

FIRST® Robotics Competition

Shipping Crate Construction

Your robot crate is an important component for your team to consider. Your crate should be sturdy enough to withstand the rigors of shipping and being moved multiple times by multiple carriers. Be sure to follow the instructions, specifically the size and weight parameters. Failure to do so may result in damage, delay and/or heartache, something no one wants to experience!

FIRST allows each team attending a Championship event to ship only one (1) crate containing their robot. If your team has a need to ship more than one (1) crate, your team is responsible for all the shipping and drayage costs for the additional crates.

Our friends at FedEx generously sponsor the cost of shipping the robot crate for every team who attends FIRST Championship. **Be sure to say thank you to FedEx!**

Sizing Information

Your Robot Crate needs to follow these restrictions:

- **Not be taller than 60" high.** Crates that are taller than 60" run the risk of being turned on their side during shipping.
- **Have a footprint no greater than 48" x 48".** The footprint is the measurements of the bottom or base of the crate.
- **Weigh less than 400 pounds when loaded.** This limit includes the weight of the crate itself.
 - Additionally, crates shipping via Air transportation must have a dimensional weight of less than 995 lbs.
 - Dimensional weight is calculated by taking the dimensions of the crate (in inches) and dividing by 139. ($L \times W \times H / 139$).
 - A crate that is 48"x48"x60" has a dimensional weight of 995lbs.

Construction Information

All Crates should be built so that they:

- **Are forklift accessible.** This can be done either by:
 - Built using a pallet as a base; or by
 - "Sitting" on 2 pieces of 4x4 Lumber, spaced at least 28" apart.
- **Sit flat on a floor and are balanced to avoid tipping.**
- **Can withstand stacking during transportation and storage, or be labeled as "non-stackable".**
- **Must not contain holes or have unprotected areas that access the interior** unless required by shipping regulations. A crate should fully contain and safely protect the robot from debris or damage.

Additional recommendations – US-Based Teams

- **Use 3/8" or 1/2" plywood OR 3/8" or 1/2" Oriented Strand Board (OSB).**
 - It is not recommended to use Medium Density Fiberboard (MDF). This material makes crates too heavy and MDF can be dangerous to use without specific safety precautions.
 - It is not recommended to use Particleboard. This material collects moisture that adds weight and makes the structure weak over time.



Additional recommendations – International Teams

- The U.S. Dept. of Agriculture has adopted international guidelines to decrease the potential for the introduction of certain plant pests that may accompany wood materials arriving from other countries. The crate construction and pallet guidelines stipulate that wood packing materials be either heat treated or fumigated with methyl bromide in accordance with applicable rules. These wood materials must have approved international mark certifying treatment.
 - Crates must be built of materials that are compliant with international shipping requirements, i.e., heat-treated and ISPM 15 compliant (resistant to fire, termites, insects, and any contaminants in general). Check out [this site](#) for additional information
 - Use only plywood or other exempted wood materials.
 - Make sure you use properly treated and labeled wood for the 4" x 4"s under your crate used for facilitating forklift use.
 - Be sure the wood used for both your pallet and your crate is marked with the approved international mark.

Below are samples of stamps on wooden pallets used in international shipping that indicate the ISPM 15 rules compliance.



Crate Contents Information

Team Crates should only contain the competition robot.

- **Do not ship any tools, first aid kits, t-shirts or other items in your robot crate.**
- **For teams shipping across international borders**, shipping these additional items causes clearance delays and other problems. Do not run the risk of your robot crate not arriving to your event in time by adding items that do not belong.

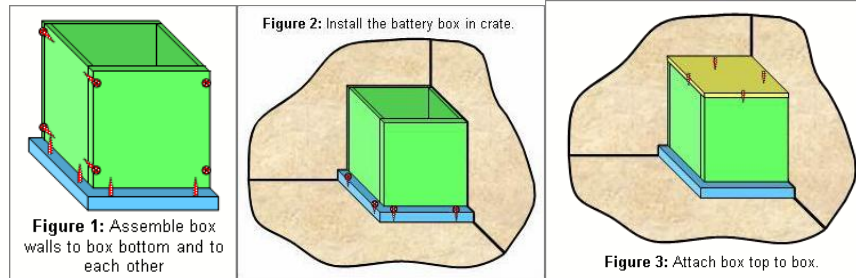
Attach relevant signage and proper labeling to your crate.

- **Remove signage and labels for previous seasons** or are not relevant for the event being shipped to.
- **Attach the proper labeling to your crate.**
 - If shipment includes the battery that was included in the Kit of Parts: [Non-Spillable Battery Sign](#)
 - For any other battery shipped, the team is responsible for getting their own proper signage for the crate according to the IATA standards.
- **Attach the proper shipping documentation to your crate.**
 - Teams approved for shipping to Championship will receive signage and shipping documents. Attach additional copies of shipping documents to your robot.
 - For teams shipping across international borders, include additional copies of the Commercial Invoice and other required documents.

Additional guidelines for shipping batteries.

- It is not mandatory that you ship your batteries with the robot. However, if you choose to ship the 12VDC batteries in the crate with the robot, federal regulations require teams to follow the instructions below:
 - Do not leave any batteries mounted on the robot (connected or not).
 - Do not ship Lithium-Ion Batteries in your crate. For more information, see this info about [Lithium-Ion Batteries](#).
 - Place batteries inside their original box or carton packaging.

- Use Styrofoam covering with protective caps to cover the battery terminals.
- In the description section of your shipping paperwork, write “NON-SPILLABLE BATTERY INSIDE”.
- Ensure that your batteries won’t roll around your crate during transport. You can use an “inner battery box” as shown below or take similar precautions to secure them.



Other Important Information

Decorate your crate to be identifiable and reusable.

- Have “TEAM # XXXX” (insert your team number) painted or stenciled in letters at least 6” high on at least one side of the crate. Shipping labels and paperwork often get lost in shipping. Painting your team number clearly on the crate will help to ensure that it arrives in your team’s Pit Area on time.
- Have a method of attaching and displaying shipping documents on the outside and on each side.
 - Affix sheets of polycarbonate, plastic, or a sheet protector securely to the outside of your crate for a place to put the shipping documents before shipment. Failure to do this may result in lost or delayed robots, due to missing or ripped shipping documents.
 - We recommend purchasing a Job Ticket Holder ([one example can be found here.](#))

Borrowing Crates for *FIRST* Championship

- Teams are allowed to borrow a crate from other teams to ship their robot to the *FIRST* Championship, however the following items must be followed:
 - Cover original team number
 - Affix or apply your team number
 - Cover or remove any other stickers, labeling, or documentation
 - Ensure the sturdiness of the crate you are borrowing.

Questions?

Email frclogistics@firstinspires.org

Contact Customer Service at (603) 666-3906 or (800) 871-8326