU ALL
- Ø.422 [10.72] THRU ALL
- 1/2-13 UNC THRU ALL

Insurance Institute for Highway Safety
988 Dairy Rd, Ruckersville, VA 22968 (434) 985-4600

Drawing Not For Production Use

Scale: 1:16
Weight: 181.5 KG
Sheet 59 of 63
### PARTS LIST

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<tr>
<th>PART NUMBER</th>
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<td>1</td>
<td>245/70R-17 TIRE AND WHEEL</td>
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<td>SHOCK UPPER SPACER MOUNT</td>
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<tr>
<td>3</td>
<td>3500# 4&quot; DROP 66&quot; HUB-HUB AXLE W/ 10&quot; DISC BRAKES</td>
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<td>4</td>
<td>24139901 SHOCK 59080550 550 LBS/IN SPRING FRONT 59080450 450 LBS/IN SPRING REAR</td>
</tr>
<tr>
<td>5</td>
<td>14&quot; CONTROL ARM</td>
</tr>
<tr>
<td>6</td>
<td>22' CONTROL ARM</td>
</tr>
<tr>
<td>7</td>
<td>HBOLT 0.6250-11X3X1.5-N</td>
</tr>
<tr>
<td>8</td>
<td>HNUT 0.6250-11-D-N</td>
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</table>

SEE SHEET 63 FOR PARTS LISTINGS
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
14" CONTROL ARM

ITEM NO. | PART NUMBER | QTY.
---|---|---
1 | THREE QUARTER X FIVE EIGHTHS ROD END | 2
2 | 14" TUBE | 1
3 | 0.75-16 LH JAM NUT | 1
4 | 0.75-16 RH JAM NUT | 1

SEE SHEET 63 FOR PARTS LISTINGS

WEIGHT: 1.2 KG
SCALE: 1:6
DIMENSIONS:

A4

[355.60] 14.000
[496.57] 19.550

[39.37] 1.550
[457.20] 18.000

[15.88] .625
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<th>Manufacturer</th>
<th>Description</th>
<th>Dimensions/Options</th>
<th>Vendor</th>
<th>Vendor Address</th>
<th>Vendor Phone</th>
<th>Vendor Website</th>
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<td>10&quot; Rotors</td>
<td>Summit Racing</td>
<td>P.O. Box 909, Akron, OH 44309-0909</td>
<td>800-230-3030</td>
<td>summitracing.com</td>
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<tr>
<td>4</td>
<td>VN2157765</td>
<td>American Racing</td>
<td>VN215 Classic Tong Thrust II 1 Piece</td>
<td>17x7, 5x4.5 bolt pattern, 4 in. backsapce</td>
<td>Summit Racing</td>
<td>P.O. Box 909, Akron, OH 44309-0909</td>
<td>800-230-3030</td>
<td>summitracing.com</td>
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<td>20</td>
<td>611-292</td>
<td>Dorman Products</td>
<td>Wheel Nut, Dometop</td>
<td>3/2-20, 13/16 Hex, 1.5 in length</td>
<td>Typically available from eBay vendors, Helix Suspension Steering Brakes, Ridetech, Airmaxxx, Speedway Motors, Summit Racing. Some offer brackets separately.</td>
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<td>350 S. Charles St, Jasper, IN 47546</td>
<td>812-481-4787</td>
<td>ridetech.com</td>
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<td>340 Victory Ln, Lincoln, NE 68528</td>
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<td>Swedged Steel Tube</td>
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<td>speedwaymotors.com</td>
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