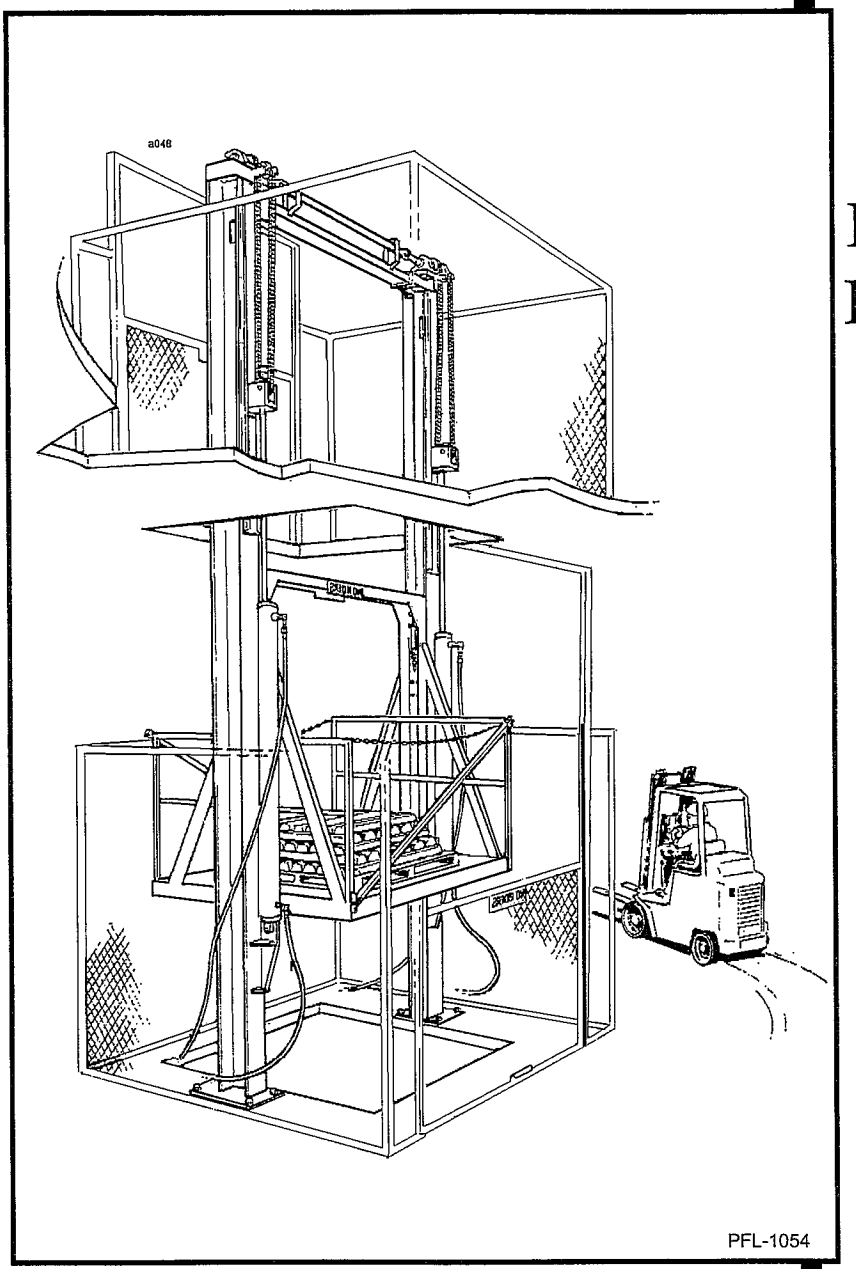
# PFLOW VERTICAL LIFTS

The Nation's Largest Manufacturer of Vertical Lifts




# INSTALLATION INSTRUCTIONS

# SERIES 21

**READ THIS MANUAL IN ITS ENTIRETY AND VERIFY JOB SITE DIMENSIONS AGAINST GENERAL ARRANGEMENT DRAWING BEFORE STARTING INSTALLATION**

**THE ILLUSTRATIONS IN THIS MANUAL ARE NOT TO SCALE OR DETAIL AND ARE FOR REFERENCE ONLY**

**090110-21I**

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## INTRODUCTION

Thank you for purchasing a PFLOW INDUSTRIES, INC., Series 21, Vertical Reciprocating Conveyor (VRC). We are confident that your unit will provide you with many years of reliable service.

**CODE REQUIREMENTS** - VRCs are NOT elevators. Your unit is designed for the movement of materials only, up to its rated capacity, from one level to the next. VRCs have their own national code (ANSI/ASME B20.1) and are specifically exempt from the National Elevator Code. All electrical designs and components are in accordance with National Electric Code (NEC) requirements. Local codes may require initial inspection of the installation and periodic inspection and testing of the unit. Call Pflow Industries for more information in the event an inspection is required for your equipment.

Some states require special components and have specific guidelines regarding how the equipment must be installed, inspected, and tested. If we know in which state the equipment will be located, and if we are kept informed of state and local requirements, Pflow will incorporate the components into the order, as approved by the customer, and also provide any pertinent information, as called out on the general arrangement drawing, related to the installation of the equipment. We will not be on site for the testing, but we strongly advise that the installer be there.

If at any time you have questions about your state's requirements, please feel free to call.

**NOTE**

*The information and illustrations in this manual are intended only as an aid to understanding the VRC's general installation. It does not cover every possible contingency or circumstance regarding non-standard options or site conditions.*

If you have a problem, call Pflow at (414) 352-9000, between 8:30 A.M. and 5:00 P.M., CST, Monday through Friday. Ask for the Product Support Department and have your serial number ready.

**Parts** - Pflow Industries maintains a complete stock of, or has access to, all replacement components. We keep detailed records of all equipment sold. If something is damaged in shipment, is defective or missing, contact us immediately.

**Service** - Our Product Support Department is available to assist your maintenance personnel with any questions or problems they may have regarding the equipment.

**Warranty** - Our warranty procedures can be found in this manual. Prior authorization must be obtained from Pflow before commencing work of any kind.

**Feedback** - Let us know how we are doing. Each installation manual contains a questionnaire. Please fill it out and return it to us. We can't prevent a problem if we are not aware of it.

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## SAFETY

To ensure your safety and the safety of those around you, it is important that you read, understand, and follow ALL the safety precautions relative to a particular task. Safety precautions in this manual are labeled with the alert symbol followed by the word DANGER, WARNING, or CAUTION.

**⚠ DANGER**

**When you see this symbol, it means that serious injury or death is likely if the instructions are not followed carefully.**

**⚠ WARNING**

**When you see this symbol, it means that the potential for personal injury is high if directions are not followed carefully.**

**CAUTION**

**When you see this, it means that the potential for damage to the equipment is high if directions are not followed carefully.**

**NOTE**

*This term is used to provide additional information to help clarify instructions.*

**⚠ DANGER**

**HIGH VOLTAGE. Failure to follow proper procedures when performing electrical installation or service may result in serious injury or death.**

**⚠ DANGER**

**DO NOT ride this equipment. Riding may result in injury or death. VRCs ARE NOT ELEVATORS.**

**⚠ DANGER**

**DO NOT walk or work under a raised platform.**

**⚠ DANGER**

**If you can open a gate when the unit is not at that level, or the unit will operate with a gate open, a safety device is not working and could result in serious injury or death.**

**⚠ WARNING**

**DO NOT operate the unit if either the gates or interlocks are not functioning properly.**

**CAUTION**

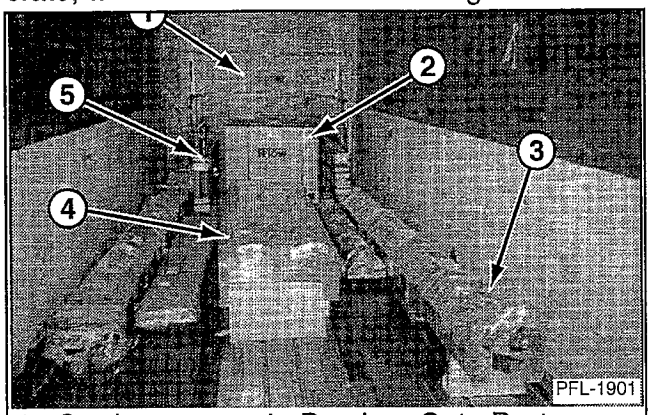
**Paint overspray on cylinder rod will damage seals and void warranty.**

**CAUTION**

**DO NOT exceed rated capacity.**

## EQUIPMENT ARRIVAL AND UNPACKING

You will need a fork truck capable of lifting approximately 2,000 lbs. Larger units may require a higher lifting capacity fork truck. To ensure complete shipments, Pflow Industries takes pictures of the unit, contents of the parts crate, and individual boxes. See Figures 1-3.




1. Carriage
2. Parts Crate
3. Columns
4. Bracing, Gate Posts & Other Components
5. Gate & Enclosure Panels

**Figure 1**

**NOTE**

*The material in the boxes, cartons, etc. was loaded complete, in good condition and so delivered to the carrier agent.*

Verify that the number of items on the Bill of Lading agrees with the number of items delivered to you. Check all pieces to determine if damage has occured during transit. The carrier agent is responsible for, and should be notified immediately of, any visible loss or damage that has occurred. If damaged, the shipment must be signed for as such. Where loss or damage appears, call on the carrier agent to inspect the shipment before unloading it and make notation of condition of contents on freight bill. A claim for loss or damage should be presented to the carrier agent without delay, and a complete statement of facts should be in your possession. All hidden damage must be reported directly to the freight carrier within seven days of delivery. Pflow Industries is not responsible for shipping / receiving damage once the equipment has left the factory nor will we file any claims for damage that may occur.

If you believe anything is missing, contact our Product Support Department immediately. Failure to notify us may affect completion time of the installation. Our warranty does not cover lost time and/or additional trips for missing or damaged components.

All replacement components or labor that may be needed as a result of any damage will require a purchase order and compliance with our RGA procedures. This number should be obtained from Pflow Industries.

Figure 2 shows the typical contents of the parts crate.

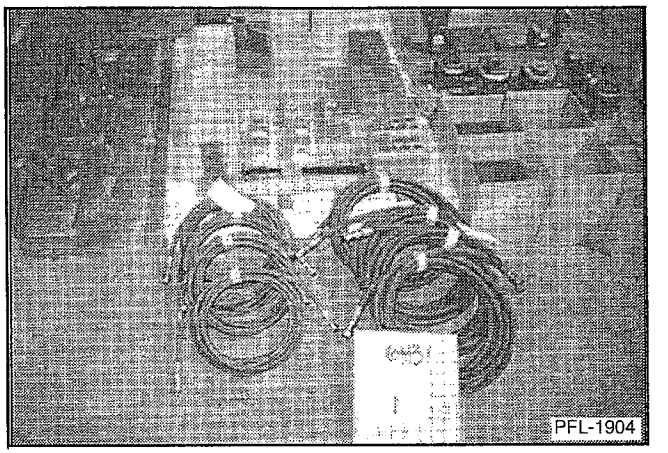



**Figure 2**

The shipping packet can be found inside the parts crate. This packet contains the owner's manual, installation instructions, general arrangement drawing, a copy of the schematic, and additional information as may be applicable to the installation.

An additional copy of the schematic can be found inside the control panel. See Figure 3.

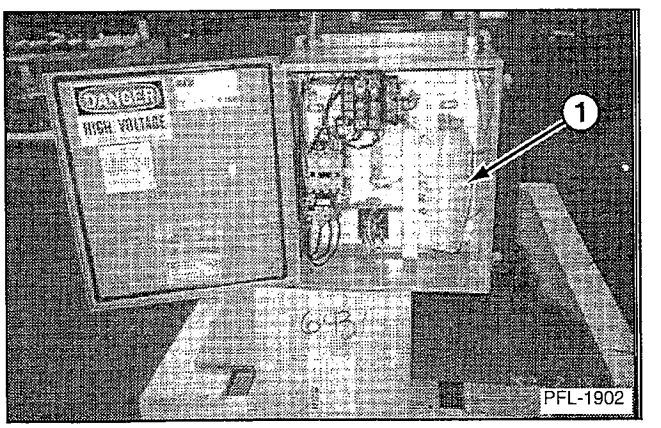



**Figure 3**

## PRE-INSTALLATION CHECKLIST

Site conditions can mean the difference between an installation that is smooth and one that is difficult.

We have provided a general checklist to help set up your installation. We recommend that the installer, or someone with installation experience, discuss not only these items but all other concerns directly with the people on site.

A pre-installation visit is always recommended and considered to be included in the responsibilities of the mechanical installer.

**⚠ WARNING**

**Safety should always be first and foremost in your mind on this or any job. Besides following safe working procedures, items required by OSHA may include: a hard hat, safety shoes, safety glasses and belt, fire extinguisher, and other safety equipment.**

### Mechanical Installer Responsibilities

- Complete mechanical erection of the equipment as sold by Pflow, called out on the general arrangement (GA) drawing and in accordance with all instructions within this installation manual.
- Return trip upon completion of the electrical installation for final checkout, adjustments and training. (See Completion Checklist.)
- On non-union sites, mounting of all electrical devices.

### Customer Responsibilities

- Unloading and transportation of the equipment to the installation area.
- Storage (if applicable). If unit is stored indoors or long-term storage is required, consult Pflow Industries for storage procedures required to keep warranty in effect.
- All necessary site work to prepare for the installation such as pit, floor opening, adequate bracing locations, and shaftway openings.
- Any site/building modifications necessary to get the equipment to the installation area.
- Adequate pick point or lifting mechanism capable of lifting the heaviest load. If weight of load is in question, please call Pflow Industries.

If you have any questions or concerns, please contact our Product Support Department prior to start of work.

__ Can the equipment pass through all doorways, hallways, etc.?

__ Can you use the customer's fork truck? Is the truck's capacity sufficient?

__ Are safety meetings required?

__ Are there any work procedure/safety guidelines particular to the job site?

__ Is welding permitted? Is a "hot permit" required? Is a fire watch required?

__ Is there a pick point capable of lifting the necessary components?

__ What hours are you allowed to work on site?

__ Who is the authorized site contact?

__ Is this a union or non-union site?

__ Bracing requirements - Will additional materials be required?

__ Is temporary power available within 10 ft. of the unit?

__ Do you have a well-lit area to work in?

__ Is the installation area ready (pit complete, floor opening cut and/or finished, etc.)?

__ Are shaftway openings complete?

__ Are there any discrepancies between the site dimensions/application and the Pflow GA drawings? Has this information been provided to Pflow?

__ Will customer doors and/or shaftway openings be completed prior to your arrival?

__ Will other trades or in-plant production cause conflict with your proposed work schedule?

__ Special welding requirements if you have special coatings, i.e., epoxy paint, hot galvanized, etc.

## SITE VS. GENERAL ARRANGEMENT

### Comparison Check

1. Check your shipment to make sure that nothing is damaged or missing. Missing components must be reported to Pflow Industries immediately per instructions in the introduction of this manual.

2. The shipping packet found inside the parts crate contains a copy of the general arrangement drawing. See Figure 4.

3. Compare the dimensions as called out on the general arrangement drawing to actual site conditions. Report any discrepancies to Pflow immediately. The following are just a few of the dimensions that could be a problem if they do not match:

   Pit Length
   Pit Width
   Pit Depth
   Is Pit Square?
   Overhead Clearance
   Gate Clearance - Level 1
   Gate Clearance - Level 2

   Are there any protrusions from the floor level or wall that could interfere with either the installation or operation?

   Floor-to-Floor Clearance - Upper Level

   Floor Opening - Length
   Floor Opening - Width
   Is Floor Opening Square?
   Is the Floor Opening Properly Aligned Above the Pit?

**CAUTION**

**Discrepancies between the general arrangement drawing and site conditions must be addressed immediately. Contact the Product Support Department (414) 352-9000 for assistance.**

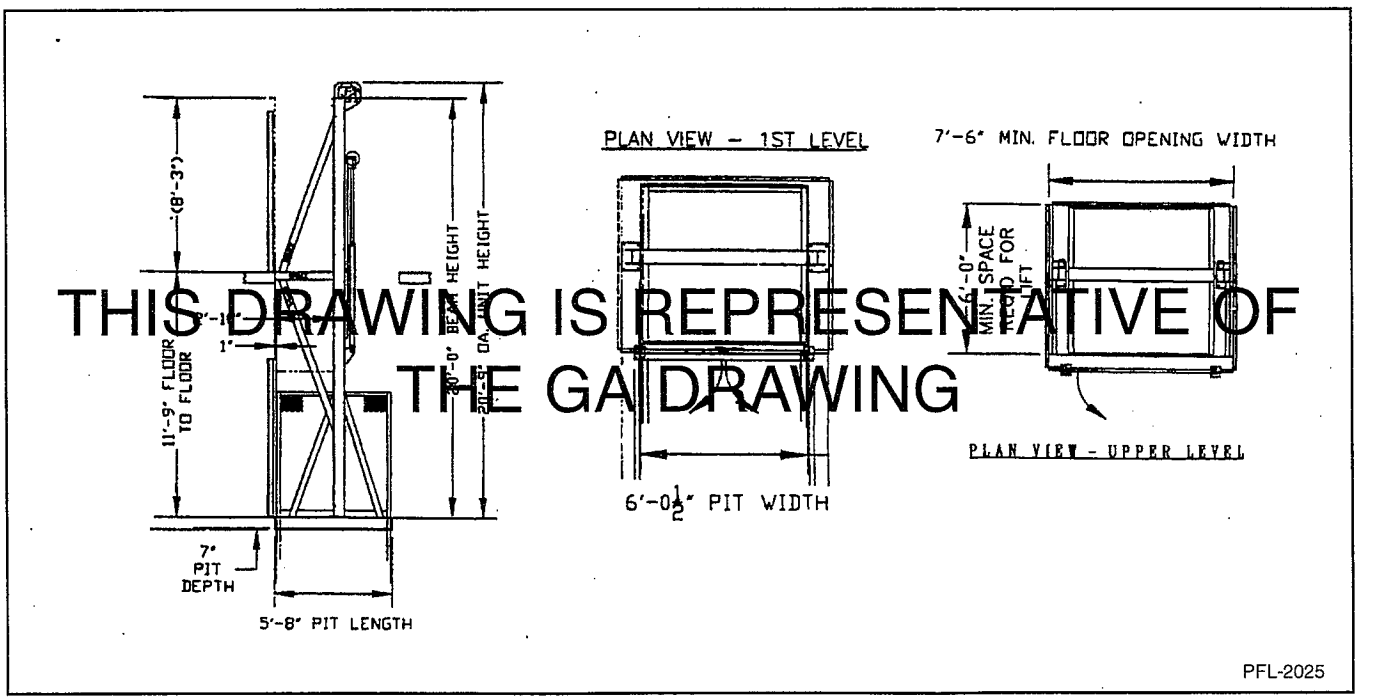





**Figure 4**

*NOTE*

*The model and dimensions shown in Figure 4 are not applicable to your unit. This drawing is for illustrative purposes only.*

## TOOLS REQUIRED FOR VRC INSTALLATION

The following is a list of tools we feel are necessary to install a VRC in a professional and expedient manner. This is only a guideline. Individual sites and applications may require additional items as needed. If you have any questions regarding these items, contact Pflow Industries.

- Welding machine and equipment. (i.e., helmet, gloves, rods, etc.)
- Cutting torch with tanks
- Fire extinguisher
- Forklift - 2,000# capacity or alternative
- Chain fall - 2,000# capacity minimum
- Come-A-Long
- Cables or hook chains with 1,000# or greater capacity
- Disk grinder
- "C" clamps
- Drift punch
- 5/8"-11 N.C. tap
- Carpenter's square
- 4' Level
- SAE 30W non-detergent motor oil
- Socket set - 1/2" drive, sockets to 1-1/8"
- Hammer drill and bits for 1/4", 3/8", and 1/2" anchors, 4" min.
- Hack saw, reciprocating saw, or portable band saw
- Drill and drill bits
- Extension cords
- Portable light
- Sledge hammer
- Allen wrenches to 3/8"
- Open or box end wrenches to 1-1/4"
- Chalk line
- Plumb bobs
- Grease gun
- 25' Measuring tape
- Rags

## INSTALLATION INSTRUCTIONS

### Unit Placement

1. The load/unload edges of the carriage should be 1" away from the edge of the upper floor level; and if there is a pit, the same dimensions apply (unless otherwise noted on GA). See Figure 1.

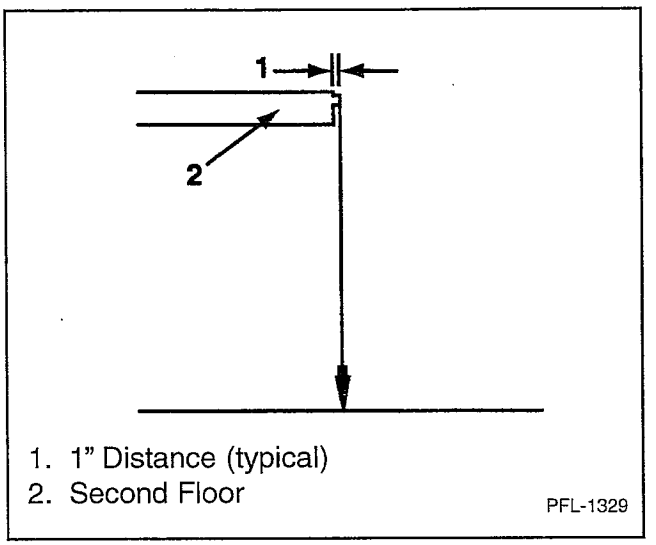



**Figure 1**

2. To verify this location on the lower level, drop a plumb bob 1" away from the edge and mark that point on the lower floor. Do this for each load/unload side.

**CAUTION**

**If there are any protrusions (from floor, wall, etc.), they will have to be removed. Plumb lines have to be positioned beyond the protrusion or the carriage WILL NOT clear after installation. Floor may have to be extended to get the proper distance from floor to carriage.**

3. Mark the center of the opening. See Figure 2.

4. Drop a plumb bob from point A and mark point B. See Figure 3.

5. Drop a plumb bob and mark points C and D. See Figures 4, 5, and 6

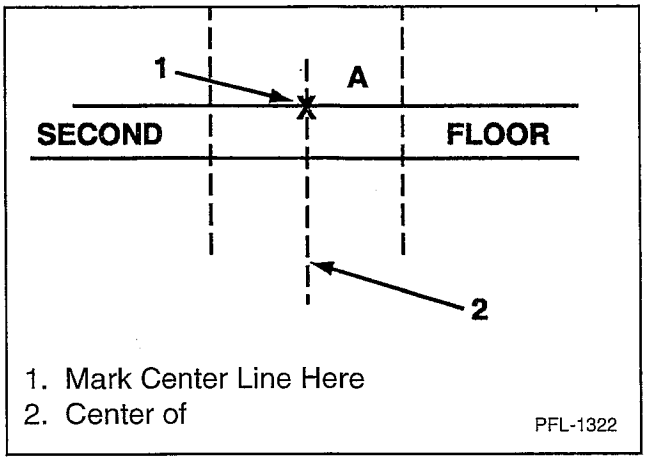



**Figure 2**

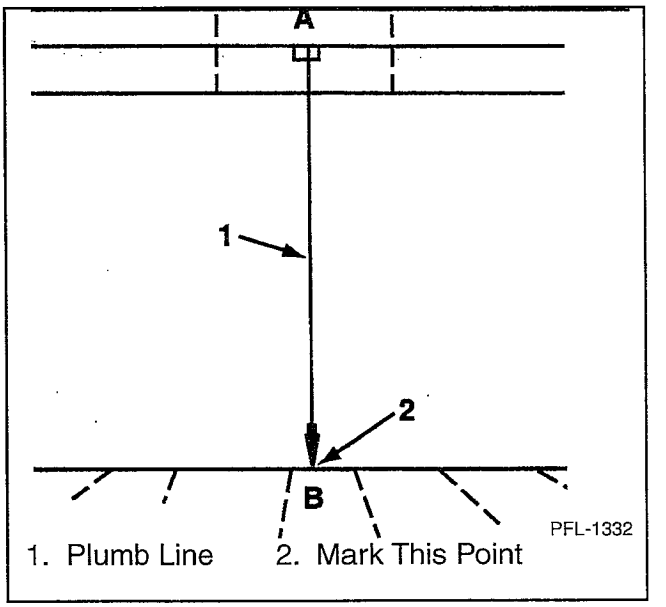



**Figure 3**

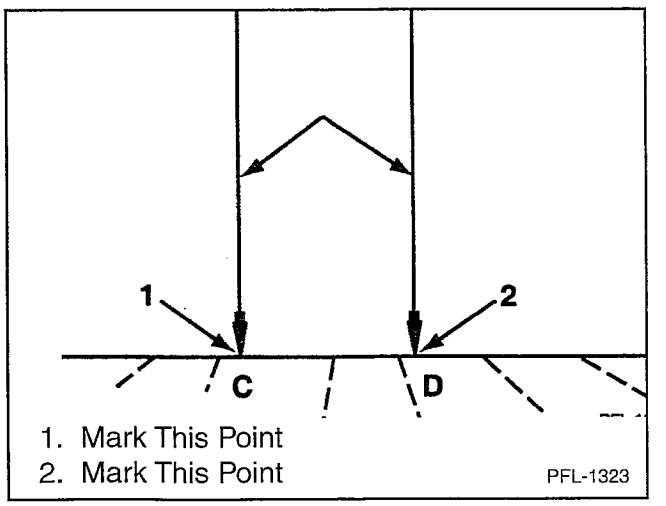



**Figure 4**

6. Locate three (3) marks C, B, and D. See Figure 5.

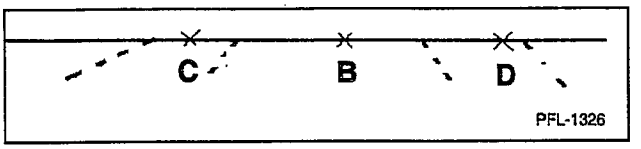



**Figure 5**

7. Snap a chalk line between marks C and D and through mark B.

8. Align rear of the carriage with line C, B, and D. See Figure 6. See GA drawing for orientation of carriage.

**NOTE**

*If carriage goes through a floor and clearances are tight, you might want to position the carriage AFTER the columns have been assembled and raised into place.*

*In some applications with taller units, spliced columns, restricted shaftways, etc., it may be necessary to raise the columns before positioning the carriage.*

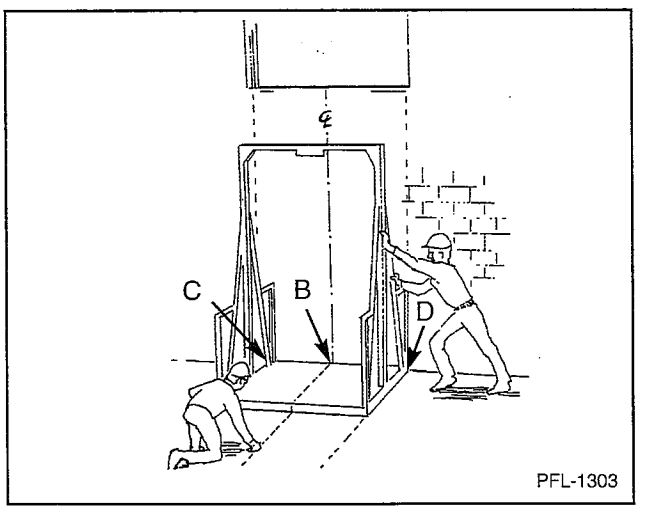



**Figure 6**

## Wheelblocks

**NOTE**

*If you have green tensioner wheels, install them now. See Figure 7.*

*After all wheelblocks are installed, tension wheels against columns to prevent carriage from rocking. Tighten mounting bolts securely. See Figure 7A.*

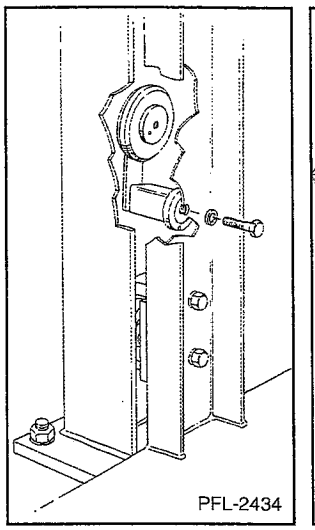



**Figure 7**

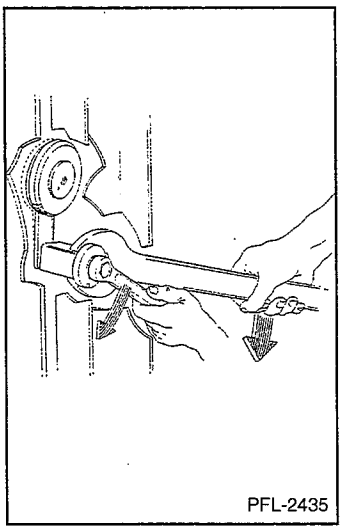
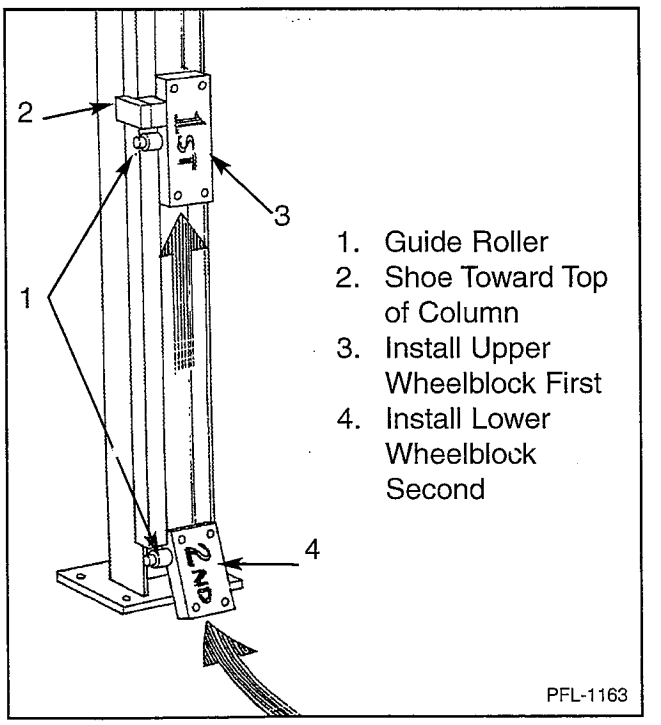



**Figure 7A**

1. Remove all 5/8" hex head screws from the four wheelblocks. Insert wheelblocks in the columns through the notch in the guide angle at the base of the beam. The upper wheelblocks are longer and are installed with the shoe toward the top of the column. Insert lower wheelblock after upper wheelblock has been inserted. See Figure 7B.

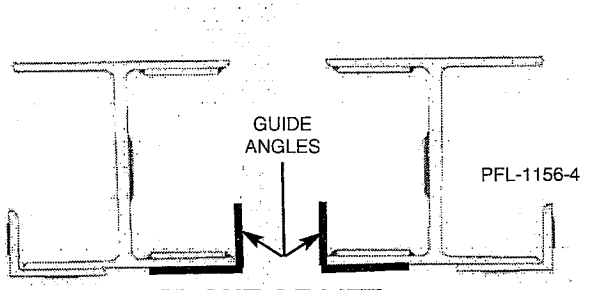
NOTE

*Wheelblocks may have to be partially disassembled for insertion into columns (removal of outside guide roller and shoe on upper wheelblock.)*



## Columns

1. Each column must be correctly installed. There is only one right way. The front of the lift for orientation is as follows: The face of the column with the guide angle to the inside of the column should be positioned toward the front of the lift.




**FRONT OF LIFT**
**STRADDLE CONFIGURATION**
(If Cantilever Configuration, See Bulletin 277-1, Cantilever Guidelines)

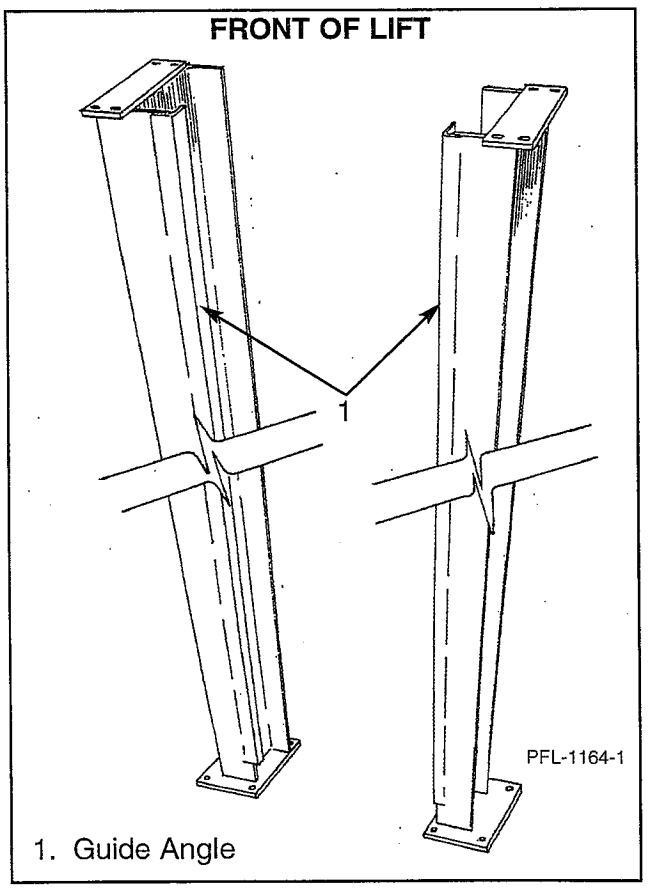



**Figure 8**

**NOTE**
*If your VRC has spliced columns, refer to Bulletin 163-1 to 3, Spliced Column Assembly, NOW. If columns are not spliced, proceed to #2 and continue installation of the VRC.*

**NOTE**
*In some applications with taller units, spliced beams, restricted shaftways, etc., it may be necessary to raise the beams before positioning the carriage.*

2. Raise right hand column into position. See Figure 9.

**CAUTION**
***Do not use the carriage and wheelblocks to support columns!***

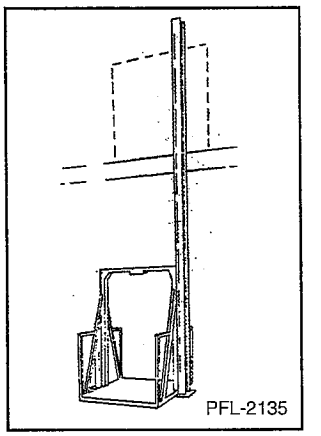



**Figure 9**

Upper wheelblock should be installed at the middle of the slots in the upright. Install jackscrew above upper wheelblock on side of carriage that has slots in the upright. See Figure 10.

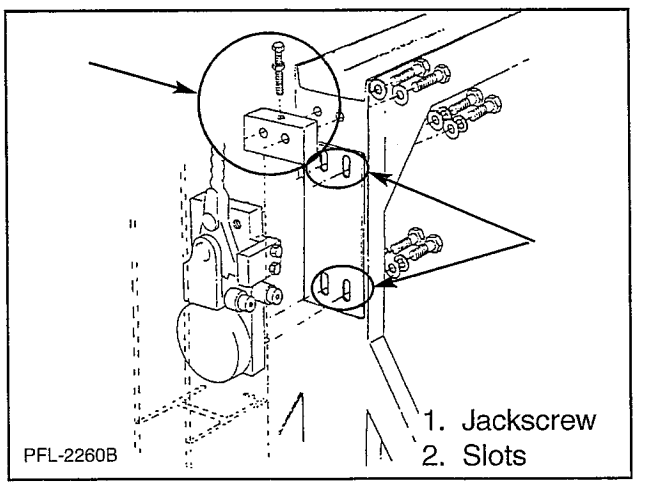



**Figure 10**

3. Slide column alongside carriage so that the wheelblocks align with mounting holes. Bolt the carriage to the upper and lower wheelblocks using the screws previously removed. Make sure column is secured to the carriage. See Figures 11and 12.

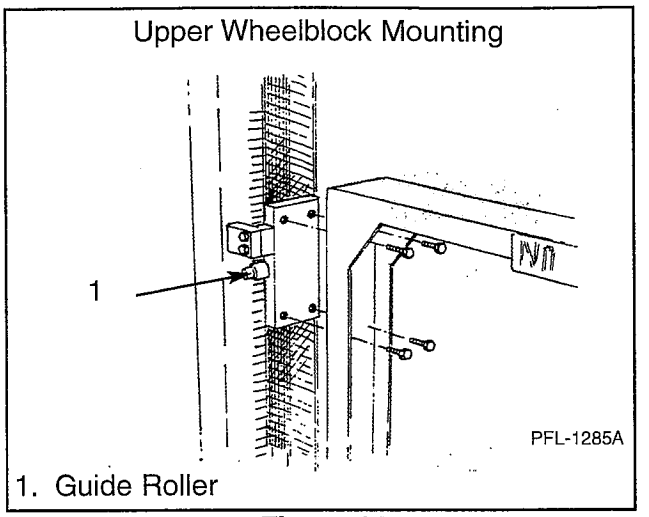



**Figure 11**

NOTE

*Safety cams need to be held in the disengaged position to ease alignment and assembly.*

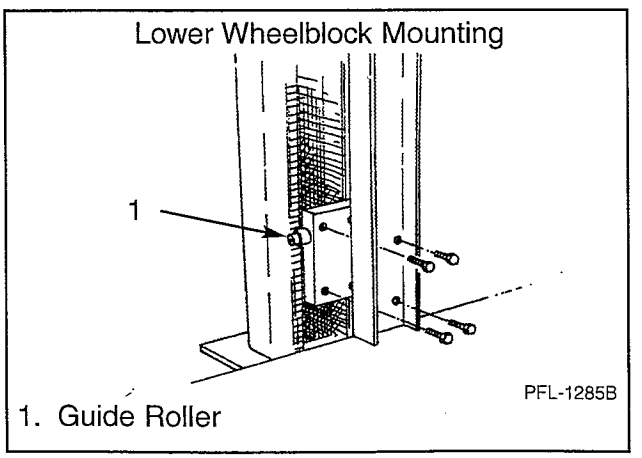



**Figure 12**

NOTE

*Running a tap through all the threaded holes in the wheelblocks to clean them out should make bolting the wheelblock to the carriage much easier.*

4. Raise the left column. Follow the same procedures as outlined in Steps 2 and 3 to install the left beam.

5. Raise the header assembly and place it into position on the mounting pads at the top of each column.

6. Install bolts as illustrated. Snug bolts down. Tighten enough to allow for adjustment. See Figure 13.

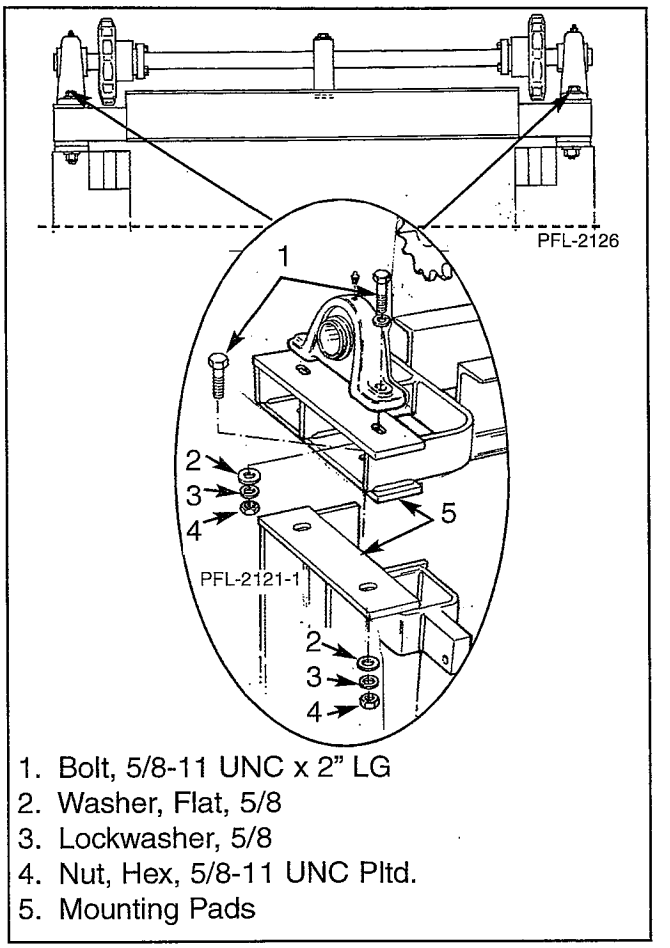
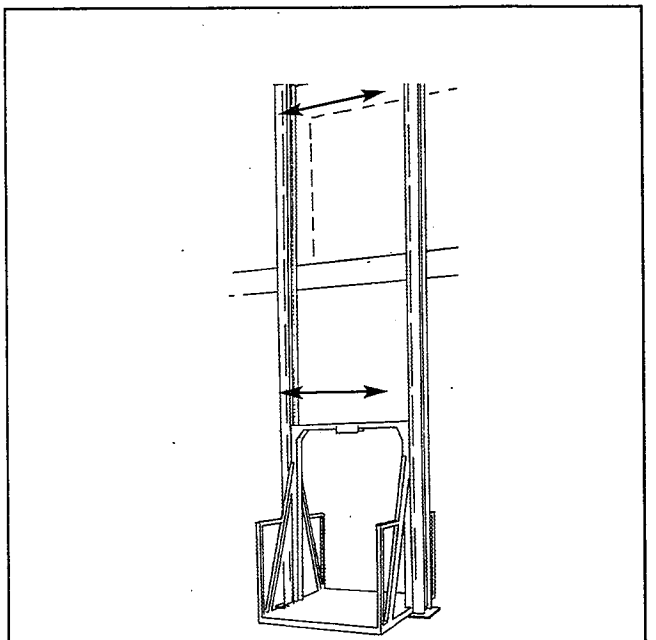



**Figure 13**

7. Alignment of the main columns is important. It is most easily accomplished as follows:

   Take the guide angle-to-guide angle dimension off of the general arrangement drawing. Verify by measuring the out-to-out dimension of the carriage uprights including shims, if applicable, plus 2 5/8". If your dimensions vary more than 1/8", contact the factory. See Figures 14 and 15.



1. Measure Here PFL-1311-1

**Figure 14**

8. Another way of setting the spacing of the columns is to tape a 1/8" shim onto the guide angle and move the lower guide roller tight to the 1/8" shim.

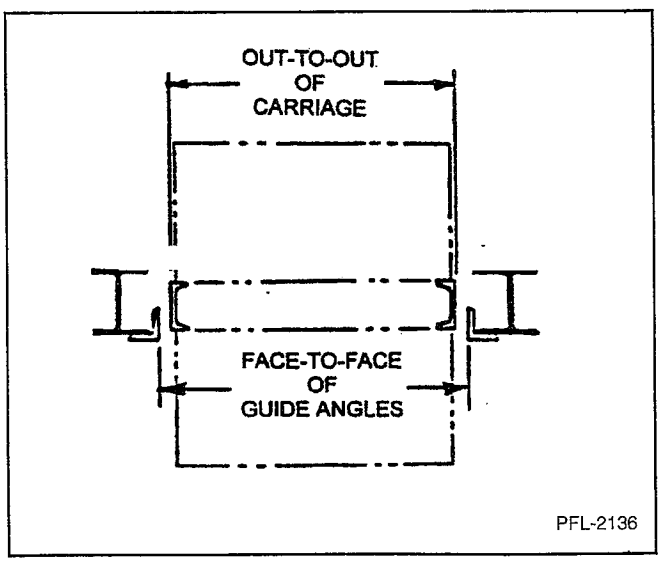
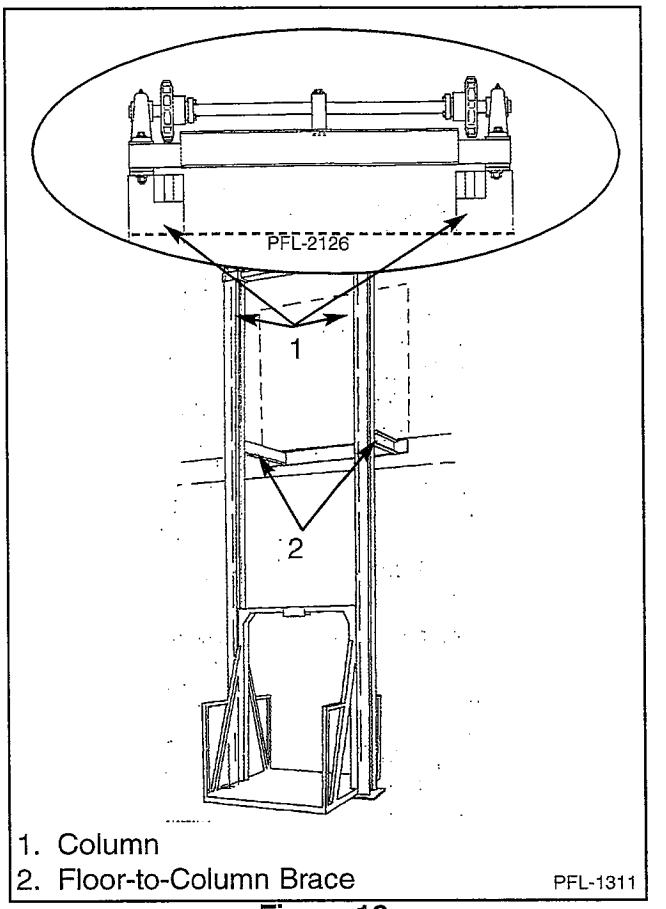



**Figure 15**

9. Plumb left column. Recheck spacing and lag or tack weld left floor-to-column brace. Make sure braces clear decklock arms, cylinder travel, etc. See Figure 16.

**NOTE**

*Make sure there is no column twist.*




1. Column
2. Floor-to-Column Brace PFL-1311

**Figure 16**

10. Recheck left column to make sure it is plumb and anchor to floor.

11. Plumb right column. Recheck spacing and lag or tack weld right floor-to-column brace. Be sure that horizontal braces are parallel to each other and level.

**NOTE**

*Again, make sure you do not allow column to twist.*

12. Recheck right column and anchor to floor if column is plumb. Recheck dimensions before fully welding column braces.

13. Add side bracing as necessary. See Figure 17.

**NOTE**

*Columns should be supported in at least two directions which are perpendicular (90 degrees) to each other.*

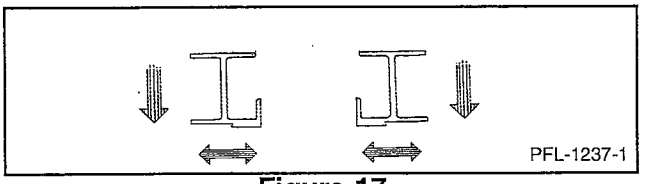



**Figure 17**

14. Tighten bolts on header assembly. See Figure 18.

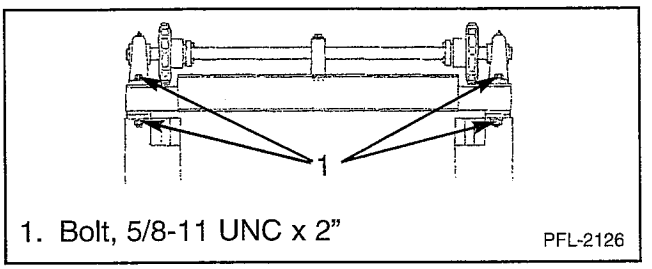



**Figure 18**

## Header/Chain Installation

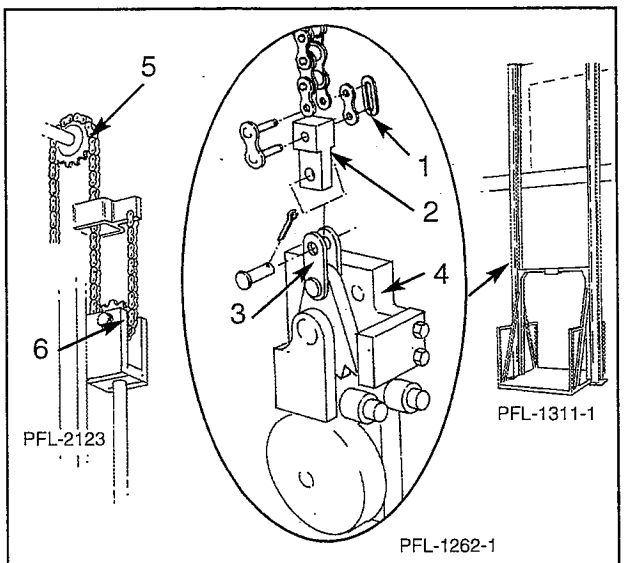
1. Remove chain from parts crate and assemble into two equal lengths. Attach one length of chain to each wheelblock as shown. You should be able to do this without removing the wheelblock. See Figure 19.

   You may have to remove plugs from the cylinder ports to extend the rod. Assemble the chain as shown in Figure 19. Check header sprocket alignment with cylinder rod. Adjust if needed.

**NOTE - ATTENTION INSTALLERS!**
*Your Pflow Industries, Inc. hydraulic vertical conveyor includes two extra small pieces of chain that can be added if needed. Typically, these additional links are not necessary. They have been included to ensure flexible installation of your Pflow equipment.*

**CAUTION**

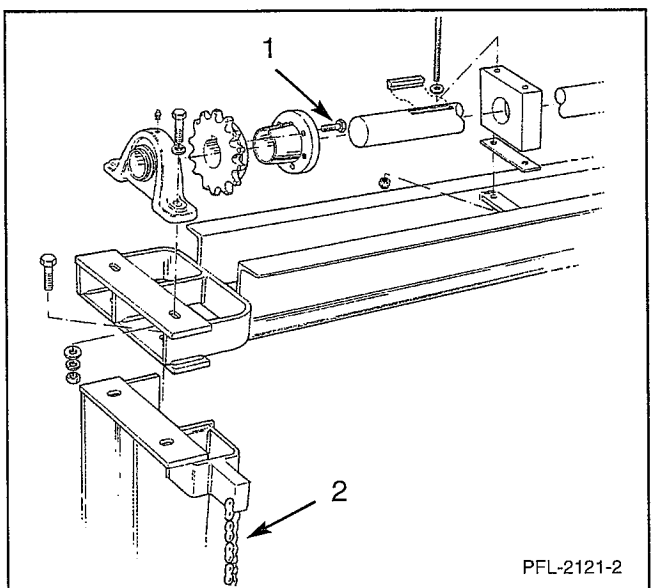
- **Confirm sprocket is aligned correctly in field.**
- **Verify the tapered surfaces of the sprocket and bushing are clean and dry.**
- **DO NOT USE LUBRICANT ON THE CAPSCREWS.**
- **Confirm all capscrews are tightened evenly and in rotation to 348 in-lbs.**
- **DO NOT OVER TORQUE. DO NOT ATTEMPT TO CLOSE GAP BETWEEN BUSHING FLANGE AND SHEAVE HUB.**




1. Master Link
2. Toggle
3. Connecting Link
4. Upper Wheelblock
5. Header Assembly Sprocket
6. Extended Cylinder w/Sprocket

**Figure 19**

2. Attach lift chain to chain pre-attached to columns. If cylinders bottom out before lift gets to upper level, remove the sections of pre-assembled chains to gain cylinder stroke. (The carriage must be solidly sitting on the floor and the power locked out before removing chains.) See Figure 20.




1. Taper Lock Bolt
2. Pre-assembled Chain

**Figure 20**

## Hydraulic Connections

**NOTE**

*The use of teflon tape or paste on all fittings prior to assembly is required. Excessive amounts may get into the system and void applicable portions of your warranty. This is not required on flat faced O-ring fittings.*

1. Attach hydraulic hoses and fittings. Do not overtighten.

UPPER CYLINDER PORT
A. Install 1/2" x 1/2" (60" cylinder) or 7/8" x 7/8" (larger cylinder) right angle swivel fittings.
B. Install velocity fuses with arrow pointing away from cylinder.
C. Connect 3/8" wire braid hose to velocity fuse.

LOWER CYLINDER PORT
D. Install 1/2" x 3/8" elbow.
E. Connect 1/4" hose to elbow.

MOTOR/PUMP UNIT
F. Install 1/2" tee to valve block assembly.
G. Install 3/8" tee to reservoir. Connect 3/8" wire braid hoses from upper cylinder ports to tee on the valve block. Connect 1/4" hoses from lower cylinder ports to tee on reservoir.

Make sure the placement of the hoses does not interfere with operation of the unit.

2. Check oil in reservoir. (Use sight glass.) Fill with oil as needed.

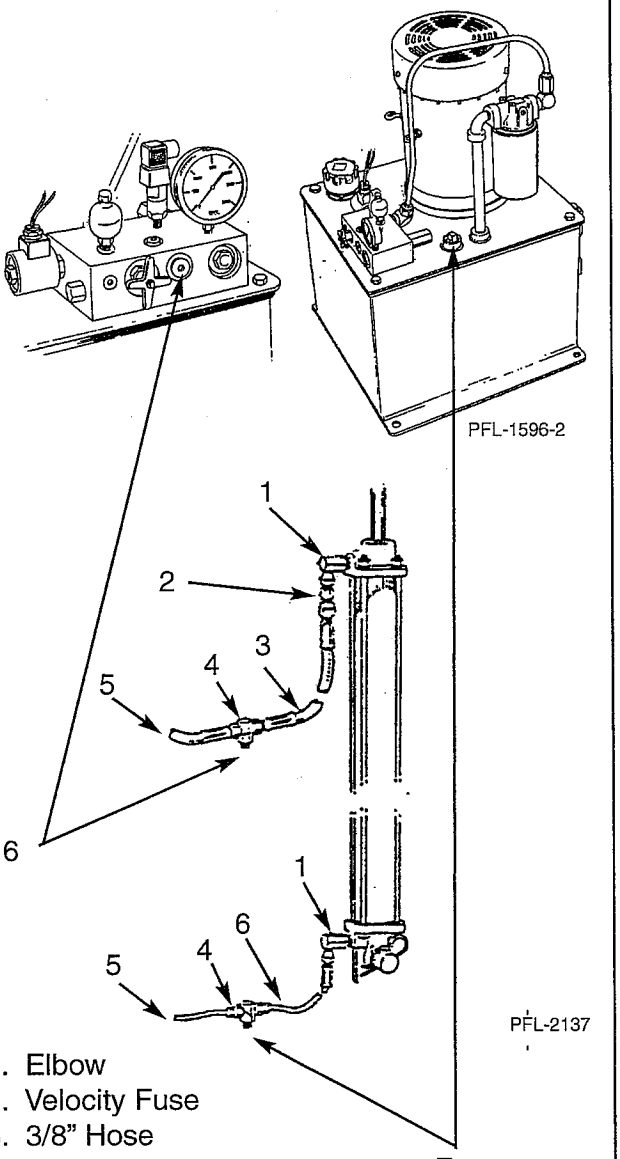
NOTE

*To complete installation of the unit, power to the motor/pump and controls will be needed, even if temporary.*

**CAUTION**

**If temporary power is connected to run lift, extreme caution should be used since all safety devices are by-passed. The use of temporary power is not recommended for inexperienced installers.**

3. Push "GO" button momentarily to check motor rotation against arrow on motor (ignore arrow on pump). If rotation is incorrect, have electrician reverse leads. Hydraulic pressure gauge will show pressure if pump is working correctly.




1. Elbow
2. Velocity Fuse
3. 3/8" Hose
4. Tee
5. To Other Cylinder
6. To Manifold Shown on Pump Unit
7. To Reservoir Shown on Pump

**Figure 21**

**CAUTION**

**Paint overspray on cylinder rod will damage seals and void warranty!**

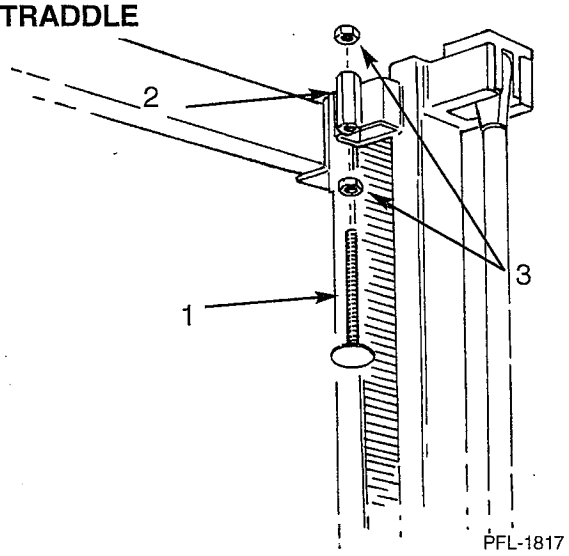
NOTE

*Pressure switch used only when decklocks are not present.*

## For Units Without DeckLocks

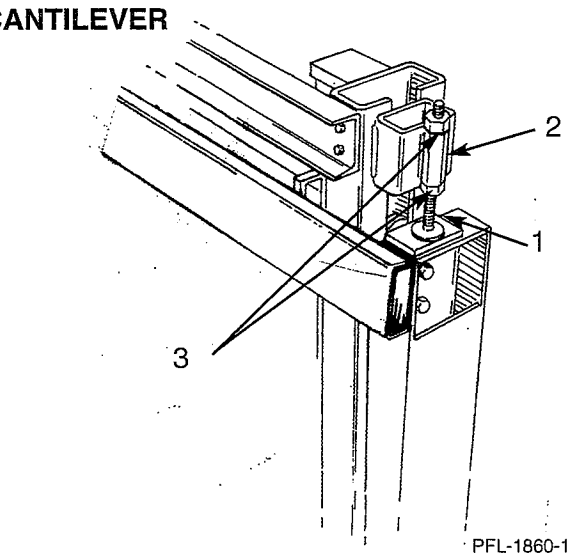
Screw liberally greased jackscrew into the factory-mounted jackscrew weldment on each column. See pictures below.

**STRADDLE**




1. Jackscrew
2. Jakscrew Weldment
3. Nuts

**CANTILEVER**




1. Jackscrew
2. Jakscrew Weldment
3. Nuts

## Anchoring and Bracing

**NOTE**

*The following illustrations are for reference only. Site conditions may require a different alternative to the ones we suggest.*

Side-to-side and front-to-back bracing of the unit is required. Seismic requirements will be different, and a separate drawing is usually provided in the shipping packet. Bracing of the unit and enclosures is the responsibility of the installer.

It is the customer's responsibility to make sure that the site conditions have a structure of adequate strength to brace to, to withstand the forces.

For a two-level unit, Pflow will supply:

(2) 10' lengths of 4" channel (unpainted)

(2) 4-hole pads (unpainted)

(1) 10' length of 1-1/2" x 1-1/2" x 3/16" angle per gate (unpainted)

(2) Cans of spray paint

Each additional level will be supplied with the following:

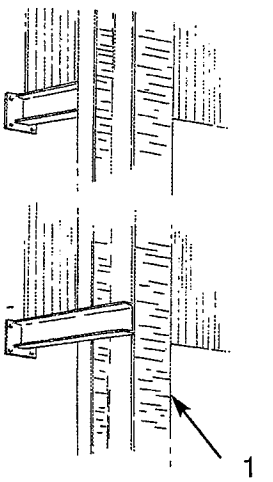
(1) 10' length of channel

(1) 10' length of angle per gate

(2) 4-hole pads

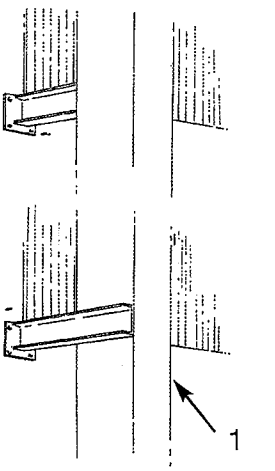
We do not supply bolts nor guarantee that the above material will be sufficient for the application. It is the installer's responsibility to check the information included in the shipping packet prior to commencing work. Specific bracing instructions may be provided.

1. Make sure the carriage is level on the floor. Recheck column spacing and wheelblock clearance. If everything checks out, anchor the base plates to the floor using 3/8" anchors. (Depth of holes should always be deeper than anchor bolts.)




1. Wide Flange Columns PFL-1218

**Figure 22**




1. Rollformed Columns PFL-1219

**Figure 23**

## Guidelines for Anchoring

Welding to a Curb Angle (Figure 24)

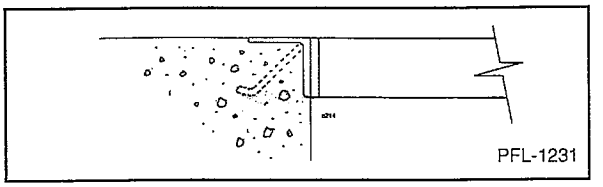



**Figure 24**

Using a Tie Plate (Figure 25)

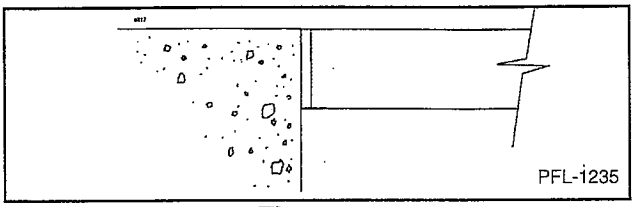



**Figure 25**

Anchoring to Wooden Floors (Figures 26, 27, and 28)

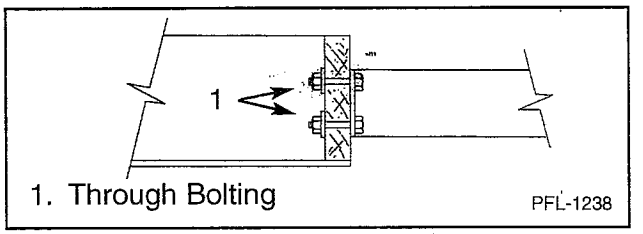



**Figure 26**

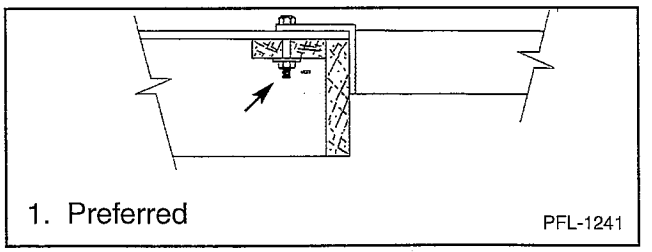



**Figure 27**

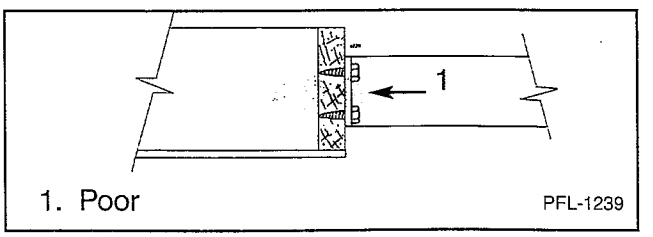



**Figure 28**

Anchoring to Block Walls (Figures 29 and 30)

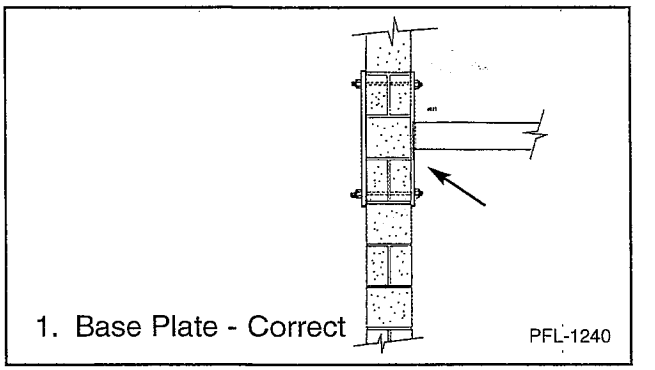



**Figure 29**

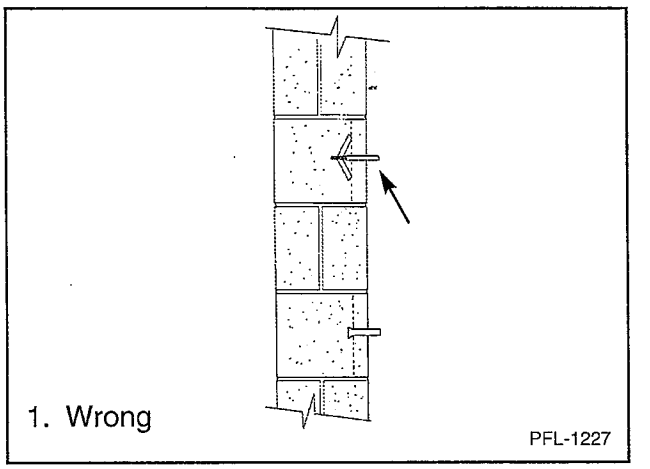



**Figure 30**

Anchoring Base Plate to Solid Floor (Figure 31)

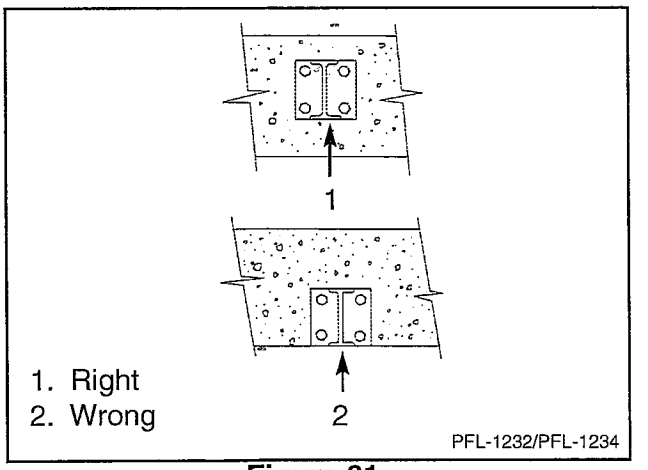



**Figure 31**

2. The following Guidelines for Bracing page shows how to attach bracing to the building. Proceed with the final bracing. Tack bracing into position.

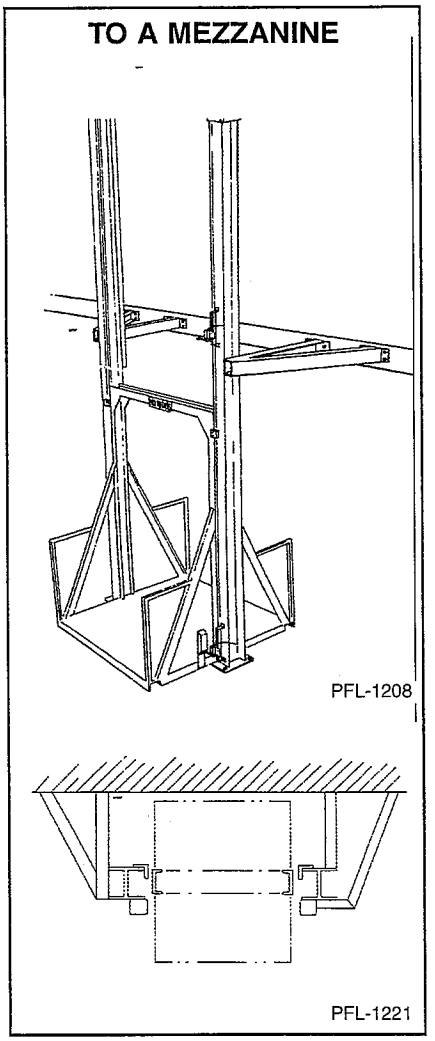
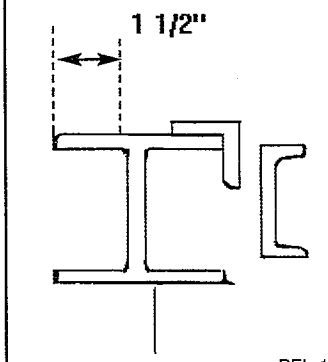



Figure 32




If you have DECKLOCKS and are bracing to the side of the beam that has the guide angle, you must keep the brace within 1 1/2" from the edge of the

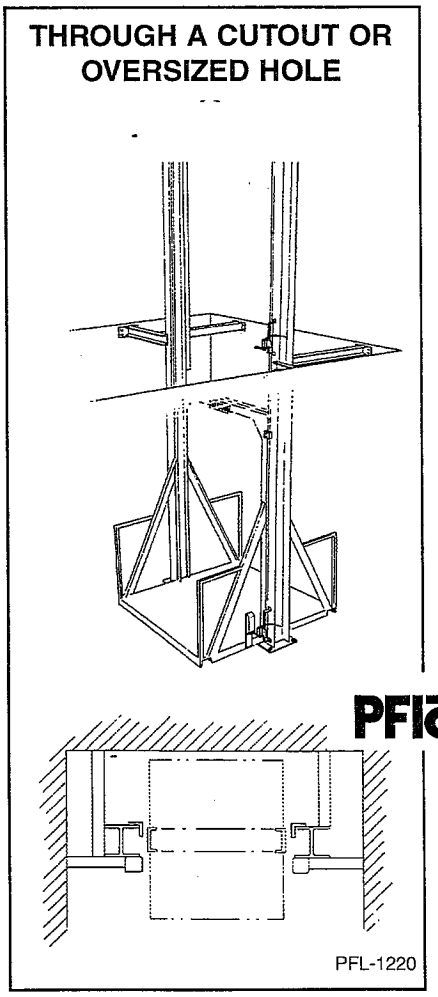



Figure 33

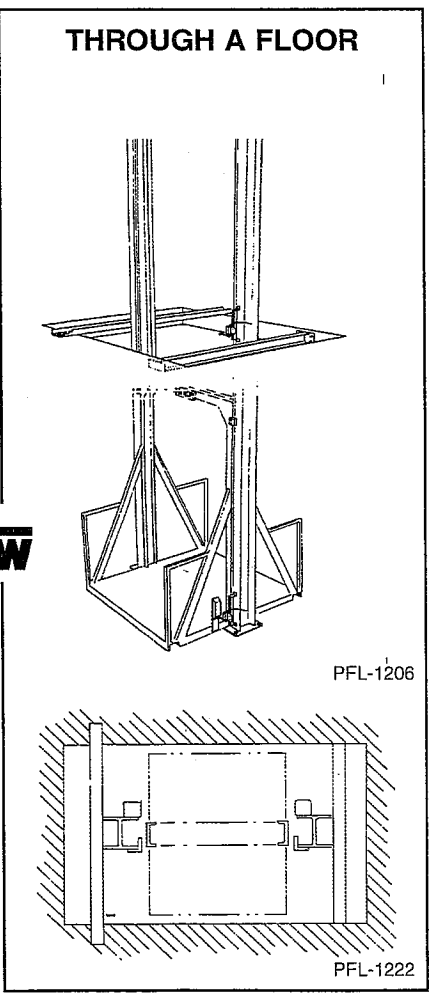



Figure 34

## Installation Notes - Anchoring & Bracing

1. Field locate and weld in the straight brace. Again, make sure brace doesn't interfere with decklock arm, cylinder travel, etc.
2. Bolt mounting plates to diagonal brace. These bolts are for installation only.
3. Align the mounting plates to the lift column.
4. Field weld the mounting plates to the straight brace and lift column.
5. Field weld the diagonal brace to the mounting plates.
6. Welding notes:
   a. All welding per latest edition AWS D1.1.
   b. Weld filler material to be min. E60XX.
   c. Unless indicated otherwise, all welds are min. 3/16" cont. fillet.

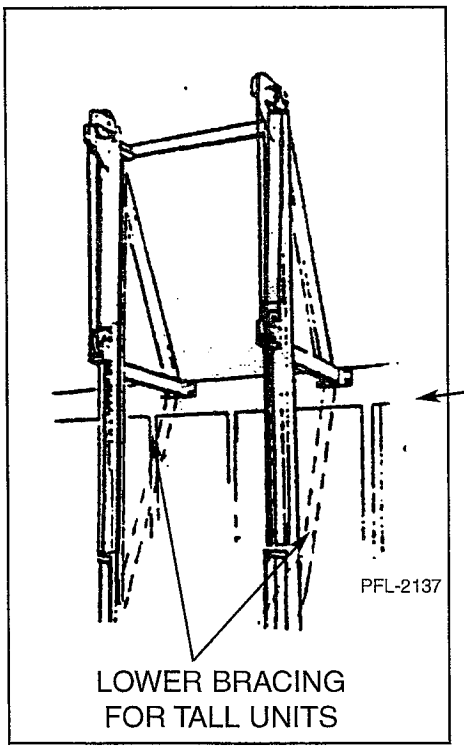
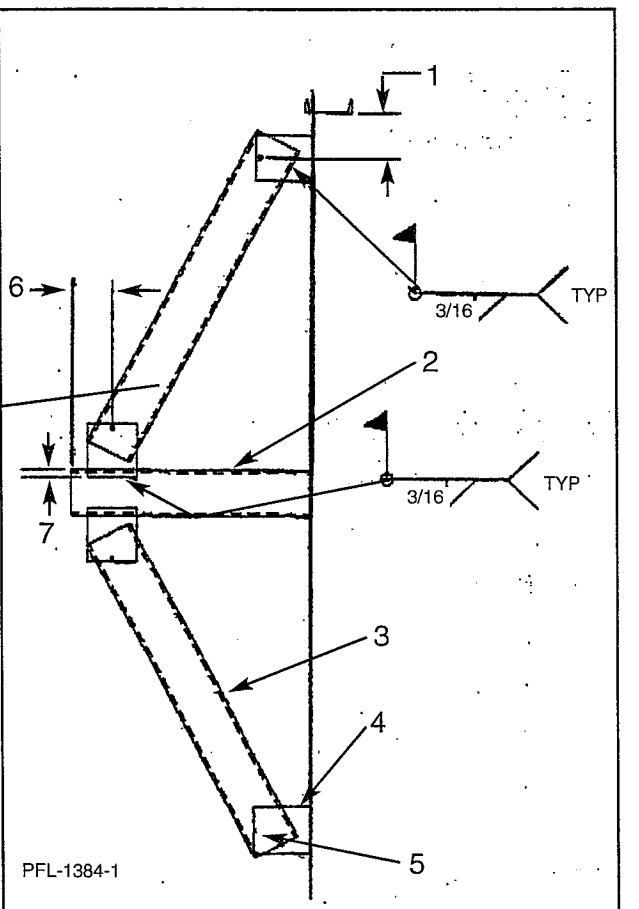



**Figure 35**




1. Approx. 6" to Carriage Header
2. Straight Brace
3. Diagonal Brace
4. Mounting Plate
5. Temporary Installation Hole
6. Approx. 5 1/2"
7. 1" Typ.

**Figure 36**

## INSTALLATION COMPLETION CHECKLIST

Please make sure all of the following steps are complete:

__ The VRC is braced from front to back and from side to side.

__ The gates and enclosures are braced.

__ Touch up all welds, marks, scrapes, etc. with paint.

__ Route hoses to prevent interference during travel.

__ Check fittings and hoses for leakage.

__ Make sure that all electrical connections are properly made.

__ Check that the unit stops level at each floor.

__ Is there excessive noise during travel?

__ Does the carriage "rock" during travel?

__ Do a full load test.

__ Safety Check #1 -

- __ You should not be able to open a gate when the unit is not present.
- __ You should not be able to operate the unit with a gate open.
- __ Did you check each level for the above items?

__ Are there any unsafe conditions that exist?

If so, please contact Pflow Industries immediately and report them.

__ Post all operational signs.

__ Remove all debris.

__ Instruct the customer on the proper operation.

__ Instruct the user on proper loading.

__ Instruct the customer on procedures if there is a problem.

__ Complete the Installation Questionnaire and Acceptance Certification. Return both to Pflow Industries.

# Installation Questionnaire

*We want to provide equipment that is built correctly and shipped complete. To achieve that, we need to know what errors are being made or what field problems you are experiencing. Please answer the following questions and return this form to the Product Support Department at Pflow Industries, Inc. If more space is required for comments, please use the reverse side.*

1. Was the unit received in good condition? Yes / No
   If not, please describe damage:_____

2. Was the unit received complete? Yes / No
   If not, what was missing?_____

3. Was the lift manufactured correctly? (Did it match the GA drawing?) Yes / No
   If not, please describe the errors:_____

4. Did the unit (i.e., lift, gates, enclosures) fit? Yes / No
   If not, please describe in detail the problem areas:_____

5. Did you return after the electrical was completed for final adjustments, testing, and training?
   Yes / No

   If No, were you able to hook up temporary power to test the unit and make all final adjustments?
   Yes / No

   If Yes, were there electrical problems that you were aware of?
   Was there a problem with the components? Yes / No
   If yes, please describe:_____
   Was there a problem with the field wiring? Yes / No
   If yes, please describe:_____

6. Did you test the unit to full capacity? Yes / No

7. Did you test all gates to make sure that the unit does NOT operate if they are open? Yes / No

8. At each level, when the carriage is NOT present, can you open the gate? Yes / No

Comments:_____

_____

Pflow Job #:_____ Customer/User:_____

Questionnaire Completed By:_____ Date:_____

Company:_____ Phone:_____

PFLOW INDUSTRIES, INC., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002;
040199

# Acceptance Certification

*We accept this equipment as being properly installed, tested, and performing to our satisfaction. This form covers both the mechanical and electrical installation of the equipment and is for the purpose of quality assurance by Pflow Industries, and in no way releases either Pflow Industries, Inc. or the installing contractor(s) of their warranty obligations. If there are any exceptions or unresolved items, please note.*

**JOB NO.:**_____ **JOB NAME:**_____

Site Mailing Address:_____

City, State, Zip Code:_____

On-Site Contact for future follow-up:

Name:_____ Title:_____

Phone: (_____) _____ - _____ Ext._____

---

**Tests Successfully Performed:** _____Load test at _____% of capacity _____Operation

_____ Gate/Interlock Operation Other:_____

---

**Personnel Instructed on the Operation:**

Name:_____ Company:_____

Name:_____ Company:_____

---

**ACCEPTED BY:** Date:_____

Name:_____ Name:_____

Title:_____ Title:_____

Company:_____ Company:_____

Phone:_____ Phone:_____

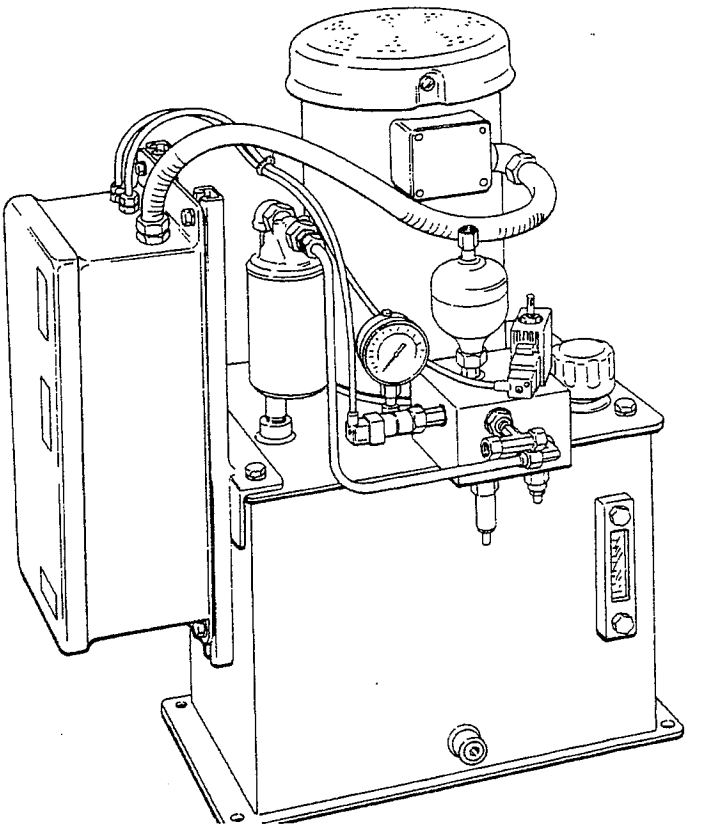
PFLOW PERSONNEL / REPRESENTATIVE / INSTALLER PRESENT:

Name:_____ Company:_____

Please return a copy of this form to the Product Support Department.

PFLOW INDUSTRIES, INC., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002; 040199

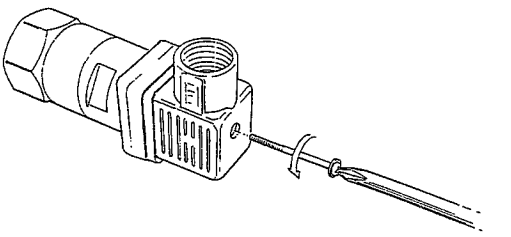
## PARTS
### Motor Pump Unit



PFL-2366

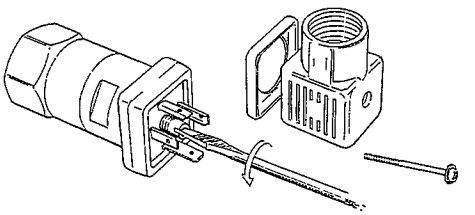
Figure 37

**SET PRESSURE TO FACTORY SETTINGS. DO NOT EXCEED FACTORY SETTINGS WITHOUT FACTORY AUTHORIZATION.**



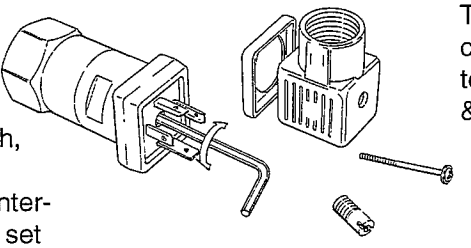
1. Remove DIN adaptor.

PFL-2132



2. Remove small brass screw.

PFL-2133



Two wires connect to terminals 1 & 2 inside.

3. Using 1/8" Allen wrench, adjust clockwise to increase set point/counter-clockwise to decrease set point.

PFL-2134

## WARRANTY

| PARTS | | LABOR | |
|---|---|---|---|
| Structure | Lifetime | Structure | Lifetime |
| Manufactured Components | One Year | Manufactured Components | One Year |
| Purchased Components | One Year | Purchased Components | 90 Days |

### The Small Print

The warranty period begins 30 days after shipment. All warranty work must be pre-authorized by Pflow Industries' Product Support Department prior to starting work. All billing must be in accordance with our Warranty Procedures. Replacement of defective parts will be handled in accordance with Pflow's Return Goods Authorization policy. If Pflow Industries determines that equipment failures were caused by abuse, improper installation, or lack of maintenance, they will not be covered. Pflow Industries will not accept consequential losses (missed production, etc.), premium time labor, or air freight charges. Manufactured items are defined as those components manufactured and/or assembled by Pflow. Structure is defined as columns and carriage (excluding carriage side guards). Purchased items are those components that are used as supplied by vendors. Gates and enclosures are excluded and covered for 90 days parts and labor. This warranty applies to all models and may not be modified or extended except by written authorization from Pflow Industries, Inc.

We, the manufacturer, sincerely hope that you do not experience problems with the equipment. If you do, the following procedures should be followed:

### Pre-Authorization

Pflow Industries must be notified of the problem before we can authorize the repair. We need to determine the cause of the problem, who should be doing the work, and what is involved. If it is our decision to have your organization or your subcontractor do the work, you will be given an authorization number which must be referenced on all subsequent paperwork. During our non-working hours, we ask that you notify us by phone or FAX during the next business day.

Issuance of an authorization number does not guarantee approval and/or payment.

### Invoices

1. You have 30 days from the date the work was completed to submit an invoice for approval. If approved, payment is made 30 days from the date of approval.
2. A deduction from outstanding payments to Pflow for warranty is NEVER authorized and will result in a 10% processing fee.
3. Invoices received without sufficient information will be returned. They will be reconsidered for approval when complete documentation is received. All invoices must include, in detail, the following:
   - Description of problem;
   - Pflow serial number;
   - Labor hours per problem;
   - Rate per hour;
   - Travel time incurred;
   - Date work was performed;
   - Copies of receipts for materials purchased locally or labor subcontracted.

### Comments

Pflow Industries is not responsible for payment made on claims prior to our approval.

Local purchase of components must be pre-authorized.

Where distance and/or experience may be more cost-effective, Pflow Industries reserves the right to use alternate organizations.

Labor is defined as a maximum of two hours travel per call, plus reasonable on-site repair time as determined by Pflow Industries.

# OPTIONS

## Gate Identification

Prior to shipment, all gate panels, posts, interlock components, etc., are color coded for each level. When two (2) gates are on one level, they will be coded with the same color. Please use the information available on the general arrangement drawing and in your installation manual to separate the components.

The colors per level will always remain the same. They are:

| LEVEL | COLOR |
|---|---|
| 1st (bottom) | Green |
| 2nd | Yellow |
| 3rd | Red |
| 4th | Blue |
| 5th | Orange |
| 6th and higher | White |

Each tag will be marked with the following:

A. Pflow Serial Number
B. Customer Project Number
C. Pflow Part Number and Description
D. Initials of Inspector
E. Levels higher than 6 will include the number of the appropriate level

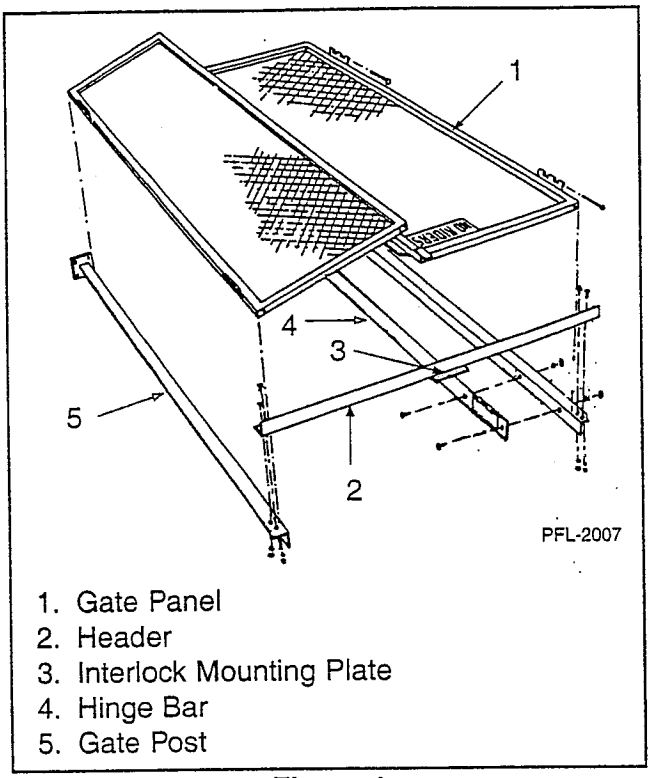
If you have any questions, please feel free to contact the Product Support Department for assistance.

# Bi-Parting Swing Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

**GREEN** - LOWER LEVEL
**YELLOW** - SECOND LEVEL
**RED** - THIRD LEVEL




1. Gate Panel
2. Header
3. Interlock Mounting Plate
4. Hinge Bar
5. Gate Post

**Figure 1**

The preferred method of installing a bi-parting swing-type gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing the gates.

1. Lay the gate posts on the floor parallel to each other. See Figure 1.

2. Place the angle iron "header" at the top of the gate posts and bolt in position with hardware provided.

3. Place the gate panels in position between the gate posts and hinge bars.

4. Locate and mark the center of the gate panel (where panels meet in the center.)

5. Locate and mark center of the carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to assure the center of the gate is on the center line of the carriage. See Figure 2.

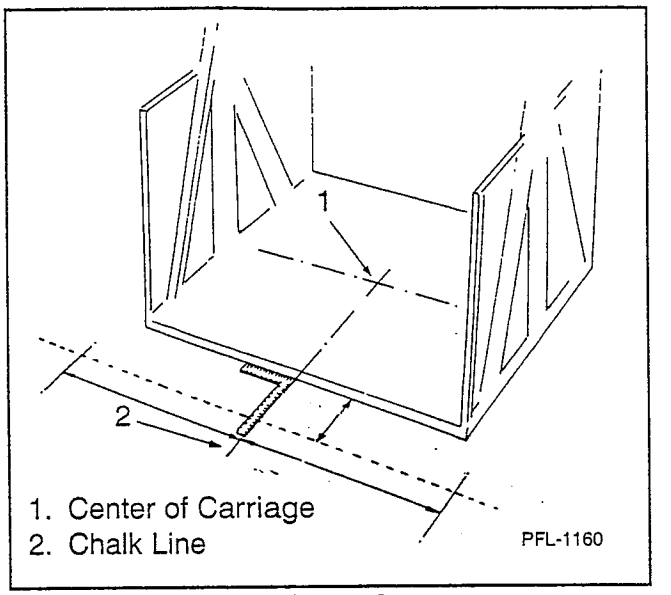



**Figure 2**

6. The ideal position of the gate is 6" from inside of gate panels to carriage. However, the gate can be located anywhere within a range of 4" minimum from inside of gate panel to carriage and a maximum of 6" from inside of gate panels to carriage. See Figure 3.

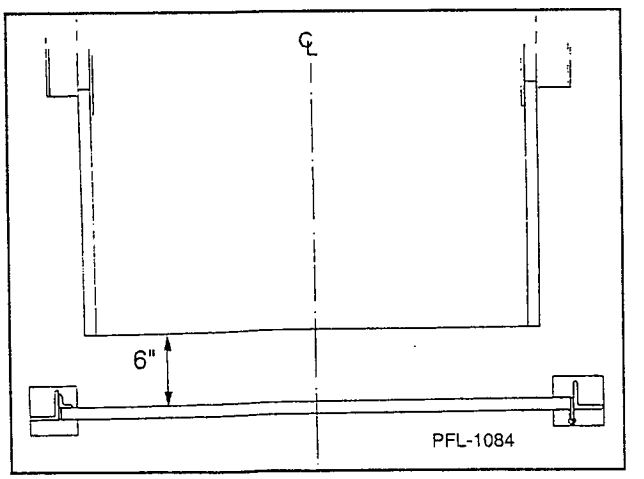



**Figure 3**

# Bi-Parting Swing Gate Installation Instructions

When the gate panel to carriage measurement has been determined, snap a chalk line to identify gate position parallel to the carriage.

**NOTE**

*Length of enclosure panels may be the determining factor in gate location.*

7. Raise the gate assembly. Position the gate assembly so the center of the gate is located on the center of the carriage line and the inside of gate panel is on the chalk line parallel to the carriage.

8. Using 3/8" anchors 3 1/2" long, drill and anchor gate post base plates to the floor.

**NOTE**

*Depth of holes should always be deeper than the length of the anchor bolt.*

9. Plumb the gate using a plumb bob or a four foot or longer level. See Figure 4.

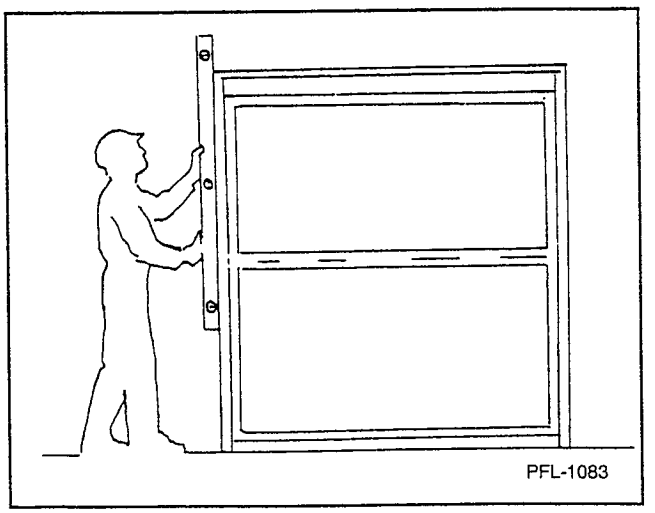



**Figure 4**

10. With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" x 1/4" angle iron or similar).

11. Tighten all bolts.

12. Weld angle iron header to gate posts. See Figure 5.

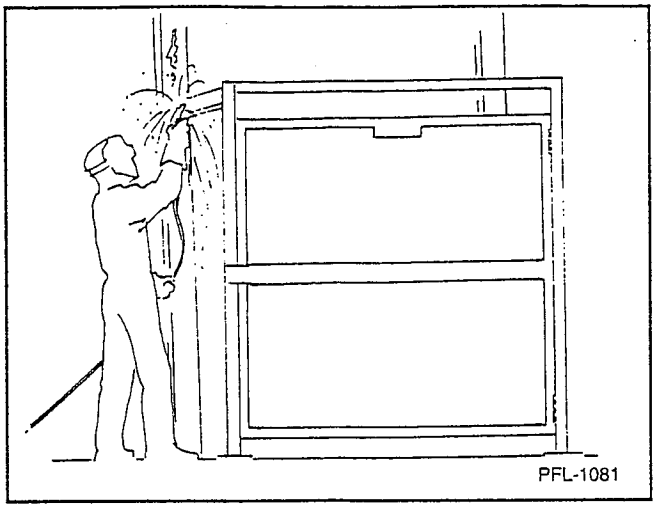



**Figure 5**

13. Check gate operation.

14. Install magnet. (A magnet belongs on each gate.) Put bolt through magnet. Turn inside nut (closest to magnet) until 1/16" clearance is obtained between nut and magnet. Take magnet with bolt and nut and put the protruding end of bolt through mounting hole. Take the other nut and lockwasher and mount the magnet. Hold the bolt and tighten mounting nut (outside nut). The 1/16" clearance is necessary to allow for variations of magnets striking the area. If given clearance is not included, magnet will not hold gate closed and may result in a broken magnet. See Figure 6.

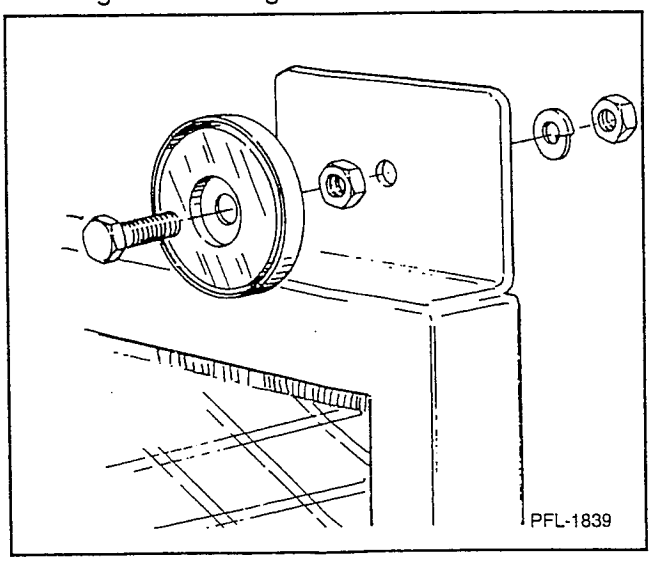



**Figure 6**

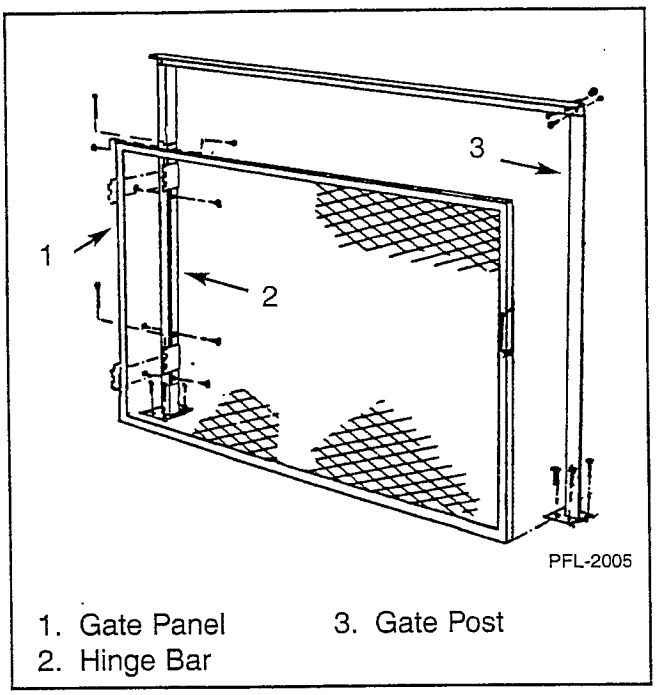
15. Install gate interlock.

# Swing Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

**GREEN** - LOWER LEVEL
**YELLOW** - SECOND LEVEL
**RED** - THIRD LEVEL




1. Gate Panel
2. Hinge Bar
3. Gate Post

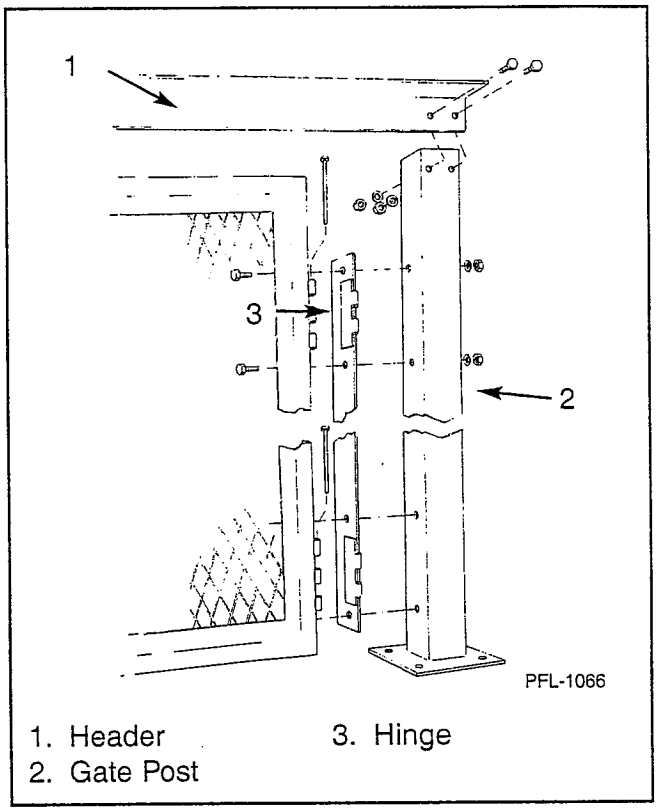
**Figure 1**

The preferred method of installing a swing gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing the gates.

1. Lay the gate posts on the floor parallel to each other. See Figure 1.

2. Place the angle iron "header" at the top of the gate posts and bolt in position with hardware provided. See Figure 2.

3. Place the gate panels in position between the gate posts and hinge bars. See Figure 2.

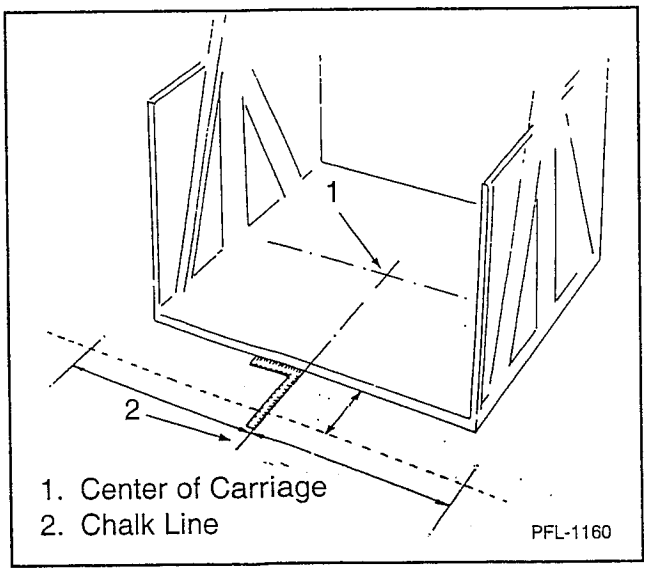



1. Header
2. Gate Post
3. Hinge

**Figure 2**

4. Locate and mark the center of the gate panel (where panels meet in the center.)

5. Locate and mark center of the carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to assure the center of the gate is on the center line of the carriage. See Figure 3.




1. Center of Carriage
2. Chalk Line

**Figure 3**

# Swing Gate Installation Instructions

6. The ideal position of the gate is 6" from inside of gate panels to carriage. However, the gate can be located anywhere within a range of 4" minimum from inside of gate panel to carriage and a maximum of 6" from inside of gate panels to carriage. See Figure 4.

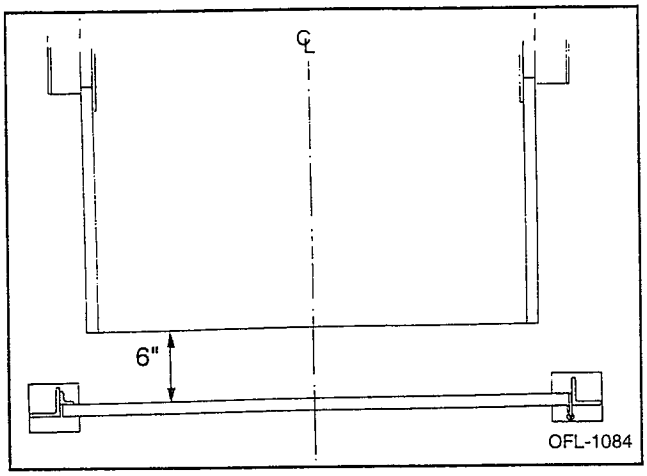



**Figure 4**

When the gate panel to carriage measurement has been determined, snap a chalk line to identify gate position parallel to the carriage.

**NOTE**

*Length of enclosure panels may be the determining factor in gate location.*

7. Raise the gate assembly. Position the gate assembly so the center of the gate is located on the center of the carriage line and the inside of gate panel is on the chalk line parallel to the carriage.

8. Using 3/8" anchors 3 1/2" long, drill and anchor gate post base plates to the floor.

**NOTE**

*Depth of holes should always be deeper than the length of the anchor bolt.*

9. Plumb the gate using a plumb bob or a four foot or longer level. See Figure 5.

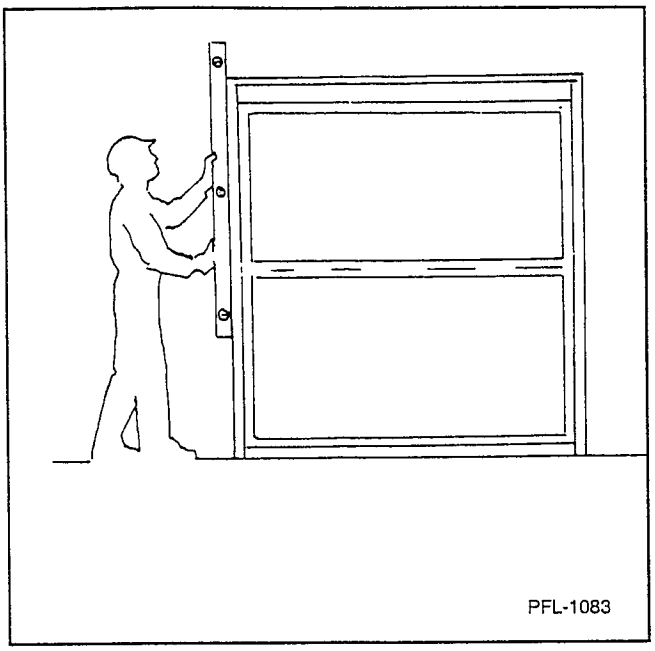



**Figure 5**

10. With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" x 1/4" angle iron or similar).

11. Tighten all bolts.

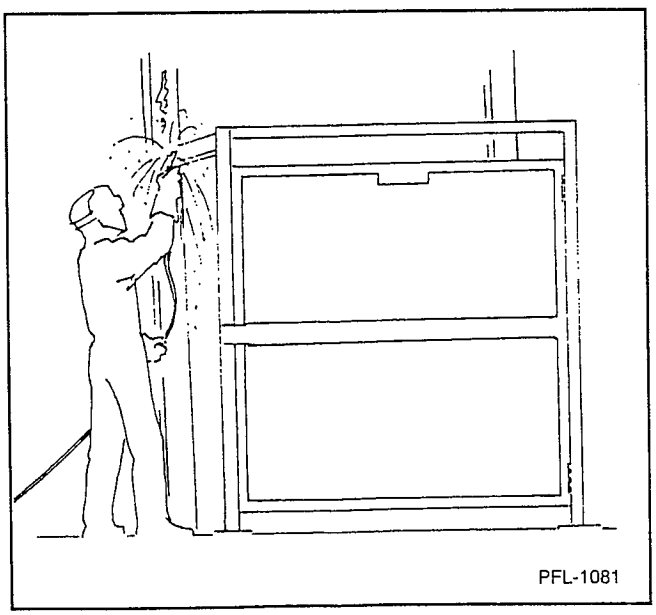



**Figure 6**

12. Weld angle iron header to gate posts. See Figure 6.

13. Check gate operation.

14. Install magnet. Put bolt through magnet. Turn inside nut (closest to magnet) until 1/16" clearance is obtained between nut and magnet. Take magnet with bolt and nut and put the protruding end of bolt through mounting hole. Take the other nut and lock-washer and mount the magnet. Hold the bolt and tighten mounting nut (outside nut). The 1/16" clearance is necessary to allow for variations of magnets striking the area. If given clearance is not included, magnet will not hold gate closed and may result in a broken magnet. See Figure 7.

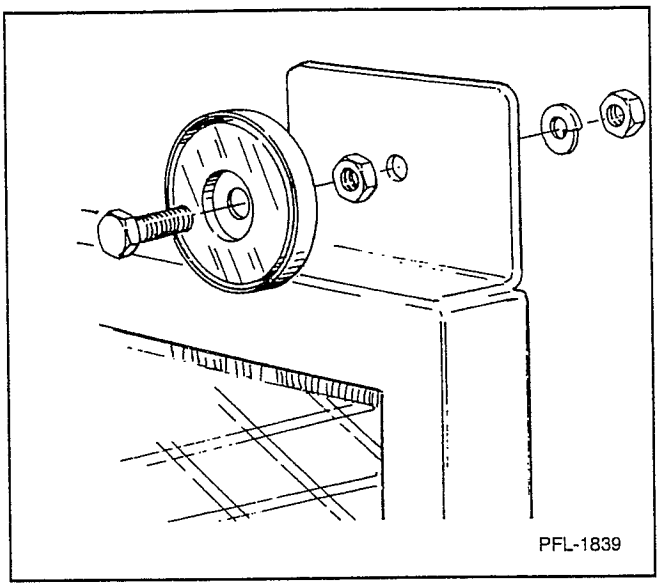



**Figure 7**

15. Install gate interlock.

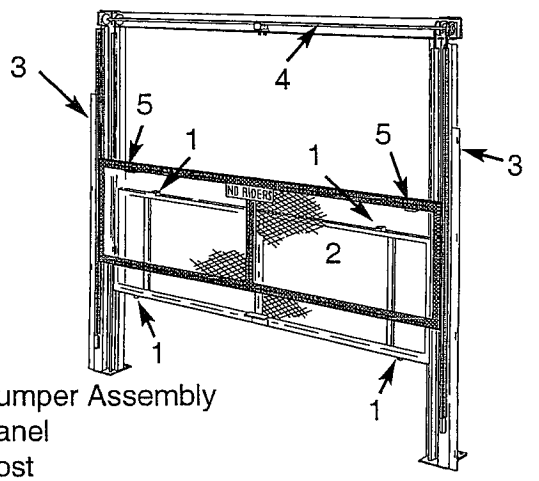
# Single & Bi-Panel VA Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components (posts, panels, header assembly, interlocks) will be color coded with tags for the appropriate level. **GREEN** = LOWER LEVEL; **YELLOW** = SECOND LEVEL; **RED** = THIRD LEVEL. Each gate will be tagged with a different color. Hardware will be in boxes marked for each level gate.

Before beginning installation of the gate, match up all gate components with their floor placement as determined by the general arrangement (GA) drawing. Assembly is easiest if there is room to lay the components out. As this is not always possible, please see Helpful Hints for Upright Assembly.

**BI-PANEL**




1. Bumper Assembly
2. Panel
3. Post
4. Header Assembly
5. Gate "Z" Bracket

PFL-1415

**Figure 1**

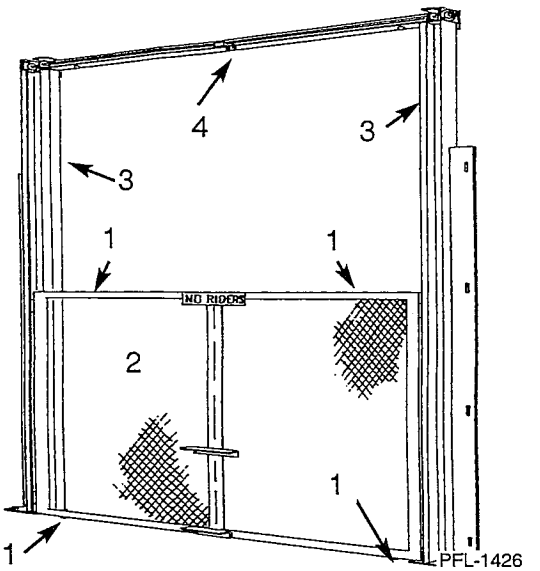
**NOTE**

*Smaller panel is the lower panel and will be closer to the carriage.*

HELPFUL HINTS FOR UPRIGHT ASSEMBLY

- Set up one post at a time. (Tie a long length of string to the last few links of chain. This will help retrieve the chain if it accidentally falls down the tube during installation.)
- Take out the counterweight shipping bolt. Slide weight above bolt and reinstall bolt.
- Make sure each post is plumb.
- With header on and chain weaved through the sprockets, you should have one to two feet of chain hanging over the sprockets. Lift panel up to meet this chain. Heavier panels may require the use of a forklift or come-along around the header.

**SINGLE PANEL**




1. Bumper Assembly
2. Panel
3. Post
4. Header Assembly

**Figure 2**

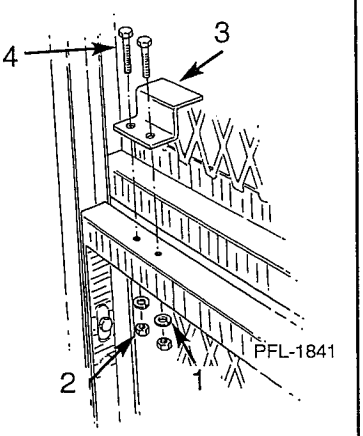
**NOTE**

*On some applications, the panel may be in two pieces and require assembly in the field.*

1. Attach gate components to the panels as shown. See Figures 3, 4, and 5.

**"Z" BRACKET**

Applicable to Bi-Panel Gates Only



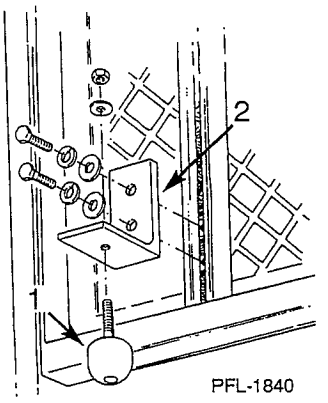

1. Lock Washer
2. Nut
3. Spacer
4. Screw, 1/4-20 x 2 1/4

**Figure 3**

# Single & Bi-Panel VA Gate Installation Instructions

**BUMPER ASSEMBLY**

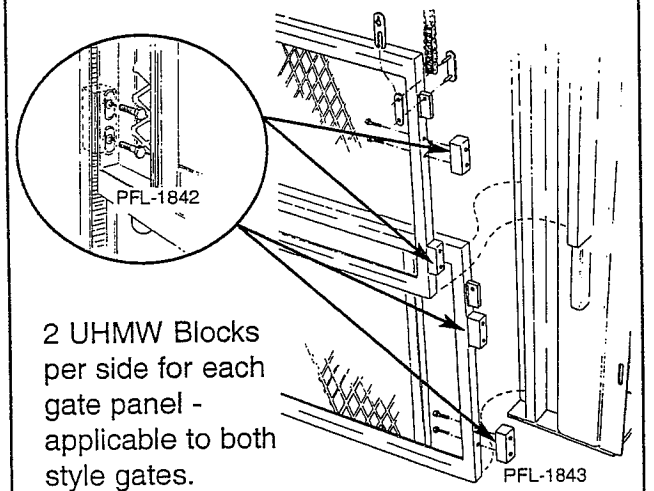
THIS ASSEMBLY COMES AS ONE PIECE and is applicable to both style gates.




1. Bumper
2. Bumper Mounting Bracket

**Figure 4**

**UHMW BLOCKS**




2 UHMW Blocks per side for each gate panel - applicable to both style gates.

**Figure 5**

**NOTE**

*Plastic UHMW blocks slide over bolt threads.*

2. Lay out the framework in the proper arrangement. See Figure 6.

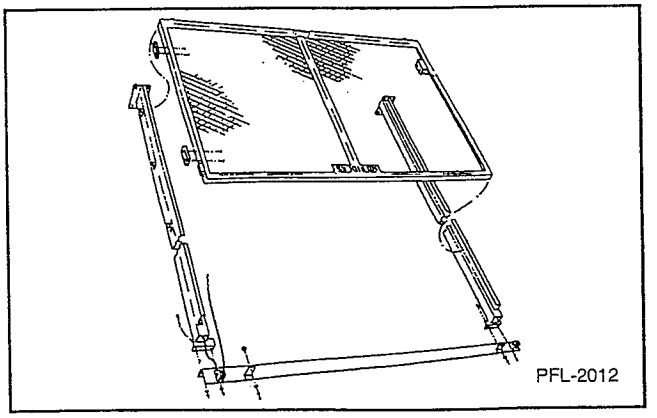



**Figure 6**

3. Position the header with the sprockets facing up. Bolt into place using four (4) 3/8-16 x 1 1/4" long bolts with lock washers and nuts. See Figures 7, 8, and 9.

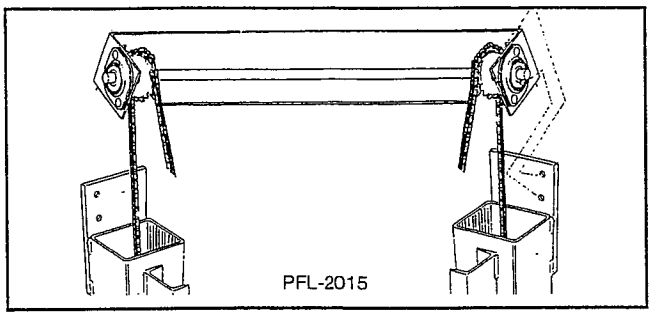
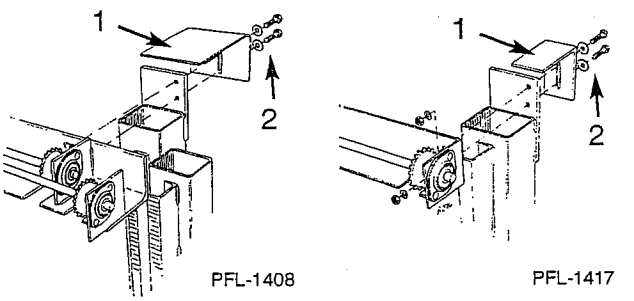



**Figure 7**

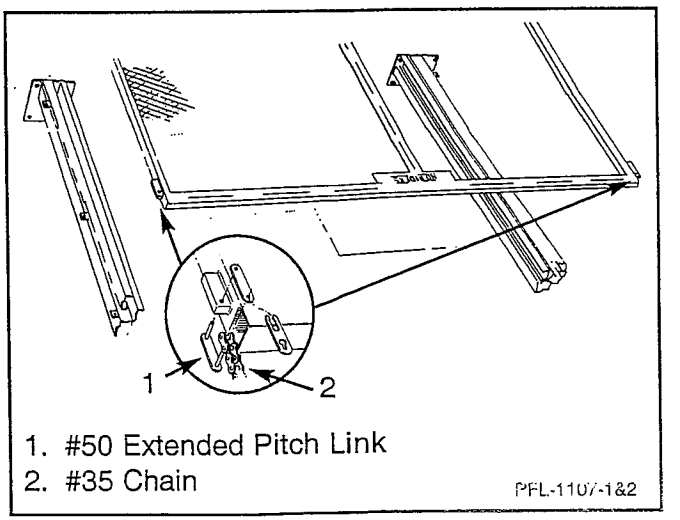
**BI-PANEL** **SINGLE PANEL**




1. Chain Anti-Jump Guide
2. 3/8 x 1/4 Screw w/Flat & Lock Washers

**Figure 8** **Figure 9**

4. Remove the #50 master links from the #35 chain sticking out of each gate post and thread the chain over the sprockets on the header. See Figure 10.




1. #50 Extended Pitch Link
2. #35 Chain

**Figure 10**

**NOTE**

*Remove the counterweight shipping bolt, slide the counterweight above the bolt, position, and re-install the bolt. Tie a length of string to the end of the #35 chain to assist in pulling the chain out of the tube if it should fall down into the tube.*

5. Place the panel(s), with all components installed, into the track of the gate posts.

6. Slide the panel up to the header and re-connect the master links removed in Step #4 (Figure 10). Make sure that the length of chain on each side is equal. See Figure 11.

**NOTE**

*When raising the panels, have one to two feet of chain hang over the sprockets.*

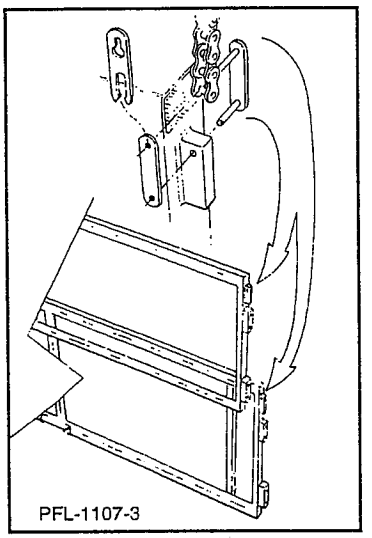
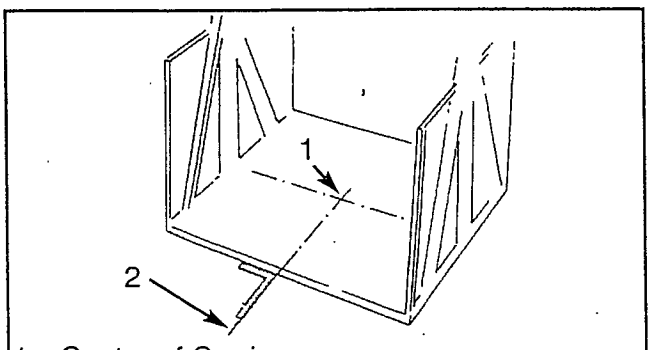


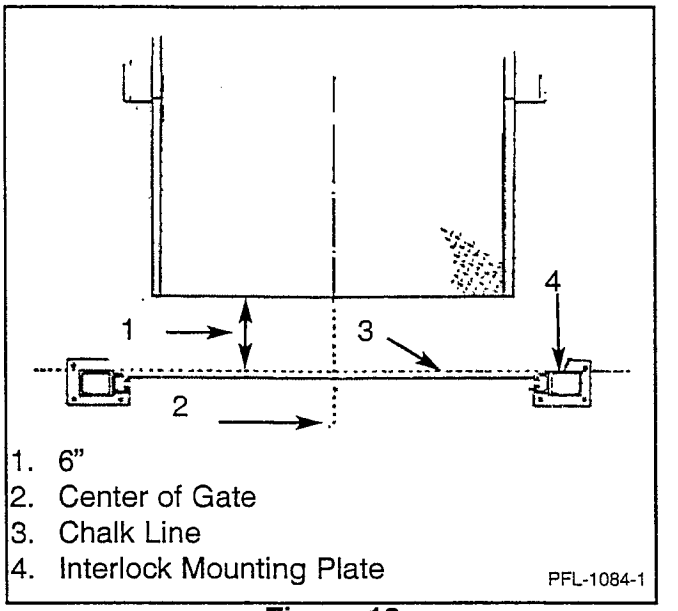

**Figure 11**

7. Stand gate assembly upright and place in position. Place the back face of the gate post on the chalk line 6" from the face of the carriage. See Figures 12 and 13. Some states require the gate closer to the carriage. Where necessary, adjust accordingly.




1. Center of Carriage
2. Chalk Line

**Figure 12**




1. 6"
2. Center of Gate
3. Chalk Line
4. Interlock Mounting Plate

**Figure 13**

**NOTE**

*The use of a forklift or come-along may be required to place heavier gate assemblies into position.*

8. Make sure the posts are plumb in both directions. See Figure 14.

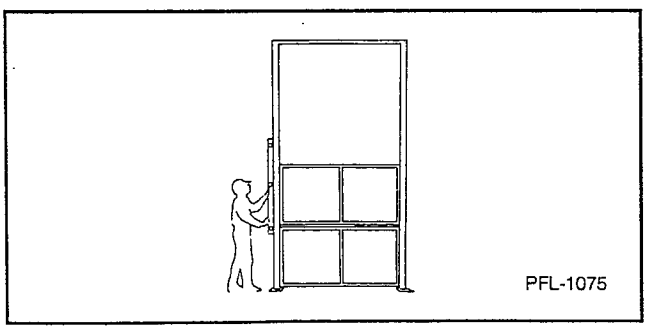



**Figure 14**

9. Temporarily brace the posts to the enclosure panels, building, or lift, as required.

10. Move the gate panels up and down and check that the panels move freely during travel from top to bottom of the posts. Lift the gate panel approximately two feet to check the counterbalancing. The gate should remain in that position.

A. If the gate continues to raise, add steel bar stock to the bottom center of the panel inside the frame. Recheck and repeat as needed

B. If the gate drops, contact Pflow Industries for instructions.

**NOTE**

*Carriage gates must also be tested during operation. Routine vibration during travel may affect the weight required and necessitate adjustments.*

11. If everything runs smoothly, brace the posts and anchor the base plates securely to the floor. See Figure 15.

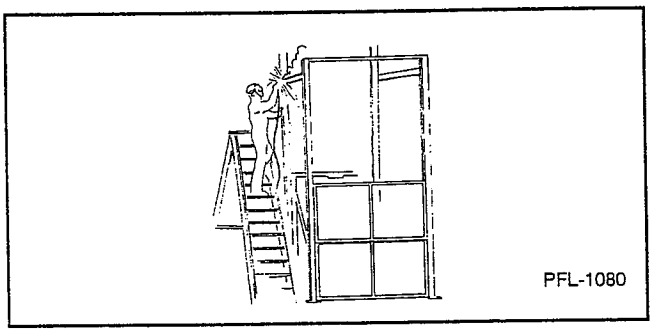



**Figure 15**

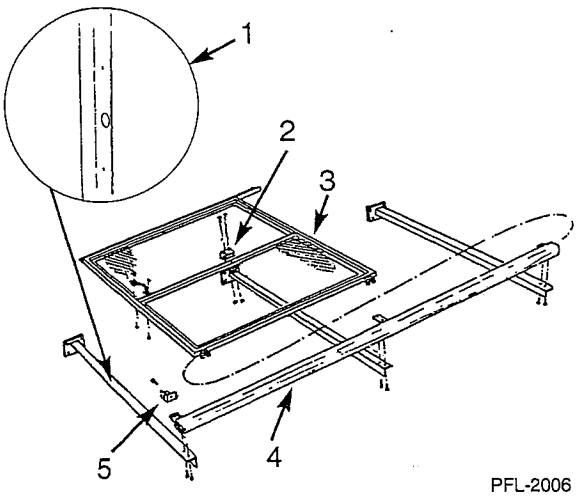
12. Make sure that the chain anti-jump guard is installed as close to the chain as possible without rubbing. See Figures 8 and 9.

Installation of INTERLOCKS and GATE STATUS SWITCHES, where applicable, are covered in other bulletins. Refer to the Table of Contents in your installation manual.

## IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

**GREEN** - LOWER LEVEL
**YELLOW** - SECOND LEVEL
**RED** - THIRD LEVEL

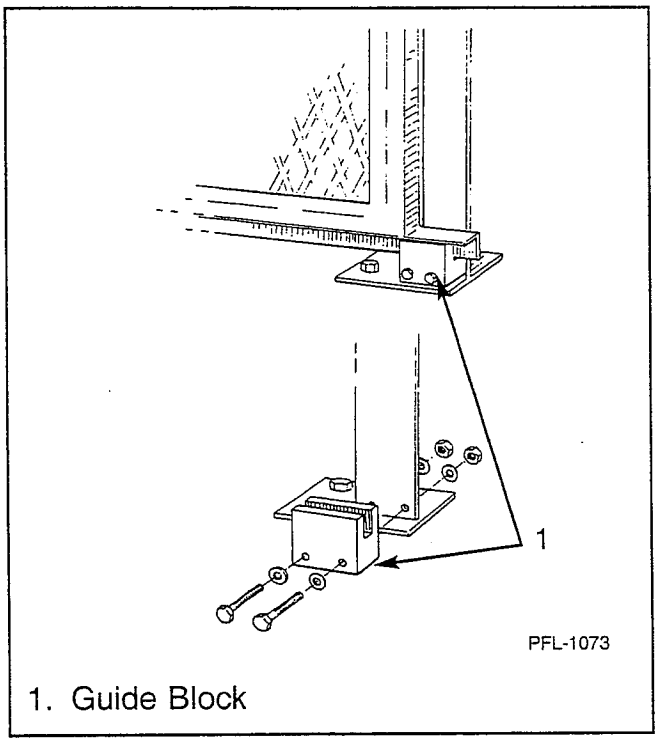



1. Hole or Cutout for Interlock on Corner Post Closing End
2. Guide Block
3. Gate Panel
4. Trolley Track Header
5. Gate Stop

**Figure 1**

The preferred method of installing a sliding gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing of the gates.

1. Lay the gate posts on the floor parallel to each other with the gate post that has the hole or cutout for the interlock on the closing end. The middle post should have two holes near the base plate for mounting the guide block. See Figure 1.
2. Bolt the trolley track header to the gate posts, and slide the gate panel into the trolley track header.
3. Bolt guide block to middle post. See Figure 2.




1. Guide Block

**Figure 2**

4. Slide gate to its closed position. Locate and mark center of the gate. See Figure 3.

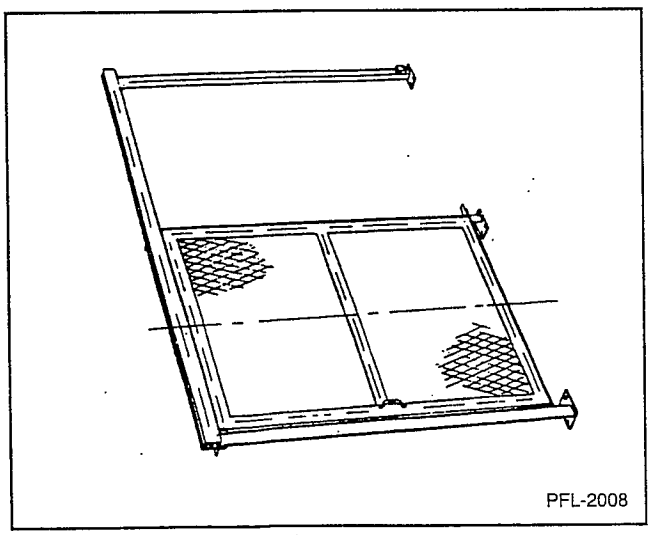



**Figure 3**

# Sliding Gate Installation Instructions

5. Locate and mark center of carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to ensure center of the gate is on the center line of the carriage. See Figure 4.

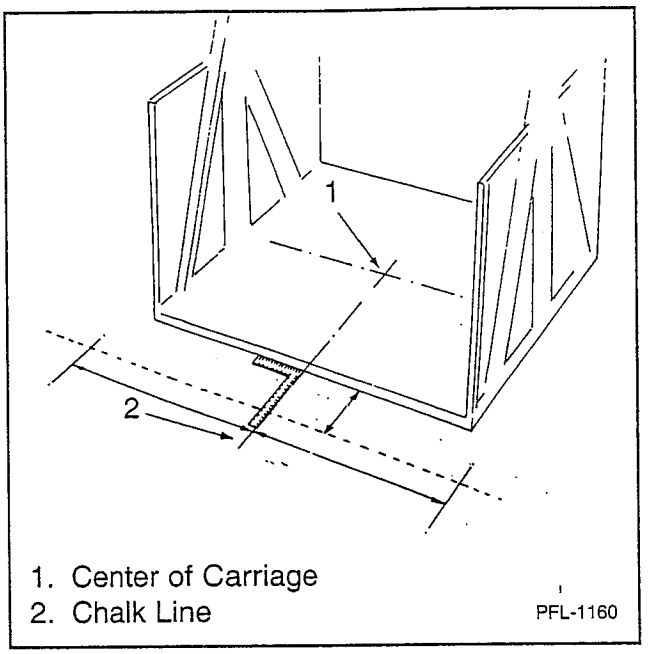



**Figure 4**

6. The ideal position of the gate is 6" from inside of gate to carriage. However, the gate can be located anywhere within a range of 4" minimum from the inside of the gate post to carriage and a maximum of 6" from inside of gate post to carriage.

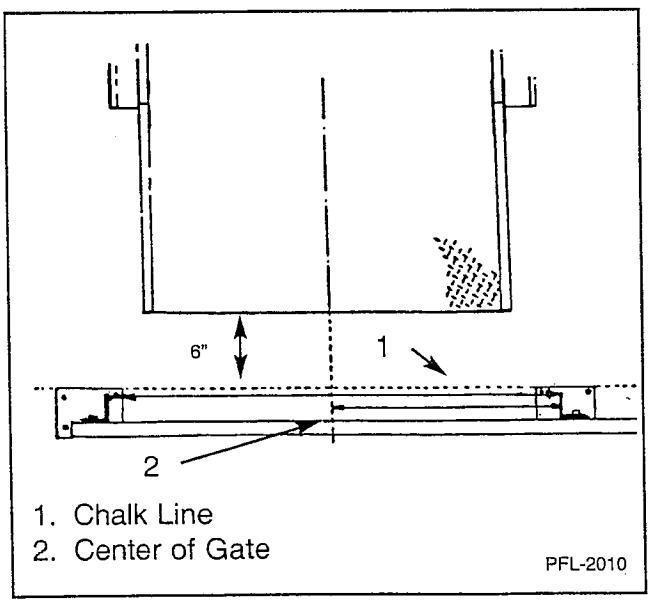



**Figure 5**

When the gate post to carriage measurement has been determined, snap a chalk line to identify the gate position parallel to the carriage. See Figure 5.

**NOTE**

*Length of enclosure panels may be a determining factor in gate location. Check GA drawing for enclosure placement.*

7. Raise the gate assembly. The track and gate are to be on the outside. Position the gate assembly so the center of the closed gate is located on the center of the carriage parallel to the carriage and the inside of the gate posts' base plates are on the chalk line. See Figure 6.

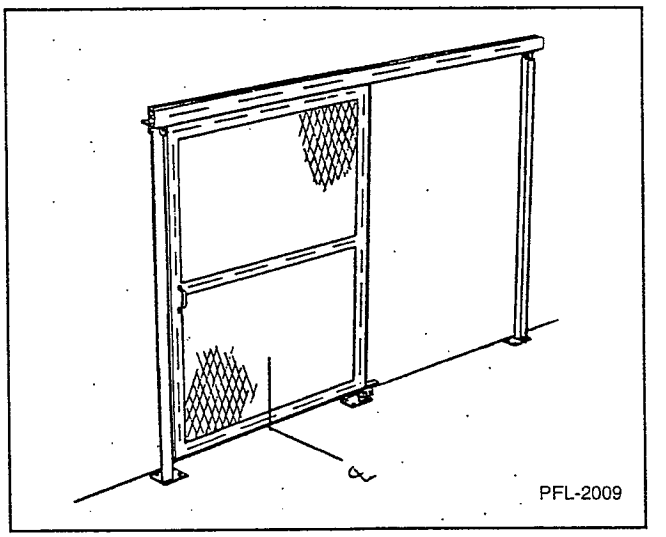



**Figure 6**

8. Using 3/8" anchors 3 1/2" long, drill and anchor gate post gate plates to the floor.

**NOTE**

*Depth of holes should always be deeper than the length of the anchor bolt.*

9. Plumb the gate using a plumb bob or a four foot or longer level. See Figure 7.

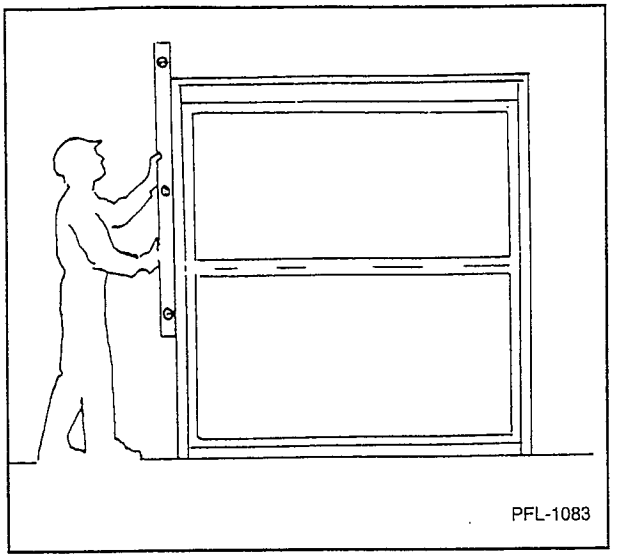



**Figure 7**

10. With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" angle iron or similar).

11. Tighten all bolts.

12. Weld angle iron header to gate posts. See Figure 8.

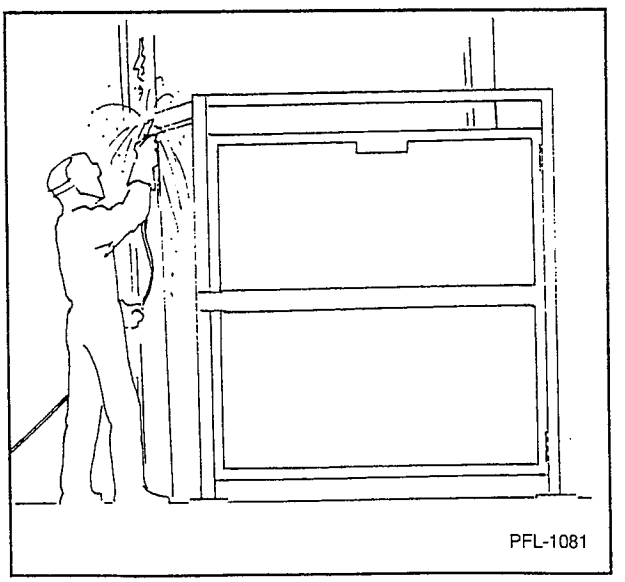



**Figure 8**

13. Check gate operation. Additional bracing may be necessary.

14. Install gate interlock.

## Gate Interlock Information

# Gate Cable Interlock Installation Instructions

**READ THIS BULLETIN IN ITS ENTIRETY BEFORE STARTING INSTALLATION.**

## GENERAL DESCRIPTION

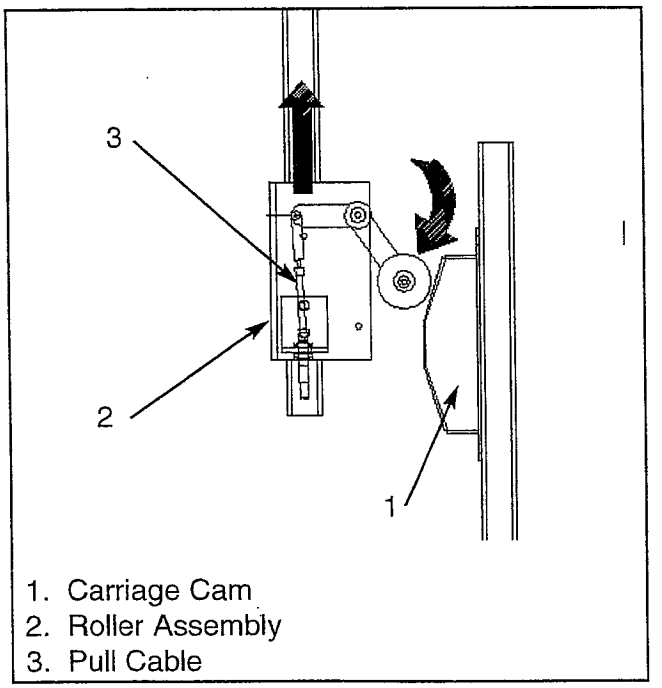
The cable interlock consists of four main items:

1. CARRIAGE MOUNTED CAM

   The cam is mounted on the carriage to activate the roller assembly. It must be positioned to allow the roller to move freely on the inclined cam face and to allow the pull cable to activate the interlock. See Figure 1.

2. COLUMN MOUNTED ROLLER ASSEMBLY

   The roller assembly is mounted on the lift column. It must be positioned to limit the pull cable travel. See Figure 1.




1. Carriage Cam
2. Roller Assembly
3. Pull Cable

**Figure 1**

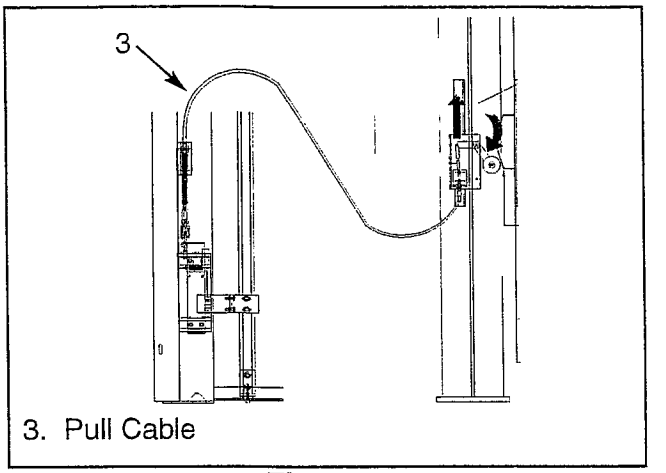
**NOTE**

*Do not allow the clevis to bottom out or overextend. The required travel is approximately 3/4"- 1". The maximum cable travel is 2".*

3. PULL CABLE

   The pull cable is a utility cable with threaded stainless steel end rods. The cable has a maximum 2" stroke. See Figures 1 and 2.

**If travel is extended beyond 2", cable damage will occur.**

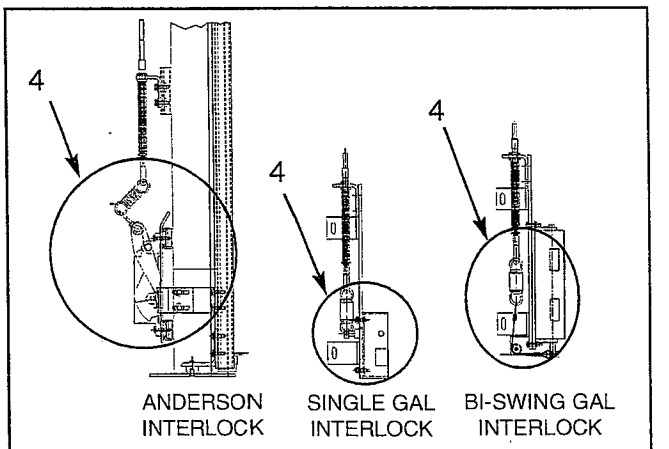



3. Pull Cable

**Figure 2**

4. GATE CABLE INTERLOCK ASSEMBLY

   The gate cable interlock assembly is attached to the gate post. The stroke of the cable is adjusted to permit the interlock to release the gate latch. See Figure 3.




4. Gate Cable Interlock Assembly

**Figure 3**

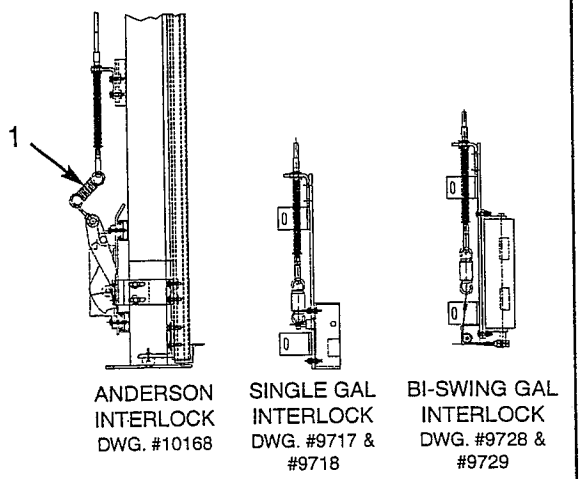
**⚠ WARNING**

**Cables are lubricated for the life of the cable. Do not remove the seals or lubricate the cable. Cables are designed to be non-repairable. Do not attempt to repair the cable. Protect the cable from physical damage by paint, kinking, vibration, etc., which may damage the cable.**

# Gate Cable Interlock Installation Instructions

## INTERLOCK ASSEMBLY ADJUSTMENT

1. The tension on the compression spring should be adjusted by positioning the cable on the angle bracket. The activation of the interlock is also adjusted by the position of the set collar. See Figure 4.




1. Compression Spring

**Figure 4**

CABLE ADJUSTMENT WITH ROLLER ARM

1. Mount the carriage cam to allow 3/4"-1" cable travel (2" maximum cable travel). Make sure the roller wheel clears the edge of the cam. Center the cable travel at the center of the full cable stroke by positioning the cable in the bracket angle. See Figure 5.

**⚠ WARNING**

**Proper engagement of the roller and cam is critical. The roller arm should pull the cable out of the sleave. Improper alignment could cause the roller arm to push the cable into the sleave causing it to bend and break.**

2. Edge of cam must not be past center of wheel toward bracket. See Figure 6.

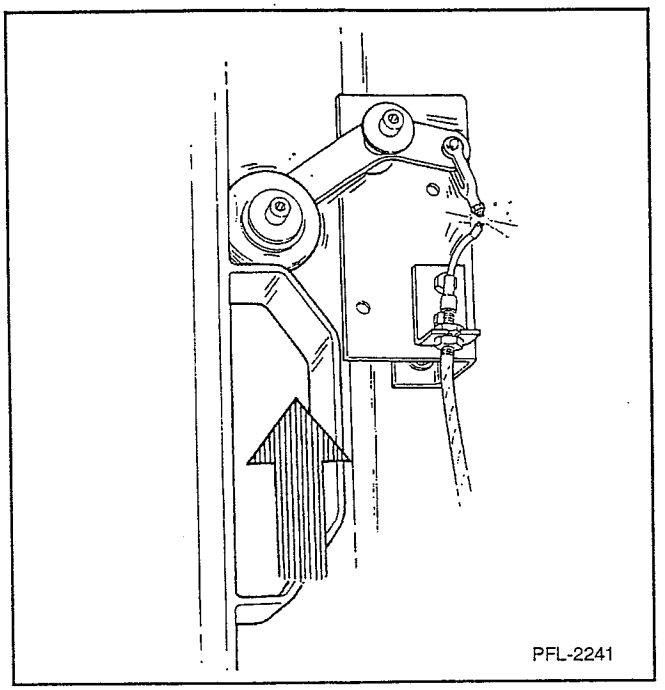
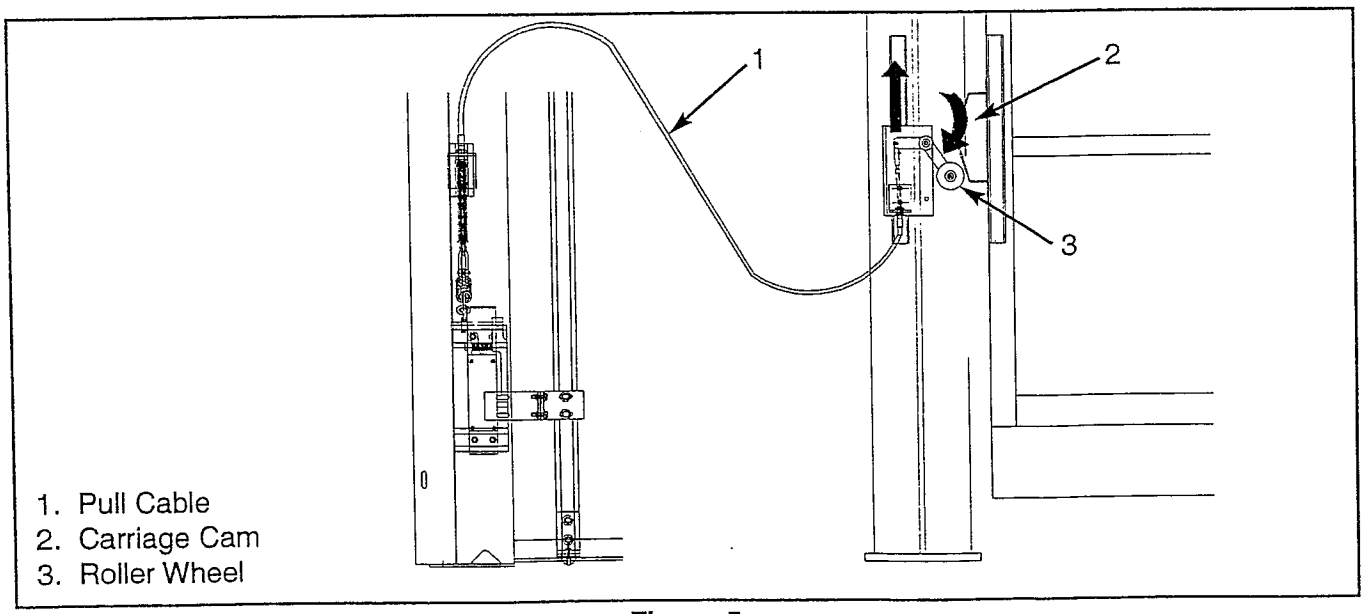



**Figure 6**




1. Pull Cable
2. Carriage Cam
3. Roller Wheel

**Figure 5**

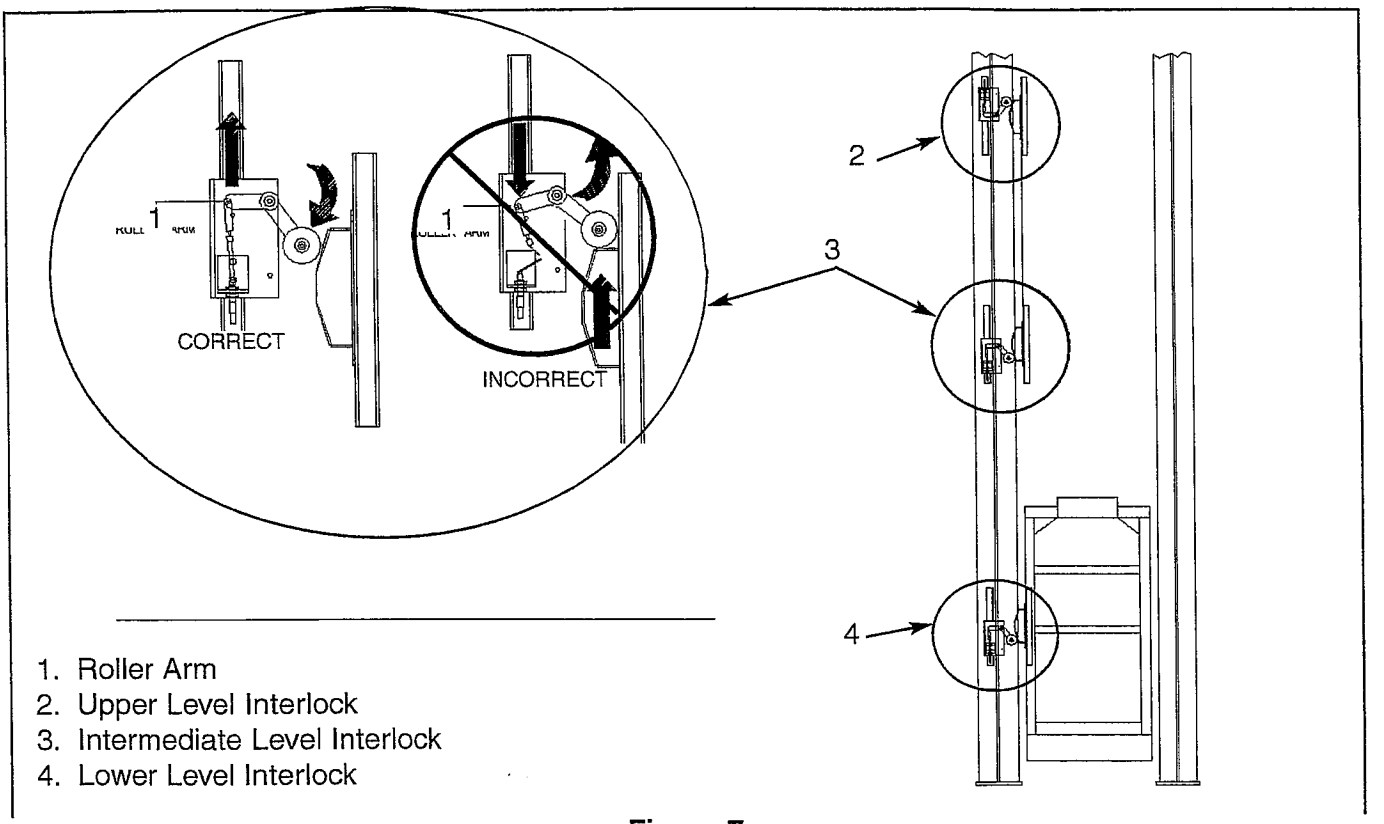
## POSITION OF THE ROLLER ARM ON THE LIFT COLUMN

1. The position of the roller on the cam is very important. The roller must roll freely on the cam incline. See Figure 7.

**CAUTION**

**Do not allow the roller to hang up on the top/bottom horizontal surface of the cam.**

**Proper engagement of the roller and cam is critical. The roller arm should pull the cable out of the sleave. Improper alignment will cause the roller arm to push the cable into the sleave causing it to bend and break.**




1. Roller Arm
2. Upper Level Interlock
3. Intermediate Level Interlock
4. Lower Level Interlock

**Figure 7**

2. At the top and bottom levels, the roller arm assembly should be oriented so the cam hits the roller wheel arm in the pivot direction. See Figure 8.

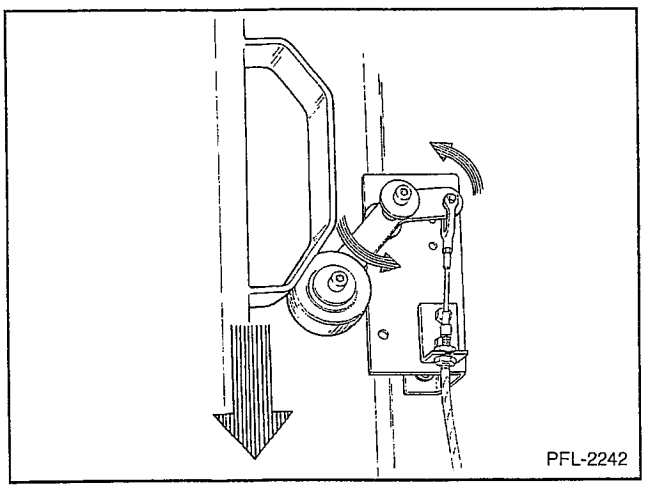



**Figure 8**

3. If you need to change roller arm assembly to opposite configuration, unbolt angle and pivot arm and reassemble in new location. See Figure 9.

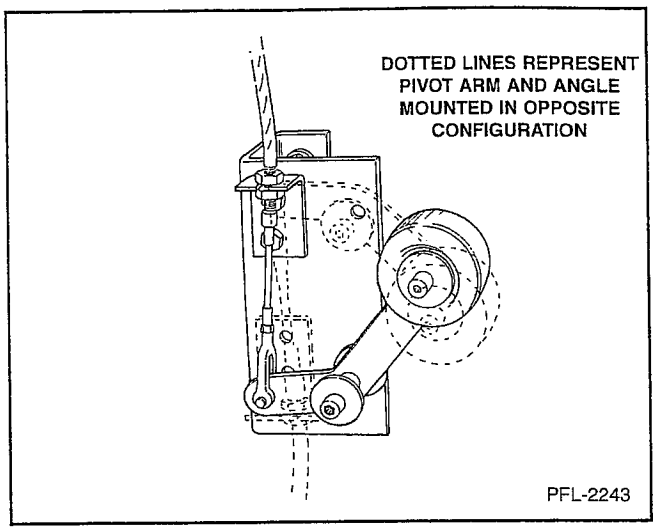



**Figure 9**

**NOTE**

*Only on the intermediate levels, the cam will hit the roller arm going in both directions, so alignment is important. See Figure 7.*

*The edge of the cam must be past center of wheel (away from bracket) to allow pivot arm to rotate. See Figure 10.*

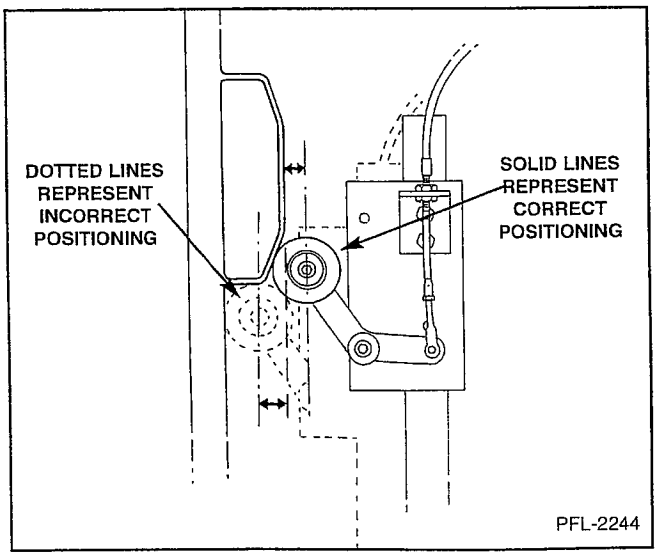
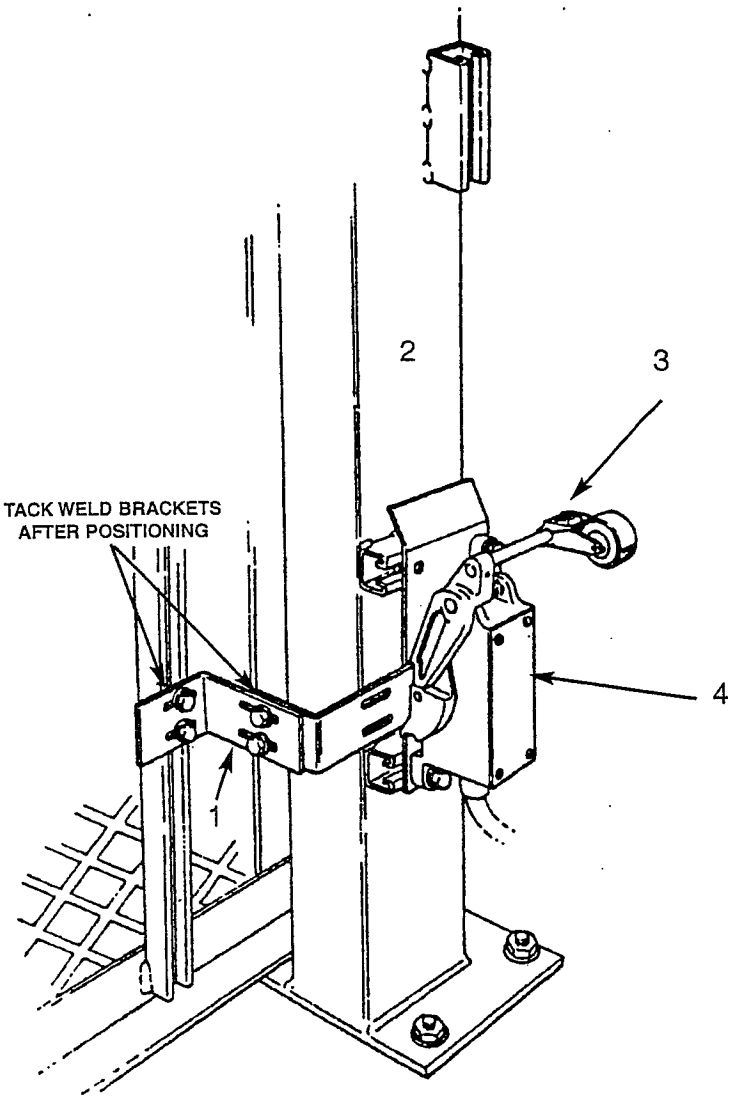



**Figure 10**

*If cam hits under the wheel not allowing the arm to pivot, the cable will break. See Figure 6.*

## Anderson Interlock for Vertical Acting Gate

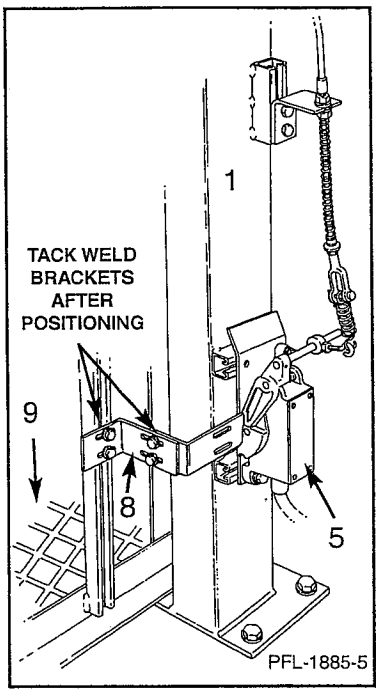


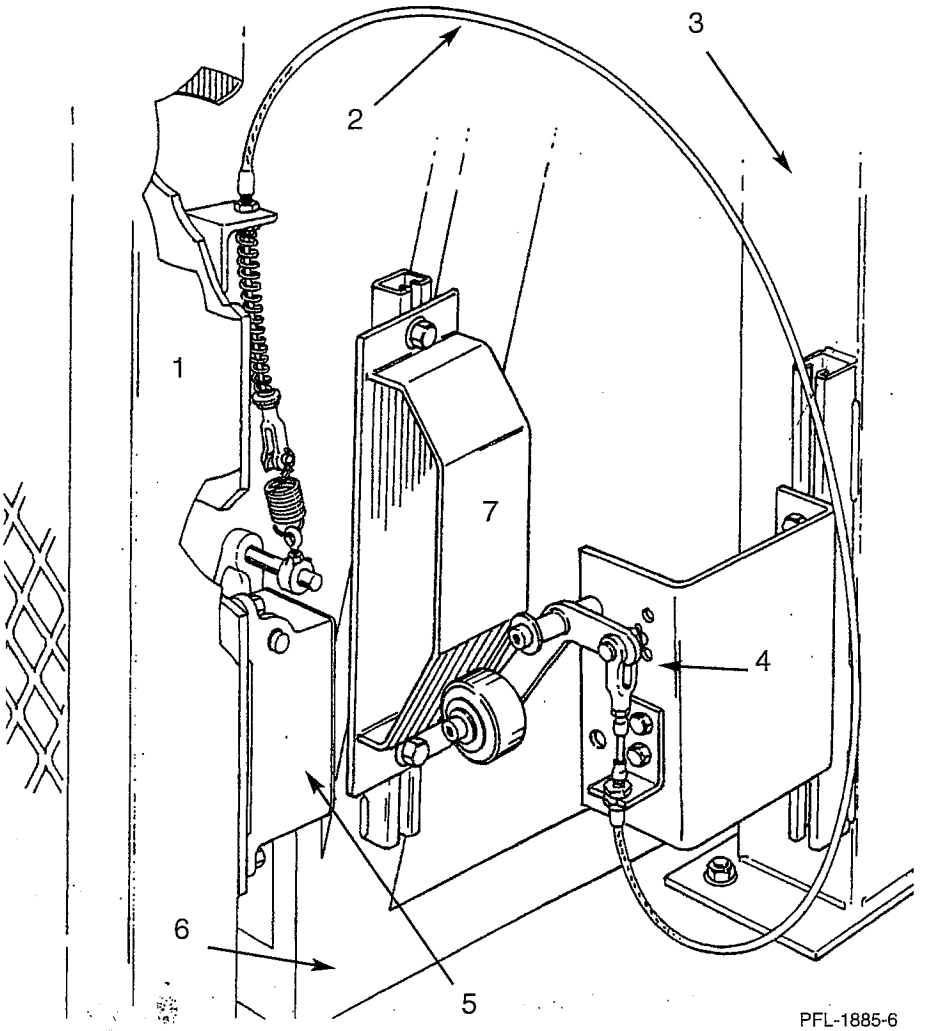

1. Actuator Bar
2. Gate Post
3. Roller Arm Assembly
4. Anderson Interlock

If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 N. Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

## Anderson Cable Interlock
## For use on Vertical Acting & Bi-Panel Vertical Acting Gates



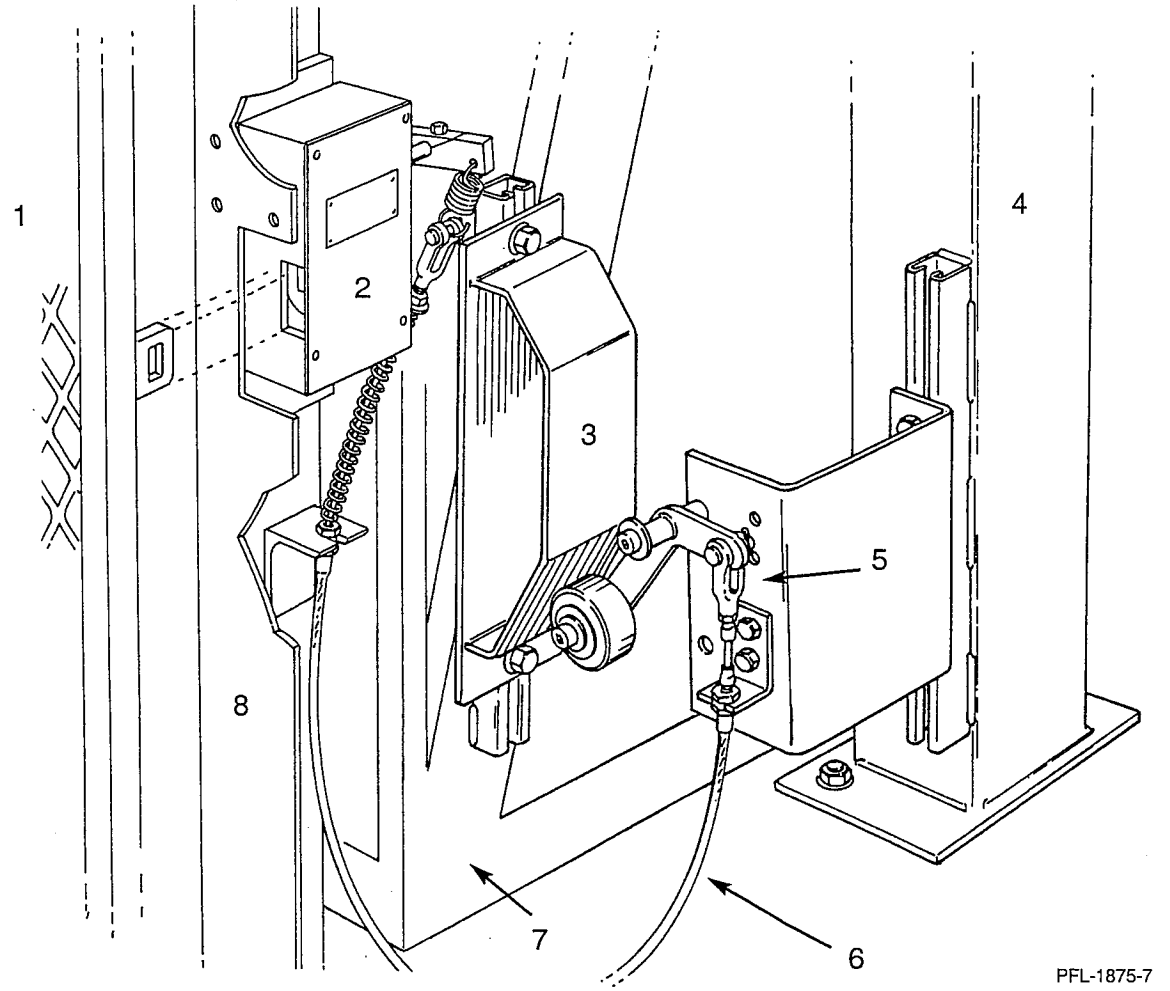




1. Gate Post
2. Control Cable Assembly
3. Lift Column
4. Roller Arm Assembly
5. Anderson Interlock
6. Carriage
7. Cam
8. Actuator Bar (On Gate Panel)
9. Gate Panel

If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

## GAL Cable Interlock
## For use on Sliding & Single Panel Swing Gates



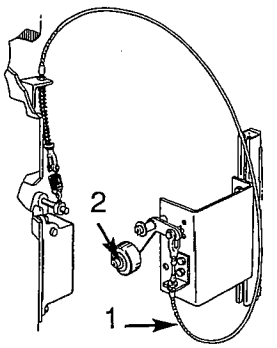

1. Gate Panel
2. GAL Interlock
3. Cam
4. Lift Column
5. Roller Arm Assembly
6. Control Cable Assembly
7. Carriage
8. Gate Post

If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

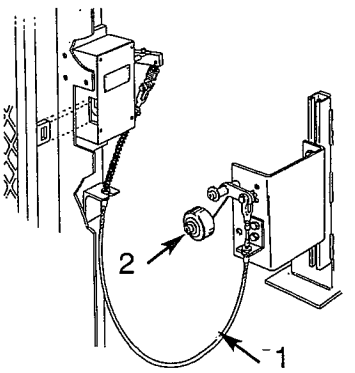
The **INTERLOCK** is a device used to mechanically prevent the gate from opening. Below are the standard types of interlocks supplied. As this is a safety device, replacement components are only available as shown below. Some configurations may vary by application.

## ANDERSON CABLE




PFL-1885-6A

## GAL CABLE

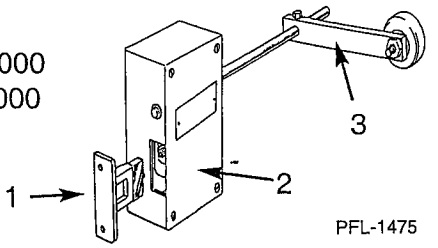



PFL-1885-7A

1. Control Cable Assembly
   10' - #9292-0120
   15' - #9292-0180
   25' - #9292-0300
   30' - #9292-0360
2. Roller Arm Assembly #9280-0000
   Wheel Only #9284-0040

## GAL (Left Hand Shown)

RH #2690-0000
LH #2691-0000

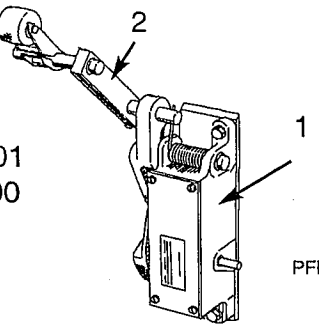



PFL-1475

1. Keeper #3838-0000
2. Contact Block (inside) #3832-0000
3. Arm w/Roller #4342-0000

## ANDERSON (Right Hand Shown)

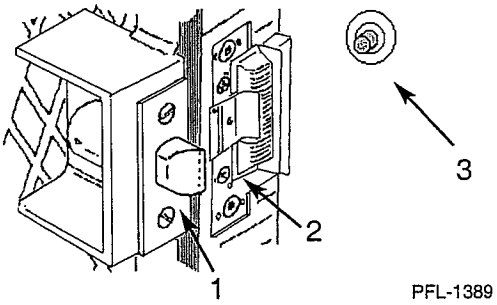
RH #2678-0001
LH #2678-0000




PFL-1368

1. Contact Block (inside)
2. Arm #6950-0000

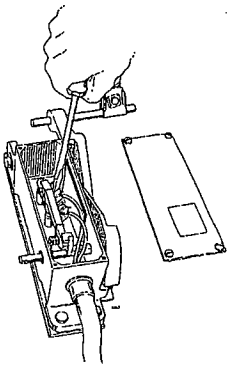
## ELECTRIC STRIKE




PFL-1389

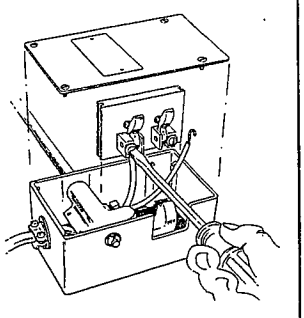
1. Spring Latch #7566-0000
2. Strike #9169-0000
3. Button #9096-0000

## ANDERSON



PFL-1401

## GAL

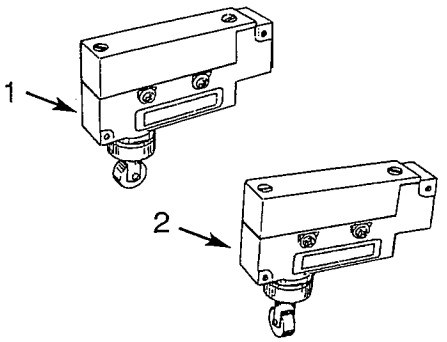


PFL-1250

See schematic for proper wiring instructions.

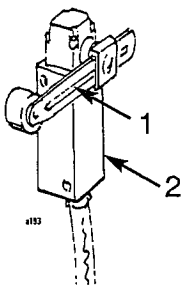
# Interlocks & Gate Status Switches

A **GATE STATUS SWITCH** is supplied when the contacts are not being used. If required, it will be mounted to the gate post or header. Normally the GAL and Anderson interlocks do not use this switch. Specific order requirements may dictate otherwise.




PFL-1293

1. Roller Plunger (parallel) #6220-0000
2. Roller Plunger (perpendicular) #6216-0000



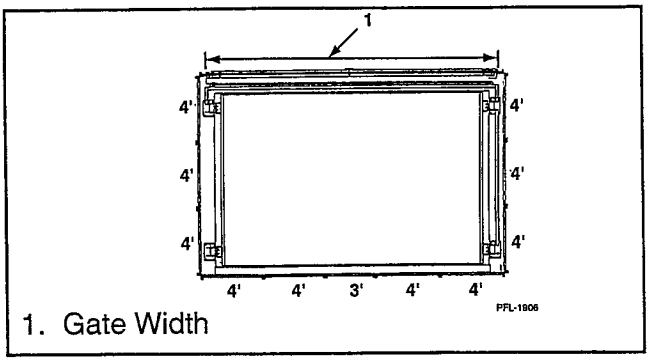

PFL-1205

1. Arm #2891-0005
2. Switch #2893-0005

# Enclosure Panels

In accordance with ANSI B20.1, Pflow Industries supplies standard enclosure panels to be installed around the unit as required by site conditions. Our panels are manufactured of 1-1/2" angle iron frame and 15 gauge flattened expanded metal which will reject a ball 2" in diameter.

The general arrangement drawing provides a "Plan View" for each level. This will show the proper placement and appropriate size for layout and installation purposes. Applications that require full height enclosures will have an additional drawing in the shipping packet. Modifications for site obstructions are best done in the field by the installer. See Figure 1.




1. Gate Width

**Figure 1**

Standard panels are 8' high in compliance with OSHA requirements. Total height includes 1-1/2" legs. These panels are to be mounted to the floor. See Figure 2.

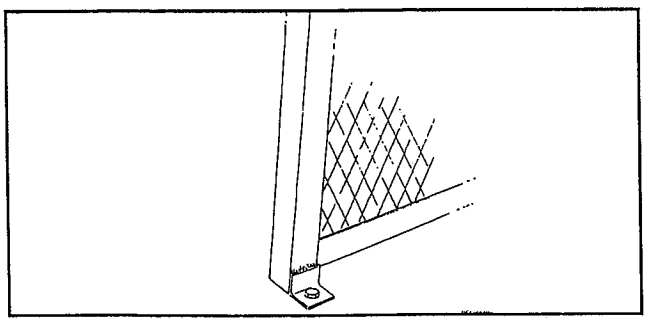


**Figure 2**

When stacking panels, as in full height applications or a transom above a gate, panels without legs are used on top of our regular panels.

Enclosures must be braced to the VRC or building structure by the mechanical installer. Use of structural angle is suggested.

Stiffeners are provided whenever two panels in excess of 6" meet. See Figure 3.

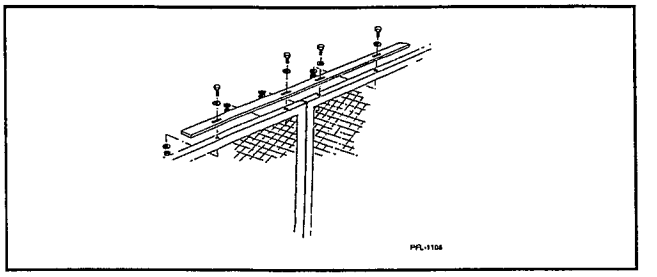


**Figure 3**

Filler panels are used to fill a gap of less than 6". See Figure 4.

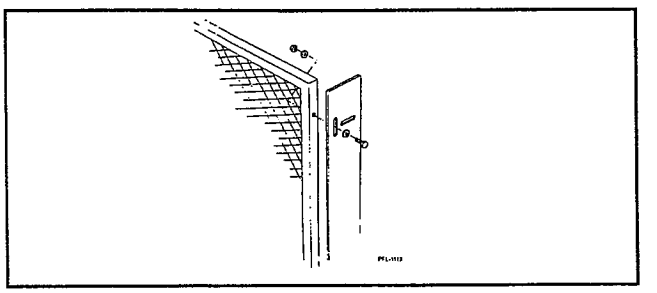


**Figure 4**

Corner angles are required for 90 degree attachment of panels. See Figure 5.

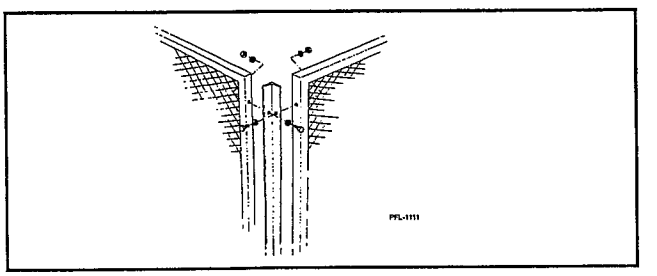


**Figure 5**

Wall attachment kits are provided when a gate or panel meets an existing wall. See Figure 6.

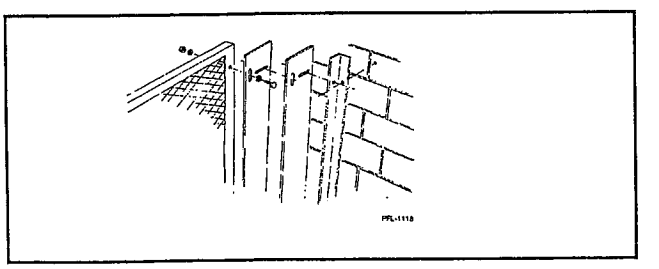


**Figure 6**

FROM: SANDY

MATERIAL SAFETY DATA SHEET - COMPLIES WITH 29 CFR 1910-1200

FORMAT A/GP ********** SECTION I ********** DATE PRINTED-03/06/01 REVISED-11-23-99

MANUFACTURERS NAME: CUSTOM-PAK PRODUCTS, INC.
N115 W19150 EDISON DRIVE
GERMANTOWN, WI 53022

INFORMATION TELEPHONE: (262) 251-6180

24 HR EMERGENCY TELEPHONE: 1-800-688-4005
FOR EMERGENCY SITUATIONS REFERENCE 13E032N-12

MANUFACTURERS CODE I.D.: 13E032N-12

PRODUCT CLASS: AEROSOL PAINT

PRODUCT DESC: 00002871-0003-N
PFLOW BLUE
ENAMEL

HMIS INFORMATION:
HEALTH.....2
FLAMMABILITY...4
REACTIVITY.....1
PROTECTIVE EQ..

PACKAGE FOR: 12TM/C C1113
PFLOW INDUSTRIES, INC. 14TM/C
MILWAUKEE, WI 53209 12TM/C

********** SECTION II - HAZARDOUS INGREDIENTS **********

| INGREDIENT | CAS # | VOLATILE % BY WEIGHT | LEL | VAPOR PRESSURE mm Hg. @20C | OSHA PEL-PPM | ACGIH TLV-PPM | SARA 313 LISTED | LISTED NTP | CARCINOGIN IARC | OSHA |
|---|---|---|---|---|---|---|---|---|---|---|
| ETHYL ACETATE | 141-78-6 | 28.0 | 2.2 | 29.30 | 400 | 400 | N | N | N | N |
| PROPANE | 74-98-6 | 14.0 | 2.2 | 110.0 | 1000 | 1000 | N | N | N | N |
| N-BUTANE | 106-97-8 | 6.0 | 1.8 | 17.0 | 800 | 800 | N | N | N | N |
| XYLENE | 1330-20-7 | 5.0 | 1.0 | 5.1 | 100 | 100 | Y | N | N | N |
| PM ACETATE | 108-65-6 | 3.0 | 1.5 | 3.7 | N/A | N/A | N | N | N | N |
| VM&P NAPHTHA/NAPHTHA | 64742-89-8 | 3.0 | .9 | 10.2 | 300 | 300 | N | N | N | N |
| *TOLUENE | 108-88-3 | 2.45 | 1.2 | 22.0 | 100 | 50 | Y | N | N | N |
| ISOBUTYL ALCOHOL | 78-83-1 | 2.0 | 1.7 | 8.0 | 100 | 50 | N | N | N | N |
| ETHYLBENZENE | 100-41-4 | 1.0 | 1.0 | 7.1 | 100 | 100 | Y | N | N | N |

* SEE WARNING SECTION V

********** SECTION III - PHYSICAL DATA **********

BOILING RANGE: -43F to 340F % VOLATILE BY VOLUME: 90.33 VAPOR DENSITY: Heavier than Air APPEARANCE: Opaque Spray

WEIGHT PER GALLON: 11.83 WATER SOLUABLITY: Negligible ODOR: Solvent Odor EVAPORATION RATE: Faster than Ether

**********SECTION IV - FIRE AND EXPLOSION HAZARD DATA **********

DOT PROPER SHIPPING NAME: CONSUMER COMMODITY ID NO.: UN1950 HAZARD CLASS: ORM-D-AIR
PACKAGE GROUP: LABEL REQUIREMENT:

EXTINGUISHING MEDIA: Use (NFPA) CLASS B extinguisher, CO2 or foam. FLASH POINT: <12F LEL: See Section II

UNUSUAL FIRE AND EXPLOSION HAZARDS: Pressure build up due to heat exposure may cause containers to explode. Water may be used to cool ruptured containers.

SPECIAL FIRE FIGHTING PROCEDURES: Fight fire from safe distance. Wear full protective equipment, including self-contained breathing gear.

LEVEL 3 AEROSOL (NFPA 30B)

## ********** SECTION V - HEALTH HAZARD DATA **********

EFFECTS OF OVEREXPOSURE: (ACUTE) Anesthetic effect. Irritation of the respiratory tract or acute nervous system depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma. EYE.....Contact may cause redness, irritation, tearing and blurred vision. SKIN.....Contact may dry skin causing cracks and irritation. INGESTION..... May be harmful or fatal if swallowed.

(CHRONIC) Reports have associated repeated and prolonged occupational overexposure to solvents with liver, kidney, brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Asthma and other respiratory ailments. Chemical sensitization.

PRIMARY ROUTE(S) OF ENTRY: (X) DERMAL (X) INHALATION ( ) INGESTION ( ) EYES

EMERGENCY AND FIRST AID PROCEDURES: VAPORS.....Remove from exposure. Administer oxygen if necessary. Call a physician. EYES.....Immediately flush eyes with water for at least 15 minutes. Get medical attention. SKIN.....Remove contaminated clothing and shoes. Wash contact area with soap and water. Wash clothing and shoes before reuse. INGESTION.....Drink 1 or 2 glasses of water to dilute. Do not induce vomiting . Consult a physician or Poison Control Center immediately.

* WARNING: Product contains a chemical(s) known to the State of California to cause cancer, birth defects or other reproductive harm.

## ********** SECTION VI - REACTIVE DATA **********

STABILITY: STABLE (X) UNSTABLE ( ). HAZARDOUS POLYMERIZATION; MAY OCCUR ( ) WILL NOT OCCUR (X)
CONDITIONS TO AVOID: High temperatures and open flames. INCOMPATIBLE MATERIALS TO AVOID: Unknown
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide.....Carbon Monoxide.

## ********** SECTION VII - SPILL OR LEAK PROCEDURE **********

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED: Eliminate all ignition sources. Provide ventilation. Collect spills with absorbent materials and non-sparking tools. See Section VIII for protective equipment.
WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State and Local regulations. Do not incinerate containers.

## ********** SECTION VIII - SPECIAL PROTECTION INFORMATION/CONTROL MEASURES **********

RESPIRATORY PROTECTION: In open areas with unrestricted ventilation, an OSHA approved respirator to remove solid airborne particles of overspray may be used if prolonged and repeated exposure is likely. In areas with restricted ventilation, the use of OSHA approved chemical/mechanical filter designed to remove both particles and vapors is recommended.
VENTILATION: Supply sufficient ventilation to keep air contaminant concentration below current OSHA (PEL) or ACGIH (TLV).
PROTECTIVE GLOVES: Use protective gloves if contact with product is likely.
OTHER PROTECTIVE EQUIPMENT: Safety glasses to prevent eye contact.
HYGIENIC PRACTICES: Wash hands before eating or using washroom.

## ********** SECTION IX - SPECIAL PRECAUTIONS **********

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store in areas above 100F or near fire or open flame. When storing large quantities, storage conditions should comply with OSHA 1910.106.
OTHER PRECAUTIONS: Prevent prolonged or repeated breathing of vapor or spray mist. Do not take internally. Keep out of reach of children. Use with adequate ventilation.

FROM: SANDY

MATERIAL SAFETY DATA SHEET - COMPLIES WITH 29 CFR 1910-1200

FORMAT A/GP

********** SECTION I ********** DATE PRINTED-03/06/01 REVISED-06-28-00

MANUFACTURERS NAME: CUSTOM-PAK PRODUCTS, INC.
N115 W19150 EDISON DRIVE
GERMANTOWN, WI 53022

INFORMATION TELEPHONE: (262) 251-6180

24 HR EMERGENCY TELEPHONE: 1-800-688-4005
FOR EMERGENCY SITUATIONS REFERENCE 18E025N-12

MANUFACTURERS CODE I.D.: 18E025N-12

PRODUCT CLASS: AEROSOL PAINT

PRODUCT DESC: 00002871-0004-N
PFLOW PRIMER

HMIS INFORMATION:
HEALTH.....2
FLAMMABILITY...4
REACTIVITY.....1
PROTECTIVE EQ..

PACKAGE FOR: 12TM/C C1113
PFLOW INDUSTRIES, INC. 14TM/C
MILWAUKEE, WI 53209 12TM/C

********** SECTION II - HAZARDOUS INGREDIENTS **********

| INGREDIENT | CAS # | VOLATILE % BY WEIGHT | LEL | VAPOR PRESSURE mm Hg. @20C | OSHA PEL-PPM | ACGIH TLV-PPM | SARA 313 LISTED | LISTED CARCINOGIN NTP | IARC | OSHA |
|---|---|---|---|---|---|---|---|---|---|---|
| ACETONE | 67-64-1 | 30.0 | 12.8 | 181.0 | 750 | 750 | N | N | N | N |
| PROPANE | 74-98-6 | 16.0 | 2.2 | 110.0 | 1000 | 1000 | N | N | N | N |
| N-BUTANE | 106-97-8 | 8.0 | 1.8 | 17.0 | 800 | 800 | N | N | N | N |
| VM&P NAPHTHA/NAPHTHA | 64742-89-8 | 5.0 | .9 | 10.2 | 300 | 300 | N | N | N | N |
| XYLENE | 1330-20-7 | 3.0 | 1.0 | 5.1 | 100 | 100 | Y | N | N | N |
| *TOLUENE | 108-88-3 | 2.20 | 1.2 | 22.0 | 100 | 50 | Y | N | N | N |
| ISOBUTYL ALCOHOL | 78-83-1 | 1.0 | 1.7 | 8.0 | 100 | 50 | N | N | N | N |
| GLYCOL ETHER EB | 111-76-2 | 1.0 | 1.1 | 0.88 | 25 | 25 | Y | N | N | N |

* SEE WARNING SECTION V

********** SECTION III - PHYSICAL DATA **********

BOILING RANGE: -43F to 340F % VOLATILE BY VOLUME: 99.90 VAPOR DENSITY: Heavier than Air APPEARANCE: Opaque Spray

WEIGHT PER GALLON: 11.89 WATER SOLUABLITY: Negligible ODOR: Solvent Odor EVAPORATION RATE: Faster than Ether

**********SECTION IV - FIRE AND EXPLOSION HAZARD DATA **********

DOT PROPER SHIPPING NAME: CONSUMER COMMODITY ID NO.: UN1950 HAZARD CLASS: ORM-D-AIR
PACKAGE GROUP: LABEL REQUIREMENT:

EXTINGUISHING MEDIA: Use (NFPA) CLASS B extinguisher, CO2 or foam. FLASH POINT: <12F LEL: See Section II

UNUSUAL FIRE AND EXPLOSION HAZARDS: Pressure build up due to heat exposure may cause containers to explode. Water may be used to cool ruptured containers.

SPECIAL FIRE FIGHTING PROCEDURES: Fight fire from safe distance. Wear full protective equipment, including self-contained breathing gear.

LEVEL 3 AEROSOL (NFPA 30B)

## ********** SECTION V - HEALTH HAZARD DATA **********

EFFECTS OF OVEREXPOSURE: (ACUTE) Anesthetic effect. Irritation of the respiratory tract or acute nervous system depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma. EYE.....Contact may cause redness, irritation, tearing and blurred vision. SKIN.....Contact may dry skin causing cracks and irritation. INGESTION..... May be harmful or fatal if swallowed.

(CHRONIC) Reports have associated repeated and prolonged occupational overexposure to solvents with liver, kidney, brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Asthma and other respiratory ailments. Chemical sensitization.

PRIMARY ROUTE(S) OF ENTRY: (X) DERMAL (X) INHALATION ( ) INGESTION ( ) EYES

EMERGENCY AND FIRST AID PROCEDURES: VAPORS.....Remove from exposure. Administer oxygen if necessary. Call a physician. EYES.....Immediately flush eyes with water for at least 15 minutes. Get medical attention. SKIN.....Remove contaminated clothing and shoes. Wash contact area with soap and water. Wash clothing and shoes before reuse. INGESTION.....Drink 1 or 2 glasses of water to dilute. Do not induce vomiting . Consult a physician or Poison Control Center immediately.

* WARNING: Product contains a chemical(s) known to the State of California to cause cancer, birth defects or other reproductive harm.

## ********** SECTION VI - REACTIVE DATA **********

STABILITY: STABLE (X) UNSTABLE ( ). HAZARDOUS POLYMERIZATION; MAY OCCUR ( ) WILL NOT OCCUR (X)
CONDITIONS TO AVOID: High temperatures and open flames. INCOMPATIBLE MATERIALS TO AVOID: Unknown
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide.....Carbon Monoxide.

## ********** SECTION VII - SPILL OR LEAK PROCEDURE **********

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED: Eliminate all ignition sources. Provide ventilation. Collect spills with absorbent materials and non-sparking tools. See Section VIII for protective equipment.
WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State and Local regulations. Do not incinerate containers.

## ********** SECTION VIII - SPECIAL PROTECTION INFORMATION/CONTROL MEASURES **********

RESPIRATORY PROTECTION: In open areas with unrestricted ventilation, an OSHA approved respirator to remove solid airborne particles of overspray may be used if prolonged and repeated exposure is likely. In areas with restricted ventilation, the use of OSHA approved chemical/mechanical filter designed to remove both particles and vapors is recommended.
VENTILATION: Supply sufficient ventilation to keep air contaminant concentration below current OSHA (PEL) or ACGIH (TLV).
PROTECTIVE GLOVES: Use protective gloves if contact with product is likely.
OTHER PROTECTIVE EQUIPMENT: Safety glasses to prevent eye contact.
HYGIENIC PRACTICES: Wash hands before eating or using washroom.

## ********** SECTION IX - SPECIAL PRECAUTIONS **********

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store in areas above 100F or near fire or open flame. When storing large quantities, storage conditions should comply with OSHA 1910.106.
OTHER PRECAUTIONS: Prevent prolonged or repeated breathing of vapor or spray mist. Do not take internally. Keep out of reach of children. Use with adequate ventilation.

Prime Coatings
Division of Prime Leather Finishes
1002 Hickory St. • Pewaukee, WI 53072
(414) 691-1930 • FAX (414) 691-3892

# TECHNICAL INFORMATION

**COATING NUMBER:** 170GY023 **DATE:** September 24,1999

**DESCRIPTION:** Grey H.S. Primer

**WEIGHT PER GALLON, LBS:** 11.99

**TOTAL SOLIDS, % BY WEIGHT:** 71.8

**TOTAL SOLIDS, % BY VOLUME:** 50.22

**VISCOSITY:** 21 " Zahn 3

**VOC, AS SUPPLIED (LBS/GAL):** 3.40

**FLASHPOINT, CLOSED CUP (SETAFLASH):** 70° F

**APPLICATION METHOD:** Spray

**REDUCTION FOR APPLICATION:** None

**CURE SCHEDULE:** Air Dry

**GLOSS:**

**VOC AT APPLICATION, LBS/GAL:** 3.40

D Flow

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : GREY H S PRIMER
IDENTIFICATION NUMBER: 170GY023 DATE PRINTED: 08/21/00
PRODUCT USE/CLASS : Air dry primer

SUPPLIER:
Prime Coatings
1002 Hickory Street
Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930
7:30 am - 4:00 pm

MANUFACTURER:
Prime Coatings
1002 Hickory Street
Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930
7:30 am - 4:00 pm

PREPARER: Lori Schneider, PHONE: 262-691-1930, PREPARE DATE: 08/21/00

## SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

| ITEM | CHEMICAL NAME | CAS NUMBER | WT/WT % EQUAL TO |
|---|---|---|---|
| 01 | VM&P Naphtha | 8032-32-4 | 11.1 % |
| 02 | Xylene | 1330-20-7 | 6.7 % |
| 03 | Toluene | 108-88-3 | 5.0 % |
| 04 | Isobutanol | 78-83-1 | 3.2 % |
| 05 | Ethyl benzene | 100-41-4 | 1.7 % |

EXPOSURE LIMITS

| ITEM | ACGIH TLV-TWA | ACGIH TLV-STEL | OSHA PEL-TWA | OSHA PEL-CEILING | COMPANY TLV-TWA | SKIN |
|---|---|---|---|---|---|---|
| 01 | 300 ppm | N.E. | 300 ppm | N.E. | N.E. | NO |
| 02 | 100 ppm | 150 ppm | 100 ppm | 150 ppm | N.E. | NO |
| 03 | 50 ppm | N.E. | 100 ppm | 150 ppm | N.E. | YES |
| 04 | 50 ppm | N.E. | 50 ppm | N.E. | N.E. | NO |
| 05 | 100 ppm | 125 ppm | 100 ppm | | N.E. | NO |

(See Section 16 for abbreviation legend)

## SECTION 3 - HAZARDS IDENTIFICATION

*** EMERGENCY OVERVIEW ***: Flammable liquid! May cause eye irritation on contact. Overexposure to vapors may cause dizziness or headache. The International Agency for Research on Cancer has evaluated ethylbenzene and classified it as a possible human carcinogen (Group 2B) based on sufficient evidence of carcinogenity in experimental animals, but inadequate evidence for cancer in exposed humans.

(Continued on Page 2)

## SECTION 3 - HAZARDS IDENTIFICATION

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Can cause eye irritation, redness, tearing.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

EFFECTS OF OVEREXPOSURE - INHALATION: Excessive inhalation of vapors can cause nasal and respiratory irritation, and central nervous system effects such as dizziness, fatigue, nausea, headache.

EFFECTS OF OVEREXPOSURE - INGESTION: Can cause gastrointestinal irritation, nausea, vomiting, or diarrhea.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Possible reproductive hazard. Overexposure may cause kidney damage. May cause liver disorder (e.g., edema, proteinuria) and damage. May cause cardiovascular disorder and damage. May cause brain cell damage from deliberate and abusive inhalation of vapors. May affect the blood, causing anemia. Toluene and xylene have been found to be orotoxins, that is, exposure to these solvents may cause hearing loss. More severe effects can result when chemical exposure is combined with noise exposure, even if these exposures are below the recommended limits.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION

## SECTION 4 - FIRST AID MEASURES

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

FIRST AID - SKIN CONTACT: Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Aspiration of this material into the lungs may cause chemical pneumonitis, which may be fatal.

## SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT: 70 F
(TAGLIABUE CLOSED CUP)

LOWER EXPLOSIVE LIMIT: 0.9 %
UPPER EXPLOSIVE LIMIT: 7.0 %

(Continued on Page 3)

## SECTION 5 - FIRE FIGHTING MEASURES

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL FOAM

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors can travel along the ground to a source of ignition and flashback. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures at or above the flashpoint.

SPECIAL FIREFIGHTING PROCEDURES: Containers can build up pressure if exposed to heat (fire). As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Use water with caution. Since this material may be lighter than water and insoluble, use of water may spread the fire.

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid runoff into storm sewers and ditches which lead to waterways. Absorb small spills with inert material and place in chemical waste container. For a large spill: dike area of spill and pump to salvage container. Collect remainder on inert material and place in chemical waste container. Wear organic vapor respirator. Remove all sparks, flames, and other sources of ignition from the area and allow any hot surfaces to cool. Use non-sparking tools only. Ventilate area thoroughly.

## SECTION 7 - HANDLING AND STORAGE

HANDLING: "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of. Wash thoroughly after handling. Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment.

STORAGE: Keep away from heat, sparks and flame. Keep container closed when not in use.

## SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

(Continued on Page 4)

## SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: NIOSH/MSHA approved respirator should be worn to avoid inhalation. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product. Ventilation rates must be maintained to keep exposure below the TLV or PEL. Otherwise, an approved organic vapor respirator must be used. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

SKIN PROTECTION: Gloves should be worn to avoid prolonged skin contact. Chemically resistant gloves should be worn if contact is likely.

EYE PROTECTION: Wear safety glasses with side shields or goggles.

OTHER PROTECTIVE EQUIPMENT: Where splashing is possible, an impermeable apron and boots should be worn.

HYGIENIC PRACTICES: Wash hands before eating. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Avoid contact with eyes, skin, and clothing.

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| BOILING RANGE | : 226 - 285 F | VAPOR DENSITY | : Is heavier than air |
| ODOR | : Solvent | ODOR THRESHOLD | : N.D. |
| APPEARANCE | : Liquid | EVAPORATION RATE | : Is faster than Butyl Acetate |
| SOLUBILITY IN H2O | : None | SPECIFIC GRAVITY | : 1.4457 |
| FREEZE POINT | : N.D. | pH @ 0.0 % | : N.D. |
| VAPOR PRESSURE | : N.D. | VISCOSITY | : N.D. |
| PHYSICAL STATE | : N.D. | | |
| WEIGHT % SOLIDS | : 71.80 | | |

(See Section 16 for abbreviation legend)

## SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Hazardous polymerization will not occur.

INCOMPATIBILITY: Avoid contact with oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning may produce carbon dioxide and carbon monoxide. Products containing nitrocellulose produce oxides of nitrogen if burned.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

(Continued on Page 5)

## SECTION 11 - TOXICOLOGICAL PROPERTIES

No product or component toxicological information is available.

Toxic section 11B: No Information.

## SECTION 12 - ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: No Information.

## SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: This material is a RCRA hazardous waste due to ignitability. Some components may be listed wastes or on the land ban form. Comply with all applicable federal, state, and local regulations when disposing of this material. This material may be fuel blended. This material may be sent to a recycler for solvent recovery.

## SECTION 14 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Paint

DOT TECHNICAL NAME:

DOT HAZARD CLASS: 3 HAZARD SUBCLASS:

DOT UN/NA NUMBER: UN 1263 PACKING GROUP: II RESP. GUIDE PAGE: 127

## SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

CERCLA - SARA HAZARD CATEGORY:
This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD FIRE HAZARD

(Continued on Page 6)

## SECTION 15 - REGULATORY INFORMATION

SARA SECTION 313:
This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

| ---------- CHEMICAL NAME ---------- | CAS NUMBER | WT/WT % |
|---|---|---|
| Xylene | 1330-20-7 | 6.7 % |
| Toluene | 108-88-3 | 5.0 % |
| Ethyl benzene | 100-41-4 | 1.7 % |
| Cobalt compounds | | 0.1 % |

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

## SECTION 16 - OTHER INFORMATION

HMIS RATINGS - HEALTH: 1 FLAMMABILITY: 3 REACTIVITY: 0

PREVIOUS MSDS REVISION DATE: 09/21/99

VOLATILE ORGANIC COMPOUNDS (VOCS): 3.40 lbs/gal, 407 grams/ltr

LEGEND: N.A. - Not Applicable, N.E. - Not Established,
N.D. - Not Determined

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The information contained on this MSDS has been checked and should be accurate. However, it is the responsibility of the user to comply with all Federal, State, and Local laws and regulations.

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<END OF MSDS>

Prime Coatings
Division of Prime Leather Finishes
1002 Hickory St. • Pewaukee, WI 53072
(414) 691-1930 • FAX (414) 691-3892

# TECHNICAL INFORMATION

**COATING NUMBER:** 170BE031 **DATE:** 27 September 1999

**DESCRIPTION:** High-Solids Blue Enamel

**WEIGHT PER GALLON, LBS:** 11.86

**TOTAL SOLIDS, % BY WEIGHT:** 71.4

**TOTAL SOLIDS, % BY VOLUME:** 51.5

**VISCOSITY:** 19 Seconds Zahn 3/ 74° F

**VOC, AS SUPPLIED (LBS/GAL):** 3.4

**FLASHPOINT, CLOSED CUP (SETAFLASH):** Per MSDS

**APPLICATION METHOD:** Conventional spray

**REDUCTION FOR APPLICATION:** None Required

**CURE SCHEDULE:** Dry to touch 30- 1 hour

**GLOSS:** 12-16 (60°)

**VOC AT APPLICATION, LBS/GAL:** 3.40

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : BLUE ENAMEL
IDENTIFICATION NUMBER: 170BE031 DATE PRINTED: 08/21/00
PRODUCT USE/CLASS :

SUPPLIER:
Prime Coatings
1002 Hickory Street
Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930
7:30 am - 4:00 pm

MANUFACTURER:
Prime Coatings
1002 Hickory Street
Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930
7:30 am - 4:00 pm

PREPARER: Lori Schneider, PHONE: 262-691-1930, PREPARE DATE: 08/21/00

## SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

| ITEM | CHEMICAL NAME | CAS NUMBER | WT/WT % EQUAL TO |
|---|---|---|---|
| 01 | Xylene | 1330-20-7 | 9.3 % |
| 02 | VM&P Naphtha | 8032-32-4 | 5.2 % |
| 03 | Toluene | 108-88-3 | 4.9 % |
| 04 | Isobutanol | 78-83-1 | 3.4 % |
| 05 | Methoxy propyl acetate | 108-65-6 | 2.6 % |
| 06 | Ethyl benzene | 100-41-4 | 2.3 % |

| | EXPOSURE LIMITS | | | | | |
|---|---|---|---|---|---|---|
| | ACGIH | | OSHA | | COMPANY | |
| ITEM | TLV-TWA | TLV-STEL | PEL-TWA | PEL-CEILING | TLV-TWA | SKIN |
| 01 | 100 ppm | 150 ppm | 100 ppm | 150 ppm | N.E. | NO |
| 02 | 300 ppm | N.E. | 300 ppm | N.E. | N.E. | NO |
| 03 | 50 ppm | N.E. | 100 ppm | 150 ppm | N.E. | YES |
| 04 | 50 ppm | N.E. | 50 ppm | N.E. | N.E. | NO |
| 05 | N.E. | N.E. | N.E. | N.E. | N.E. | NO |
| 06 | 100 ppm | 125 ppm | 100 ppm | | N.E. | NO |

(See Section 16 for abbreviation legend)

## SECTION 3 - HAZARDS IDENTIFICATION

*** EMERGENCY OVERVIEW ***: Flammable liquid! May cause eye irritation on contact. Overexposure to vapors may cause dizziness or headache. The International Agency for Research on Cancer has evaluated ethylbenzene and classified it as a possible human carcinogen (Group 2B) based on sufficient

(Continued on Page 2)

## SECTION 3 - HAZARDS IDENTIFICATION

evidence of carcinogenity in experimental animals, but inadequate evidence for cancer in exposed humans.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Can cause eye irritation, redness, tearing.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

EFFECTS OF OVEREXPOSURE - INHALATION: Excessive inhalation of vapors can cause nasal and respiratory irritation, and central nervous system effects such as dizziness, fatigue, nausea, headache.

EFFECTS OF OVEREXPOSURE - INGESTION: Can cause gastrointestinal irritation, nausea, vomiting, or diarrhea.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Possible reproductive hazard. Overexposure may cause kidney damage. May cause liver disorder (e.g., edema, proteinuria) and damage. May cause cardiovascular disorder and damage. May cause brain cell damage from deliberate and abusive inhalation of vapors. May affect the blood, causing anemia. Toluene and xylene have been found to be orotoxins, that is, exposure to these solvents may cause hearing loss. More severe effects can result when chemical exposure is combined with noise exposure, even if these exposures are below the recommended limits.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION

## SECTION 4 - FIRST AID MEASURES

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

FIRST AID - SKIN CONTACT: Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Aspiration of this material into the lungs may cause chemical pneumonitis, which may be fatal.

(Continued on Page 3)

## SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT: 70 F
(TAGLIABUE CLOSED CUP)

LOWER EXPLOSIVE LIMIT: 0.9 %
UPPER EXPLOSIVE LIMIT: 13.1 %

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL FOAM WATER FOG

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors can travel along the ground to a source of ignition and flashback. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures at or above the flashpoint.

SPECIAL FIREFIGHTING PROCEDURES: Containers can build up pressure if exposed to heat (fire). As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Use water with caution. Since this material may be lighter than water and insoluble, use of water may spread the fire.

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid runoff into storm sewers and ditches which lead to waterways. Absorb small spills with inert material and place in chemical waste container. For a large spill: dike area of spill and pump to salvage container. Collect remainder on inert material and place in chemical waste container. Wear organic vapor respirator. Remove all sparks, flames, and other sources of ignition from the area and allow any hot surfaces to cool. Use non-sparking tools only. Ventilate area thoroughly.

## SECTION 7 - HANDLING AND STORAGE

HANDLING: "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of. Wash thoroughly after handling. Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment.

STORAGE: Keep away from heat, sparks and flame. Keep container closed when not in use.

(Continued on Page 4)

## SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

RESPIRATORY PROTECTION: NIOSH/MSHA approved respirator should be worn to avoid inhalation. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product. Ventilation rates must be maintained to keep exposure below the TLV or PEL. Otherwise, an approved organic vapor respirator must be used. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

SKIN PROTECTION: Gloves should be worn to avoid prolonged skin contact. Chemically resistant gloves should be worn if contact is likely.

EYE PROTECTION: Wear safety glasses with side shields or goggles.

OTHER PROTECTIVE EQUIPMENT: Where splashing is possible, an impermeable apron and boots should be worn.

HYGIENIC PRACTICES: Wash hands before eating. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Avoid contact with eyes, skin, and clothing.

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| BOILING RANGE | : 226 - 285 F | VAPOR DENSITY | : Is heavier than air |
| ODOR | : Solvent odor | ODOR THRESHOLD | : N.D. |
| APPEARANCE | : Blue liquid | EVAPORATION RATE | : Is faster than Butyl Acetate |
| SOLUBILITY IN H2O | : None | | |
| FREEZE POINT | : N.D. | SPECIFIC GRAVITY | : 1.4248 |
| VAPOR PRESSURE | : N.D. | pH @ 0.0 % | : N.D. |
| PHYSICAL STATE | : N.D. | VISCOSITY | : N.D. |
| WEIGHT % SOLIDS | : 71.36 | | |

(See Section 16 for abbreviation legend)

## SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Hazardous polymerization will not occur.

INCOMPATIBILITY: Avoid contact with oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning may produce carbon dioxide and carbon monoxide. Products containing nitrocellulose produce oxides of nitrogen if burned.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

(Continued on Page 5)

## SECTION 11 - TOXICOLOGICAL PROPERTIES

No product or component toxicological information is available.

Toxic section 11B: No Information.

## SECTION 12 - ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: No Information.

## SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: This material is a RCRA hazardous waste due to ignitability. Some components may be listed wastes or on the land ban form. Comply with all applicable federal, state, and local regulations when disposing of this material. This material may be fuel blended. This material may be sent to a recycler for solvent recovery.

## SECTION 14 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Paint

DOT TECHNICAL NAME:

DOT HAZARD CLASS: 3 HAZARD SUBCLASS:

DOT UN/NA NUMBER: UN-1263 PACKING GROUP: II RESP. GUIDE PAGE: 127

## SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

CERCLA - SARA HAZARD CATEGORY:
This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD FIRE HAZARD

(Continued on Page 6)

## SECTION 15 - REGULATORY INFORMATION

SARA SECTION 313:
This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

| CHEMICAL NAME | CAS NUMBER | WT/WT % |
|---|---|---|
| Xylene | 1330-20-7 | 9.3 % |
| Toluene | 108-88-3 | 4.9 % |
| Ethyl benzene | 100-41-4 | 2.3 % |
| Cobalt compounds | | 0.1 % |

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

## SECTION 16 - OTHER INFORMATION

HMIS RATINGS - HEALTH: 1 FLAMMABILITY: 3 REACTIVITY: 0

PREVIOUS MSDS REVISION DATE: 09/29/99

VOLATILE ORGANIC COMPOUNDS (VOCS): 3.40 lbs/gal, 407 grams/ltr

LEGEND: N.A. - Not Applicable, N.E. - Not Established,
N.D. - Not Determined

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The information contained on this MSDS has been checked and should be accurate. However, it is the responsibility of the user to comply with all Federal, State, and Local laws and regulations.

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<END OF MSDS>

# HYDRAULIC OIL *AW*

MOORE FLO HYDRAULIC OIL AW is formulated for use in industrial and mobile equipment hydraulic systems. It exceeds the requirements of hydraulic equipment manufacturers such as Cincinnati Milacron P68, P69, P70; Denison HF-1, HF-2, HF-0, Vickers 35VQ25, Sperry Vickers I-286-S, and Ford M6C32.

## MOORE FLO FEATURES

. Contains a premium anti-wear additive.
. Includes a demulsifying additive to separate water rapidly.
. Combats rust corrosion and oxidation.
. Contains zinc-type anti-wear agents to help minimize wear in high-speed, high-pressure vane, gear and piston pumps.
. Remains stable even when exposed to moisture or extreme temperatures.
. Contains anti-foam agents for controlled release of entrained air.
. Compatible with common filter media.

## BENEFITS

. Prolongs hydraulic system life.
. Reduces maintenance costs.
. Available in five grades to meet requirements for most hydraulic systems.

| TYPICAL PROPERTIES | ISO GRADE | | |
|---|---|---|---|
| | 32 | 46 | 68 |
| Density, kg/m$^3$ @ 15°C | 865 | 868 | 870 |
| Kinematic Viscosity (D445) | | | |
| cSt @ 40°C | 33 | 46 | 70 |
| @ 100°C | 5.2 | 6.4 | 8.2 |
| Viscosity Index (D2270) | 95 | 95 | 95 |
| Flash Point (COC), °C | 190 | 200 | 214 |
| Pour Point, °C | -36 | -33 | -30 |
| Color (ASTM) | 2.5 | 3.0 | 3.5 |
| Vickers 35VQ25 | Pass | Pass | Pass |
| Denison HF-O | Pass | Pass | Pass |
| Rust Protection | | | |
| Distilled Water | Pass | Pass | Pass |
| Syn. Sea Water | Pass | Pass | Pass |
| Oxidation, (D943), hr | 2100+ | 2100+ | 2100+ |
| Demulsibility (D1401) | | | |
| oil/water/cuff (minutes) | | 40/37/3(20) | |
| Copper Corrosion (D130) | 1 | 1 | 1 |

# HOMAN AW HYDRAULIC OILS

## DESCRIPTION

Homan AW Hydraulic Oils contain the latest thermally stable zinc antiwear additive system. They are non-foaming and provide superior protection against rust and oxidation. Their temperature performance is excellent.

## BENEFITS

Homan AW Hydraul Oils will provide long-term, trouble-free service in high output hydraulic systems operating at high temperatures, pressures, and speeds.

## APPLICATIONS

Homan AW Hydraulic Oils may be used in general purpose lubricant applications where straight mineral oils and conventional rust and oxidation inhibited oils are recommended.

| Properties | Typical Values | | | | |
|---|---|---|---|---|---|
| **ISO GRADE** | **32** | **46** | **68** | **100** | **150** |
| API Gravity | 31.4 | 30.2 | 29.8 | 29.4 | 28.4 |
| Flash Point, °F | 403 | 420 | 450 | 490 | 478 |
| Viscosity, cSt @ 100° | 5.35 | 6.54 | 8.35 | 11.8 | 14.4 |
| Viscosity, SUS @ 210°F | 44.2 | 48.1 | 54.3 | 64.4 | 77.1 |
| Viscosity, cSt @ 40°C | 32.2 | 44.4 | 65.2 | 101 | 149 |
| Viscosity, SUS @ 100°F | 164 | 227 | 338 | 526 | 782 |
| Viscosity Index | 98 | 97 | 96 | 95 | 94 |
| Color, ASTM | 1.0 | 1.0 | 3.0 | 3.0 | 3.5 |
| Pour Point, °F | -25 | -30 | -15 | -10 | -5 |

Homan AW Hydraulic Oils exceed the following requirements:

Cincinnati Milacron Specifications: P-68, P-70, and P-69
Denison Requirement: HF-0
Vickers Requirements: I-286-S Data Sheet & M2950-S

spec132

# MOORE OIL COMPANY, INC.

4033 W. CUSTER AVENUE
MILWAUKEE, WI 53209-9247

## MATERIAL SAFETY DATA SHEET NUMBER 122

**IDENTITY: HOMAN AW32 HYDRAULIC**

## SECTION I

| | |
|---|---|
| MANUFACTURER NAME: | Homan Corporation |
| ADDRESS: | 3650 South Homan Avenue<br>Chicago, Illinois 60632 |
| TELEPHONE NUMBER: | (773) 523-0250 |
| EMERGENCY NUMBER: | Chemtrac 24 Hours (800) 424-9300 |
| DATE PREPARED: | JANUARY 7, 2001 |

## SECTION II-HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS: Not applicable for this product.

National Fire Protection Association (NFPA) - Hazard Identification

| Health | Flammability | Reactivity | Basis |
|---|---|---|---|
| 1 | 1 | 0 | Recommended Homan Corp. |

## SECTION III-PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: IBP Approximately 555 F

SPECIFIC GRAVITY (H2O-1): 0.87-0.88

VAPOR PRESSURE (mm Hg): Less than 0.1 mm @ 20 C

MELTING POINT: Pour Point approximately -36°C

VAPOR DENSITY (AIR-1): Greater than 5

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EVAPORATION RATE: (Butyl Acetate=1) Less than 0.01

SOLUBILITY IN WATER: Negligible; less than 0.1% @ 1 atmosphere and 25 C

APPEARANCE AND ODOR: Light yellow liquid nil to bland odor

## SECTION IV-FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 410° F Cleveland Open Cup

FLAMMABLE LIMITS: Estimated Values LEL: 0.7% UEL: 7.0%

EXTINGUISHING MEDIA: Foam water spray (fog), dry chemical carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Use water spray, dry chemical foam or carbon dioxide. Use water to keep fire-exposed containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Treat as a petroleum oil fire.

## SECTION V-REACTIVITY DATA

STABILITY: _____ Unstable ____X____ Stable
Conditions to Avoid:

INCOMPATIBILITY: Strong Oxidizing agents-liquid Chlorine, Concentrated oxygen, Sodium & Calcium Hypochlorites.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Combustion may yield fumes, smoke, oxides of sulfur & nigrogen carbon monoxide & HC1.

HAZARDOUS POLYMERIZATION: _____ May Occur __X___ Will Not Occur
Conditions to Avoid:

## SECTION VI-HEALTH HAZARD DATA

HEALTH HAZARDS (ACUTE OR CHRONIC): Minimal Toxicity.

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ROUTES OF ENTRY/SIGNS AND SYMPTOMS:

EYE CONTACT: May cause slight irritation but does not cause permanent damage.

SKIN CONTACT: Contact with hot material may cause thermal burns.

INHALATION: Exposure to high oil mist concentrations may lead to oil pneumonia.

INGESTION: May cuase nausea and vomiting. May act as a laxative. May irritate gastrointestinal tract. Does not cause permanent damage.

CARCINOGENICITY: Non-carcinogenic
WTP?:
IARC MONOGRAPHS?:
OSHA REGULATED?:

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known

## SECTION VII-PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TAKEN FOR RELEASE OR SPILL OF MATERIAL: Contain spill, absorb, pump or wipe up. Remove remainder with solvent or detergent and water. Keep out of sewers and waterways.

WASTE DISPOSAL METHOD: May be given to an approved waste hauler. Observe local, state, and federal regulations for disposal of petroleum lubricant.

PRECAUTIONS IN HANDLING AND STORING: Do not store near heat, sparks, flame or strong oxidants.

OTHER PRECAUTIONS: If misting occurs, control of exposures to 5 mg/m3 or less is recommended.

## SECTION VIII-CONTROL MEASURES

RESPIRATORY PROTECTION: Use supplied-air protection in confined or enclosed spaces, if needed.

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VENTILATION:

| | |
|---|---|
| LOCAL EXHAUST: | Use to capture vapor/mist if necessary. |
| SPECIAL: | No smoking or open lights. |
| MECHANICAL: | Use in confined areas. |
| OTHER: | Use explosion-proof machinery. |

PROTECTIVE GLOVES: Use chemical-resistant gloves.

EYE PROTECTION: Use splash goggles or face shield.

PROTECTIVE CLOTHING OR EQUIPMENT: Use chemical-resistant apron or impervious clothing.

WORK/HYGIENIC PRACTICES: Minimize breathing mists. Practice good personal hygiene.