UNIFIED
INDUSTRIES, INC.
HOWELL, MICHIGAN 48843

TEL: (517) 546-3220

# ETA-4, ETA-8 and ETA-X ENGINEERING DATA

## FOR TOOL RAIL AND BRIDGE CRANE APPLICATIONS

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ETA-4 AND ETA-8 SERIES

1. All track and hangers shall be installed in accordance with the manufacturer's detailed layout drawings.

2. Track and bridge beam provided is Series 6000 extruded aluminum alloy track.

3. The track or bridge beam provided shall be modular design, weld free application, and self-aligning with complete bolt-together capability at all splice joints and hangers.

4. All track sections provided shall be sawcut square to required length by the manufacturer. All joints shall be subjected to tensile stress and all track joints shall be flush when complete.

5. The rated load of the track, monorail or bridge crane shall be determined so that deflection under rated load shall not exceed 1/550 of the span. Lateral deflection will not be accepted.

6. The allowable stresses applied shall not exceed 20% of the minimum yield strength of the materials used.

7. The maximum rated load for all track provided by the contractor including hoist, product, process equipment, and all attachments, etc., shall not exceed the rated loads specified below:
   a. 4" Series Track—ETA-4 acceptable for maximum rated load up to and including 500 lbs.
   b. 8" Series Track—ETA-8 acceptable for maximum rated loads up to and including 2000 lbs.
   c. For increased loads, consult factory.

8. For bridge crane or hoist application(s), the maximum overhang of the bridge girder to the center of a runway rail shall not exceed the requirements specified below unless approved by the owner and manufacturer:
   a. 4" Series Rail—ETA-4 the maximum overhang shall be 10" including the end cap and end stop.
   b. 8" Series Rail—ETA-8 the maximum overhang shall be 16" including the end cap and end stop.
   c. For larger overhangs, consult factory.

9. All bridge cranes, hoists, runways, monorail, and track shall be installed straight, parallel, level and at the same elevation. Installation tolerance shall not exceed the values specified below:
   a. Longitudinal leveling, multiple runways and single rail systems .250" in overall length, with a maximum rate of change of no more than .125" on twenty-foot centers.
   b. Elevation runway-to-runway .250" in span, maximum rate of change .125" on twenty-foot centers.
   c. Centering runway-to-runway .500" in overall length, maximum rate of change .125" on twenty-foot centers.
   d. Centering for single rail to a parallel conveyor or workstation shall be +/- .500" in overall length of the system, maximum rate of change .125" on twenty-foot centers.

10. All sway bracing and thrust bracing required shall be provided by the contractor, all connections shall be torsional - by design. Compression-type connections will not be accepted.

11. One month after system buyoff, the enclosed track shall be thoroughly inspected and releveled by the contractor. All bolts at the splice connections' hangers and support structure shall be rechecked for proper torque. Abnormalities noted by the contractor shall be brought to the attention of the manufacturer immediately.

12. All trolley running surfaces shall be aligned flush in accordance with this specification and shall present no shock loading at a splice connection. Transverse tilt will not be accepted.

13. Tension tubes at all splice connections shall be factory aligned and welded by the track manufacturer.

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14. Joint modification or holes required in track section(s) shall be by drilling or saw cutting only. The flame cutting of holes or splice joints will not be permitted.

15. Where hanger rods are used, the allowable stress shall be 20% of the minimum yield strength of the material provided.

16. All hangers shall be installed true and vertical. All suspension fittings shall bear the load equally.

17. All bolts, nuts, fasteners, attachments, etc., required for rail for enclosed track assembly shall be provided by the equipment manufacturer.

18. All double girder bridge cranes provided shall incorporate diagonal bracing for parallel stabilization.

**TURNS**

1. Enclosed track turns shall be factory formed by the manufacturer. All tension tubes shall be aligned and installed at the manufacturer's facility.

2. The radius of all enclosed track turns shall be designed to allow the carriers or trolleys to freely negotiate each horizontal turn without binding.

3. The standard radius for enclosed track turns in the 4" series shall be minimum 4'0", unless approved by the manufacturer.

4. The standard radius for enclosed track turns in the 8" series shall be minimum 6'0", unless approved by the manufacturer.

5. Short radius turns with a radii that is less than the standard specified above shall be pre-approved.

6. The maximum overhang of straight track to the tangent point of a horizontal turn shall not exceed 12".

7. A minimum of two (2) hangers shall be used in the radius of each 90-degree curve, the two (2) hangers shall be in addition to one (1) hanger at each splice joint. The maximum distance between hanger centers shall not exceed 3'0". If required, additional hangers shall be provided in accordance with the design and calculated distance based on the trolley or carrier loading.

8. Special curves shall be supported and braced in accordance with the rail manufacturer's requirements. Under no condition shall track hanger centers exceed 3'0".

9. Curved track section shall be installed with uniform bolt tension to insure that load trolleys do not bind at splice joint.

10. A straight section of track shall be provided between each horizontal turn.
    a. For single-trolley 4" systems, the minimum distance between each tangent shall be 12".
    b. For double-trolley 4" systems with articulating load bars, the minimum distance between each tangent shall be 28" unless approved.
    c. For single trolley 8" systems, the minimum distance between each tangent shall be 18".
    d. For double-trolley 8" systems with articulating load bars, the minimum distance between tangents shall be 36".

11. All hangers provided shall be installed true to the vertical plane.

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1. All trolleys shall be as manufactured by Unified Industries, Inc.
2. All trolleys shall consist of one (1) high-tensile aluminum-magnesium alloy.
3. All trolley wheels provided for hoists, bridge cranes, and related equipment shall conform to the manufacturer's standards for monorail hand trolleys.
4. Trolley wheels shall be hard nylon, machined symmetrically true with the axis. All trolley wheels shall be the retainer type, designed for a single row of high quality, precision-ground ball bearings. All trolley wheels shall have a stud that is press-fitted into the trolley body.
5. Trolley side guide rollers shall be hard nylon-machined symmetrically true with the axis. All trolley side guide rollers shall be designed for double row, full compliment, precision-ground ball bearings.
6. All trolleys shall be equipped with safety lugs so, in the event of a wheel failure, the trolley cannot come out of the enclosed track.
7. All bearings shall be protected by grease and dust seals.
8. Load links and load straps shall be provided by the manufacturer's recommendation.
9. Under no condition shall the contractor provide light capacity trolleys for use on heavy flange track.

**ETA-8 RAIL SECTION PROPERTIES:**

Material 6005-T5

Weight per foot = 6.92 lb

Cross sectional area = 5.77 $in^2$

Moment of inertia Ixx = 36.1 $in^4$
Iyy = 16.3 $in^4$
ry = 1.68 $in^4$

**ETA-4 RAIL SECTION PROPERTIES:**

Material 6005-T5

Weight per foot = 3.43 lb

Cross sectional area = 2.75 $in^2$

Moment of inertia Ixx = 4.45 $in^4$
Iyy = 2.17 $in^4$
ry = 0.89 in