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New London Engineering
STANDARD CONDITIONS OF SALE

The following standard conditions of sale are set forth to give the Seller and the Buyer an understanding of the terms of the sale and provide mutual protection in the transaction. (Required reading for all accounts.)

TERMS AND CONDITIONS OF SALE BETWEEN SELLER (New London Engineering) AND BUYER

1) TERMS OF PAYMENT. Firms rated by Dun and Bradstreet with a "Composite Credit Appraisal" of "good" or "high" and having adequate financial strength will be placed on open account terms. Open Account terms are 1-% 10 days. 30 days Net on unit orders and 30 days Net on parts orders. Any unauthorized discount taken after 10 days will be re-invoiced. Firms not rated by Dun and Bradstreet will be shipped C.O.D. until Seller has been provided with appropriate credit references and information. If these meet above-mentioned financial requirements, the firms will be placed on open account terms. Orders are invoiced from the day of shipment. Terms begin from the date of the invoice. No exceptions. The buyer will be required to pay a late charge of one and one half percent (1 ½%) per month on any balance remaining open 30 days after the date on which payment is due the Seller. The Seller reserves the right to change terms, prices, and specifications without notice.
2) DOWN PAYMENTS. In the event of large dollar volume orders, long lead times, anticipated extended shipment time, or other causes, the Seller reserves the right to require a down payment and/or progress payments. Orders with this type of requirement will not be processed into fabrication until the down payment or first progress payment, as meets contract conditions, is received.
3) NEW ACCOUNTS. If Buyer is in doubt as to its rating with the mercantile agencies, please submit three credit references and the name of the Buyers bank. Provide all names, addresses, and phone numbers.
4) C.O.D. ORDERS. Please include a deposit of 50% with orders for units to be shipped C.O.D., shipment will then go forward C.O.D. against bill of lading for the balance. Parts orders for more than $500.00 will require a 50% deposit.
5) EXPORT ORDERS. Prices for export crating can be obtained by contacting the Sales Department for quotations and placing orders.
6) PRICE CHANGES. Seller may change the prices listed without notice in order to reflect Sellers prices at time of shipment and any increase in transportation, labor, or other costs. If a delivered price has been quoted, any charges at destination for spotting, switching, handling, storage, and other accessorial services and demurrage shall be borne by Buyer. Seller reserves the right to correct any obvious errors or mistakes in specifications or prices.
7) WHEN ORDERING. Please specify name of item; catalog part number, as well as Serial Number of the Conveyor and any other pertinent information, to insure prompt handling of the order.
8) MINIMUM BILLING. $50.00 Net, exclusive of transportation charges.
9) DELIVERIES. Any delivery schedule indicated is based on the Seller's present estimate of the time required to ship after receipt of Buyer's order and is contingent upon Buyer supplying all required technical information to the Seller when needed. In the event of any delay in Seller's performance due in whole or in part to any cause beyond Seller's reasonable control, Seller shall have such additional time for its performance as may be reasonably necessary under the circumstances. Deliveries are normally quoted A.R.O. (After Receipt of Order), which means when the written purchase order is received by the Seller; or A.R.O.A.D (After Receipt of Approval Drawings), which means signed approval drawings with no changes are received by the Seller. All orders are scheduled during a particular week. The Seller will not be required to ship on a particular day. Seller's responsibility ceases when delivery is made to the transportation company. Claims for loss or damage in transit must be handled by the Buyer with the carrier.
10) EXTRA MANUALS. Seller will furnish one combined safety, installation, operation, maintenance, and parts manual. Should extra manuals be required above the one manual supplied with each unit, a price of $10.00 will be charged for each extra manual.
11) SUSPENSION OF PERFORMANCE. If in Seller's judgement reasonable doubt exists as to Buyer's financial responsibility, or if Buyer is past due in payment of any amount owing Seller, Seller reserves the right, without liability and without prejudice to any other remedies, to suspend performance, decline to ship, or stop any material in transit, until Seller receives payment of all amounts owing to Seller, whether or not due, or adequate assurance of such payment.
12) SHIPMENT. Shipment may be by carrier or other means selected by Seller. Title to any goods priced at shipping shall pass to Buyer upon delivery at such shipping point. All units are shipped knocked-down. If shipment is delayed by Buyer, date of readiness for shipment shall be deemed to be date of shipment for payment purposes. If manufacture is delayed by Buyer, a payment shall be based on purchased price and percentage of completion, balance payable in accordance with the terms as stated. Equipment held for the Buyer shall be at risk and expense of the Buyer.
13) WARRANTIES. Seller warrants that material in and workmanship on the equipment manufactured by Seller will be free from defects at time of shipment. If during the first twelve months (or 2000 hours, whichever comes first) of operation after final shipment, the Buyer establishes to Seller's satisfaction that any part or parts manufactured by Seller were defective when they were shipped, the Seller will, at its expense, deliver (but not install) replacement parts. Buyer must contact Seller within the first nine months after sale to Buyer to allow any warranty coverage to be applied. Seller's liability under this warranty is limited to furnishing of such replacement parts and Seller will make no allowance for corrective work done unless Seller agrees hereto in writing. Buyer must check all hardware tightness and reducer oil level and vent plug at time of installation, and retighten any and all hardware loosened during shipping. Damage or deterioration due to failure to check these items, or due to extraordinary wear and tear (including, but not in limitation, use of said equipment to handle products of sizes, weights, and shapes at speeds or methods which differ from information originally provided by Buyer), chemical action, wear caused by the presence of abrasive material or by improper maintenance or lubrication, shall not constitute defect. Seller has made no representations, warranties, or guarantees, expressed or implied, not expressly set forth in the preceding paragraph. Seller shall not be liable hereunder for any consequential or indirect damages included but not in limitation to, damages which may arise from loss of anticipated profits or production, or from increased cost of operation or spoilage of material. The components used in the manufacture of said equipment, which were manufactured by others, will carry such manufacturer's customary warranty, which Seller will obtain for Buyer's benefit upon request. NOTE! To protect warranties on any defective conveyor components (i.e. gearbox, motor, etc.) call the Seller's home office for authorization before disassembling or replacing. Failure to do so will immediately void all warranties and guarantees.
14) SAFETY DIRECTIONS. Seller makes no warranty whatsoever that the equipment and installation of said equipment when placed in operation and use by Buyer will comply with pertinent national, state, and local health and safety laws, including but not in limitation, the Federal Occupational Safety and Health Act (OSHA) and the regulations, standard rules and orders issued pursuant to any such laws. Buyer shall be solely responsible for compliance therewith for any damages, penalties or fines arising from non-compliance; provided however, that Seller shall cooperate with Buyer in the design, manufacture or purchase of safety features or devices which Buyer deems to be necessary under OSHA or any other statute, ordinance or governmental regulation, the price at which any such further equipment or service shall be furnished by Seller and shall be at Seller's standard prices then in effect, or as agreed upon between Seller and Buyer. Unit applications, locations, the proximity of any and all persons to the equipment or any moving parts or materials, and

customer specifications determine the type, quantity and/or placement of electrical, electrical safety or other safety controls required. Whether these controls are supplied by *New London Engineering* or another supplier, all OSHA safety and health standards, the National Electrical Code and local codes must be followed.

15) TOLERANCES AND VARIATIONS. All goods shall be subject to tolerances and variations consistent with usual trade practices regarding dimension, straightness, section, composition, and mechanical properties and normal variations in surface and internal conditions and quality and shall also be subject to deviations from tolerances and variations consistent with practical testing and inspection methods.

16) RETURNS. In the event a failure should occur in any of the parts of the machine during the warranty period the following procedure must be followed to return and receive replacement parts and/or receive permission for on-site repairs and/or repair charges. A minimum 25% handling charge will be made on all returned goods. *CONTACT NEW LONDON ENGINEERING IMMEDIATELY AS TO THE NATURE OF THE PROBLEM.* *A) PARTS: 1) at this time, replacement parts will be sent prepaid. These parts will be invoiced for the normal selling price.*

2) In a few days, you will receive a Returned Goods Authorization (RGA) slip, which will be your authorization to return the problem parts to NLE prepaid. (The Returned Goods Authorization slip must accompany the problem parts or they will be refused).

3) When the problem parts are received in NLE's plant, our claims department and/or the manufacturer of the components will determine if the parts are covered under warranty. If the parts are determined to be defective NLE will issue the proper credit for them. If the parts are determined not to be covered by warranty, you will be required to pay the full invoice price.

B) REPAIRS OR REPAIR CHARGES (ON-SITE):

1) An estimate of the cost of repairs, in hours, material and dollars must be given in writing to Seller along with an accurate description of the problem.

2) The Seller reserves the right to grant permission for repairs, or to arrange to have NLE employees or agents repair the equipment on-site, or to request the return shipment of the unit(s).

3) The Seller will not accept any back-charges or accept any returned parts or units made or shipped, unauthorized by the Seller.

Seller Also Reserves The Right To Not Accept The Return Of Any Goods Which It Deems To Be Related To Good Safety Practices.

17) COPYRIGHT. No reproduction either in whole or in part may be made of the Seller's catalog, drawings, sketches, etc., without written permission from NLE's Sales department.

18) BACK ORDERS. Seller will attempt to ship all orders complete; however, in the event of back orders, the orders will be shipped with freight charges, collect or prepaid, at Sellers option only.

19) CLAIMS. Claims for shipping shortages, concealed or otherwise, will not be allowed by Seller, unless reported within 30 days after shipment of merchandise. Shipments travel at Buyer's risk and all damaged freight claims will be the responsibility of the Buyer.

20) PRODUCT CHANGE. Products of modular design with standardized components as represented in Seller's catalog have been one of the main features of its equipment over the years. However, Seller reserves the right to make changes without notice, in the interest of product improvement, delivery, or the application of new materials.

21) TOOLS, DIES, AND FIXTURES. Unless otherwise expressly provided herein, any tools, dies, or fixtures which may be developed for Seller in the production of the goods covered hereby shall be owned by Seller, as Seller may elect, even though you are charged in whole or in part for the cost of such tools, dies, and fixtures.

22) PATENT INFRINGEMENT. If any of the goods are to be furnished to Buyer's specifications, Buyer agrees to indemnify Seller and Seller's successors and assigns, against all liabilities and expenses resulting from any claim of infringement of any patent in connection with the production of such goods. NOTE: Unless requested and agreed upon in writing by Buyer and Seller before the start of engineering and/or manufacturing (concept drawings or sequences put forth during original proposal or quote will constitute the start of engineering) the Seller will not be held to any secrecy or exclusivity clauses by the Buyer, and Seller shall retain all patent rights for any equipment designed or manufactured by the Seller.

23) SPECIAL DRAWINGS OR DATE REQUIREMENTS. If a customer should require one or more special drawings larger or different than the standard 8 ½" x 11" line drawing in our catalog, Seller will have the option to charge for the master drawing or copies as requested. Consult the Seller for prices on any special drawings or date requirements, or drawings required on magnetic media, such as 3 ½" disks. Sepias and/or other original drawings are not available.

24) CANCELLATION. An order may be cancelled or modified only by written agreement between the parties. Buyer insistence upon canceling or suspending fabrication or shipment, or Buyer's failure to furnish specifications when required, may be treated by Seller as a breach of contract by Buyer, and Seller may cancel any unshipped balance without prejudice to any other remedies Seller may have. Cancellation charges can be obtained from the Sales department.

25) TAXES. All applicable federal, state, or local sales use, occupational or excise taxes are the responsibility of the Buyer and shall be in addition to the price or prices stated unless otherwise specifically stated. Seller shall have the right to invoice separately any such tax as may be imposed at a later time. Applicable tax exemption certificates must accompany any order to which the same applies.

26) MODIFICATIONS OR ALTERATIONS TO EQUIPMENT. Modifications or alterations to the equipment without express written consent of the Seller-Manufacturer is forbidden. Failure to obtain consent in writing relieves the Seller-Manufacturer from any and all liability for said product.

27) EQUIPMENT OPERATION. Buyer agrees to require its employees to read and be familiar with the safety instructions and the operation and maintenance portion of the manual before operating this equipment. Buyer agrees to completely train and require its employees to use all safety devices and guards on the equipment and to use safe operating procedures. Buyer agrees to not remove or modify any such equipment, switch, device, guard, or warning sign or allow it to fall into disrepair. If Buyer, or its employees, fails to strictly observe all these obligations, Buyer agrees to indemnify and save Seller harmless from any liability or obligation incurred by the Seller to persons injured directly or indirectly by the operation of the equipment.

28) RESALE, TRANSFER, OR LEASE OF EQUIPMENT TO OTHERS. Buyer agrees to the continuing obligation to notify Seller of the resale, transfer, or lease of the equipment to third parties, stating the name and address of the new owner or transferee and the location of the equipment.

29) REPORTING PERSONAL INJURIES OR PROPERTY DAMAGE. The Buyer or user agrees to notify Seller within 30 days of any accident or occurrence involving Seller's machinery or equipment resulting in personal injury or property damage, and shall cooperate fully with Seller in investigation and determining the cause of such accident or occurrence. In the event that the Buyer or user fails to give notice to Seller and so cooperate, the Buyer or user agrees to indemnify and save Seller harmless from all loss or damage arising from such accident or occurrence.

30) ASSIGNABILITY. Any contract for sale and purchase of machinery and equipment cannot be assigned except with the written consent of Seller.

31) SUCCESSOR OWNERS AND USERS. The terms and conditions hereof are binding on successor owners and users, who take by purchase, assignment, lease, or otherwise, the right to own, use or operate the equipment sold to the original buyer, and said terms and conditions shall transfer with the equipment itself as an integral obligation of any successor to the original buyer. The successor owner and user obligations and liabilities stated herein shall also apply if the original buyer was a dealer and purchased the equipment from Seller for purposes of resale and transfer to third parties.

32) INSTALLATION AND ERECTION. Installation and erection of the equipment or supervision thereof by Seller, if specified or requested by Buyer, shall be governed by Seller's Standard Conditions of Erection and Installation and/or other specifications contained in the written order.

33) ENTIRE AGREEMENT. These Terms and Conditions of Sale constitute the entire agreement between the parties concerning any machinery or equipment sold and purchased. It shall not be modified or cancelled except by mutual agreement in writing and signed by all parties.

34) APPLICABLE LAW. The laws of the State of Wisconsin shall govern and control the right, duties, remedies, and obligations of Seller, Buyer, successors, users, and owners and Wisconsin law shall be used to interpret and construe all of the terms and conditions hereof.

GENERAL: Seller shall not in any event be liable for indirect special consequential or liquidated damages or penalties.

WARRANTIES

Seller warrants that material in and workmanship on the equipment manufactured by Seller will be free from defects at time of shipment. If during the first twelve months (or 2000 hours, whichever comes first) of operation after final shipment, the Buyer establishes to Seller's satisfaction that any part or parts manufactured by Seller were defective when they were shipped, the Seller will, at its expense, deliver (but not install) replacement parts. Buyer must contact Seller within the first twelve months after sale to Buyer to allow any warranty coverage to be applied. Seller's liability under this warranty is limited to furnishing of such replacement parts and Seller will make no allowance for corrective work done unless Seller agrees hereto in writing. Buyer must check all hardware tightness and reducer oil level and vent plug at time of installation, and retighten any and all hardware loosened during shipping. Damage or deterioration due to failure to check these items, or due to extraordinary wear and tear (including, but not in limitation, use of said equipment to handle products of sizes, weights, and shapes at speeds or methods which differ from information originally provided by Buyer), chemical action, wear caused by the presence of abrasive material or by improper maintenance or lubrication, shall not constitute defect. **Seller has made no representations, warranties, or guarantees, expressed or implied, not expressly set forth in the preceding paragraph.** Seller shall not be liable hereunder for any consequential or indirect damages included but not in limitation to, damages, which may arise from loss of anticipated profits or production, or from, increased cost of operation or spoilage of material. The components used in the manufacture of said equipment, which were manufactured by others, will carry such manufacturer's customary warranty, which Seller will obtain for Buyer's benefit upon request.

NOTE! To protect warranties on any defective conveyor components (i.e. gearbox, motor, etc.) call the Seller's home office for authorization before disassembling or replacing. Failure to do so will immediately void all warranties and guarantees.

To obtain an RGA (Returned Goods Authorization), contact the Customer Service department at New London Engineering.

NEW LONDON ENGINEERING
PRODUCT SAFETY STATEMENT

To: All of our customers, their operators, staff, and vendors

NLE works hard for safety, but needs to remind you of the increasing OSHA-mandated responsibilities of owners to TRAIN their operators in safe operation and maintenance practices. This manual cannot be considered to be complete as an aid in this training. Please consult your nearest OSHA office for training guidance including Lock-out/Tag-out procedures.

NLE requires and expects the customer/owner to comply with all applicable safety code standards and good construction and operation practices.

New London Engineering strives to make its products SAFE. Often, however**, NLE's** customers resell conveyors, or reuse them in completely different applications. NLE cannot control any unknown new uses or modifications, or assure their suitability or their compliance with applicable safety codes and practices. **NLE** offers its assistance to any customer in achieving the safe and productive reuse of good equipment. Some numbers of pertinent safety codes, standards, and regulations are printed later in this section (Pgs.12-13), along with their mailing addresses. The customer is referred to these and all applicable safety codes and practices for final guidance.

NLE will continue its best efforts to design, build, and market safe products, and will continue to advocate and urge their safe application, installation, and operation.

NLE requests your written or faxed suggestions as to how its product could be improved in its safety, convenience of use, function, maintenance, or repair. Please date and sign your suggestion, and send it to:

New London Engineering
Attn: Product Safety and Planning
1700 Division Street
New London, WI 54961
Phone: (920) 982-4030 / (800) 437-1994
Fax: (920) 982-6800

SAFETY ALERT AND WARNING SIGNALS

Three Safety **SIGNAL** words shown below are used similarly throughout industry, for your quick understanding of the level of particular risks:

CAUTION: Indicates a potentially hazardous situation, if not avoided, may result in *minor or moderate injury*. It may also be used to alert against unsafe practices.

WARNING: Indicates a potentially hazardous situation, if not avoided, could result in *death or serious injury*, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

DANGER: Indicates an imminent situation, if not avoided, will result in *death or serious injury*. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

This manual must be read completely by each person involved with the conveyor. The customer must further train each operator in all areas of safe operation and maintenance. All machines have inherent hazards, such as moving parts, sharp edges, and electrical power. **Personnel must be trained** in identifying and avoiding all their hazards. The very last page in this section serves as a sign-off sheet to show everyone's name after they have read and understood at least this part of their safety training. Use other sign off sheets for the remainder of your safety-training program. **All warnings and safety regulations must be read, understood, and obeyed.**

Only authorized and trained personnel are to be allowed near this machine. All safety features are to be kept intact and operational. Contact NLE at any time for improving safety levels through the use of additional optional equipment. Plan now to create a safe and productive workplace.

This machine must not be altered in any manner, or operated with any missing guards or any damaged, missing, or malfunctioning parts. If any modification is deemed necessary to accomplish the user's requirements, write or fax a description including a sketch or drawing to NLE describing the anticipated changes or new uses. Include the machine identification (Serial Number, Model Number), condition, and any previous modifications.

WARRANTY IS VOIDED BY ANY CHANGES, WHICH ADVERSELY AFFECT SAFETY, OR ADD SIGNIFICANT UNAUTHORIZED LOADS OF ANY KIND TO THE NLE EQUIPMENT.

Remember that **NLE** may be able to help the customer or user discuss and avoid unintentionally creating hazardous situations. Careful attention by the customer on-site must be used for safe transfer of product from one machine to the next, and providing accessible space for proper operation, inspection, and cleaning.
Some other safety factors to keep in mind are slippery spillage of material, safe personnel traffic lane requirements around the machines, noise levels, dust pollution, dangerous automatic startup, and handling of hot or toxic materials.

The user is warned to consider each and every machine involved with this one from NLE, because of the hazards of interfacing one machine to the next. Machines can interfere with the moving product and with each other in unexpected ways, causing damage to themselves, and possible injury to nearby workers. Never pretend there is only one machine involved in a safety decision; this is seldom the case.

GUARDING "OPEN" SYSTEMS

The customer is warned and instructed that any open system requires the use of certain barriers, grates, guard rails, or other guarding to prevent a person from falling or reaching into or coming into contact with the moving parts or materials.

NLE requires and assumes that no one will step on, step across, or step over the conveyor or hopper opening at any time. This is obviously dangerous because these items were not designed as walking surfaces or to handle extra loads; and movement of material or conveyor belts could occur unexpectedly. Forbid personnel from climbing onto or over parts of the conveyor or hopper; it was not designed for this. Instead, install crossovers, ladders, and guards, which comply with OSHA regulations. No person may ever ride the conveyor. **Owners shall affix warning signs on the conveyor reading Do Not Ride or Walk on the Conveyor!** Signs with this message from **NLE** are listed at the end of this safety section (Pg 14) .

Extreme care is required in any conveyor used as a "pick line" to prevent employees from ever becoming entangled with passing material or moving parts of the conveyor. Always use pull rope switches there.

WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

GUARDING ALL DANGER POINTS

An important concept that OSHA uses is guarding the **POINT OF OPERATION**. This is **any point where the machine can injure an employee**. OSHA requires these potential danger points to be guarded without any remaining opening large enough for an employee to hurt themselves if they stuck any part of their body into that hole.

Guards less than a finger's distance from **danger** must have no hole large enough for any finger to fit through. Guards less than an arm's distance from danger must have no hole large enough for any arm to fit through. Keep these OSHA regulations in mind when you look at guarding your machines, especially where they fit together.

Danger Points can be said to be "GUARDED BY LOCATION", if they are far enough from any person's reach that no foreseeable operator or curious passerby could be injured. This usually means that they are more than eight feet from the walking or working surface nearby. Consult OSHA regulations for clarification.

SAFE WALKWAYS NEAR CONVEYORS OR HOPPER OPENINGS

Walkways near machines should be marked with yellow sidelines to keep workers away from any hazardous moving parts. Whenever conveyors or machines are mounted overhead, above aisles or other passageways, a minimum clearance of 7' 0" measured vertically from the floor or walking surface to the lowest part of the conveyor or its guards shall be provided. **At least 8' 0" is required below the lowest moving parts of any unguarded pinch points**. Provide safe walkways for every employee. Alternate passageways or crossovers may be required for proper access to emergency exits.

Overhead conveyors shall be guarded by spill guards, catch nets, bottom pans, guard rails or the equivalent, to avoid the possibility of the material falling off the conveyor for any reason.
WARNING: *FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH.*

OPERATION TRAINING REQUIREMENTS

The customer/owner must develop a **TRAINING PROGRAM** for all the employees, including instruction in **safe** machinery operation and in emergency procedures. Only trained employees shall be allowed to operate and maintain conveyors or other machines, or to perform work in their immediate vicinity. Untrained employees must never be allowed to do this. **Different training is always required for maintenance**. It must cover safety concerns for maintenance on powered equipment, verification of competence and use of proper tools and procedures. A concern for the safety of others is required.

All employees shall know proper **LOCKOUT/TAGOUT procedures** and lock and tag supply locations. This is very important. **A written program for your particular location is required**. Besides preventing accidents, a lockout/tagout program can help avoid costly fines…and OSHA is rigorously enforcing lockout/tagout laws.

Train maintenance personnel in the location of lockout tags and padlocks too. A yellow visible board for these must be easily accessible, in accordance with OSHA section 1910.147. **Before restarting any conveyor, all personnel near it must be warned that it is going to start up.** Conveyors interlocked to automatically restart require warning horns before restarting. All controls, power disconnects, and safety switches shall be **well-labeled**, easy to spot, and never blocked from easy access. All personnel shall be trained to identify these switches correctly.
A conveyor shall only carry the amount and type of material or product that it is capable of handling safely. Training in avoiding overloads is required. Emergency procedures must be known. Under no circumstances shall the safety characteristics of the conveyor be altered. Unsafe work or maintenance habits must not be permitted. Safe work is serious business.

Regular routine inspections shall be enforced to insure that all safety features actually work and have not been removed or defeated. All guards and stickers must be in place. Remember that all the employees must be kept safe and this can't happen with missing or broken safety devices.

MAINTENANCE SAFETY

Preventative maintenance programs are very cost effective, ensuring that all conveyor components are maintained for long life and safety. Record keeping and setting up a calendar of maintenance for each machine can be combined into a comprehensive program that reduces accidents and breakdowns. Maintenance safety training is required for anyone ever expected to perform any maintenance. This helps prevent accidents, lost time and downtime.

Even simple maintenance such as lubrication and adjustments shall not be performed by untrained people, but only by your qualified and trained maintenance personnel. They need to know what to check and how to service the conveyor, and how to do this in a safe manner. Access covers have been designed to require tools to remove; this prevents untrained operators with no tools from getting into dangerous areas of the machine.

There must be a safe amount of room for maintenance. In-floor pits must allow easy removal of covers and shafts, and be well lighted. Access to conveyor sections above head height must be steady work surfaces. Ready access to switches is important.

Cleanliness has been seen to be very important both around the operator positions and inside the machines. Spilled materials can cause operator tripping or slipping hazards. Material carryback or buildup inside the conveyor can quickly damage costly components and adversely affect conveyor operation. Keep material buildup to a minimum. Inspect regularly inside the unit.

All access covers and safety guards must be securely in place before restarting machinery, even temporarily. All guards must be in good repair, with all warning stickers visible and legible. *Replacement stickers are available at no charge from NLE*. A copy of these stickers is located near the end of this section.

If there ever needs to be re-leveling of large conveyors, only qualified personnel, with adequate equipment should proceed.
Whenever practical, **DO NOT lubricate the machine while it is powered**. Only trained personnel who are aware of the hazards of moving parts shall ever be allowed to do any lubricating. Optional automatic lubrication systems can be purchased from NLE for some of these tasks. Do not avoid lubricating just for safety reasons. Always keep your machine correctly lubricated, but it must be done safely!

SAFETY STANDARDS AND CODES

NLE requires and expects the customer/owner to comply with all applicable safety code standards and good construction and operation practices. Following these paragraphs is a list of standards that may apply to your machine. This list is included for your convenience, does not necessarily contain all codes and standards, and is to be updated by you periodically.

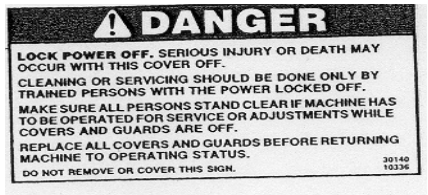
NLE recommends that you all make a sincere effort to keep yourselves informed on safety topics and have the latest versions of all regulations on hand. Safety standards are constantly evolving, and it requires vigilance to remain fully informed and protected.

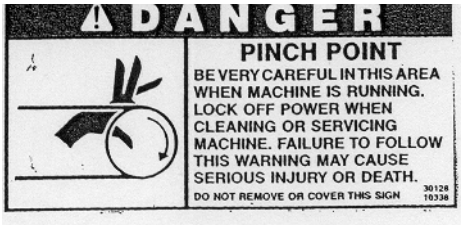
SAFETY CODE TOPICS	CODE SECTION NUMBERS
Backstops, Brakes (are they required?)	**OSHA 1910.27d, 2, 5**
Drive Guards	OSHA 1910.219m; 1910217c2b
Electrical Codes and Regulations	**NEC; OSHA 1910.300**
Emergency Stop Switches	ANSI B20.1 paragraph 5-11.2c
Guards and Covers	**ANSI B20.1 paragraph 5.09.1.1**
Inlet Grates, Covers for Openings	OSHA 1910.272j
Interfacing Adjacent Machines	**ANSI B20.1 paragraph 5-11.2c**
Ladders	OSHA 1910.24b
Lockout/Tagout	**OSHA 1910.147**
Platforms	OSHA 1910.23c3;1910.23e;1910.24b
Point of Operation Guarding	**OSHA 1910.212a3; 1910.217c2b**
Refrain From Altering Any Safety Characteristics	ANSI B20.1 paragraphs 5-12.7
Shafting and Coupling Guards	**OSHA 1910.219;10910.219c4;1910.219j**

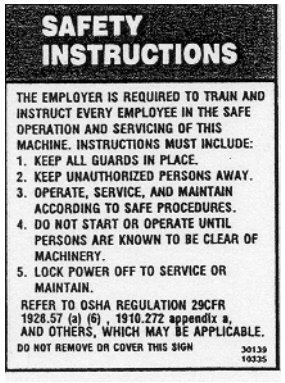
ADDRESSES FOR OBTAINING SAFETY CODES

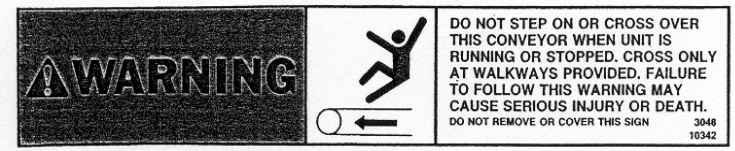
ANSI	**American National Standards Institute** **1430 Broadway** **New York, NY 10018**
OSHA	Office of Mechanical Engineering / Safety Standards, Room M 3621 OSHA Department of Labor, 200 Constitution N.W. Washington, D.C. 20210
ASME	**American Society of Mechanical Engineers** **347 East 47th Street** **New York, NY 10017**
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
ASAE	**American Society of Agricultural Engineers** **2950 Niles Road** **St. Joseph, MI 49085**
NEC	National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
UL	**Underwriters Laboratories** **207 East Chicago Street** **Chicago, IL 60611**

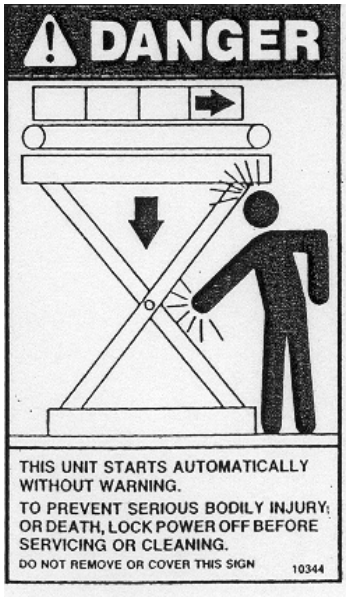
SAFETY SIGNS

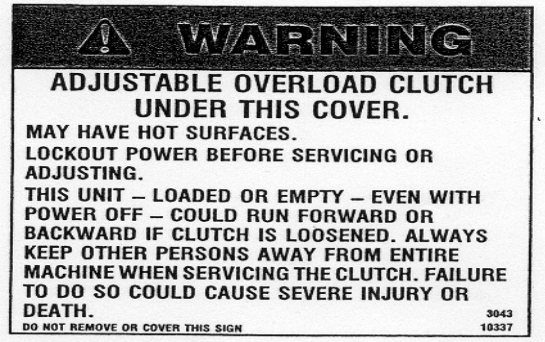


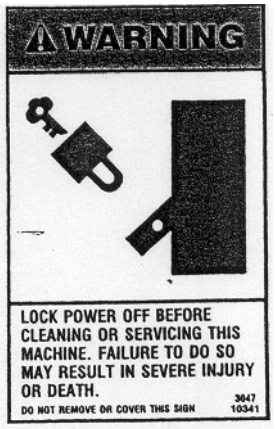












SIGN OFF SHEET FOR ALL EMPLOYEES

The owner or employer responsible for the safe operation of this machine shall instruct all persons who may come into contact with it how to do so in a safe manner. This training shall include LOCKOUT/TAGOUT procedures, safe operation and maintenance, and good housekeeping.

HAVE EACH PERSON READ THIS MANUAL. Check their knowledge and then have them sign below, indicating that they understand all of the safety regulations pertinent to your machine. If there is a language barrier or other restriction to their understanding, this manual should be read to them and further questions asked. **Have them sign below only after they have demonstrated their understanding and use of the safety practices in this manual.**

Remember that this manual is only part of an adequate training program. It must be coupled with specific instructions for this particular application and with full information of national and local safety regulations that may apply.

I certify that I have read this manual, acquired all applicable safety and operating knowledge for this machine:

NAME (PRINT)	DATE	INITIALS

RECEIVING YOUR CONVEYOR

UNLOADING: Make sure that unloading personnel are qualified and properly equipped for your particular unloading situation. Don't attempt to use a forklift truck if you really require a crane! Twisted frames are difficult to repair. Use the correct rigging slings and lifting equipment to avoid any frame twisting. Use lifting sling and chain spreaders to avoid compressing or bending portions of the conveyor.

- **Immediately** upon arrival of your shipment, inspect the outside carton or skid for damage. Open the box and inspect for missing items. If your shipment is flawed, stop unloading and request immediate inspection by the carrier. Take exception on the delivery receipt by including damage description words; for example, "2 cartons gouged" or "corners crushed". Takes photos and keep any original containers on hand for carrier inspection, or **it becomes very difficult to get your damages reimbursed**.

- Start a document file for each short or damaged shipment, and don't delay in filing a claim against the carrier once the amount of damage or loss is known. The time limit is less than nine months for domestic truck shipments. Claim forms are available from the delivering carrier.

- Plan to have enough room to temporarily store all of the pieces out of the weather. If the conveyor will not be installed immediately take all necessary precautions to protect your investment. Lubricate unpainted parts (like shafts), cover the conveyor, and protect it from being bumped, and store copies of the instruction manual where you can find them later.

- Check your shipment to verify that all operating components have arrived safely and that all parts have been shipped. NLE recommends that this be done right away to avoid delay when assembly of the conveyor is done.

UNPACKING YOUR CONVEYOR

- Your conveyor will most likely have been shipped and protected in a long cardboard box or on a wooden skid. The conveyor sections and supports can be found loose in the box or strapped to the conveyor. The drive components are generally mounted to the drive section.

  - ***For missing components that are not shown as being backordered on the packing list, notify NLE immediately. Give the following information:***
    Name of Dealer or Representative
    Serial Number
    Description of Items Missing

- Identify all the loose parts and sections from the drawings located in the back of this manual. You may also cross-reference your packing slip and/or approval drawings.

- Supports are shrink-wrapped and packed in the long box, strapped to the skid, or already attached to the conveyor sections. In most cases, the smile brackets (support mounting brackets) are already attached to the frame. To mount supports, refer to "Support Identification" section of this manual.
- Options, such as Discharge Chutes or Infeed Hoppers, are either mounted to the conveyor or shipped on a separate skid or box. In most cases, these parts bolt to the conveyor and will have the mounting hardware located in a cloth bag that will either be taped to the part or labeled for it.

- In the event, you find a part that you feel you do not need or is not correct for your conveyor, please contact our Customer Service Department @ (800) 437-1994, for assistance.

GENERAL INSTALLATION

All installers MUST read this manual before proceeding. The customer's sign-off sheet is located on the back page of the Safety Section and should be used to enforce training and familiarization with this installation. Call your New London Engineering Representative or experienced millwrights if questions arise.

INSTALLATION REQUIREMENTS:

- ✓ Use experienced and trained riggers, millwrights, installers, and licensed electricians. This is the only approach approved by New London Engineering and is entirely for your safety.

- ✓ Supports should be securely added as soon as each section is put into place. Use as many installers as required for safety. Check machine leveling and adjust it frequently during the installation. Belt tracking later depends heavily on the levelness of the conveyor.

- ✓ Support anchors and customer-supplied supports must be adequate for all foreseeable loads, including any offset drive weight at the drive section. If possible, lateral bracing from building columns or adjacent machinery should be considered.

- ✓ Hardware tends to loosen during shipment, and should be tightened correctly. Tighten all bearings and sprocket set screws; they are especially important for dependable operation of your unit. As sections are assembled into place, check all hardware for tightness. *You are responsible for any damage caused by loose hardware that was not tightened at this time.* Recheck hardware regularly, to protect your investment and your workers.

- ✓ Check the access to operator positions. There must be room around the various parts of the conveyor both for its operation and for maintenance procedures. Add any guardrails or safety devices now, before the unit is ever put into service.

- ✓ Check that all warning stickers are visible and legible. Use these where they will do the most good. Additional stickers are available upon request from New London Engineering.

ELECTRICAL INSTALLATION

National Electrical Codes are laws for safety. They must be followed, under the guidance of your local electrician, inspector or licensed journeyman electrician. Here is how this helps you:

1) It allows good machine control, protecting operators from mechanical accidents when material jams.
2) It safeguards personnel from electrical shock injuries.
3) It safeguards the machine and its connecting wires from major short circuit current damage.
4) It also safeguards the machine from slight amounts of over-current that can slowly overheat motors and wires, causing fires.

WARNING: Failure to follow Electrical Code requirements could result in serious injury or death.

Many conveyors can be electrically reversed, but check that they are not able to jam with loaded material when doing so. Your controls must be clearly labeled which direction is which, for safety.
New London Engineering recommends that motor direction must be verified before attempting to run the conveyor itself. If you are unsure which direction is backwards and which is forwards, be sure to ask someone who knows. Disconnect the drive chain before wiring the motor. Check the rotation of the reducer shaft. Complete all connections and replace all guards.

Do not install this machine without a lockable electrical disconnect switch.

New London Engineering cannot know all of the uses and applications of its units, but recommends the installation of one or more emergency stop switches on each installation. These may be purchased through your New London Engineering Representative. The customer will have to determine the number and location of emergency stop switches. These can be palm button switches, pull rope switches or other approved types. Save your personnel; save your investment; use stop switches.

Variable Speed Controls can be included on any installation. Most of these are the DC-type, requiring DC motors. ALWAYS disconnect and lock out electrical power before working on these controls. It is very easy to accidentally short out the solid state components inside these controls. Read their directions carefully then call your New London Engineering Representative if troubleshooting questions remain.

Photo eyes, proximity sensors and limit switches can be used to control the magnetic starter of a conveyor. These options are simple to install and are available through your New London Engineering Representative. With them, a conveyor can start and stop as required to move your product in, as it is sensed in particular locations. Extreme care must be taken around any conveyor that can start up without warning. Warning lights or horns may be required. If your conveyor could ever start without warning, then regular training, guarding, and safety stickers may be required.

Complex control or interlocking of an equipment system so machines operate together or in timed sequences, is always best left to an expert. This interlocking is often accomplished using programmable controllers, which should be able to activate the warning horns before machines can automatically restart. Programmable controllers are available as options through your New London Representative.

All electrical options require additional operator and maintenance personnel training. The customer must do this as soon as possible. Operator confusion about how to control, stop, slow down, or otherwise operate the machine can result in a dangerous and costly accident. Maintenance confusion can result in ruined controls unless the directions are read and understood. Always keep copies of these directions in a clean location where they can easily be found and referred to.

Familiarize yourself with the four main areas of Electrical Safety:

1) Operator Physical Safety

The first area for safety, operator physical injury, requires the physical guarding of all moving parts of the equipment. This means that electrical disconnect switches should be padlocked in the off position before work on movable parts is begun. Learn Lockout/Tagout requirements and train all employees immediately. Always install emergency stop switches near open areas and operator areas, to minimize injuries from accidental contact with moving material or equipment parts. Eliminate accidents before they happen with thorough training.

2) Electrical Shock Hazards

The second area, electrical shock hazards, requires properly sized and protected wiring and electrical equipment. Code requirements for wiring, grounding and conduit must be followed. The entire installation must be inspected periodically to catch any deterioration in your exposure to these and other risks. Use first rate components and install them properly. Don't ever allow workers to abuse them.

3) Short Circuit Protection

The third area, short circuit protection, requires properly sized fuses or circuit breakers for each and every section of the electrical distribution system. The code requires different sized protection and wiring in different sections. This is the only way to protect the entire system adequately.

4) Slight Over-currents

The fourth area, slight over-currents, can actually cause a lot of damage because it cannot be stopped with just fuses or circuit breakers, which are only available in so many sizes. Instead you must use magnetic starters with accurately sized heaters. Heaters are sensitive enough to prevent damage from slight overloads and low-voltage situations. The newest types of starters use adjustable heaters. In either case, your electrician should size or adjust the heaters based on actual full load amperages located on the motor nameplate. This will protect your motor investment.

Magnetic Starters also prevent dangerous unexpected restarting after power outages, and allow remote control switches, emergency stop switches and low speed switches to be used. These are important reasons why magnetic starters are code-required.

Magnetic Starters, emergency stop switches, variable speed controls, and other electrical components are available from your New London Engineering Representative, and should be included in your final installation, as required by the National Electrical Code and by your particular situation.

CONVEYOR ASSEMBLY/ SET UP

Once you have checked your shipment, unpacked, and identified your conveyor sections and supports, you can begin the assembly of it. Only common hand tools are required to assemble your conveyor, such as open-end wrenches, Allen wrenches, a level and a tape measure.

- Before you begin to install:
  - Make sure there will be adequate room for maintenance and operation activities.
  - Make sure there will be adequate room to remove the drive shaft, for instance, and access to the drive area should be easy.
  - Crossovers may be required for operators normal traffic patterns.
  - Never allow employees to climb on or to walk over the conveyors.
  - Overhead conveyors need floor space for ladders during maintenance work.
  - Good lighting is important everywhere.

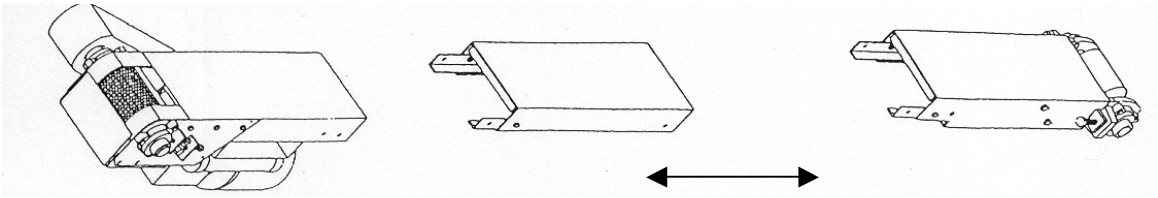
If your conveyor is made of bolted construction, bolt the sections together using the splice plates that are provided. Splice plates are generally shipped on the end of the conveyor sections or in a cloth bag. If the conveyor is a welded construction, you may be required to weld them in the field.

PLASTIC BELT CONVEYORS

If the conveyor is a one-piece frame or less than 10' long, it will come assembled. The belt will already be installed but will need to be tracked. The supports will need to be mounted to the conveyor (Refer to "Support Identification" section of this manual) for locations. All bolts will need to be tightened prior to start up.

If your conveyor is longer than 10', please see the following instructions:

- Start with the assembly of the Frame first:
  - Start at the **infeed** end, by attaching it to the longest of the **intermediate** sections. Continue to assemble shorter intermediate sections, finishing with the **discharge** section of the conveyor. Typically, the splice plates are attached as illustrated below. If not, you will find
  - them in the attached cloth bag.
    - Some conveyors, especially those with inclined sections, list a different order of intermediates, as required for proper positioning of supports, knee braces, or center drive options. Refer to the Approval Drawings for these circumstances or contact your New London Engineering Representative.
    - A Center Drive will generally ship already mounted to the **intermediate** section. In these cases, you will have (2) Infeed Sections.
  - Tighten all hardware firmly.



- When you are ready to attach the supports, refer to "Support Identification" section of this manual.

DISCHARGE **INTERMEDIATE** **INFEED**

Once the frame and supports are attached, check the conveyor to make sure it is level and square.

PREVENTATIVE MAINTENANCE SCHEDULE

GENERAL INSPECTIONS AND MAINTENANCE:	FREQUENCY
Inspect Conveyor for damages.	At Delivery
Inspect Shipment for missing pieces.	At Delivery
(You have 30 Days to report missing components)	
Locate, read, and protect your instruction manual.	At Delivery
Check conveyor levelness and true-ness.	At Installation
Clean around operator areas, infeed, and discharge.	Daily
Check inside the frame for material build-up.	Weekly
Clean off motor and reducer.	Monthly
Check and adjust belting take up tension.	Monthly
Check frame for corrosion, cleanliness, and damage	Monthly
Check drive chain tension	BI-Monthly
Retighten setscrews and drive mounts.	Semi-Annually
Check electrical amperages and connections.	Annually
LUBRICATION MAINTENANCE:	**FREQUENCY**
Lubricate the main drive chain.	Monthly
Carefully lube the bearings.	Quarterly
Check reducers lube level.	Quarterly
BELT MAINTENANCE:	**FREQUENCY**
Check the belt length – See "Belt Length Maintenance" and	After 24 hrs of operation/
"Catenary Sag" sections of this manual.	Monthly for (3) months
Check the belt sprockets and wearstrips for signs of wear or damage.	Monthly
Check the sprockets for proper engagement with the belt.	Monthly
Check the belt return system for worn or damaged rollers, shoes or wearstrips.	Monthly
Check the belt connecting rods for wear (remove a couple of them at least part way).	Monthly
SAFETY REQUIREMENTS:	**FREQUENCY**
Make extra copies of this manual.	Immediately
Train new employees in all safety areas.	At Hiring
Check that all safety guards are in place.	Weekly
Check that all warning stickers are readable.	Monthly
Conduct regular Operation and Safety Training.	BI-Monthly
Update all safety regulations and literature.	Annually

PREVENTATIVE MAINTENANCE AND TROUBLE SHOOTING

Belt Length Maintenance

A principle for smooth operation of a plastic belt is to properly accommodate the increase or decrease in the length of the belt while operating. One of the most common methods for controlling belt length is to provide catenary sag. See Assembly/Setup Startup section of this manual.

In some situations, in addition to catenary sag, you may have to accommodate the change in belt length by adding or removing belt sections. Belts will either elongate or contract in operation because of these factors:

- **Temperature variations**
  Assuming belts are installed at average ambient conditions, normally about 70°F (21°C), any significant temperature change in operation will result in contraction or elongation of the belt. The magnitude of the thermal contraction or expansion is dependent upon the *belt's material*, the *difference in temperatures* and the *overall length of the belt*.
- **Elongation (strain) under load**
  All belts will elongate if tension is applied. The amount of increase in length will depend upon the belt *Series and Style*, the *belt's material*, the *amount of tension* or "belt pull" applied, and the *operating temperature.*
- **Elongation due to break-in and wear**
  New belts will usually experience elongation in the first days of operation as the hinge rods and modules "seat" themselves. In some severe services where heavy loads exist or abrasives are present, belts will experience elongation due to wear of the hinge rods and enlargement of the modules' hinge rod holes.

TROUBLE SHOOTING

Straight Running Belts		
Problem:	Possible Cause:	Solution:
1. Belt not engaging with drive sprockets.	Incorrect belt tension around drive sprockets. (Belt is too loose or tight).	Check that the catenary sag on the return side of the belt is in the 1”-6” range. See “Assembly/Setup-Startup” section of this manual. (You may have to add or remove belt sections).
	Shafts may not be positioned in the right indictor mark.	Check both sides of each shaft and make sure they are set in the “Mark” recommended by NLE. See “Shafts & Sprockets” section of this manual.
	Incorrect belt returnway design.	Insure belt returnway allows for recommended catenary sag. Re-space rollers to get proper sag; by-pass slider bed returnway to get proper sag. See “The Return” section of this manual.
	Sprockets not aligned correctly on shaft.	Check sprocket alignment by laying a straight edge parallel to the shaft at the base of any tooth on the sprocket to make sure that all sprockets are in the same position across the belt. On sprockets having a tooth count that is evenly divisible by 4, teeth are automatically properly aligned when put on the square shaft. However, if the tooth count cannot be divided evenly by 4, special care must be taken to avoid problems. If timing holes are provided on these sprockets, they must be placed in alignment all the way across the shaft, *see* steps (4), (5) & (6) in “Shafts & Sprockets” section of this manual.
	Insufficient belt wrap around drive sprockets.	Relocate the first return roller after the drive shaft to insure 180 degrees or more of belt wrap around drive sprockets. See “Assembly Setup/Startup” section of this manual.
	Shafts may not be parallel or aligned.	Measure the “A” and “B” dimensions illustrated in steps (2) and (3) in the “Shafts & Sprockets” section of this manual.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
2. Belt not tracking properly.	Drive and tail shafts not plumb, level and square to each other.	Inspect shafts to insure they are plumb, level and square to each other. Lock into place with shaft collars. *See* steps (1), (2) and (3) in "Shafts & Sprockets" section of this manual.
	Conveyor frame and/or components, not level or square.	Check and adjust conveyor frame. Check shaft alignment after any adjustment in frame. It may be necessary to re-plumb, level and square the shafts. See "Shafts & Sprockets" section of this manual.
	Sprockets not aligned correctly on shaft.	Check sprocket alignment by laying a straight edge parallel to the shaft at the base of any tooth on the sprocket to make sure that all sprockets are in the same position across the belt. On sprockets having a tooth count that is evenly divisible by 4, teeth are automatically properly aligned when put on the square shaft. However, if the tooth count cannot be divided evenly by 4, special care must be taken to avoid problems. If timing holes are provided on these sprockets, they must be placed in alignment all the way across the shaft, *see* steps (4), (5) & (6) in "Shafts & Sprockets" section of this manual.
	Locked sprocket on drive and idle shafts are not properly aligned.	Re-align sprockets "locked" in place by a retainer ring or other device insuring that the drive shaft sprocket in perfectly aligned with the idle shaft sprocket, *see* steps (4), (5) & (6) in "Shafts & Sprockets" section of this manual.
	Material build-up on bottom of belt interfering with proper sprocket tooth engagement.	Clean bottom of belt, removing any material build up that could interfere with sprocket tooth engagement. It may be necessary to provide in-place brushes, scrapers, scrolls or other devices to prevent future material build up.
	Belt miss-spliced.	Check the splicing illustrations in the belt manufacturer's manual—make sure the belt was spliced properly.
	Return roller not level and square to conveyor frame.	Inspect and correct any return roller that is not level or square with conveyor frame.
	Retainer rings improperly utilized or missing.	Replace missing retainer rings; check retainer ring location to make sure locked sprockets on drive and idle shafts are in perfect alignment. *See* steps (4), (5) & (6) in "Shafts & Sprockets" section of this manual.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
3. Excessive belt wear.	Belts, sprockets or wearstrip exposed to abrasive material.	Eliminate or reduce the presence of abrasive material which might come in contact with the belt, sprockets or wearstrip. As an example, this material could be periodically blown off the plastic conveyor parts by the use of plant pressurized air or washed off at the end of the shift. An in-place spray wash could be employed. Abrasive resistant sprockets are available for several belt series. Contact New London Engineering for assistance.
	Incorrect wearstrip material.	Insure wearstrip material is correct for the application. *See* "Carryway" section of this manual.
	Binding of belt in conveyor frame.	Check the conveyor frame to insure it is level and square. Correct any conditions causing belt to rub or bind.
	Uneven or incorrect product loading.	Add support under loading area of belt, add a chute to orient conveyed material so that it is traveling in the same direction as the belt and, ideally, at a similar speed. If product is side loaded, add a side guide to opposite side of belt.
	Excessive belt speed.	High speed belts, especially those with short shaft centers, will wear faster than belts at lower speeds. Reduce belt speed if possible.
	Incorrect wearstrip spacing.	Wearstrip spacing varies with the load on the belt, belt style and temperature. *See* "Carryway Preparation" section of this manual.
	Sharp corners on carryway or returnway wearstrips.	Make sure the leading edge of any carryway or returnway wearstrips, or slider beds are beveled or radiused for smooth belt travel. *See* "Carryway Preparation" section of this manual.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
4. Excessive sprocket wear.	Sprockets exposed to abrasive material.	Eliminate or reduce the presence of abrasive material which might come in contact with the belt, sprockets or wearstrip. As an example, this material could be periodically blown off the plastic conveyor parts by the use of plant pressurized air or washed off at the end of the shift. An in-place spray wash could be employed. Abrasive resistant sprockets are available for several belt series. Contact New London Engineering for assistance.
	Incorrect tension on belt. (Belt is too loose or too tight).	Check that the catenary sag on return side of belt is in the 1"-6" range. *See* "Assembly/Setup-Startup" section of this manual. (You may have to add or remove belt sections).
	Excessive belt speed.	Reduce belt speed if possible.
	Drive and idle shafts not plumb, level and square to each other.	Inspect shafts to insure they are plumb, level and square to each other. Lock into place with shaft collars. *See* steps (1), (2) and (3) in "Shafts & Sprockets" section of this manual.
	Insufficient number of sprockets.	It is possible that the conveyor requires a more even distribution of load among sprockets. Contact New London Engineering for advice.
	Locked sprockets on drive/idle shafts not aligned with each other correctly.	Re-align sprockets "locked" in place by a retainer ring or other device insuring that the drive shaft sprocket is perfectly aligned with the idle shaft sprocket. *See* steps (4), (5) & (6) in "Shafts & Sprockets" section of this manual.
	Sprockets are not aligned correctly on shafts.	Check sprocket alignment by laying a straight edge parallel to the shaft at the base of any tooth on the sprocket to make sure that all sprockets are in the same position across the belt. On sprockets having a tooth count that is evenly divisible by 4, teeth are automatically properly aligned when put on the square shaft. However, if the tooth count cannot be divided evenly by 4, special care must be taken to avoid problems. If timing holes are provided on these sprockets, they must be placed in alignment all the way across the shaft. *See* steps (4), (5) & (6) in "Shafts & Sprockets" section of this manual.
	Shafts may not be positioned in the right indictor mark.	Check both sides of each shaft and make sure they are set in the "Mark" recommended by NLE. See "Shafts & Sprockets" section of this manual.
	Shafts may not be parallel or aligned.	Measure the "A" and "B" dimensions illustrated in steps (2) and (3) in the "Shafts & Sprockets" section of this manual.
	Shaft deflection or twisting.	Inspect shaft for evidence of deflection or twisting. Bent or twisted shafts must be replaced. An intermediate bearing may be required for wide belts. Contact New London Engineering for assistance.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
5. Excessive belt edge wear or damage.	Belt contacting obstructions on conveyor belt, returnway, frame or adjacent equipment.	Check the conveyor frame to insure it is level and square. Correct any conditions causing belt to rub or bind.
	Belt improperly aligned and not tracking correctly.	Re-align sprockets “locked” in place by a retainer ring or other device insuring that the drive shaft sprocket is perfectly aligned with the idle shaft sprocket. Check the conveyor frame to insure it is level and square. Correct any conditions causing belt to rub or bind.
	Thermal expansion causing belt edge to “rub” somewhere on conveyor frame.	Correct conveyor frame dimensions to insure there is a 0.25 in. (6.4 mm) minimum clearance on each side of the belt when full thermal expansion (highest temperature) is encountered.
	Conveyor frame not square or level.	Check the conveyor frame to insure it is level and square. Correct any conditions causing belt to rub or bind.
	Shafts not held in place correctly with shaft collars, etc., allowing the shafts to migrate to one side.	Insure shafts are plumb, level and square; make any corrections and hold shaft in place with a set collar.
	Belt miss-spliced.	Check the splicing illustrations in the belt manufacturer’s manual; make sure the belt was spliced properly.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
6. Sprockets move laterally to center or edge of belt.	Drive and idle shafts not plumb, level and square to each other.	Inspect shafts to insure they are plumb, level and square to each other. Lock into place with shaft collars. *See* steps (1), (2) and (3) in "Shafts and Sprockets" section of this manual.
	Retainer rings incorrectly used.	Add or relocate "locked" sprocket retainer rings. *See* steps (4), (5) and (6) in "Shafts & Sprockets" section of this manual.
	Locked sprocket on drive and idle shafts not properly aligned with each other.	Re-align sprockets "locked" in place by a retainer ring or other device, insuring that the drive shaft sprocket is perfectly aligned with the idle shaft sprocket, *see* steps (4), (5) and (6) in "Shafts & Sprockets" section of this manual.
	Sprockets not aligned correctly on shaft.	Check sprocket alignment by laying a straight edge parallel to the shaft at the base of any tooth on the sprocket to make sure that all sprockets are in the same position across the belt. On sprockets having a tooth count that is evenly divisible by 4, teeth are automatically properly aligned when put on the square shaft. However, if the tooth count cannot be divided evenly by 4, special care must be taken to avoid problems. If timing holes are provided on these sprockets, they must be placed in alignment all the way across the shaft, *see* steps (4), (5) and (6) in "Shafts & Sprockets" section of this manual.
	Material build up on bottom of belt preventing proper tooth engagement.	Clean bottom of belt removing any material build up that could interfere with sprocket tooth engagement. It may be necessary to provide in-place brushes, scrapers, scrolls, or other devices to prevent future material build up.
	Belt miss-spliced.	Check the splicing illustrations in the belt manufacturer's manual; make sure the belt was spliced properly.
	Shaft deflection or twisting.	Inspect shaft for evidence of deflection or twisting. An intermediate bearing may be required for wide belts. Bent or twisted shaft must be replaced.
7. Sideguard wear or damage (including breakage).	Sideguards contacting conveyor frame, returnway or adjacent equipment.	Eliminate obstructions to sideguard travel. Check the conveyor frame to insure it is level and square. Correct any conditions causing belt or sideguards to rub or bind.
	Uneven or incorrect belt loading.	Correct any belt loading method that may be damaging sideguards. Use a chute to orient conveyed material so that it is traveling in the same direction as the belt and, ideally, at a similar speed. Add support under loading area of belt.

Straight Running Belts		
Problem:	Possible Cause:	Solution:
8. Flight wear or damage (including breakage).	Flights contacting obstructions on conveyor frame, returnway or adjacent equipment.	Eliminate obstructions to the flight travel. Check the conveyor frame to insure it is level and square. Correct any conditions causing belt to rub or bind.
	Uneven or incorrect belt loading.	Adjust belt loading as necessary to protect flights. Add a chute to orient conveyed material so that it is traveling in the same direction as the belt and, ideally, at a similar speed.
	High impact in infeed area.	Reduce or eliminate impact on belt by adding an "impact plate" above belt to absorb initial shock. Mount plate at an angle that will direct impacting piece gently onto the belt.
	Improper flight support on returnway.	Flighted belts should be supported on each side of belt (on the "indent") and as needed across the belt width.
9. Impact damage to belt.	Uneven or incorrect belt loading.	Add support under loading area of belt. Add a chute to orient conveyed material so that it is traveling in the same direction as the belt and, ideally, at a similar speed.
	Unsuitable belt material.	Review the materials section of the belt supplier's manual or call New London Engineering for assistance.
10. Belt develops excessive catenary sag.	Incorrect total belt length.	Excess catenary sag must be at the belt's coldest operating temperature because the belt will then be contracted to its shortest length. If excess catenary is found, shorten the belt by removing rows of modules.
	Insufficient belt tension in high heat applications.	If the excess catenary sag is due to thermal expansion from operational temperatures and is not excessive when cold, it may be necessary to add a take-up/tensioning device on the conveyor to compensate for the thermal growth. Contact New London Engineering for assistance.
	Elongation of belt due to initial start-up situation or heavy loads.	Plastic belt will elongate during initial "break-in" period. This is a natural process that is a function of the belt acclimating itself to the application, and is more noticeable when heavy loads are present. In this case, allow the belt to adjust to operating conditions before shortening it. ***CAUTION:*** Monitor the belt during this "break-in" to avoid binding or catching.

Radius Belts—All radius/curved belt applications should be reviewed by Engineering and run through its Engineering Program Analysis to insure the belt is strong enough for the radius application in question.
The radius/curved Engineering Program requires all the following information:
-- Any environmental condition which may affect the belt's friction coefficient
-- Belt width **-- Length of each straight run** **--Operating Temperatures**
-- Turning angle of each turn **-- Turn direction of each turn** **-- Belt Speed**
-- Inside turning radius of each turn **-- Product loading (#1 ft)** **-- Elevation Changes**
-- Carryway/ hold down rail material **-- Product back up condition**

Problem:	Possible Causes:	Solutions:
1. Belt not engaging with drive sprockets.	Incorrect belt tension/wrap around drive sprockets.	Check both sides of each shaft and make sure they are set in the "Mark" recommended by NLE. See "Shafts & Sprockets" section of this manual. Measure the "A" and "B" dimensions illustrated in steps (2) and (3) in the "Shafts & Sprockets" section of this manual.
	Belt length changes not accommodated.	As the belt changes length, with temperature, load, and wear, excess belt may be piling up right after the drive sprockets (at the lowest tensioned point), causing the belt to bounce off of the drive sprockets. A snub roller can help isolate this from the drive sprockets, but a vertical belt take-up, prior to the first turn, may be required. Contact New London Engineering for assistance.
	Straight section from curve to drive shaft not at least 1.5 times the belt width.	If this straight section is too short, the belt pull will not be evenly distributed. This causes two primary problems: 1) the belt will have a slightly different pitch and phase from one side to the other, and 2) the belt will have a large tendency to "walk" to the outside of the last curve, placing a significant side load on the sprockets. This straight must be 1.5 times the belt width.
	Belt edge not supported leading to the drive sprockets.	Even conveyors that meet the minimum straight requirements have a tendency to walk toward the outside of the last turn. To keep the sprockets from having to absorb this side load, a guide rail should be installed on the outside edge of the belt leading to the drive shaft. This guide should not force the belt to the inside; rather, it should keep the belt perpendicular to the last turn.
	Returnway section not parallel (vertically) with carryway section.	This forces the sprocket rotation to be not truly in-line with the belt travel, leading to side loads on the sprockets. Even if the belt continues to engage, the sides of the sprocket teeth may wear prematurely.
	Locked sprockets and restrained belt edge causing an over constrained condition.	On INTRAFLEX™ 2000, there is no belt tracking provided by the sprockets, so the belt must be guided to the shaft, and all of the sprockets should be retained in position. On Series 2200 and Series 2400, however, the sprockets do track the belt. Never guide a Series 2200 or Series 2400 belt to the drive shaft AND lock the sprockets in position. If these two constraints don't "agree," the sprockets will disengage or wear quickly.

Radius Belts		
Problem:	Possible Causes:	Solutions:
2. Excessive wear on the guide rail wearstrip, especially in turns.	Wearstrip material's PV value is exceeded.	The wearstrip that guides the belting through the turn is under significant bearing load, especially at the transitions between straight sections and turning sections. The combination of this load and the speed of the conveyor may be too much for the particular wearstrip material. An indication of this will be a sharp temperature rise in these sections of the conveyor. A better material with a higher PV may be used, but care should be taken; at some point the wearstrip will stop wearing and the belt edge will start to wear. It is generally preferable to replace wearstrip instead of belting. Contact New London Engineering for assistance.
	Not enough clearance for belt through the section in question.	If the belt is bound through a section, additional compressive loads are applied to the wearstrip (as well as additional tensile loads on the belt). Before installing a belt, take a section of belt and manually pass it through all sections and wearstrip to insure adequate clearance.
	Guide rails through the turn not smooth or even.	A guide rail that is not smooth can induce high radial forces leading to higher loads on the rail and the belt. An indication of this will be higher temperatures on this wearstrip than in other sections. Insure that all guide rails form a smooth arc for any turn.
3. Excessive sprocket wear.	Belt edge not supported leading to the drive sprockets.	Even conveyors that meet the minimum straight requirements have a tendency to walk toward the outside of the last turn. To keep the sprockets from having to absorb this side load, a guide rail should be installed on the outside edge of the belt leading to the drive shaft. This guide should not force the belt to the inside; rather, it should keep the belt perpendicular to the last turn.
	Returnway section not parallel (vertically) with carryway section.	This forces the sprocket rotation to be not truly in-line with the belt travel, leading to side loads on the sprockets. Even if the belt continues to engage, the sides of the sprocket teeth may wear prematurely.
	Locked sprockets and restrained belt edge causing an over constrained condition.	On INTRAFLEX™ 2000, there is no belt tracking provided by the sprockets, so the belt must be guided to the shaft, and all of the sprockets should be retained in position. On Series 2200 and Series 2400, however, the sprockets do track the belt. Never guide a Series 2200 or Series 2400 belt to the drive shaft AND lock the sprockets in position. If these two constraints don't "agree," the sprockets will disengage or wear quickly.

Radius Belts		
Problem:	Possible Causes:	Solutions:
4. Excessive belt edge wear or damage.	There is a catch point on the guide rail or hold down wearstrip that is snagging an edge.	The guide rail wearstrip obviously must be in contact with the belt, but it should be as free from catch points or sharp leading edges as practical. If an outer hold down rail is placed so that it catches the belt, the edge may be damaged. The outer rail needs to be placed so that there is running clearance between it and the belt at the belt's maximum operating temperature.
	Inappropriate guide rail wearstrip material.	If the wearstrip is not showing dramatic wear, it may have too high of a PV value in relation to the belt. If the wearstrip is made from an acetal, nylon, PTFE, etc., a UHMW (plain or lubricated) may need to be used. Replacing wearstrip is usually preferable to replacing belts.
5. Hinge rod migrating out of belt.	Rods not correctly seated during belt installation.	On INTRAFLEX™ 2000, the rods have a head that must be snapped past the lip of the flush edge module. If this head is damaged or missing, replace the rod. Series 2200 and Series 2400 use headless rods. These rods must snap past the retention lip on the flush edge.
	The edge is damaged, either from a snag or from wear.	Inspect the belt for signs of damage. If it is from a snag point, replace the damaged edges and check the frame carefully for the cause of the snag.
	For Series 2200 or Series 2400, rods cut at a sharp angle for installation.	When cutting a rod prior to installation, a blunt cut is preferable to a sharply angled cut. An angled cut may allow the tip of the rod to start past the retention lip.

BEARING LUBRICATION

Many conveyors come equipped with **permanently lubricated** bearings, which have no grease zerks. These include 2 and 3-Bolt Flange Bearings with shaft sizes through 1-7/16". This prevents injecting improper or contaminated grease, and leaves the seals tighter due to elimination of grease purging. **Lubricate other bearings regularly** with approved lubricants from the list below. **Avoid over lubrication**, especially when shafts are not turning, as this can blow out the seals and lead to contamination and failure of the bearing. Exercise extreme caution around all moving equipment when working close to them, for lubrication.

Acceptable Lubricants: **Standard Oil Co of Indiana – Stanolith #57**
Sinclair Oil Co – Litholene
Socony Mobil Co. – Armvac #781
Keystone Lubrication Co. - #84H Light
Texas Oil Co. – Multi-Fak #2

(Suppliers for these lubricants can be found in your Yellow Pages under "Oil-Lubricating".)

Proper intervals of bearing lubrication depend on the speed, temperature, and working conditions involved. In normal applications of 16 hours a day or less, a three-month interval is adequate (in clean conditions). Lock off equipment before attempting to wipe or touch movable equipment of any kind. Clean off grease zerk fittings before lubrication and wipe excess lube from the shaft seals so you can observe the amount of newly expelled grease. Remember to tighten the bearing set screws BI-annually while doing the greasing.

MOTOR MAINTENANCE

At regular intervals, check that the motor electrical connections are tight and not corroded. Blow clean any open frame motors, and clean off any dust or debris so proper amounts of heat may be radiated. If motors consistently become covered with debris, construct a guard above them, which does not hinder heat radiation.

Lubricate any motors with grease fittings every two years unless conditions are extremely dirty or damp. Lubricate any motors with sleeve bearings with 10 – 15 drops of SAE #20 non-detergent or motor oil every year (more often if dirty or damp).

New motors are more efficient, but run at higher temperatures than you may be used to. Do not become alarmed unless the ambient temperatures at your drive section are >104^F. At these high temperatures, normal motors may overheat at full loads, and special high-temperature motors may be required.

REDUCER MAINTENANCE

Most conveyors come equipped with New London Engineering's standard Gear Reducer made by Grove Gear. This is a trouble free reducer with normal applications and maintenance. To keep it that way, make sure you know how to check it over, then do it regularly, as shown below.

Try to keep the reducer sprocket installed as close to the reducer as possible to reduce any overhung loads. Keep the reducer clean so it can dissipate excess heat better. All mounting bolts should be tightened securely. Check the lube level regularly. Change the lubricant every six months or 2500 hours, whichever comes first. **Gearmotors** require no lubrication change under most conditions. These gearmotors are used most often on the Model 250 "Thin-Line" Conveyors.

MANUFACTURER'S RECOMMENDED LUBRICANTS

MANUFACTURER	AGMA COMPOUND #7 (15 – 60^F Ambient Temp)	AGMA COMPOUND #8 (50-125^F Ambient Temp)
Amoco Oil Co	Worm Gear Oil	Cylinder Oil #680
Cheveron USA, Inc	Cylinder Oil #460X	Cylinder Oil #680X
Exxon Co., USA	Cylesstic TK-460	Cylesstic TK-680
Gulf Oil Co.	Senate 460	Senate 680D

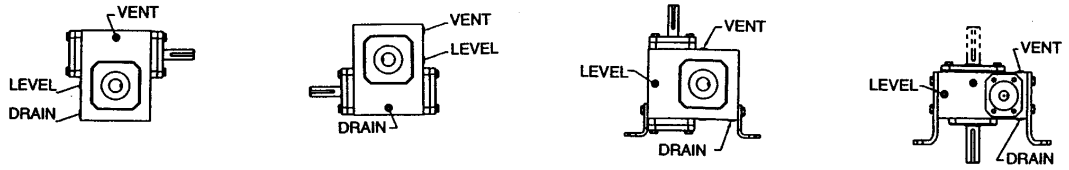
Mobil Oil Corp.	600W Super	Extra Hecla Super
Shell Oil Co.	Valvata Oil J460	Valvata Oil J680
Sun Oil Co.	Gear Oil 7C	Gear Oil 8C
Texaco	Honor Cylinder Oil	650T Cylinder Oil
Union Oil Co., of CA	Steaval A	Worm Gear Lube 140

Inspect your reducer **vent plug** often to make sure it is clear and operating. It is the upper plug on the reducer. The next lower plug is the **level plug**, and the lowest plug is the **drain plug**. ***The oil level should be kept at the bottom of the threaded hole of the level plug.*** However, if the conveyor and reducer are inclined above horizontal, extra oil may be required for optimum reducer life. Synthetic Oil, if used, should not be intermixed with regular oil.

Input and Output Seals can be purchased through your local New London Engineering Representatives.

STANDARD SPEED REDUCER MOUNTING POSITIONS AND VENT PLUG LOCATIONS

Before putting unit into operation, substitute the vent plug for the solid pipe plug at the position desired. Arrows indicate the recommended vent plug locations:



On Unit sizes 1262 (226) and larger all applications with vertical input and output shafts should be referred to the factory. Special provisions for bearing lubrication may be required.

MAINTENANCE ADVICE

Maintenance eliminates costly downtime. It lets you increase the return on your investment, avoid dangerous accidents, and prevent having to turn away customers because your equipment breaks down when you least expect it. To avoid this costly downtime, regular maintenance and stocked replacement parts decreases your chances of being down.

Set up a periodic maintenance SCHEDULE and stick to it. Use the schedule that follows as a starting point, and include maintenance for all your equipment and any safety checks required locally. Provide adequate time for this regular maintenance to reduce yearly operating costs, lost down time, and risk of accidents. Install adequate lighting for safe operation, reliable inspections and efficient repairs.

Except as otherwise required, this conveyor must be stopped and its starting switches locked out and tagged out before making adjustments or doing maintenance work.

Trained and experienced personnel equipped with the proper tools should only do maintenance work. They should be well aware of the dangers of working near moving belting and parts, and *accept responsibility* for their safe performance of any maintenance work done while the conveyor is running. There should always be a person present at the off switch at these times. **Lockout and tag-out practices save lives. Use them whenever possible!**

Material load changes cause many repairs, due to motor overloading, equipment-damaging spillage, and increased operating stress on belting and other parts. Be very careful when increasing conveyor speeds or loading levels. **Never overload the unit, even temporarily, or use it beyond its rated capacity or speed**. If you are unaware of your capacity rating, please call your Dealer or New London Engineering.

Material carry-back or jamming is sometimes a problem. Oily light material or stringy shavings can be carried back down into the conveyor, causing hidden drag and eventual jamming. Use pimpled belt or an optional scraper or brush for these applications. Very thin material can also wedge between parts of the belt and restrict it from flexing freely. Contact your New London Engineering Representative with any questions.

Keep the conveyor area CLEAN. Do not allow buildup of material inside any part of the conveyor. This leads to shorter component lives and increased downtime. Friction, pressure and rust can destroy even hard steel if conditions are bad, due to material jams and moist, corrosive and abrasive material buildup. Rusting of the belt or buildup of material on it can damage the belt quickly. Without lubrication, rollers can seize and fail; belting can refuse to flex. Lubrication requirements increase dramatically with poor cleanliness. Both the roller and the apron barrel joints required periodic lubrication to keep them free from friction. Very carefully drip or spray oil on the sides of the rollers as they pass. With the unit locked off, clean the apron surfaces and apply oil with a sprayer, small mop or a long-spout oilcan. Rollers and apron barrels require clean 30 weight oil. Keep the apron surfaces from rusting with a light film of waste oil. Remember that disposing of oil later can become expensive, so avoid spillage and excess dripping.

Always comply with all of the applicable codes, regulations and standard practices for your area and in our safety section.

SUPPORT IDENTIFICATION AND ASSEMBLY

- For the most part, supports should be mounted to the conveyor sections prior to turning them upright and locating in position. This can be difficult in many situations, so please use the proper mechanical equipment necessary to avoid any injuries.

- Prior to assembly, use the following drawings and tables to determine what items you should have for the supports that are called out on the packing slip.
  - The packing slip will tell you if knee braces are required or not.
  - If you feel that a part is missing, contact New London Engineering as soon as possible and we will try to get the parts out as soon as possible.

  Always refer to your packing slip to see what supports are being called out for your height specifications.

- Supports consist of all or part of the following items:

1) Upper Support
2) Lower Support
3) Spreader
4) Smile Bracket*
5) Knee Brace**
6) Knee Brace Bracket**
7) Mounting Hardware
8) Cross Bracing

*Smile Brackets are generally mounted to the conveyor prior to shipment. If you do not find them with the support items, look on the bottom of your conveyor. For longer conveyors, smile brackets are generally shipped with the other support items.

**Knee Braces and Knee Brace Brackets are used when heights of the conveyor are over 36" Top of Belt, or if they are called out for a special reason. Refer to the packing slip if you are unsure of whether you should have these or not.

- Supports include other parts besides the upper and lower support pieces.
  - Notice the *support spreader* and also the optional diagonal *knee brace.*
  - Knee braces, if listed on your packing slip, attach to the frame bottom flanges using the knee brace bracket shown on following pages.

- This bracket uses holes that are approximately 20” to 24” from a frame joint.
- The lower end of the knee brace is bolted to the upper or lower support, at approximately 45^ from the frame.
- Some knee braces are adjustable in length, and comprised of two different pieces that overlap each other.
- All the bolts should be securely tightened as you level the conveyor.
- Knee braces are used on many conveyors more than 36” high.

❖ Level your conveyor both laterally and longitudinally, to prevent later problems with belt tracking**.**

- **Long conveyors may require several different adjustments to eliminate all the dips.**
- Uneven floors may even require different holes to be used on different supports.
- Be sure to tighten support bolts and anchor the conveyor to the floor.
- During anchoring, check that your conveyor is **straight**.
- When you are done, your conveyor will be stable and located at the correct location with respect to the other equipment around it.

Please refer to the chart below to verify that you have the proper number of supports provided.

NUMBER OF SUPPORTS REQUIRED

CONVEYOR LENGTH	NUMBER OF SUPPORTS REQUIRED
5’ – 14’	2 Pair
15’ – 24’	3 Pair
25’ – 34’	4 Pair
35’ – 44’	5 Pair
45’ – 54’	6 Pair
55’ – 64’	7 Pair
65’ – 74’	8 Pair
75’ – 84’	9 Pair
85’ – 94’	10 Pair
95’ – 104’	11 Pair

Please insert “Supports Standard Duty” from the Distributor Catalog here.

Sprocket and Belt Specification Chart

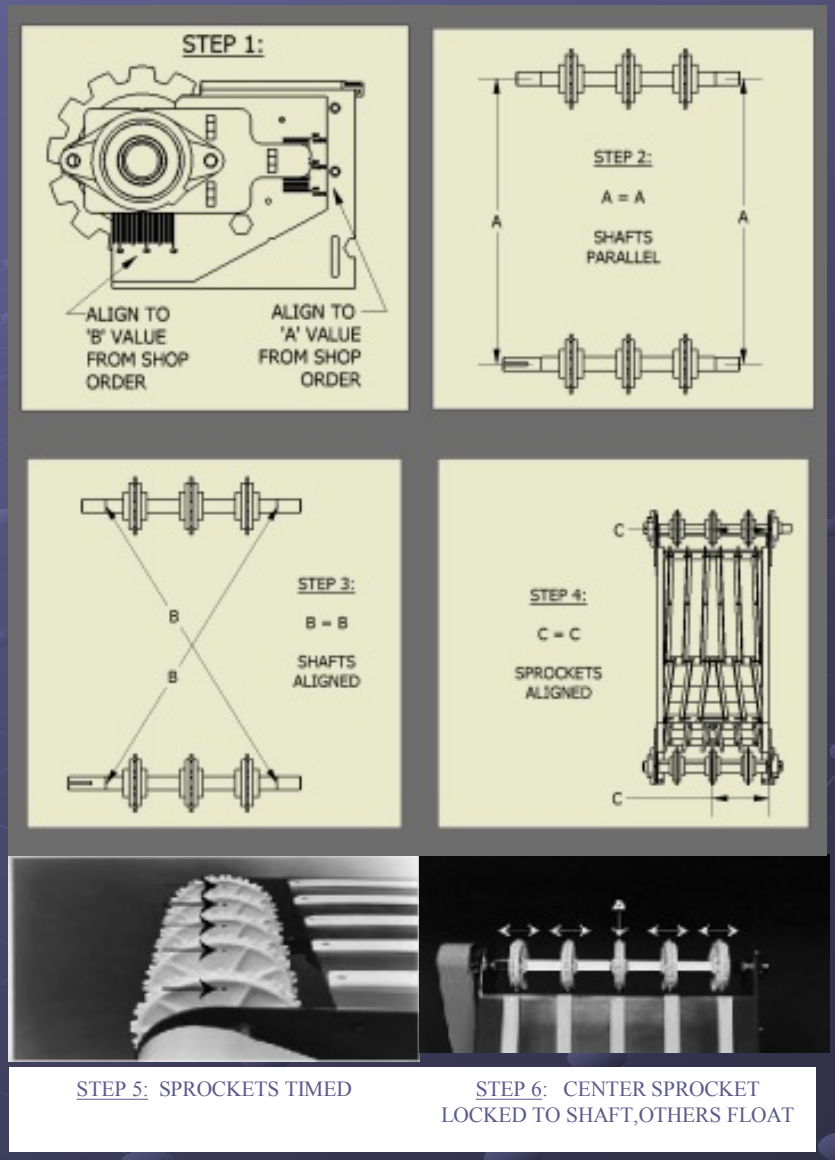
Material Properties: / Material Types:				ACETAL (AC)	POLY-PROPYLENE (PP)	POLY-AMIDE (PA)	POLY-ETHYLENE (PE)	SPLIT METAL	ABRASION RESISTANT METAL	POLY-URETHANE	GLASS FILLED NYLON
Typical Application				Belts: HD Apps, Lo Temp Lo Friction Sprockets: Gen Use	Belts: Gen Use, Lightweight, Chemicals Sprockets: Chemicals	Belts & Sprockets: HD Apps, Dry Only, High Temp	Belts: Lo Temp, Hi Impact, Flexible, Sunlight, Lo Abrasion	Special Sprockets: Confined Spaces, Abrasion	Special Sprockets: Hi Abrasion	Special Sprockets: Lo Temp Abrasion	Special Sprockets: Abrasion
Resistance: Impact / Cuts (Belts)				G / VG	G / G	VG / VG	VG / F				
Resistance: Abrasion / Chemicals (Belts and Sprockets)				F / F	F / G	E / F	P / G	E / G	E / G	G / F	G / F
Strength (Belts and Sprockets)				High	Med	Exc	High	Exc	High	Med	High
FDA (Belts and Sprockets)				Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Temp Range, ^F, DRY Temp Range, ^F, WET				-50 to 200 -40 to 140	45 to 220	-50 to 240 NR	-20 to 220 -20 to 220	45 to 220	-200 to 300	0 to 120	-50 to 250
Belt Series, Pitch, Type	Materials	Cost	Strength	SPKT PD	SPKT PD	SPKT PD	SPKT PD	SPKT PD	SPKT PD	SPKT PD	SPKT PD
METRIC BELTS											
NLE H2620, 1.0, GEN USE	PP-AC-PA	$$$ - $$$$	135-250			3.9/5.8					
NLE H5020, 2.0, HD USE	PP-AC-PE	$$$ - $$$$	200-340	4.0/6.5							
NLE H2540, 1.0, RADIUS	PP-AC-PA	$ - $$	80-125			3.9/5.9					
NLE H3800, 1.5, RAD HD	PP–AC	$ - $$	130-180	4.0/5.9							
INCH BELTS											
NLE H2470,1.0, INCH GEN USE	PP	$	170			3.9/5.8					
NLE I0900, 1.07, INCH GEN USE	PP-AC-PE	$$ - $$$	60-120	3.5/6.1	3.5/6.1			3.5/6.1	6.1	6.1	6.1
NLE I1000, 0.6, INCH TIGHT XFER	PP-AC-PE	$$$ - $$$$	80-125-40	3.5/6.1	3.5/6.1			3.5/6.1			6.1
NLE I1400, 1.0, INCH GEN USE	PP-AC	$$$ - $$$$	150-200	3.9			5.7				5.7
NLE I0400, 2.0, INCH HD USE	PP-AC-PE	$$$$ -$$$$$	200-270-150	4.0/6.4	4.0/6.4			4.0/6.4	6.4		
NLE I2400, 1.0, INCH RADIUS	PP-AC	$$ - $$$	100-140	3.9/6.4	3.9/6.4					3.9	3.9/6.4
NLE I2200, 1.5, INCH RADIUS HD	PP-AC-PE	$$$ - $$$$	130-200-80	3.9/6.3	3.9/6.3						

Assembly/Setup
Shafts & Sprockets

Square: describes the shaft placement in the conveyor for ideal conveyor running. Square shafts are **Parallel** and **Aligned.**

Timing: describes the proper polar placement of sprockets on the shaft to ensure the teeth all line up properly

- Step 1: Position Shafts at each end with indicator marks located properly for the belt to be installed. (See order acknowledgement for mark location).
- Step 2: Shafts must be **Parallel.**
  - Fine adjustment of bearing plates: 'A' Dimension must match on each side
- Step 3: Shafts must be **Aligned**.
  - Fine adjustment of shafts in bearings: 'B' Dimension must match on each side
- Step 4: Center Sprockets must be **Aligned**.
  - 'C' Dimension to frame side must match at both ends of conveyor
  - Use centered test belt to locate sprocket
- Step 5: Sprockets must be **Timed**.
  - If the number of teeth cannot be evenly divided by 4, align all pilot holes. See Step 5 illustration.
- Step 6: Center Sprockets must be **Locked** in position, via shaft collars or retaining rings.
  - For shafts with just two sprockets each, lock the sprocket nearest the drive side.
  - Locked sprocket may be offset slightly from conveyor center to achieve belt centering or when an even number of sprockets is used.
  - All other sprockets are free to move along shaft.



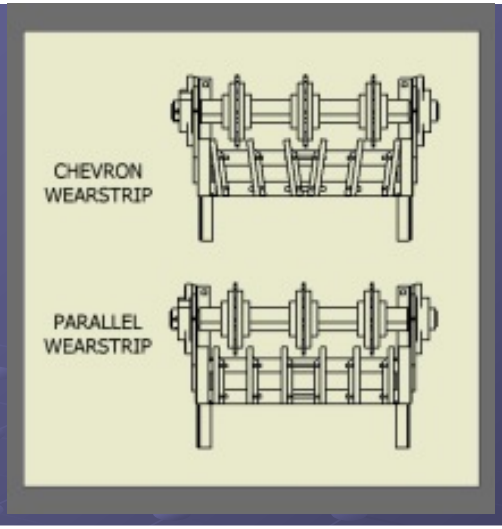
STEP 5: SPROCKETS TIMED

STEP 6: CENTER SPROCKET LOCKED TO SHAFT,OTHERS FLOAT

Assembly/Setup
Carryways

- Carryway: the belt support bed on the top of the conveyor. This can be a flat steel or plastic deck or an arrangement of wearstrips: Chevron & Parallel are the most common.
  - Chevron: viewed from the discharge end the runners form a series of 'V' shapes, like tractor tire treads, for HD use only.
  - Parallel: straight runners for the entire conveyor length, standard applications.

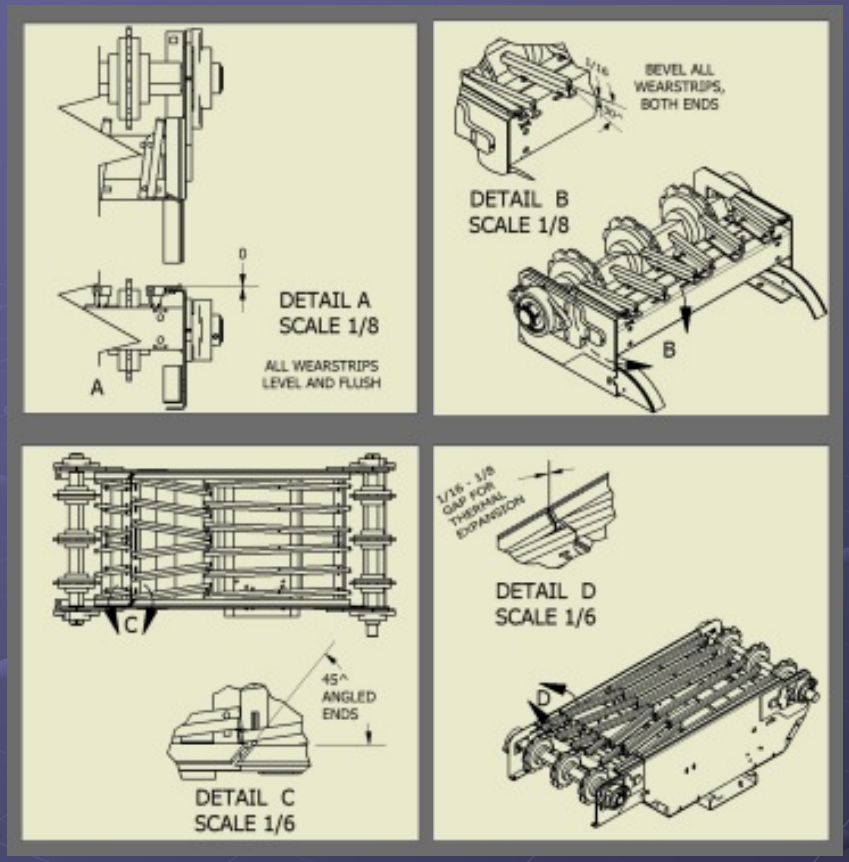
- Wearstrip Materials:
  - Ultra High Molecular Weight (UHMW) Plastics: FDA/USDA compliant, they are an excellent value. There are many special variations , but primary examples are plain UHMW, AntiStatic (use for electronic components sensitive to charge) and Oil-filled (used for more lubrication, NOT for dusty applications).
  - NYLON Generally stronger and more expensive than UHMW. Better for elevated temperatures, speeds, and loads

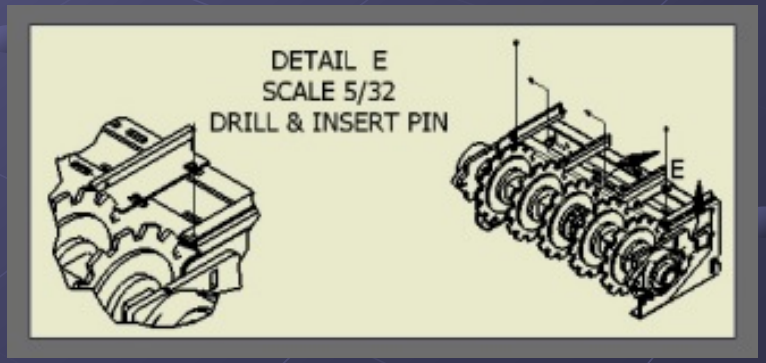


MATERIAL ---------- PROPERTY	UHMW	Oil Filled UHMW	NYLON 6
Tensile Strength, psi	4600-6800	9500-11000	12000-13000
Static Friction	.20-.25	.19-.22	-
Dynamic Friction	.14-.19	.11-.22	.22
Thermal Expansion, in/in/^F	1.1x10(E-4)	3.5x10(E-5)	5X10(E-5)
Melting Temp, ^F	280	450	450
Continuous Service Temp,^F	180	230	230
Suitability, Weak Acid	Good	Good	Good
Suitability, Strong Acid	Fair	Poor	Poor
Alcohols	Good	Good	Good

Assembly/Setup
Carryway Preparation

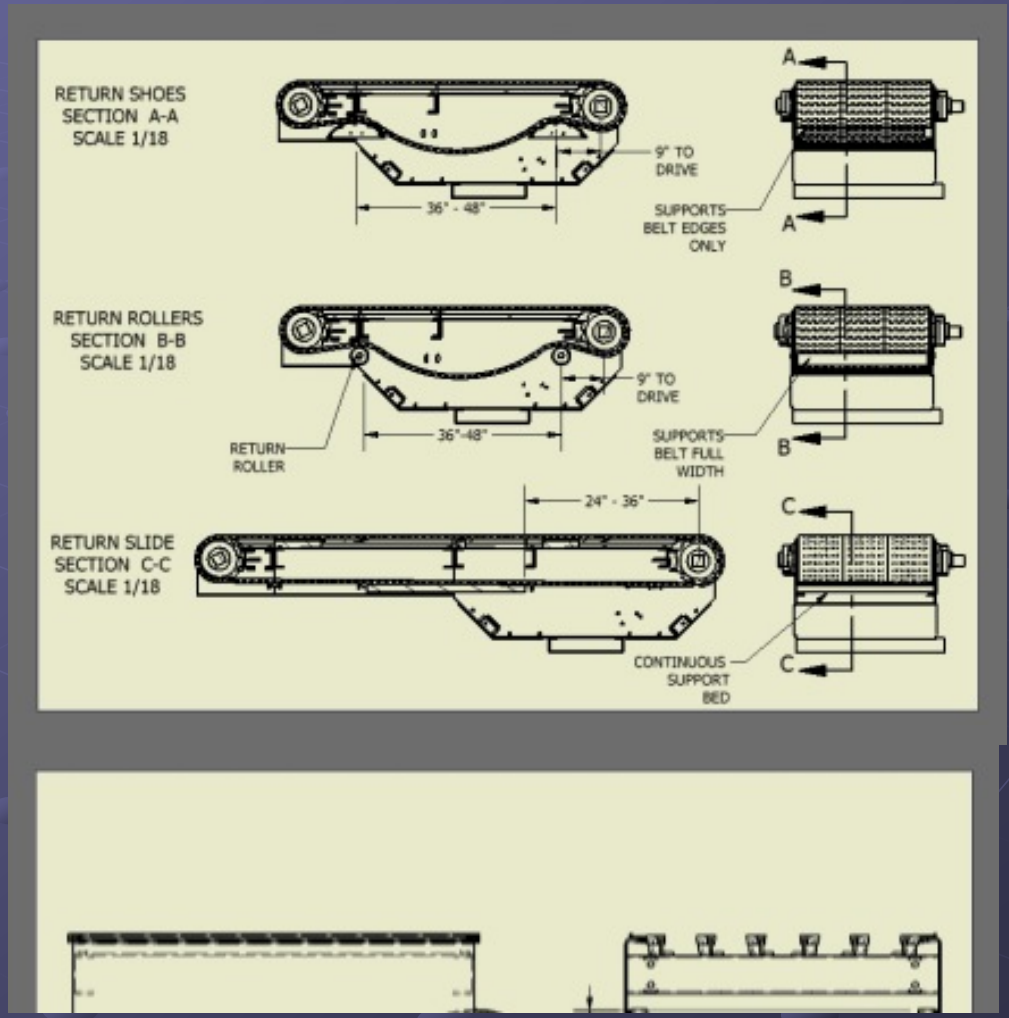
- Detail A: Wearstrips must be flush and level.
- Detail B: Bevel wearstrip ends for smooth transitions.
- Detail C: Angle cut adjoining wearstrips for overlapping condition.
- Detail D: Leave gaps at joints to allow for thermal expansion.
- Detail E: Drill 3/16” diameter holes thru wearstrip and brackets and insert pin



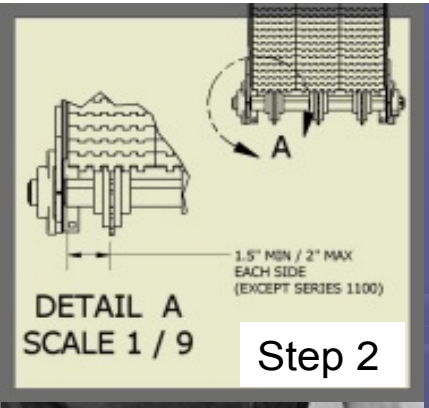


Assembly/Setup
The Return

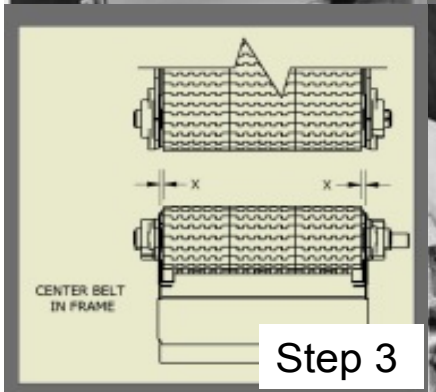
- Return Support Types:
  - None
    - Conveyor lengths under 6’ only
  - Return Shoes
    - Support outer edges of belt only to allow belt attachments like insert rollers, flights etc.
    - Low noise
    - Not for high friction belts
    - 24” Maximum Belt Width
  - Return Rollers
    - Support the belt full width
    - Low friction
  - Return Slide
    - Start 24” from drive sprockets (machines up to 12’), 36”-48” (machines over 12’)



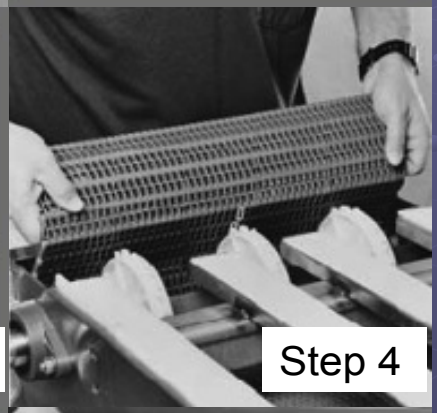

Step 1

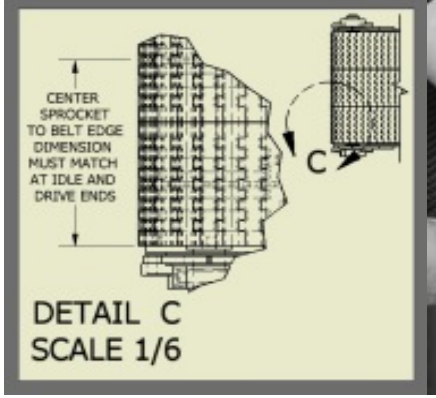


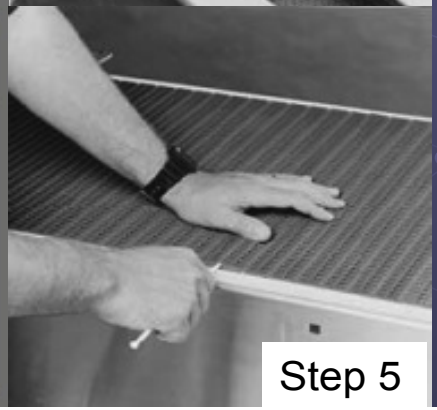
Step 2



Step 3


Step 4



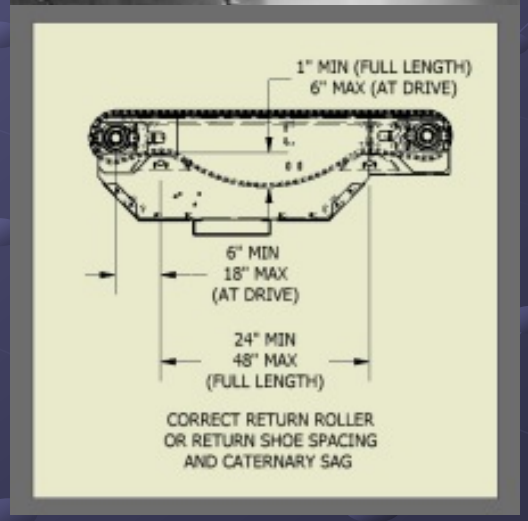

Step 5

Assembly/Setup
Belt Installation:

- Step 1: Place the belt on the drive end of the conveyor frame, slide down the carryway to the idle end, wrapping the idle sprockets without shifting the sprockets on the shaft.
- Step 2: Maintain outermost sprockets 1.5” – 2” from belt edge (1” for NLE#I1100 belts only).
- Step 3: Center the belt in the frame.
- Step 4: Thread belt through return and wrap the drive sprockets:
  - Detail C: Maintain the same belt edge to locked sprocket dimension, belt centering, and outer sprocket locations as used at idle end.
- Step 5: Temporarily insert hinge rod.

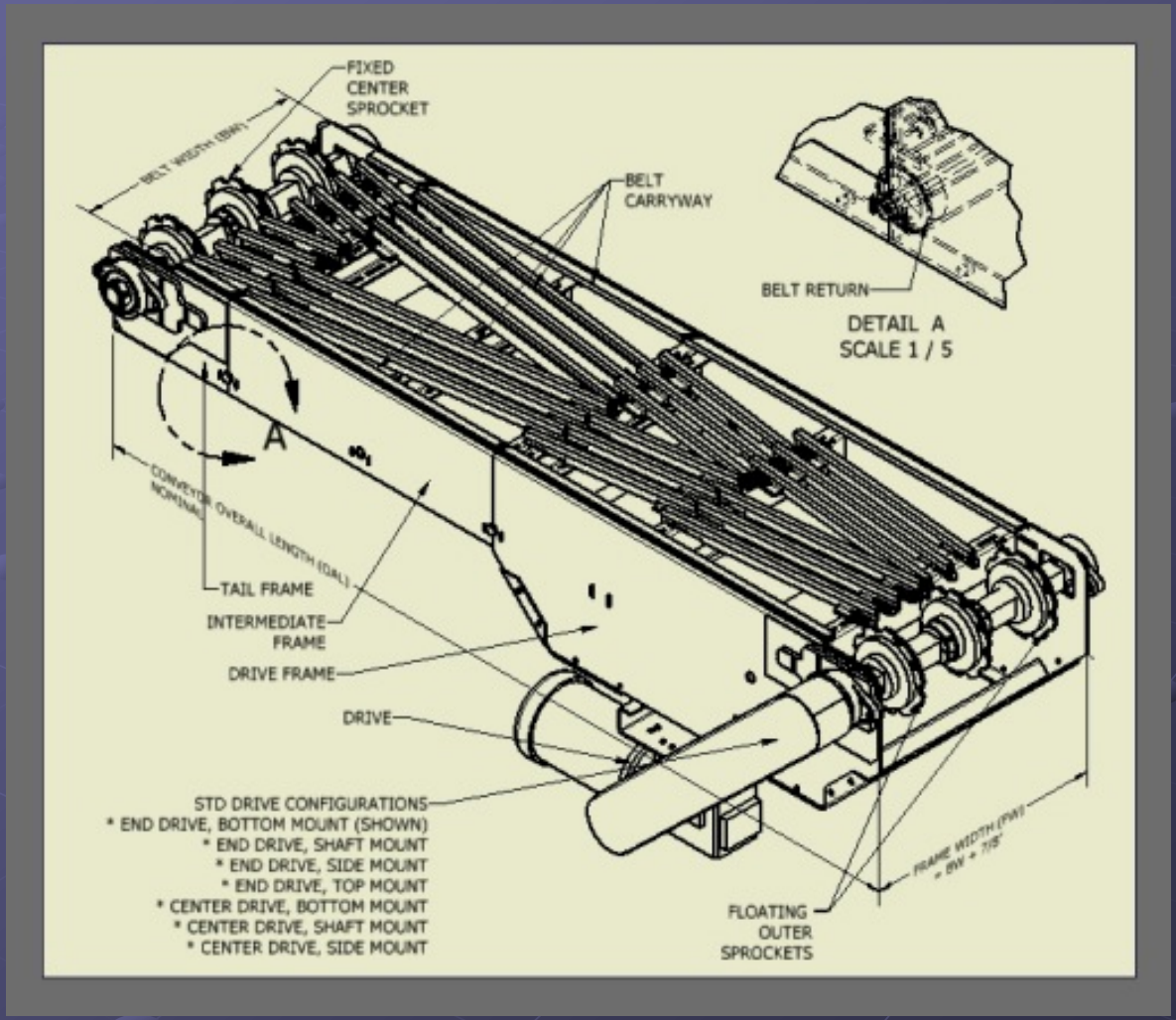
Assembly/Setup
Startup

- Cycle the conveyor by hand or jog slowly while verifying good sprocket/belt engagement and checking for possible catch points.
  - If belt tracks poorly, return to sprocket section and reinstall to correct settings. If problems persist, inspect bearings for proper alignment and frame for straight and level condition.
- Check that belt droop (caternary sag) between return belt supports (rollers or shoes) is in the 1”- 6” range and adjust belt length as required to eliminate belt slap (remove excess belt) or overtightness (increase belt length)
- Once running smoothly, finish securing the hinge rod per specific belt recommendations (see the belt manufacturer’s owners manual).



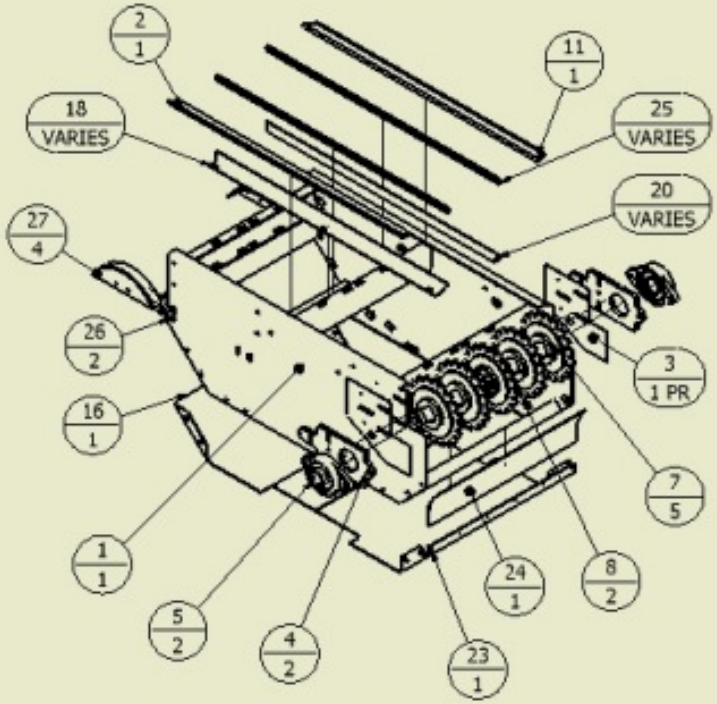
Product Support
PLASTITRAK Terms

- This diagram shows a typical straight running end driven conveyor:
  - *Tail*: undriven end where product is usually loaded
  - *Intermediates*: frame sections bolted between the tail and drive frames
  - *Drive*: the end of the conveyor where product is discharged, many drive positions are .
- Each frame section has a *carryway* and a *return* for the top and bottom surfaces of the belt
- The infeed and discharge sections utilize sprockets. The center sprocket of each shaft is fixed in position. Outer sprockets are free to float on the shaft.



End Drive

PLASTITRAK END DRIVE EXPLODED VIEW

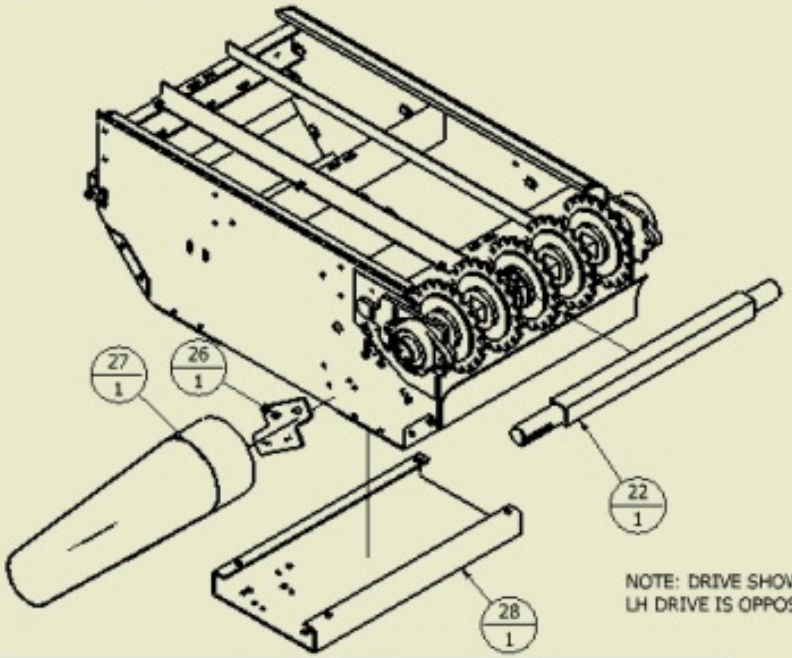


NOTE: WEARSTRIP PIN MATERIAL
#2000XXXXXXPX04 (NOT SHOWN)
IS SOLD PER FOOT

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	EDRVWX00	END DRIVE FRAME WELD
2	1	2000XXEDRVPX02RH	END DRIVE RH WEARSTRIP
3	1 PR	2000XXEXXXM~00	SHAFT LOCATING PLATE
4	2	2000XXEXXXMX01	END BEARING PLATE
5	2	02955.19	2 BOLT FLANGE BEARING
7	5	BELT SPROCKET	BELT SPROCKET
8	2	00051.18	SHAFT COLLAR ASSY
11	1	2000XXEDRVPX02LH	END DRIVE LH WEARSTRIP
16	1	EDRVMX10	END DRIVE LOWER GUARD
18	VARIES	2000XXEDRVMR11	END DRIVE CTR WEARSTRIP CARRIER, RH
20	VARIES	2000XXEDRVML11	END DRIVE CTR WEARSTRIP CARRIER, LH
23	1	EDRVMX11	END DRIVE END GUARD
24	1	EDRVMX12	END DRIVE FLAPPER
25	VARIES	2000XXEDRVPX03	END DRIVE CENTER WEARSTRIP
26	2	XXXXAX30	RETURN ROLLER, BW 24IN & UP
27	4	2000XXXXXXAX30	RETURN SHOE, BW < 24IN

End Drive Bottom Mount

PLASTITRAK END DRIVE, BOTTOM MT
EXPLODED VIEW



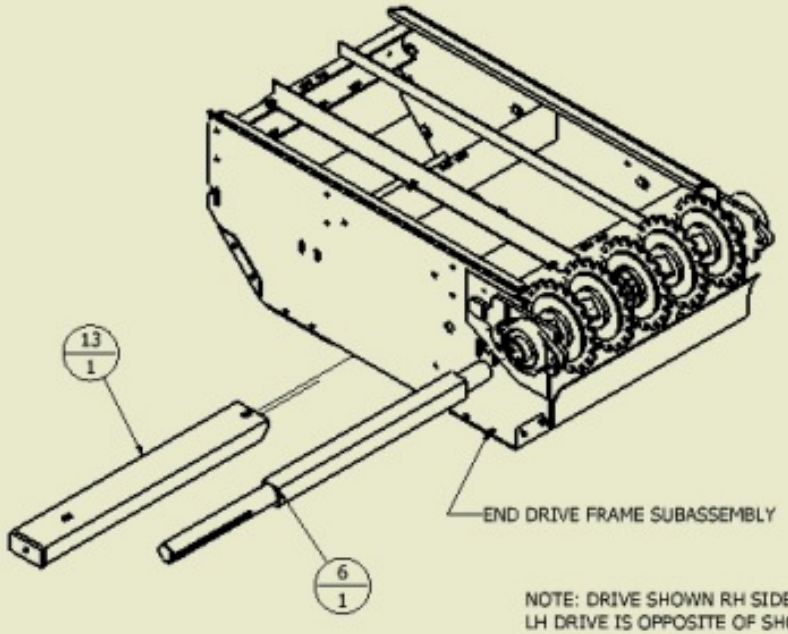
NOTE: DRIVE SHOWN RH SIDE
LH DRIVE IS OPPOSITE OF SHOWN

Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
22	1	XBRIPX01	DRIVE SHAFT
26	1	2000XXEBRIMX49	BOTTOM MT DRIVE GUARD BRACKET
27	1	2000XXEBRIAX50	DRIVE CHAIN GUARD ASSY
28	1	EBRIM~20	BOTTOM MT MOTOR BASE

End Drive Shaft Mount

PLASTITRACK END DRIVE, SHAFT MT
EXPLODED VIEW

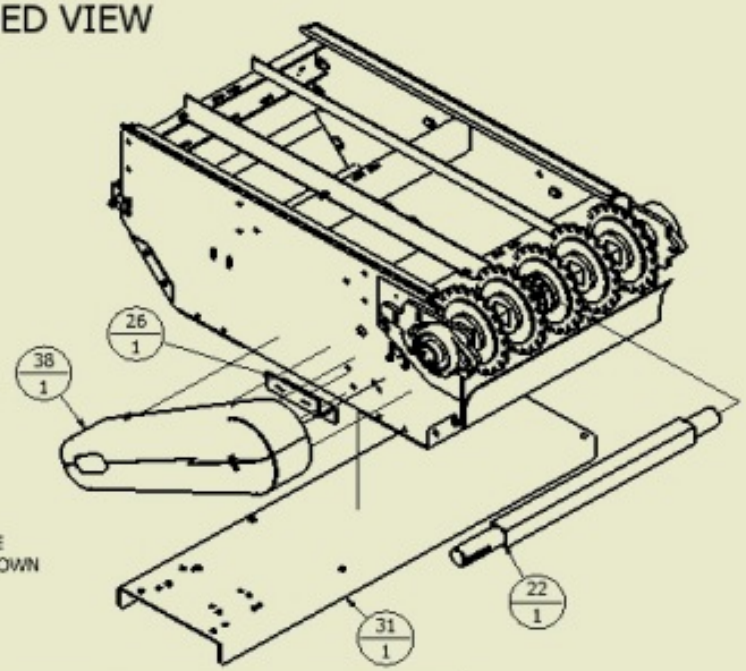


NOTE: DRIVE SHOWN RH SIDE
LH DRIVE IS OPPOSITE OF SHOWN

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	XHRXPX01	DRIVESHAFT, HOLLOWSHAFT GEARBOX
13	1	200016XHRXWX20	SHAFT DRIVE MOTOR BASE WELD

End Drive Side Mount

PLASTITRAK END DRIVE, SIDE MT
EXPLODED VIEW

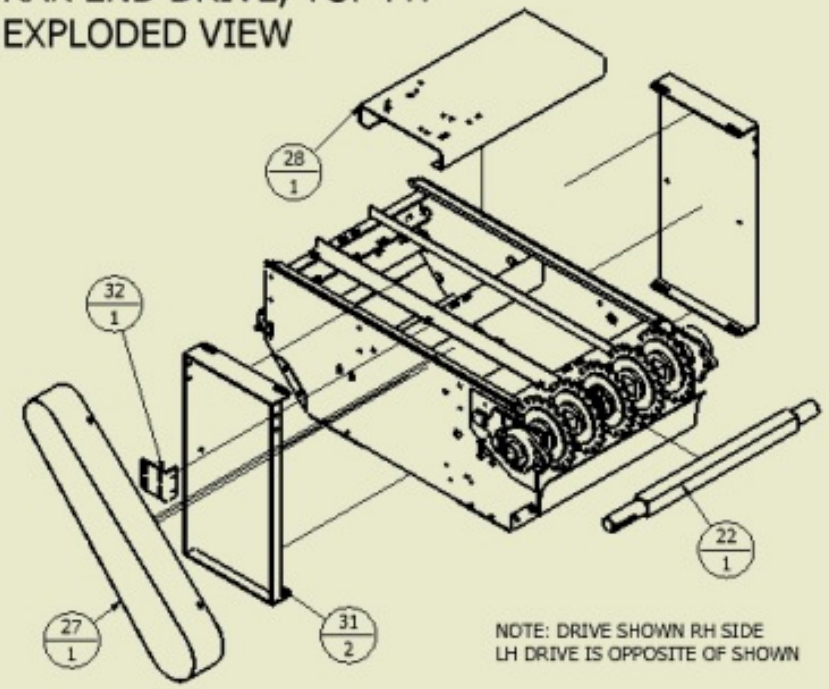


NOTE: DRIVE SHOWN RH SIDE
LH DRIVE IS OPPOSITE OF SHOWN

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
22	1	XBRIPX01	DRIVE SHAFT
26	1	2000XXEBRIMX49	BOTTOM MT DRIVE GUARD BRACKET
31	1	ESRIM~20	SIDE DRIVE MOTOR BASE
38	1	2000XXESRIAX50	END DRIVE SIDT MT GUARD ASSY

End Drive Top Mount

PLASTITRAK END DRIVE, TOP MT
EXPLODED VIEW

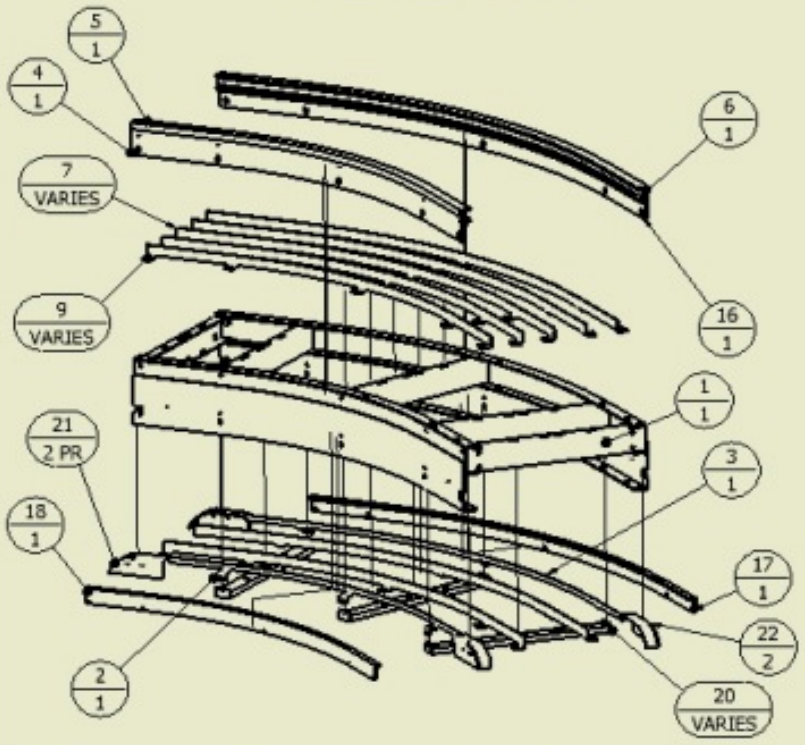


NOTE: DRIVE SHOWN RH SIDE
LH DRIVE IS OPPOSITE OF SHOWN

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
22	1	XBRIPX01	DRIVE SHAFT
27	1	2000XXEBRIAX50	TOP MT DRIVE CHAIN GUARD ASSY
28	1	EBRIM~20	MOTOR BASE
31	2	2000XXETRXWX60	TOP MT DRIVE HEADPLATE WELD
32	1	2000XXETRXMX52	TOP MT DRIVE GUARD BRACKET

LH/ RH Curve

PLASTITRAK LH/RH CURVE EXPLODED VIEW



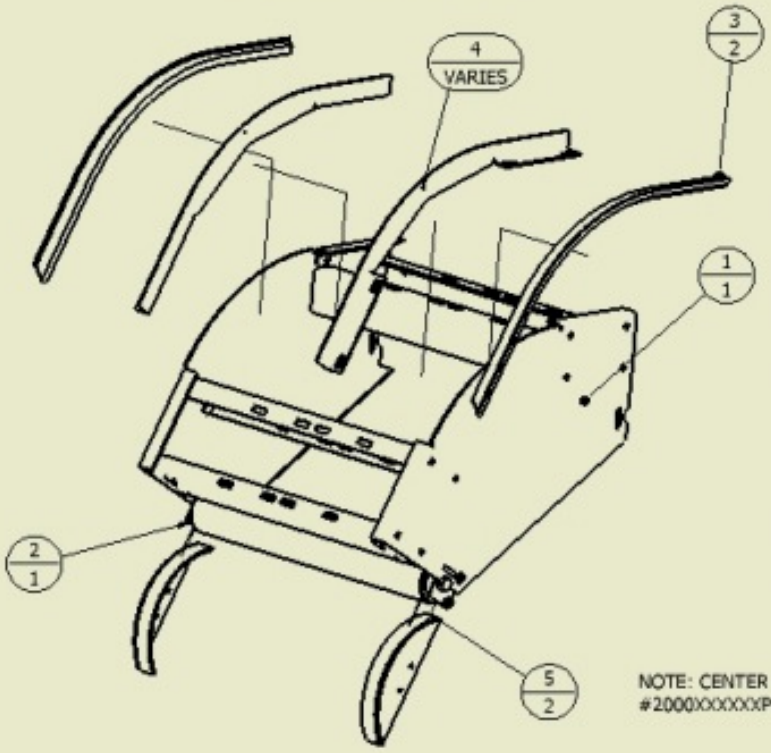
NOTE: CENTER WEARSTRIP #2000XXXXXXPX03 AND PIN #2000XXXXXXPX04 (NOT SHOWN) ARE SOLD PER FOOT

Parts List

ITE	QTY	PART NUMBER	DESCRIPTION
1	1	CWX00	CURVE FRAME WELD
2	1	CMXA4	CURVE INNER RETURN BRKT
3	1	CMXB4	CURVE OUTER RETURN BRKT
4	1	CMXA1	CURVE INNER UPPER BRKT
5	1	CPXA0	INNER UPPER WEARSTRIP
6	1	CPXB0	OUTER UPPER WEARSTRIP
7	VARIES	CMX20-CMX28	CENTER WEARSTRIP BRKTS, UPPER & LOWER
16	1	CMXB1	OUTER UPPER BRKT
17	1	CPXB1	OUTER UPPER WEARSTRIP
18	1	CPXA1	INNER RETURN WEARSTRIP
20	VARIES	XXXCWX30	RETURN SPREADER WELD
21	2 PR	2000XXCXXXA~31	CURVE END RETURN SHOE

Upper Curve

PLASTITRAK UPPER CURVE EXPLODED VIEW

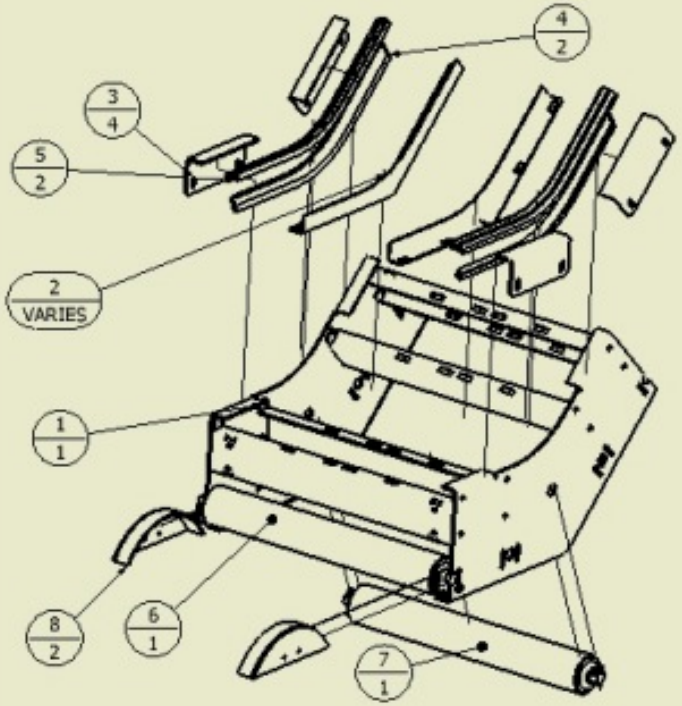


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	UWX00	UPPER CURVE FRAME WELD
2	1	XXXXAX30	RETURN ROLLER ASSY, BW 24IN & UP
3	2	UPX02	UPPER CURVE TOP LIP WEARSTRIP
4	VARIE 5	UMX10	UPPER CURVE CENTER WEARSTRIP BRKT
5	2	2000XXXXXXAX30	RETURN SHOE ASSY, BW < 24IN

NOTE: CENTER WEARSTRIP #2000XXXXXXPX03 & PIN #2000XXXXXXPX04(NOT SHOWN) ARE SOLD PER FOOT

Lower Curve

PLASTITRAK LOWER CURVE EXPLODED VIEW

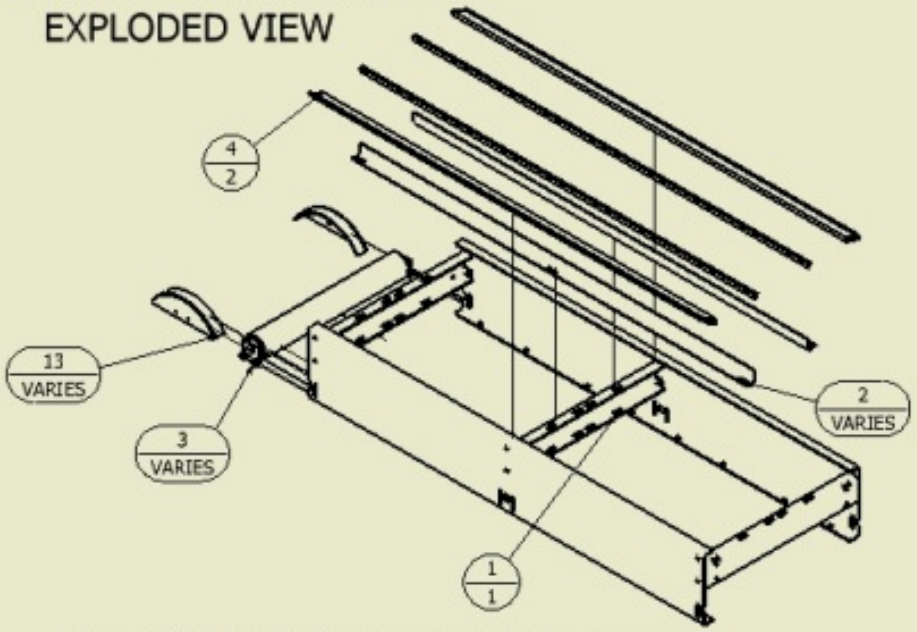


NOTE: CENTER WEARSTRIP #2000XXXXXXPX03 AND PIN #2000XXXXXXPX04 (NOT SHOWN) ARE SOLD PER FOOT

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	LWX00	LOWER CURVE FRAME WELD
2	VARIES	LMX10	LOWER CURVE CENTER WEARSTRIP BRACKET
3	4	2000XXXXXLMX10	LOWER CURVE HOLDDOWN BRACKET
4	2	LPX02	LOWER CURVE TOP LIP WEARSTRIP
5	2	LPX03	LOWER CURVE HOLDDOWN WEARSTRIP
6	1	XXXXAX30	RETURN ROLLER ASSY, BW 24IN & UP
7	1	XXXLAX30	CURVE ROLLER ASSY
8	2	2000XXXXXXAX30	RETURN SHOE ASSY, BW < 24IN

Intermediate Frame

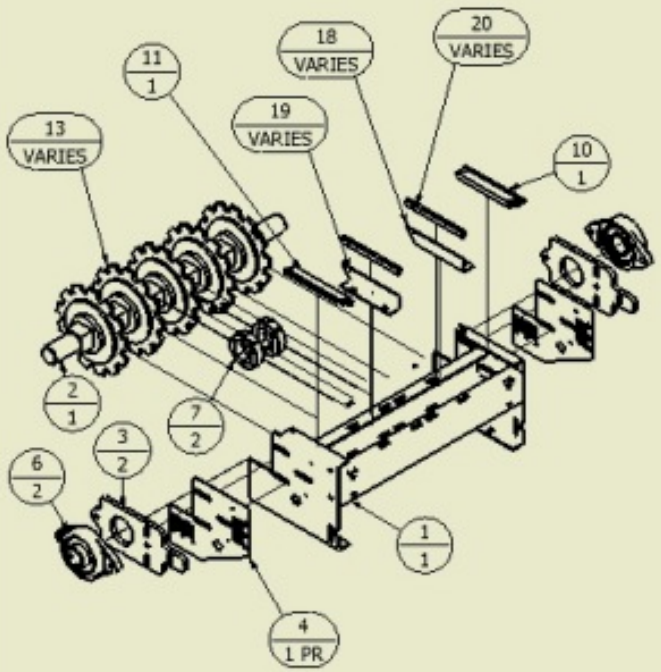
PLASTITRAK INTERMEDIATE FRAME
EXPLODED VIEW



NOTE: CENTER WEARSTRIP #2000XXXXXXPX03 & PIN #2000XXXXXXPX04
(NOT SHOWN) ARE SOLD PER FOOT

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	2000__I---IWX00	INTERMEDIATE FRAME WELD
2	VARIES	2000XX---IMX11	INTERMEDIATE CENTER WEARSTRIP BRKT
3	VARIES	XXXXAX30	RETURN ROLLER ASSY, BW 24IN & UP
4	2	2000XX---IPX02	INTERMEDIATE TOP LIP WEARSTRIP
13	VARIES	2000XXXXXXAX30	RETURN SHOE ASSY, BW < 24IN

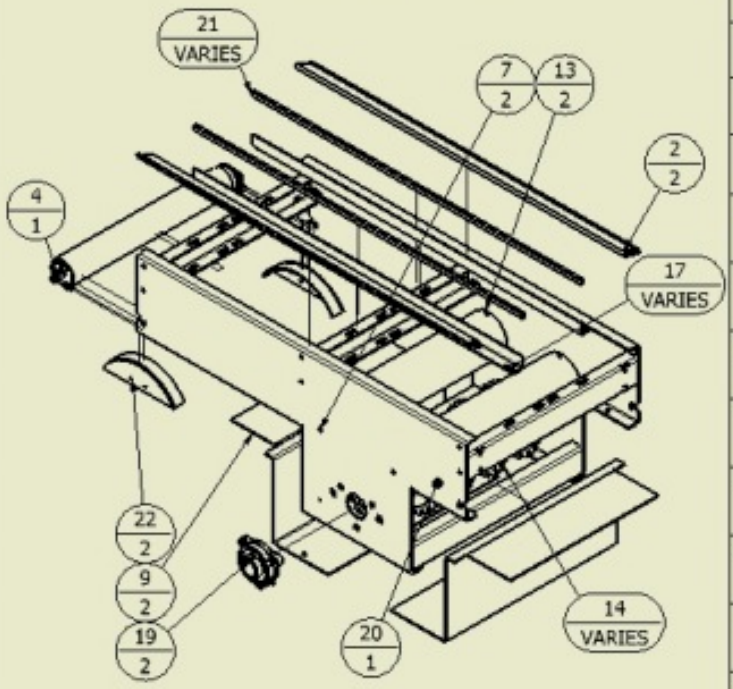
Tail/ Undriven End/ Idle End



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	EINFWX00	IDLE END FRAME WELD
2	1	EINFPX01	IDLE END SHAFT
3	2	2000XXEXXXMX01	END BEARING PLATE
4	1 PR	2000XXEXXXM~00	END SHAFT LOCATING PLATE
6	2	02955.19	2-BOLT FLANGE BEARING
7	2	00051.18	SHAFT COLLAR ASSY
10	1	2000XXEINFPX02LH	IDLE END LH WEARSTRIP
11	1	2000XXEINFPX02RH	IDLE END RH WEARSTRIP
13	VARIES	BELT SPROCKET	BELT SPROCKET
18	VARIES	2000XXEINFM~11	IDLE END CENTER WEARSTRIP CARRIER, LH SIDE
19	VARIES	2000XXEINFMR11	IDLE END CENTER WEARSTRIP CARRIER, RH SIDE
20	VARIES	2000XXEINFPX03	IDLE END CENTER WEARSTRIP
21	4	2000XXXXXXPX04	

Center Drive

PLASTITRACK CENTER DRIVE EXPLODED VIEW

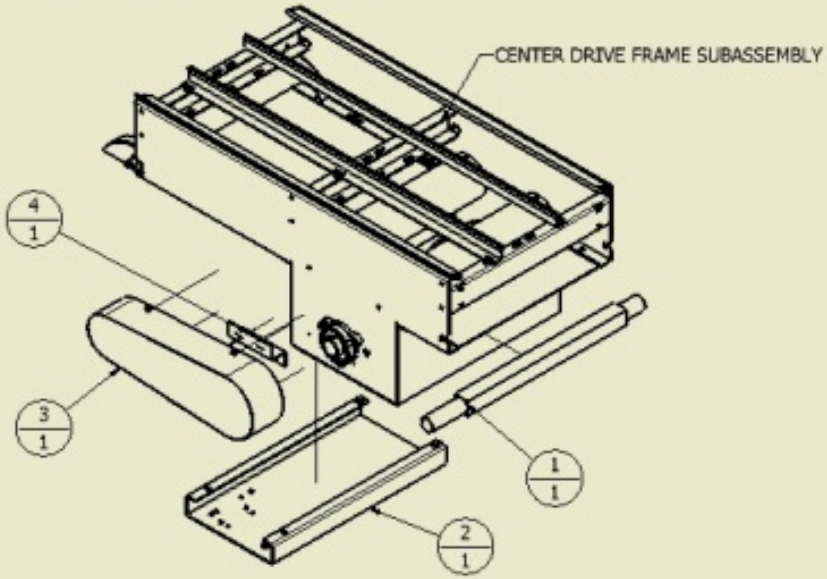


NOTE: WEARSTRIP PIN MATERIAL #2000XXXXXXPX04 (NOT SHOWN) IS SOLD PER FOOT

Parts List			
ITE	QTY	PART NUMBER	DESCRIPTION
2	2	2000XXCDRVPX02	CENTER DRIVE TOP LIP UHMW
4	1	2000__XXXXAX30	M2000 RETURN ROLLER ASSY, BW > 24IN
7	2	2000__CDRVMX01	M2000 CENTER DRIVE IDLE SHAFT
9	2	2000__CDRVMX10	CENTER DRIVE BOTTOM PAN
13	2	2000__CDRVPX21	CENTER DRIVE IDLER PULLEY 4IN C-HUB
14	VARIES	BELT SPROCKET	BELT SPROCKET
16	2	00051.18	SHAFT COLLAR, 1.5IN SQUARE
17	VARIES	2000XXCDRVMX11	CENTER DRIVE WEARSTRIP BRKT
19	2	00282.01	CENTER DRIVE BEARING
20	1	2000__CDRVWX00	CENTER DRIVE FRAME WELD
21	VARIES	2000XXCDRVPX03	M2000 END DRIVE CENTER WEARSTRIP
22	2	2000XXXXXXAX30	M2000 RETURN SHOE ASSY, BW < 24IN

Center Drive Frame Mount

PLASTITRACK CENTER DRIVE FRAME MT
EXPLODED VIEW



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	CFRIPX01	DRIVE SHAFT
2	1	EBRIM~20	BOTTOM MT MOTOR BASE
3	1	2000XXCFRIAX50	M2000 CTR DRIVE FRAME MT CHAIN GUARD ASSY
4	1	2000XXEBRIMX49	BOTTOM MT DRIVE GUARD BRACKET