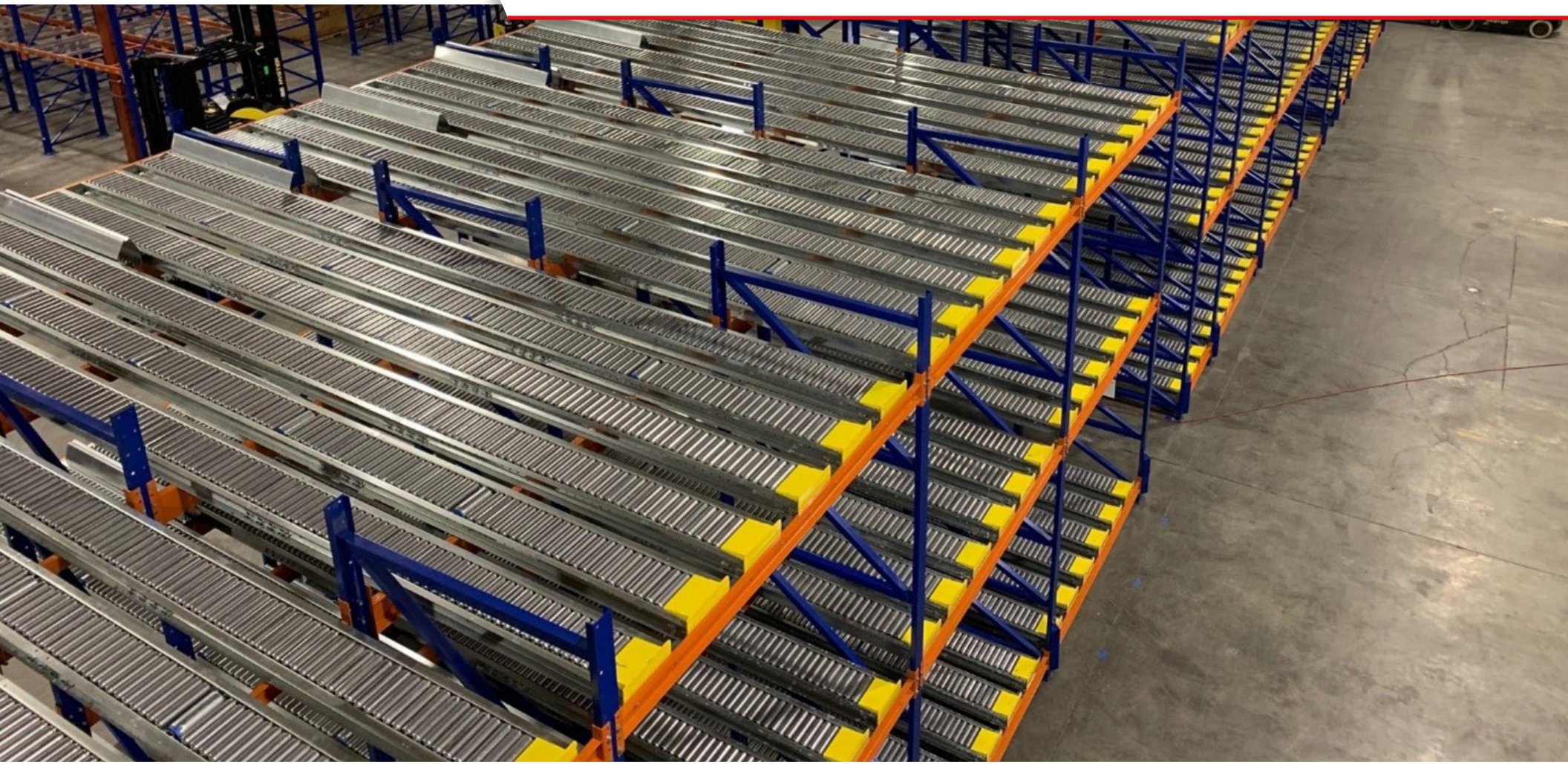
MALLARD MANUFACTURING
YOUR GRAVITY FLOW SPECIALISTS

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE



Pallet Flow Racking & Operation

Pallet flow rack is a dynamic rack system designed with SKU-dedicated pallet storage lanes. The wheeled or roller rails set into the lanes are pitched to flow pallets from the load side to the unload side of the system. Always use caution around the system due to active pallet movement. Follow the instructions in this guide for safe operation and maintenance of your system.

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

MALLARD MANUFACTURING
YOUR GRAVITY FLOW SPECIALISTS

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

SAFETY RULE #1

Workers must follow federal, state, and local safety codes and use fall protection equipment at all times when working at elevated heights. Appropriate safety equipment should also be worn, such as goggles, hard hats, gloves, etc.

LOADING PALLETS

- Square the forklift facing the pallet flow lane.
- Lift the pallet 3 to 4 inches above the rails.
- Do not raise the pallet too high as to strike a load above.
- Place the pallet centered in the lane and slowly lower and tilt it down onto the rails keeping it squared with the front of the beam.
- Tilt the pallet to release it from the forklift.
- After securely placing the pallet on the flow rails, slowly back out of the lane.
- Pallets should easily advance on their own.
- Follow this process to load subsequent pallets.

Square the forklift with lane & raise the pallet 3" above the rails

Place the pallet centered in the lane & tilt onto the rails

After placing the pallet, slowly back out of the lane

Follow the same process to load the remaining pallet positions

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

UNLOADING PALLETS

- To extract a pallet from the pallet flow lane, square the forklift with the pick-face opening.
- Load the pallet onto the forks and raise it 3 to 4 inches above the rails to clear the front beam.
- Slowly back out of the system.
- Note: the driver controls the flow of the rear pallets by slowly backing away from the system.
- If the rear pallets do not advance on their own, the operator can gently push back the front pallet a few inches to bump the rear pallets and begin the flow.
- If the pallets do not resume flow, reload the pallet and do not unload it until the hang-up issue is resolved. See The SAFE Way to Handle a Pallet Hang-Up section of this guide for instruction.

Square the forklift with the pick-face opening and lift the pallet 3+ inches above the lane

Slowly back out of the lane controlling the speed/ advancement of rear pallets in the lane

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

PALLET FLOW RACK ACCESSORIES

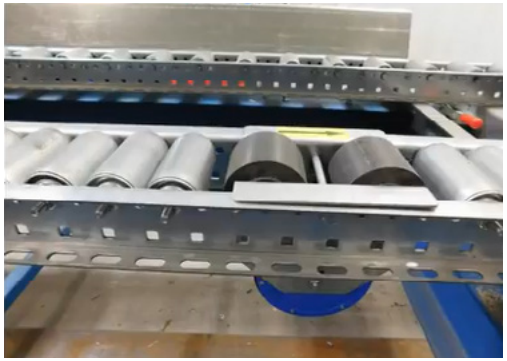
Pallet flow lanes can be equipped with accessories to ensure safe, durable operation. Accessories include speed controllers, entry guides, pallet separators, and ramp stops.

Speed Controllers - depending on the pallet style, load weight, and pitch, the system may be equipped with speed controllers. These devices will slow the pallet as it flows over. They are typically located in several spots in the lane, particularly for deep-lane systems.

Entry Guides - custom-fit guides on the left and right side of the lane opening help forklift operators gauge the pallet position and ensure the pallet is loaded centered in the lane.

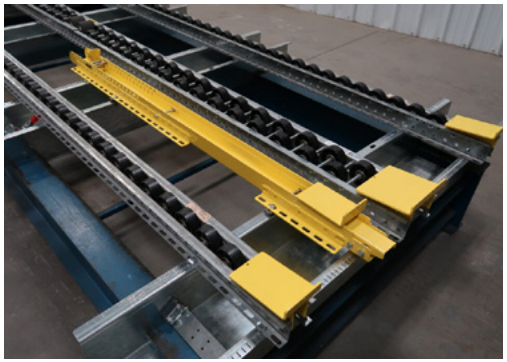
Pallet Separators - devices that hold rear pallets from butting up and pushing against the front pallet. Pallet separators are used in case-pick applications, deep-lane configurations, and systems where heavy pallet loads can cause a safety concern, i.e., tall systems where forklift mast capacity is reduced.

Ramp Stops - heavy-gauge steel ramp stops at the end of the pallet flow lane help bring the pallet to a safe stop and contain it in the lane until removed by personnel or forklift. Ramp stops are bolt-on and can be replaced if damaged without replacing the full rails

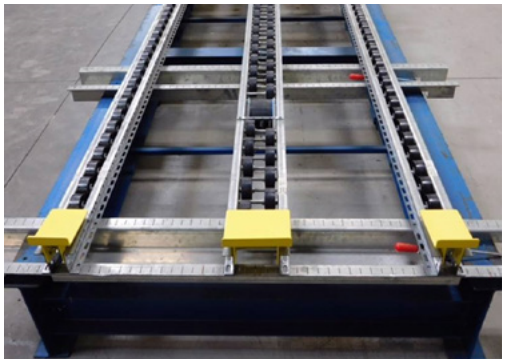


Drop-In Speed Controller

Entry Guides



Case Pick Separator



Ramp Stops

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

MALLARD MANUFACTURING
YOUR GRAVITY FLOW SPECIALISTS

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

THE SAFE WAY TO HANDLE A PALLET HANG-UP

Working in and around pallet flow systems should be limited to properly trained personnel. If a pallet stops or fails to restart after sitting, it may be due to weak or broken pallets, debris, settling, and temperature changes. Follow these steps to restart the flow.

SAFETY RULE #2

Never attempt to climb on or enter the system. Follow the instructions for the SAFE Way to Handle a Pallet Hang-Up.

Pallet Hang-Up Step 1 - Charge the System

1. If a pallet is hung up, load another pallet into the lane to see if it dislodges the stuck pallet.
2. If the pallet does not begin to flow, continue to load pallets into the lane until it is full or pallet releases.

Pallet Hang Up Step 2 - The Plugging Method

1. Lift the front pallet 1" above the rollers.
2. Firmly push or bump the rear pallets back into the lane, about 4."
3. Back out, extracting the front pallet and gently "plugging" the rear pallets forward.

For more information and video instruction, check out these online resources. Just copy and paste or type the following into the Search Bar on malllardmfg.com.

Tips for Optimal Pallet Flow Maintenance & Performance

Tips for Clearing a Pallet Hang Up - Plugging Method

Charging the System

Plugging the System

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

Pallet Hang-Up Step 3 - Load Additional Pallets

1. If unsuccessful, have the forklift operator load pallets from the DISCHARGE end until the hung pallet can be pushed back.
2. Have a worker alert the forklift operator once the incoming pallet makes contact with the stuck pallet.

Pallet Hang-Up Step 4 - Empty the Lane

SAFETY RULE #3

Mark off the area (both the entry and exit aisles) to alert operators of the hazard and personnel working on the system.

1. If unsuccessful, remove the last pallet loaded in the lane.
2. Remove all pallets from the adjacent lane.
3. Fill the empty lane with empty pallets to provide a platform safe for walking over the rollers. NOTE: the pallets must fit together to prevent movement.
4. Enter the empty lane from the CHARGE side of the system following facility safety requirements (tie-offs, etc.).
5. Diagnose the reason for pallet hang up (debris, bad pallet, etc.).
6. Manually free the pallet, if possible.

If you have any additional questions regarding pallet flow maintenance or system design, call our experts.

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

PALLET FLOW RACK MAINTENANCE

Mallard pallet flow systems are engineered to perform and built to last in the toughest of warehouse environments. But even the "hulk" of gravity flow storage requires routine maintenance and safety checks to ensure optimal system performance and worker safety. You should regularly inspect your pallet flow system for structural forklift damage, pallet or product damage, and system misuse. We've developed the following maintenance checklist to help guide you through the process.

Step 1: Develop a Maintenance Log & Schedule

- Conduct a visual inspection of the system within a few days of installation
- Check for proper connections, debris and extra hardware on the floor
- System review at one month and then quarterly after installation
- Use review criteria provided below and pay close attention to prior repair work

Step 2: Conduct Full System Visual Inspection

- Check for forklift damage to rack and/or support rails
- General cleaning - Pallet flow wheeled rails and rollers are pre-lubricated and should not require additional lubrication unless exposed to excessive moisture, salt (or other corrosives), dust.
  - » Use WD40 to remove moisture and dirt within the component
  - » A medium-weight oil can provide lubrication
- Test Pallet Separators -Pallet separators require minimal maintenance or adjustment when properly used. Follow these steps to test the separator function:
  - » Unload the lane.
  - » Manually press the separator to observe the stopper raising and lowering asynchronously with the lever at the DISCHARGE aisle. In lanes with DP-600 Dual Pallet Separators, ensure that the rear separator lifts and lowers as expected.
  - » The stopper should drop below the wheel or roller level.
  - » Test a pallet in the lane to observe proper function.
- Scan impact zones for damaged or missing rollers or wheels. To replace a damaged wheel or roller follow these steps:
  - » Loosen the bolt/shaft and lock nut with a wrench or socket.
  - » Slide bolt out to remove the damaged wheel and replace it.
  - » Tighten connections
- Test Speed Controllers - It's important to maintain safe flow speed and for pallets to track evenly down the center of the lane. Look for these signs that your speed controllers may be malfunctioning:
  - » Pallet surge - pallets may not be making contact with the speed controllers, or the speed controller may be damaged.
  - » Pallet slowing abruptly - the speed controller could be freezing up.
  - » Hearing loud or unusual noise - speed controllers should be relatively quiet. A grinding sound or noise may indicate damage vs. pallet irregularities, requiring attention.
  - » Make sure all springs are intact for controllers with springs

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

Step 3: Implement a Manual Inspection

- Test speed controllers - turn to test resistance
- Check fastener connections
  - » Beam to uprights
  - » Row spacers to uprights
  - » Floor anchors
  - » Flow rails to beams or mounting tabs
  - » Entry guides secured

Step 4: Create a Pallet Review Program

- Check for the following pallet conditions
  - » Missing/splintered boards
  - » Protruding nails
  - » Even flow surface and board thickness for repaired pallets
- If plastic, check that all pods are intact and runners - no plastic should be hanging below the pallet flow rollers
- Ensure that pallets comply with the design parameters of the original system. i.e., same pallet/style and weight range

Step 5: Document All System Inspections and Repairs

Remember - Good Pallets = Good Pallet Flow! We say this with every project. New or like-new GMA wood pallets, similar to CHEP and PECO, are manufactured according to industry standards and designed for optimal load stability and consistent, reliable flow.

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

PALLET FLOW RACK FAQS

FAQ 1 - Help! My pallets are hanging up.

There are two things to look at here.

1. Is this a consistent problem throughout the system?
2. Are multiple pallets getting hung up in the same area?

Random hang-ups throughout the pallet flow system are typically caused by the pallets vs. the system. Your pallets may be a different style than the system is constructed to handle, or they may be in poor condition with broken, warped, or missing boards. Additionally, the pallet load weight may be lower than the system was designed to carry.

For pallet hang-ups in the same location, you may have debris blocking the free flow of the wheels or rollers. You may also have damage to your speed controllers or broken wheels or rollers. Again, also check the pallet load weight to ensure it is not too low.

Solution:
Clear the pallet using the procedures outlined above for safely clearing a pallet obstruction. Ensure that your operators understand proper loading procedures and that pallets are loaded centered in the lane. Entry guides are available to help with this if needed.

FAQ 2 - Pallets are Advancing Too Quickly

This is another serious safety issue that should immediately be addressed. A critical look at how you are using your system will help you narrow in on the cause.

1. Does the pallet load weight exceed the maximum weight for the system design? Pallet load weight that exceeds the maximum pallet weight will damage speed controllers and possibly the wheels and rollers.
2. What is the condition of the pallets? Poor condition pallets may not make consistent contact with the wheels/rollers and speed controllers.
3. Are the pallets different than the system was designed to handle? Changing materials, i.e., wood to plastic, can cause surfing issues—also, a change in the bottom configuration of the pallet could cause your pallet to skim over speed controllers.
4. Is it likely that your speed controllers came into contact with water, oil, or a substance that would damage their ability to function freely?
5. Everything checks out, but the problem continues? The speed controller may have a defective part.

Solution:
Begin with the easiest and most likely culprit. Check your pallet conditions and ensure that the pallet specs are in line with the system design expectations.

- Confirm pallet weight, style, and condition.
- Clean speed controllers if necessary.
- Replace speed controllers if damaged and not due to system misuse.

PALLET FLOW RACK OPERATION & MAINTENANCE GUIDE

FAQ 3 - The Pallet Separator isn't Engaging

Pallet separators work automatically. If yours is not engaging, it can cause the pallets to surge to the end of the lane, causing a safety concern. The issue is likely due to one of these situations:

1. The pallet load weight is not within the proper load capacity of the separator functionality.
2. Pallets do not conform to the design specs of the system, i.e., too small, too large.
3. Poorly conditioned pallets with broken or missing boards may be preventing the separator from stopping the advancing pallet.
4. The separator may have a broken element.

Solution:

Remove the front pallet and test the separator using the specified pallet and load weight. Ensure the pallet is in good condition. If the separator does not engage, it may need replacement. Contact Mallard for proper diagnosis and replacement products.

FAQ 4 - My Inventory and/or Pallet Specs Have Changed

Pallet flow systems are designed to the specific inventory and pallet specs of the user. If the load weight or dimensions of your inventory have changed, it can significantly affect the safety and reliability of the flow system. Similarly, pallet size and/or material changes will often produce different system results.

1. Load weight changes - increased weight can damage speed controllers causing pallets to flow too quickly. Decreased weight can lead to hang-ups.
2. Inventory size changes - smaller or larger inventory can cause point loading and unsafe operation.
3. Pallet size or style change - pallet to rail connectivity is critical in pallet flow. A change in the way the bottom of the pallet touches the rollers/wheels, speed controllers, or separators can cause a safety concern.
4. Pallet material change - a change from wood to plastic or metal is significant in gravity flow rack. Wheels and rollers are uniquely chosen to compliment the pallet material. Plastic, for example, can surf over polycarbonate wheels or rollers not equipped with specific grip rollers.
5. Pallet stacking - going from a single height to double or triple is a significant change in the operation of your flow lane. It can endanger workers if the system is improperly equipped to handle the load height.

Solution:

Call Mallard and request a pallet flow test using the existing lane design and samples of the new inventory or pallets. The Mallard team will determine if the changes are significant enough to require modification to the system design to ensure the safety of your workers and the effectiveness of the gravity flow system.

If you have any additional operational or maintenance questions regarding your pallet flow system, please contact the Mallard team.

101 Mallard Road, Sterling, IL.61081
Phone: 800-243-6694 Fax: 815-625-9498 Email: info@mallardmfg.com www.mallardmfg.com