



MAGNETIC CONVEYING COMPONENTS

MAGNA-RAILS® AND MAGNA-ROLLS®

Time-proven practical ways to apply magnetism and improve the efficiency of automated conveyor lines.



FEATURES

- Rugged construction
- Standard and custom-designed sizes
- Magna-Rails available in permanent and electro-magnetic designs
- Magna-Rails available with either Erium® 45 (alnico) or Erium® 25 (ceramic) magnetic elements
- Magna-Rolls available with flat or contoured faces

ONLY FROM ERIEZ

Eriez Magna-Rails® and Magna-Rolls® have been the industry standard for nearly four decades.

An ever present need within many processing industries is the ability to hold steel parts firmly on moving belt conveyors. Such conveyors, fitted with Eriez Magna-Rails, ensure that parts do not fall off, even when being elevated or lowered.

Magna-Rolls are commonly used in direct contact with steel sheets and tubing. Their firm magnetic grip helps ensure that when the roll turns, the steel moves. Further, when the roll stops, the steel stops as well, thus eliminating the need for pinch rollers.

See how these versatile tools can help your production lines.



INTRODUCTION/ OVERVIEW

MAGNETICS + AUTOMATION = MAGNAMATION

As the acknowledged pioneer in the application of magnetics for industrial uses, Eriez early foresaw the potential of this force in the development of automated materials handling systems.

More than 30 years ago Eriez developed standard components — Magna-Rails and Magna-Rolls — that could be used alone or in combinations, and could be integrated into special assemblies, to magnetically convey, transfer, control, elevate, reposition, hold or orient basic ferrous materials and finished parts.

The result? Magnamation — for increased efficiency and faster production with maximum safety and accuracy of control.

Magnamation makes it possible to handle more materials in less space, eliminate the problems of gravity flow or feeding, and allow the option of single or multi-level conveying, or both, in the design and engineering of complete systems.

For the manufacturer or processor faced with the necessity of improving production and reducing time and labor costs to remain competitive, Magnamation offers a cost-effective solution to operation of existing conveyor lines.

Eriez' staff of design engineers and production line specialists is always available to assist with the evaluation of conveyor requirements — planning of new facilities — or step-by-step modernization of existing systems.

MAGNA-RAILS AND MAGNA-ROLLS AT WORK



MAGNA-RAILS

These magnetic elements, positioned under conveyor belts and secured by mounting brackets, provide a safe, positive hold for ferrous parts—cans, sheets, nails, stampings, finished parts, even scrap—at high speeds in any direction, even up inclines as steep as 90°.

Two types of permanent magnet Magna-Rails are offered — Erium® 45 (Alnico) and Erium 25 (Ceramic). Straight sections are available in various holding strengths, and in increments up to 10' (3 m) in any one section. They can be positioned to provide any desired length.

Transition sections in various radii and matching holding strengths can be made to bolt to a straight section, providing a smooth carry-over from one direction to another.

Electro Rails

In addition to the Erium 45 and Erium 25 models, an Electro magnetic rail is available for special applications where on/off power is required. Electro rails are built with a 3-3/4" (95 mm) face width in standard 12" (304 mm) as well as special lengths. They use a Class B insulated coil and can be furnished for operation on either 110V, DC or 220V, DC.

System Design

All models are designed for fast, simple installation on either new or existing equipment. Multiple rows, curved sections, transitions, etc., and varying magnetic strengths can be selected and joined to accommodate any required combination of conveyor configurations. All models can be installed in almost any type or size of belt conveyor.

Belt Requirements

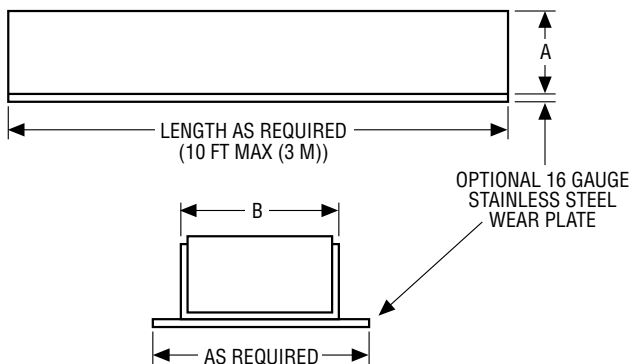
With Magna-Rails, belt speed is ordinarily not a limiting factor; however, belt thickness is critical to optimum performance. Maximum magnetic efficiency is obtained when the conveyor belt is as thin as can practically be used. Belts thicker than 1/4" (6 mm) are usually not recommended.

Model Choices

Erium 45 (Alnico) rails can be furnished with or without sturdy aluminum covers. Ceramic rails are covered by virtue of their construction. Also, 16-gauge stainless steel wear plates can be furnished at extra cost, as well as diamond-patterned plates to cut down on belt friction. In most cases, wear plates should be installed between any style Magna-Rail and the belt.

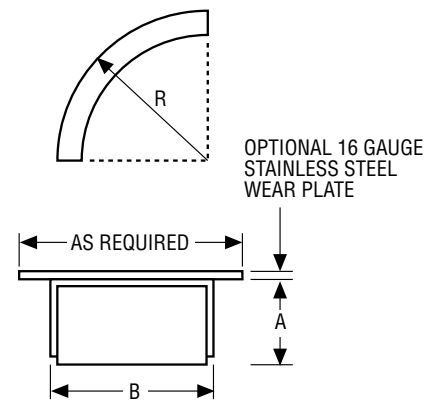
SPECIFICATIONS - CERAMIC MAGNA-RAILS

Straight Section



MODEL	A		B		WT/FT		RECOMMENDED TRANSITION
	in	mm	in	mm	lb	kg	
CM-2	17/32	13	2-19/32	66	2.5	1.1	CMT-2
CM-4	25/32	20	4-3/32	104	8.4	3.8	CMT-6
CM-6	1-5/32	29	4-3/32	104	12.4	5.6	CMT-8
CM-8	1-13/32	36	4-3/32	104	14.6	6.6	CMT-12
CM-12	1-29/32	48	4-3/32	104	19.6	8.9	CMT-16
CM-16	2-17/32	64	4-3/32	104	25.6	11.6	CMT-16 or special

Transition Section (5° to 90° Segments)



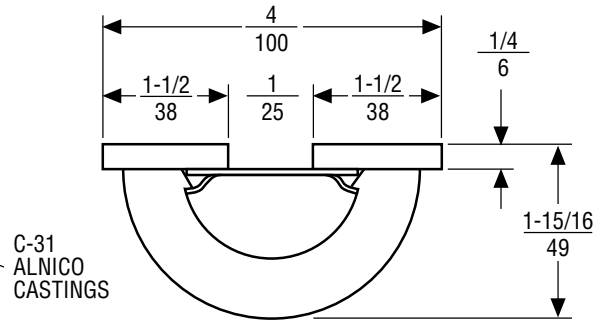
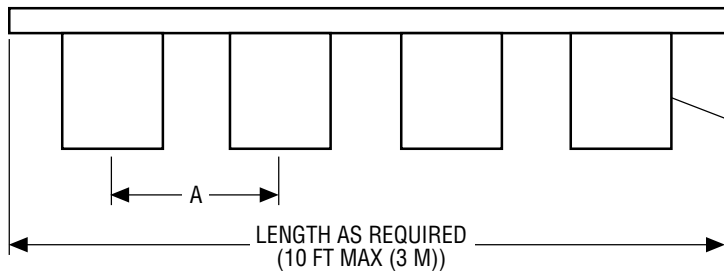
MODEL	MIN. RADIUS*		A		B		WT/FT	
	in	mm	in	mm	in	mm	lb	kg
CM-2	15	381	17/32	13	2-19/32	66	2.5	1.1
CM-4	15	381	25/32	20	4-3/32	104	8.4	3.8
CM-6	18	457	1-5/32	29	4-3/32	104	12.4	5.6
CM-8	18	457	1-13/32	36	4-3/32	104	14.6	6.6
CM-12	24	610	1-29/32	48	4-3/32	104	19.6	8.9
CM-16	24	610	2-17/32	64	4-3/32	104	25.6	11.6

* 27" (686 mm) is the standard radius for CMT-2.
36" (914 mm) is the standard radius for CMT-4 thru CMT-16.

MAGNA-RAILS

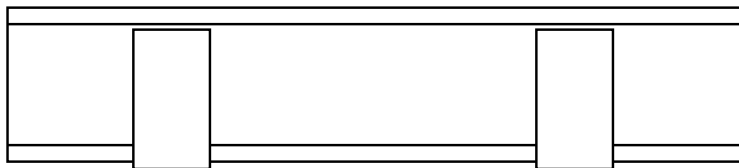
SPECIFICATIONS - ALNICO MAGNA-RAILS

Without Cover



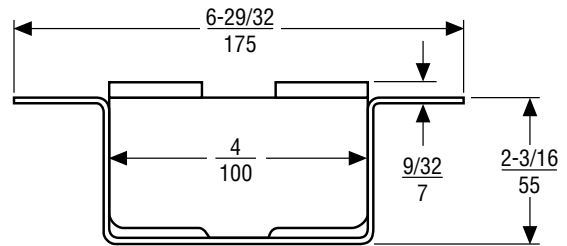
INCHES
MILLIMETERS

With Cover



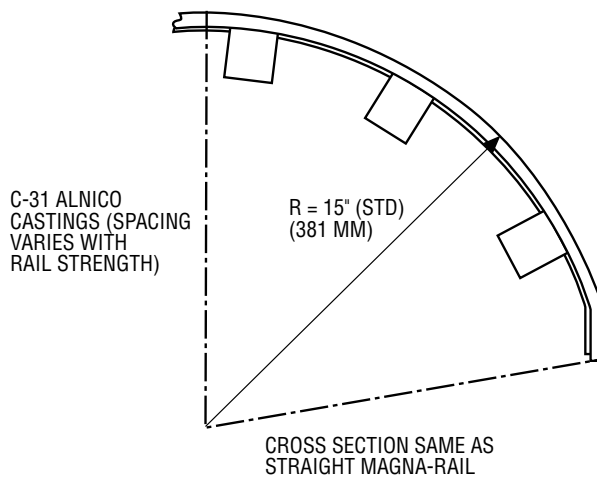
INCHES
MILLIMETERS

ENOUGH MOUNTING BRACKETS SHIPPED WITH COVERED RAIL FOR MOUNTING (BY CUSTOMER) ON APPROXIMATELY 12-INCH (305 MM) CENTERS



FOR COVERED RAIL, ADD 2 LB/FT (3 KG/M) TO THE WEIGHT OF UNCOVERED RAIL

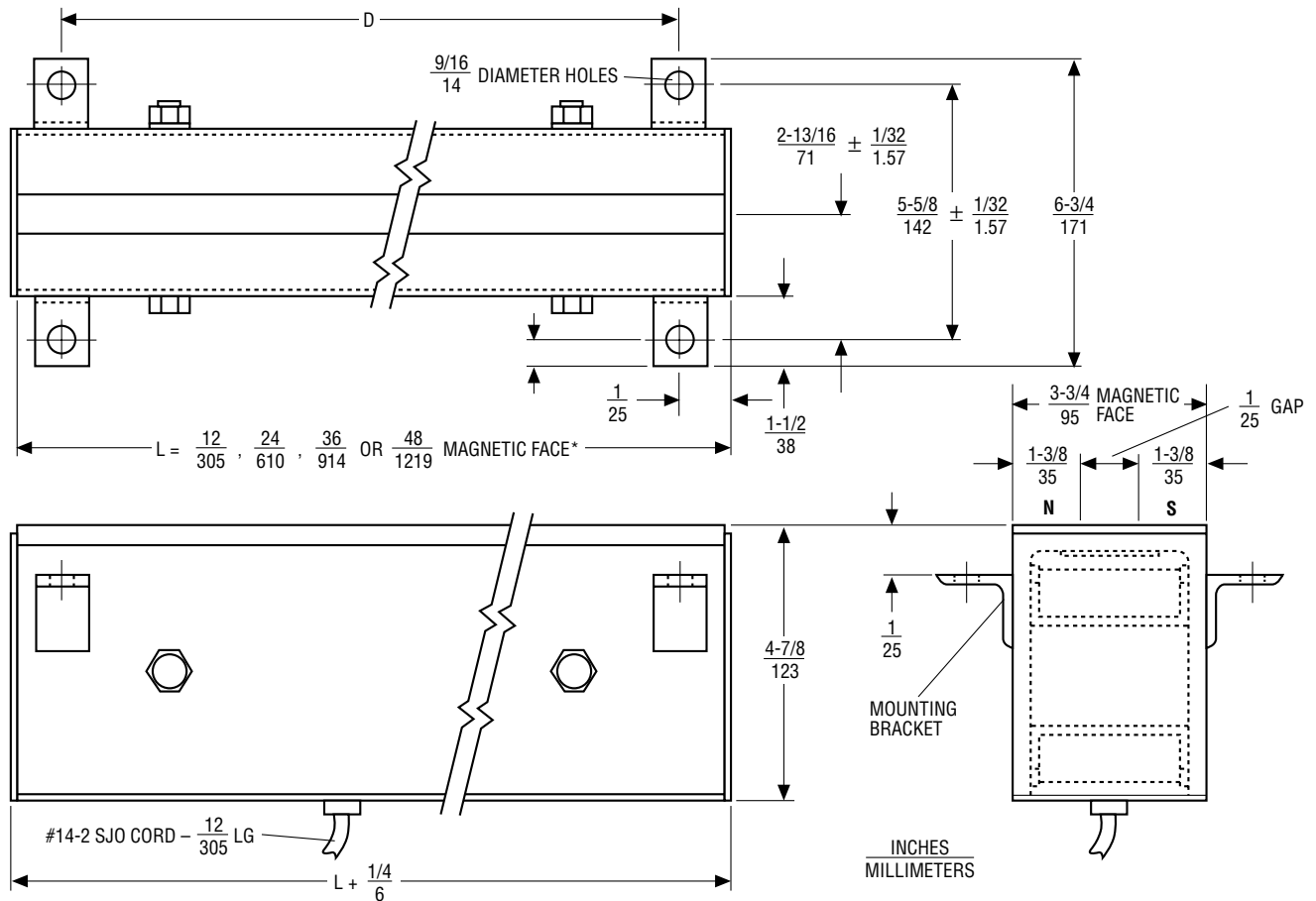
Transition Section



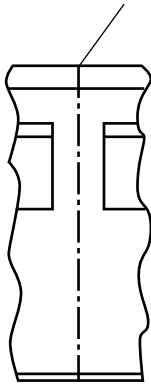
MODEL	A		WT/FT	
	in	mm	lb	kg
31-12	12	305	3	1.4
31-6	6	152	5	2.3
31-4	4	102	8	3.6
31-3	3	76	9	4.1
31-2	2	51	13	5.9

MAGNA-RAILS

SPECIFICATIONS - ELECTRO MAGNA-RAILS



UNITS MAY BE BUTTED TOGETHER
AT ENDS - REMOVE END COVERS



CAN BE BUILT IN INTERMEDIATE
OR LONGER LENGTHS

L		WATTS	WEIGHT		D	
in	mm		lb	kg	in	mm
12	305	92	35	15.9	10-1/4	260
24	610	184	65	29.5	22-1/4	565
36	915	276	95	43.1	34-1/4	870
48	1,220	368	125	56.8	46-1/4	1,175

Note: 1. Specify either 115 VDC or 230 VDC
2. Turn off time is 225 to 350 ms

100% Duty Cycle



MAGNA-RAILS

SPECIFICATIONS - PULL TEST DATA

Ceramic

AIR GAP		MODEL											
		CM-2		CM-4		CM-6		CM-8		CM-12		CM-16	
in	mm	oz	kg	oz	kg	oz	kg	oz	kg	oz	kg	oz	kg
1/4	6	36	1.02	90	2.49	102	2.8	113	3.2	120	3.4	130	3.6
1/2	12	16	.45	54	1.47	70	1.98	78	2.2	88	2.5	93	2.7
3/4	19	6	.17	34	.91	48	1.30	56	1.6	60	1.7	66	1.9
1	25	3	.08	24	.56	32	.91	40	1.13	43	1.2	48	1.4
1-1/2	38	0	0	10	.20	15	.40	19	0.54	20	0.57	24	0.68
2	50	0	0	4	.08	7	.20	8	0.23	10	0.31	12	0.34

Alnico

AIR GAP		MODEL							
		31-12		31-6		31-3		31-2	
in	mm	oz	kg	oz	kg	oz	kg	oz	kg
1/4	6	24	.68	47	1.33	78	2.2	90	2.5
1/2	12	10	.28	23	.65	50	1.4	53	1.5
3/4	19	5	.14	13	.37	33	.93	39	1.10
1	25	3	.09	8	.23	22	.62	26	.74
1-1/2	38	1-1/2	.04	3 1/2	.1	9-1/2	.27	12	.34
2	50	0	0	0	0	4-1/2	.13	0	0

Electro

AIR GAP		COLD CONDITION		HOT CONDITION	
in	mm	oz	kg	oz	kg
1/4	6	76	2.15	66	1.87
1/2	12	46	1.30	36	1.0
3/4	19	32	.91	23	.65
1	25	20	.57	14	.4
1-1/2	38	9	.25	6	.17
2	50	4	.11	3	.08

SPECIFICATIONS - HOLDING POWER

Ceramic

MATERIAL THICKNESS		CM-2				CM-4				CM-6				CM-8				CM-12				CM-16			
		FACE		1/4" (6 mm) AIR GAP		FACE		1/4" (6 mm) AIR GAP		FACE		1/4" (6 mm) AIR GAP		FACE		1/4" (6 mm) AIR GAP		FACE		1/4" (6 mm) AIR GAP		FACE		1/4" (6 mm) AIR GAP	
in	mm	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg
0.009	.22	1.5	.7	0	0	5.2	2.4	1.2	.5	8.9	4.0	3.92	1.8	14.1	6.4	9.1	4.1	8.8	4.0	2.78	1.26	8	3.6	5	2.3
0.018	.45	4.5	2.0	0.5	.2	16.2	7.4	6.2	2.8	15.9	7.2	9.92	4.5	21.1	9.6	13.1	59.4	18.8	8.5	9.78	4.4	19	8.6	12	5.5
0.039	.99	5.5	2.5	0.5	.2	28.2	12.8	12.2	5.5	41.9	19.0	20.9	9.5	45.1	20.5	25.1	11.4	38.8	17.6	20.07	9.1	42	19.1	33	15.0
0.125	3.18	9.5	4.3	0.5	.2	97	44	58	26.3	120	54.4	69	31.3	125	56.7	80	36.3	140	63.5	85	38.6	145	65.8	80	36.3
0.250	6.35	9.5	4.3	0.5	.2	165	74.8	72	32.7	215	97.5	100	45.4	215	97.5	115	52.2	214	97.1	130	59.0	215	97.5	120	54.4
0.50	12.70	--	--	--	--	200	90.7	80	36.3	230	104.3	105	47.6	230	104.3	120	54.4	235	106.6	130	59.0	245	111.1	120	54.4
0.75	19.05	--	--	--	--	200	90.7	80	36.3	250	113.4	105	47.6	250	113.4	120	54.4	255	115.7	130	59.0	245	111.1	120	54.4
1.00	25.40	--	--	--	--	200	90.7	80	36.3	255	115.7	105	47.6	255	115.7	120	54.4	255	115.7	130	59.0	245	111.1	120	54.4
1.25	31.75	--	--	--	--	200	90.7	80	36.3	255	115.7	105	47.6	255	115.7	120	54.4	255	115.7	130	59.0	250	113.4	120	54.4
1.50	38.10	--	--	--	--	200	90.7	--	--	255	115.7	105	47.6	255	115.7	120	54.4	255	115.7	130	59.0	260	117.9	130	59.0

Alnico

MATERIAL THICKNESS		31-12				31-6				31-3			
		CONTACT		1/4" (6 mm) AIR GAP		CONTACT		1/4" (6 mm) AIR GAP		CONTACT		1/4" (6 mm) AIR GAP	
in	mm	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg
.009	.2	3	1.4	1	.5	5	2.3	2 1/2	1.1	21	9.5	5	2.3
.017	.4	5 1/2	2.5	2	1.0	9	4.1	4	1.8	35	15.9	10	4.5
.039	1.0	13	5.9	4	1.8	19	8.6	7	3.2	50	22.7	15	6.8
.125	3.2	40	18.2	8	3.6	50	22.7	20	9.1	80	36.3	45	20.4
.250	6.4	45	20.4	8	3.6	70	31.8	20	9.1	120	54.5	60	27.4

Electro

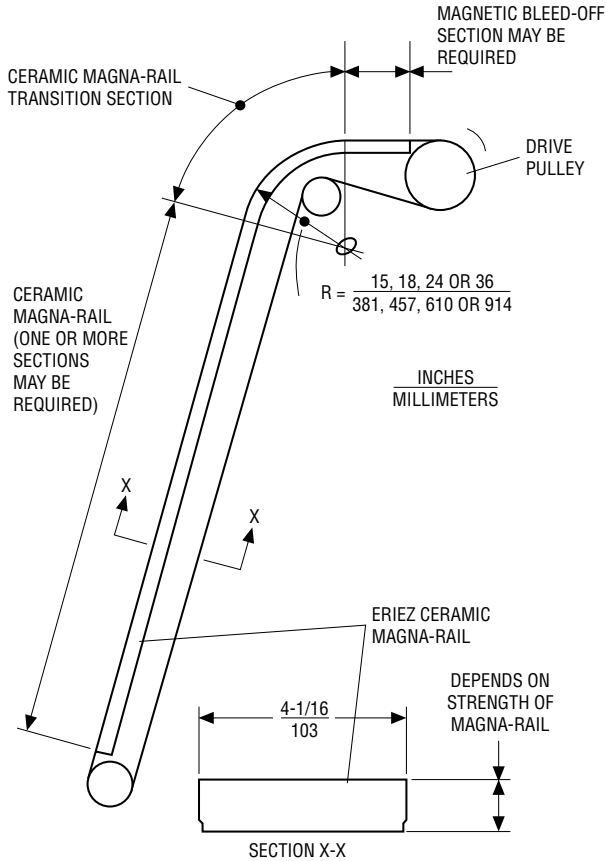
MATERIAL THICKNESS		CONTACT	
in	mm	lbs	kg
.009	.2	6	2.7
.017	.4	13	5.9
.039	1.0	35	15.9
.125	3.2	100	45.4
.250	6.4	180	81.7
.500	12.7	370	168.

Note For Pull Test Data: All tests with a 1/8 x 1 x 3 inch (3 x 25 x 75 mm) steel pull test bar

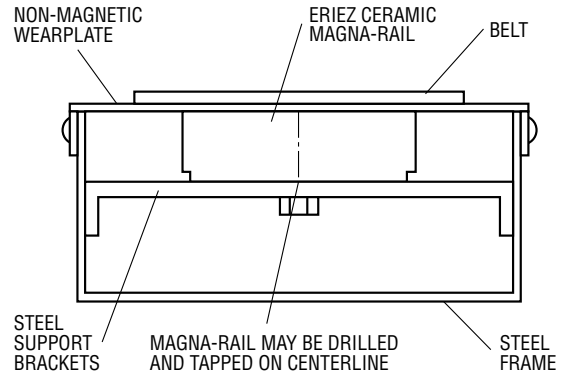
Note For Holding Power: All tests with a 4 x 12 inch (102 x 305 mm) steel plate

MAGNA-RAILS

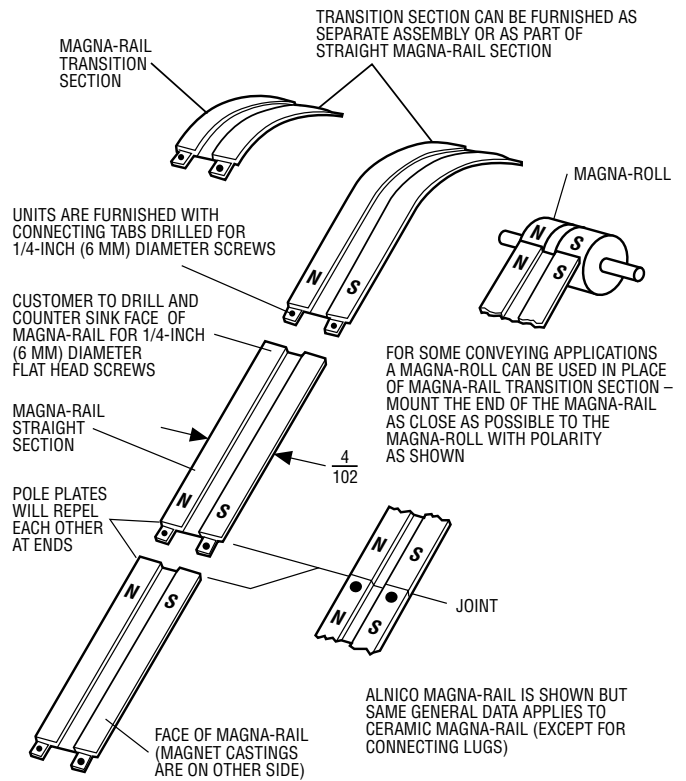
SPECIFICATIONS - CONVEYOR INSTALLATION DATA



BASIC MAGNETIC ELEVATOR CONSTRUCTION (USING CERAMIC MAGNA-RAIL)



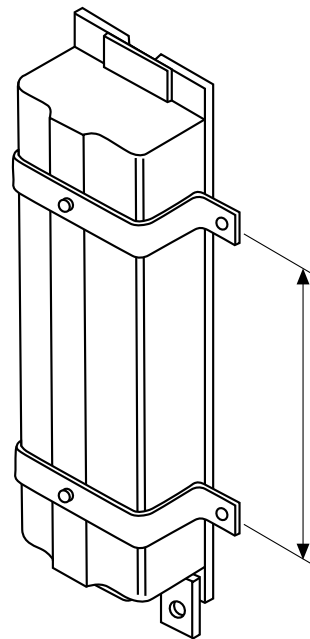
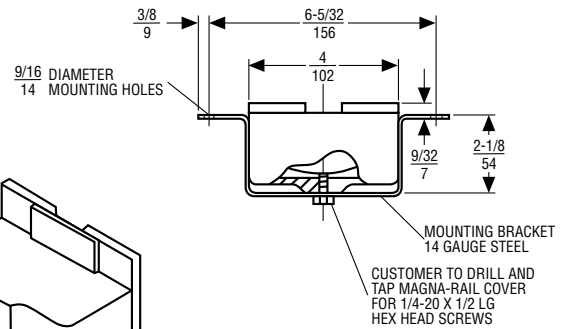
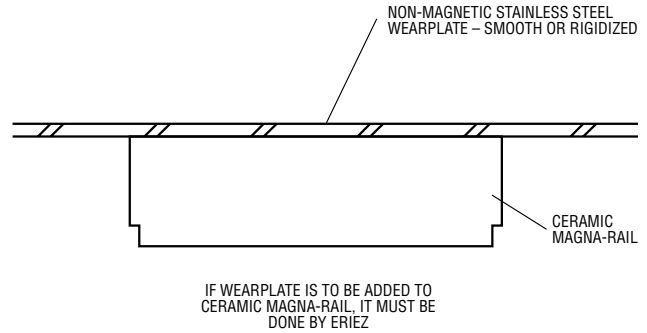
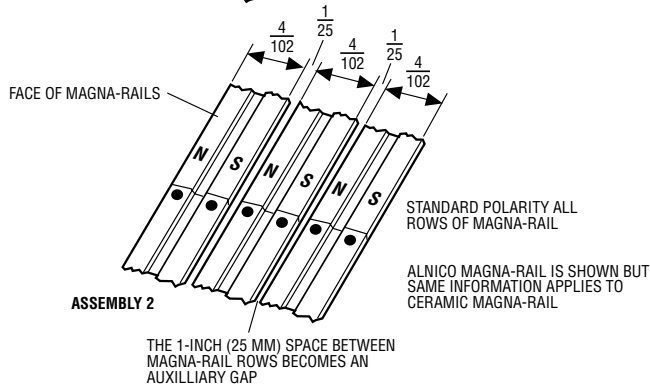
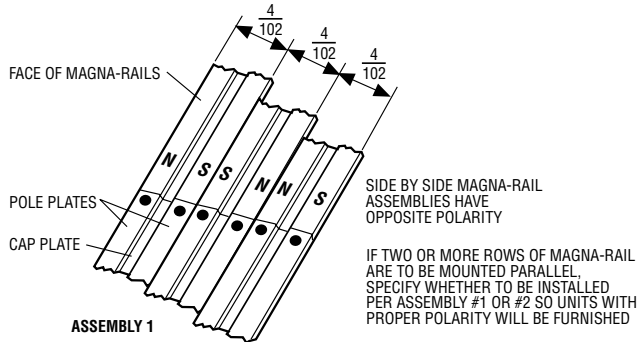
CROSS SECTION SHOWING TYPICAL MOUNTING OF ERIEZ CERAMIC MAGNA-RAIL IN CONVEYOR FRAME BY USER



ALNICO MAGNA-RAIL SECTIONS IN TANDEM

MAGNA-RAILS

SPECIFICATIONS - CONVEYOR INSTALLATION DATA

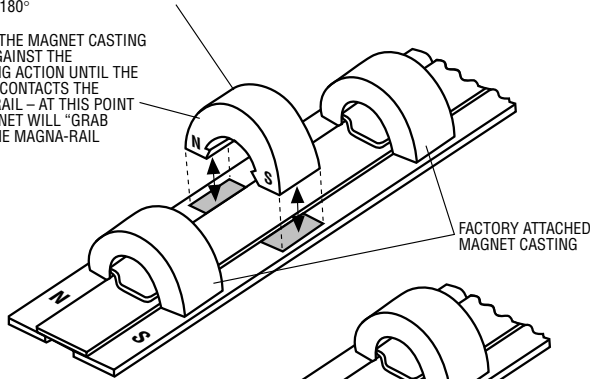


ENOUGH MOUNTING BRACKETS ARE SHIPPED WITH COVERED MAGNA-RAIL UNITS FOR MOUNTING ON APPROXIMATELY 12-INCH (305 MM) CENTERS

MOUNTING COVERED MAGNA-RAILS

TO ADD MAGNET CASTING:
 1. DETERMINE POLARITY OF LOOSE MAGNET CASTING BY HOLDING IT FIRMLY OVER THE MAGNA-RAIL AS SHOWN - IF THERE IS A REPELLING ACTION BETWEEN MAGNET CASTING AND MAGNA-RAIL THEN THE POLARITY IS AS MARKED ON THIS FIGURE AND IS CORRECT. IF THERE IS AN ATTRACTING ACTION THEN REVOLVE THE MAGNET CASTING 180°

2. PUSH THE MAGNET CASTING POLES AGAINST THE REPELLING ACTION UNTIL THE CASTING CONTACTS THE MAGNA-RAIL - AT THIS POINT THE MAGNET WILL "GRAB ONTO" THE MAGNA-RAIL



MAGNA-RAILS CAN BE CUT ANYWHERE BETWEEN CASTINGS (NOT APPLICABLE TO CERAMIC MAGNA-RAIL)

ADDING CHARGED MAGNET CASTING TO CHARGED MAGNA-RAIL

MAGNA-RAILS

SELECTOR CHART - FOR HANDLING MISCELLANEOUS PARTS

TYPICAL PRODUCTS	31-12			31-6			31-3			REMARKS	
	MAXIMUM CAPACITY (Per Minute)		MAXIMUM ANGLE OF INCLINATION	MAXIMUM CAPACITY (Per Minute)		MAXIMUM ANGLE OF INCLINATION	MAXIMUM CAPACITY (Per Minute)		MAXIMUM ANGLE OF INCLINATION		
	lb	kg	Degrees	lb	kg	Degrees	lb	kg	Degrees		
Jar lids, bottle caps, washers, 3/8" hex nuts, tacks, staples, rings, flat small ferrous stampings, etc.	50	22.7	90	100	45	90	175	79	90	--	
Nails (all sizes), small bolts, screws, steel studs, wires, ground chips, metal powders, steel shot, etc.	NOT RECOMMENDED			100	45	90	175	79	90	Parts must be fed evenly to hopper and break away from pile rather than stringing out.	
Spring clips, steel channels, electric junction boxes, irregular formed shapes up to 1/2 lb (.099 kg)	Capacity varies by size, weight and spacing of parts			Capacity varies by size, weight and spacing of parts		90	Capacity varies by size, weight and spacing of parts		90	Must have reasonable amount of surface contact.	
Plastic handle screwdrivers, wooden handle hammers, bonded rubber to metal mounts, etc., partly magnetic materials						60			60	75	Recommendations are function of magnetic content of part.
Pipe wrench jaws, tie bars, die clamps, large bolts, hinges, gears, chisels, pipe fittings, to 2" diameter, etc., small castings up to 3 lb (1.362 kg)						90			90	90	
12 oz Cans (Empty) (354 ml)						30			60	90	Data based on cans conveyed with flat closed end on belt. For conveying cans on sides, necessary to have side guides on conveyor.
12 oz Cans (Full) (354 ml)						30			50	80	
No. 303 Can (Full) (3-1/8" D x 4-3/8, 17 oz)						30			45	70	
No. 2-1/2 Can (Full) (4" D x 4-5/8, 29 oz)	35	60	90								
Pails, pulley stock, flanges, etc., heavy castings up to 12 lb (5 kg)						60			90		

Rolling objects such as sides on conveyor, etc. For underbelt conveying use same rail strength as for 90 degree incline conveyance.



MAGNA-RAILS

SELECTOR CHART - FOR CAN HANDLING

CAN SIZE	EMPTY CANS				FILLED CANS			
	INCLINE ANGLE				INCLINE ANGLE			
	30°	45°	60°	90°	30°	45°	60°	90°
202 X 509	31-6	CM-4	CM-4	CM-6	CM-6	--	--	--
202 X 714	31-6	CM-4	CM-4	CM-6	CM-6	--	--	--
211 X 413	31-6	31-6	CM-4	CM-4	CM-6	CM-8	CM-8	CM-12
211 X 604	31-6	31-6	CM-4	CM-4	CM-6	CM-8	--	--
211 X 713	31-6	31-6	CM-4	CM-4	CM-8	--	--	--
303 X 509	31-6	31-6	CM-4	CM-4	CM-8	CM-8	CM-16	CM-16
404 X 211	31-6	31-6	31-6	31-6	CM-4	CM-4	CM-8	CM-8
404 X 411	31-6	31-6	CM-4	CM-4	CM-6	CM-6	CM-8	CM-16
404 X 700	31-6	31-6	CM-4	CM-4	CM-8	CM-12	CM-16	--
502 X 310	31-6	31-6	CM-4	CM-4	CM-4	CM-6	CM-8	CM-8
502 X 514	31-6	31-6	CM-4	CM-4	CM-8	CM-12	CM-16	--
502 X 700	31-6	31-6	CM-4	CM-4	CM-8	CM-12	CM-16	--
603 X 300	31-6	31-6	CM-4	CM-4	CM-8	CM-12	CM-12	CM-12
603 X 600	31-6	31-6	CM-4	CM-4	CM-8	CM-12	--	--
603 X 812	31-6	31-6	CM-6	CM-6	CM-8	CM-12	--	--
610 X 504	31-6	31-6	CM-4	CM-4	CM-8	CM-12	--	--
610 X 713	31-6	31-6	CM-4	CM-4	CM-8	CM-12	--	--
610 X 908	31-6	31-6	CM-6	CM-6	CM-8	CM-12	--	--

Note: Allowances must be made for unusual loading methods, belt surface conditions, high rate of can handling, or other adverse factors.

Additional horsepower required per foot (kw required per m) of belt loading.

Rail Strength

31-12	31-6	31-3
.002-.03	.005-.10	.01-.20
(.005-.07)	(.01-.23)	(.02-.45)

Also approximately 1 hp. (.75 kw) additional for any transition section

Data based on belt speed of 100 ft/min (30 m/min) or 85 rpm of head pulley.

Tests run at 100 ft/min (30 m/min) belt speed on 1/8-inch (3 mm) 3-ply belt over 16 gage stainless wear plate.

CONSIDERATIONS FOR MOST EFFECTIVE CONVEYING

- Use flattest angle possible
- Use as thin a belt as practical.
- Proper feeding to belt important for maximum volume
- Rolling objects best conveyed by wedging between each other
- Cleats of proper height generally enhance conveying of rolling parts.
- Flat belt surfaces give maximum contact with the product, which provides best conveyance.
- Tight belt conditions develop extra hp. requirements because of transition piece
- Thin as practical non-magnetic wear plates between magnet face and underside of belt limit abrasion.
- Tall parts normally require extra magnet strength.
- Normally belt speed is not a limiting factor except to be considered in the transition of tall objects.
- For conveying large, flat areas of steel (i e., 5 gal. paint buckets or motor laminations) it is generally more economical to provide double or triple row Magna-Rails in preference to the use of one large super strength Magna-Rail.

MAGNA-ROLLS

Magna-Rolls are constructed in several types— with a flat surface or crowned. Contoured and special faces for specific jobs are available, as well as single and multiple gap units.

Choice of Diameters

Virtually any diameter from 2-1/2" (63 mm) and up can be supplied in Magna-Rolls.

The 2-1/2" (63 mm) and 4-3/8" (110 mm) rolls have a narrow air gap which provides maximum holding power and traction for a given diameter.

When arranged side by side on a common shaft, these units are placed with like poles adjacent (N-S, S-N, N-S, etc.) resulting in deeper and stronger magnetic fields and minimum space.

Shafts

Small diameter rolls under 8" (203 mm) must be used on nonmagnetic shafts. Rolls 8" (203

mm) in diameter and larger use steel shafts. Any desired number of individual elements can be placed on a shaft and adjusted laterally to suit conditions, or groups may be joined to form one continuous wider roll.

Wide Magna-Rolls can be furnished wherein only certain areas are magnetic or the entire width can be energized.

Variations in shaft diameters and lengths are available and, because the shafts are not a part of the magnetic circuits, they can easily be replaced or modified to specific requirements.

Special Designs

Magna-Rolls can also be furnished crowned for better belt tracking, or with hard chrome faces for abrasion resistance.

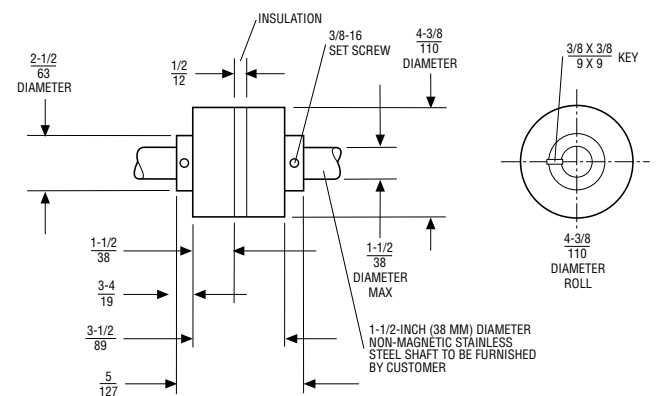
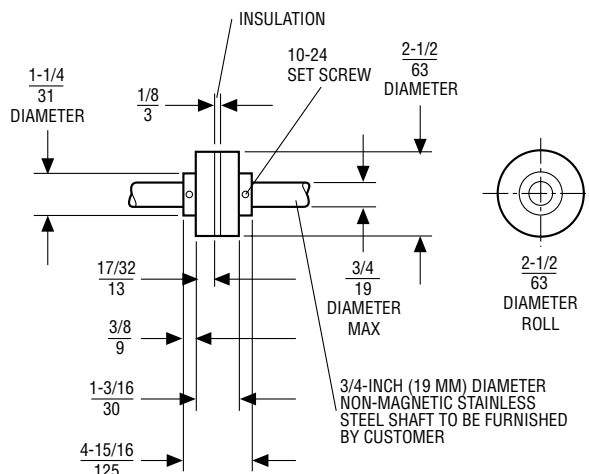
SPECIFICATIONS

TRACTION POWER 2-1/2" (63 mm) DIAMETER ROLL				TRACTION POWER 4-3/8" (110 mm) & 5-3/8" (135 mm) DIAMETER ROLL OR LARGER			
SHEET THICKNESS				SHEET THICKNESS			
in	mm	lb	kg	in	mm	lb	kg
.011	.28	.5	.2	.011	.28	1	.5
.020	.51	1.6	.7	.020	.51	1.75	.8
.029	.74	4	1.8	.029	.74	5	2.3
.250	6.4	14	6.4	.062	1.6	18	8.2
				.125	3.2	30	13.6
				.250	6.4	46	20.9

ROLL DIAMETER		MINIMUM PULLING AT 1/4" DISTANCE*		MAGNETIC FIELD DESIGN	SHAFT DIAMETER	
in	mm	oz	kg		in	mm
2-1/2	63	6	.17	Peripheral	3/4	19
4-3/8	110	68	1.9	Peripheral	1-1/2	38
5-3/8	135	68	1.9	Peripheral	2-1/2	63
8	203	68	1.9	Peripheral	2	50

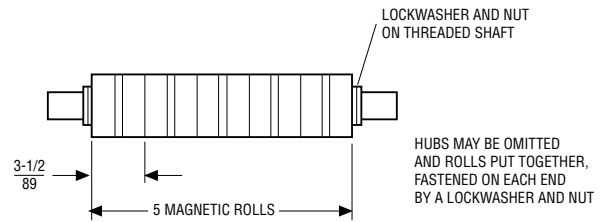
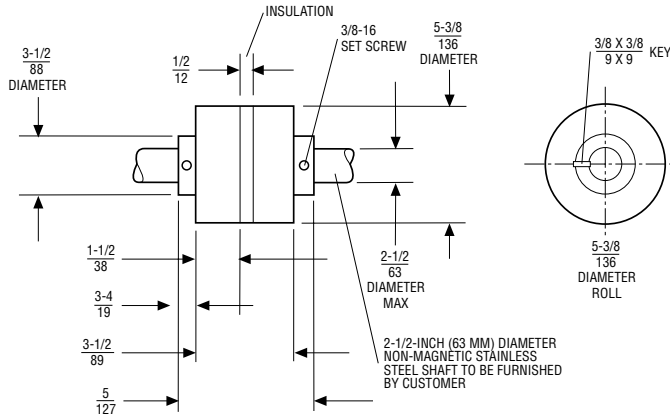
* 1/8" x 1" x 3" Pull test bar used for testing

DIMENSIONS

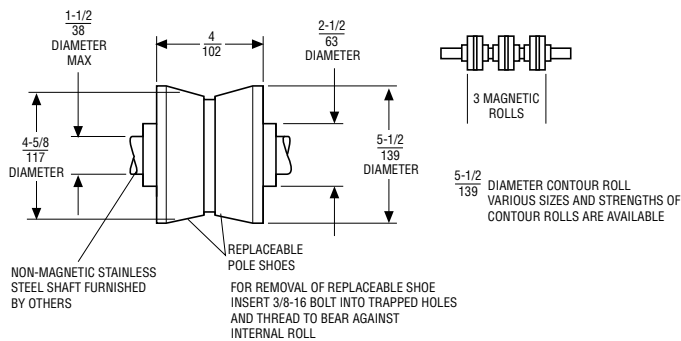


MAGNA-ROLLS

DIMENSIONS



OPTIONAL
.002-INCH HARD CHROME WEAR SURFACE OR
CARBURIZED AND CASE-HARDEN TO RC 60-62
(1.524-1.575), OR ROLL MAY BE MADE OF
SAE 52100 STEEL AND HARDENED.
FOR ROLL DIAMETERS SHOWN ONLY



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