

Design and Construction Guide



HI-VI™ VIBRATORY FEEDER TRAYS

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WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and INSPECTION APPLICATIONS

Introduction

This manual details the design and construction of trays for Eriez Hi-Vi Vibratory Feeders.

Careful attention to this information will help in obtaining the most efficient and dependable performance of Eriez equipment.

If there are any questions or comments about the manual, please call the factory at 814-835-6000 for Vibratoy Feeder assistance.

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Elements of Tray Design

The following information is intended as an aid for customers who wish to design and build their own trays for use with Eriez Vibratory Feeders. As in any other mechanical design, there are certain criteria in the design of trays which must be met if best results are to be obtained.

SIZE, WEIGHT, SHAPE

For a given size of Feeder, the tray width, length, bottom area, and weight should not exceed the maximum values shown on page 4. Figures for tray height are not given, but in order to hold the weight to a minimum (always desirable), the side and back walls should be made no higher than to adequately contain and feed the product. It should be remembered, however, that the back and side walls act as longitudinal and lateral supporting braces, and for this reason, the walls should not be made so low that this bracing effect will be lost.

LOCATION WITH RESPECT TO DRIVE UNIT

The center of gravity of the tray should be positioned slightly above the center line of the drive (see Fig. 1). This is accomplished by positioning the drive under the tray at a place where the center line will project up to the tray near the center of gravity. It is sometimes necessary to extend the drive mounting beyond the back of the tray to do this (see Fig. 8).

The center of gravity of a tray may be located by hanging the tray from a wire and, using a plumb line, mark on the tray side the vertical line from the hanging point to the floor. Hanging the tray from two or three different places on the tray will give you two or three lines on the tray side. The center of gravity is where the lines cross.

The center of gravity of a tray may be shifted by adding a weight to the front or back of the tray depending on which direction the center of gravity must be moved (see Fig. 6).

Locating the drive center line very far from the tray center of gravity will result in poor feeding and possibly excessive stresses which could cause failure.

BRACING

The tray should be braced so that spurious vibrations are minimized. Such spurious vibrations if permitted, will cause poor quality feeding and may result in tray breakage. Any necessary stiffening of the tray can be accomplished by welding bars on edge (or other shapes such as angles, channels, etc.) at critical points.

There are two critical areas on any tray which almost always need bracing of some sort. These are the bottom and sides directly ahead of the tiebar and the bottom and sides at the discharge end (see Fig. 2). In any given tray, other critical areas may be found by experiment and observation. Areas requiring special attention are:

1. Bottoms of wide trays (may need lateral bottom bracing).
2. Bottoms of long trays (may need longitudinal bottom bracing).
3. Sides of high-walled trays (may need vertical side bracing).

The bottoms of wide trays, if not adequately stiffened will feed the product irregularly and may even feed backward at some points. Long trays will whip excessively and may cause spurious vibrations to be set up in the tray bottom. The sides of high-walled trays will vibrate laterally and may cause spurious vibrations to be set up on the tray bottom.

Suggested ways of bracing various parts of the tray are shown in Figs. 2 through 8.

WELDING OF TRAYS

The mounting channels or bars should be spot welded to the tray bottom with two rows of spot welds on 1 or 2" (25 or 50 mm) centers. (See Figs. 2 and 3). The channels or bars and bottom and side brace should be intermittently welded to the tray with 1/4" (6 mm) long fillets on 1" (25 mm) centers.

The tray corner seams should be welded continuous on the outside and, for greater strength, not ground smooth.

Elements of Tray Design *(cont.)*

MATERIALS AND FINISHES

Mild steel or stainless steel sheet is recommended for tray construction. Generally speaking, gauges should not exceed #12 for Feeder Models 58B and 52A; #14 for 56 and 66 Series Feeders; #16 for 26, 36 and 46 Series Feeders. Feeder Models 15A, 48A, HS-10, HS-20 and HS-42 also use 16 gauge material. Plastic, aluminum or other metals of equivalent weight and strength may be used, but these are somewhat more difficult to apply because the mounting channel must still be of sheet steel. In cases of this sort, where the tray cannot be welded to the steel mounting channel, the channel should be welded to a flat steel plate and the tray then fastened tightly to the plate with vibration-proof fasteners.

Any desired finish or coating can be applied to the insides of trays, but if a fine, smooth finish is required, more attention must be paid to surface distortion in welding. It is best in such cases to use shorter welds placed closer together to minimize heat distortion of the bottom surface.

SCREENS

Wire mesh screens must be tightly stretched in a tray in order to feed. Screens with sheet metal hooks formed on the sides and held with clamp bars give the best results. Perforated metal screens work well when securely fastened to the tray usually by bending up the sides and bolting to the tray sides.

Screens over 9" (230 mm) wide should have crowning supports from the tray bottom and running down the length of the tray.

Representative manufacturers of screening materials suitable for vibratory feeders are the Bixby-Zimmer Engineering Company, Galesburg, Illinois and the Hendrick Manufacturing Company, Carbondale, Pennsylvania.

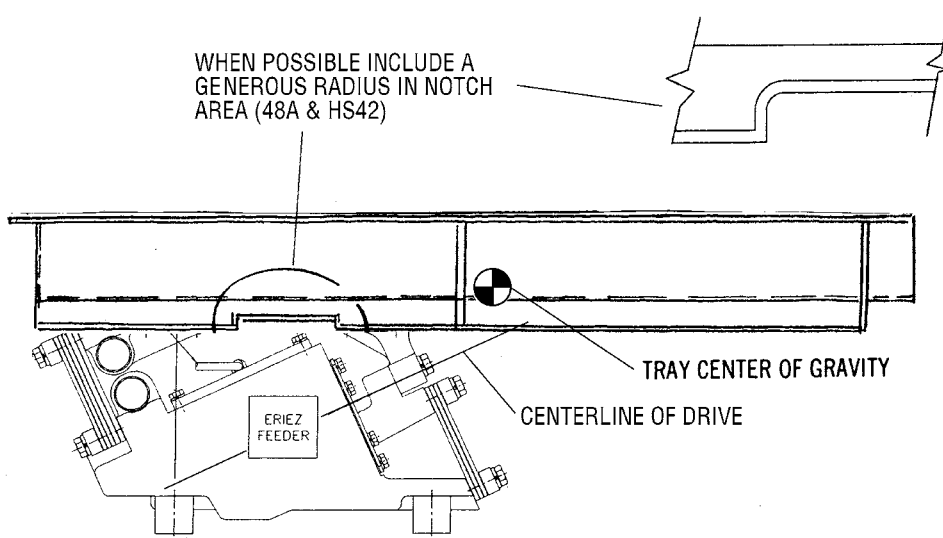


FIGURE 1

FIGURE 2

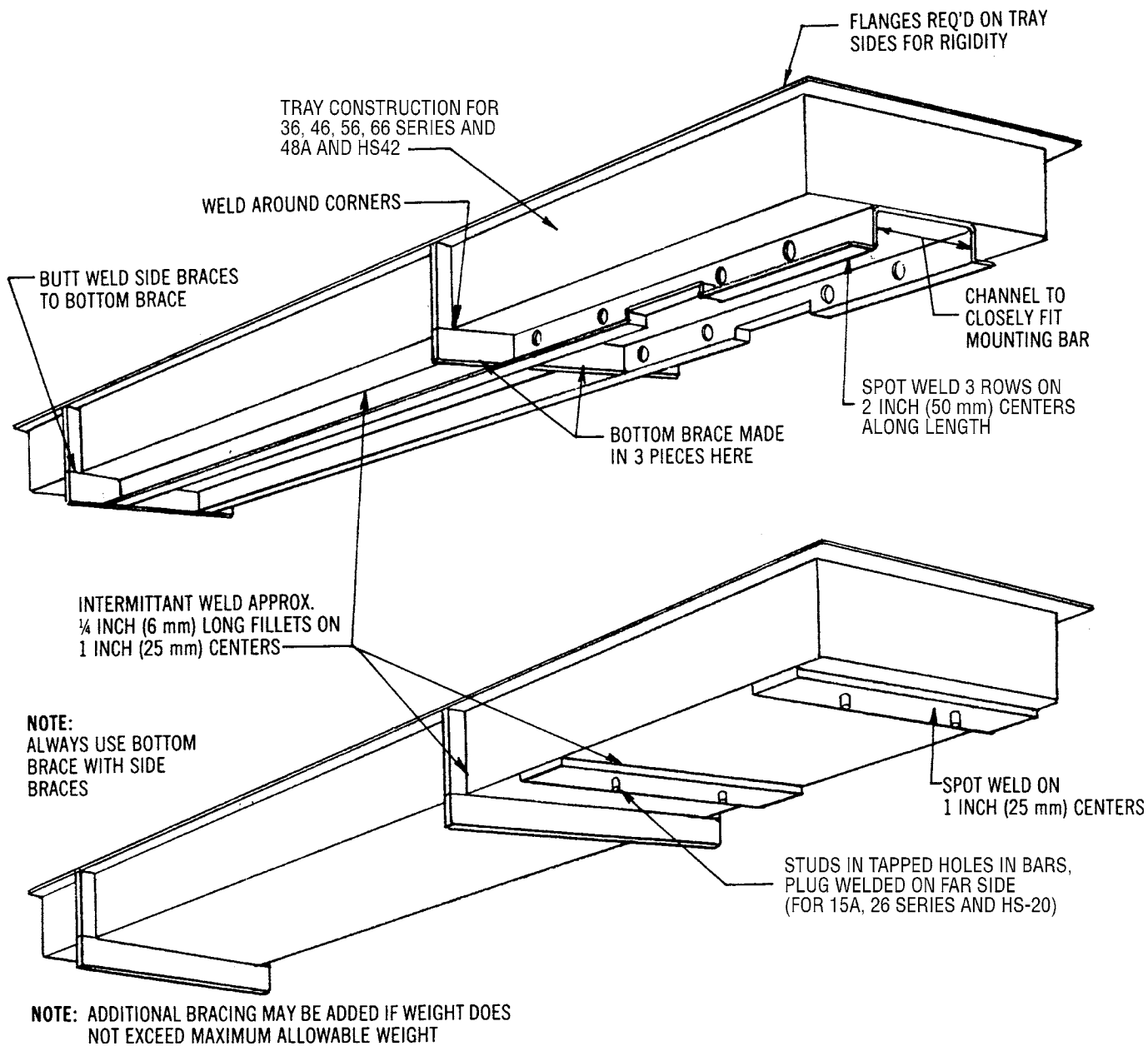


FIGURE 3

Elements of Tray Design *(cont.)*

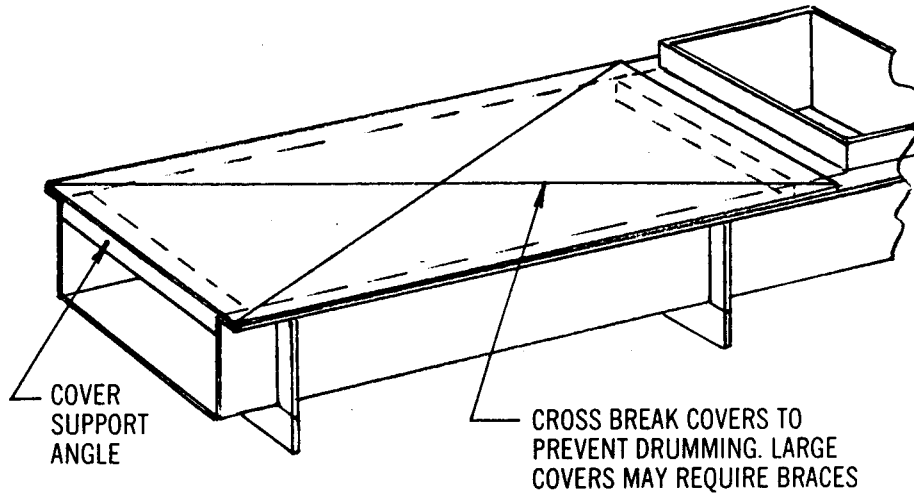


FIGURE 4

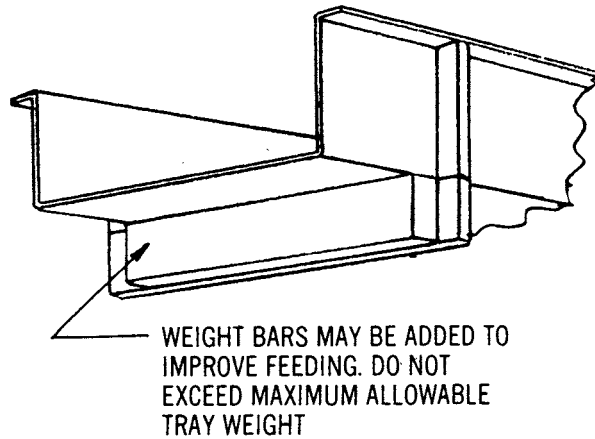


FIGURE 5

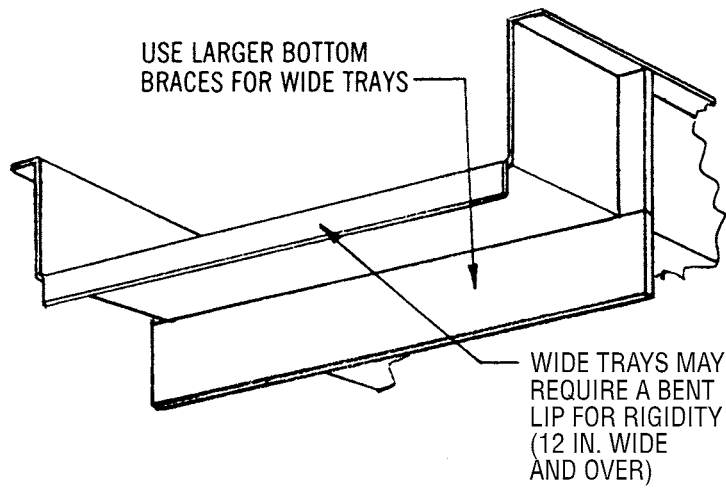


FIGURE 6

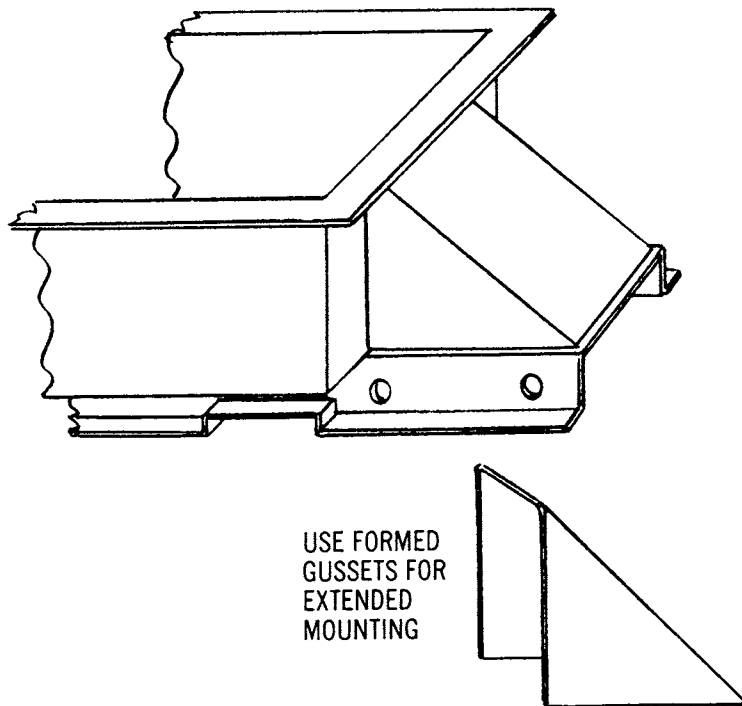


FIGURE 7

Tray Data

Models 15A thru 58B
 Models HS-10 thru HS-42
 HS-26 thru HS-66
 Models HD-26 thru HD-66

MODEL	MAXIMUM FLAT TRAY AREA (BOTTOM OF TRAY)		MAXIMUM TRAY WEIGHT	
	IN ²	MM ²	LBS	KG
15A	120	77,500	6	2.7
48A	367	236,800	30	13.6
52A	400	258,100	50	22.7
58B	575	371,000	80	36.3
HS-10	84	54,200	4	1.3
HS-42	367	236,800	30	13.6
26C	150	96,800	8	3.2
36C	330	212,900	18	8.2
46C	380	245,200	35	16.0
56C	425	274,200	40	18.1
66C	550	354,900	50	22.7
HS-26	150	96,800	8	3.2
HS-36	330	212,900	18	8.2
HS-46	380	245,200	35	16.0
HS-56	425	274,200	40	18.1
HS-66	550	354,900	50	22.7
HD-26	150	96,800	8	3.2
HD-36	330	212,900	18	8.2
HD-46	380	245,200	35	16.0
HD-56	425	274,200	40	18.1
HD-66	550	354,900	50	22.7

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