

# the **CrossFit** JOURNAL ARTICLES

## **Outfit Your Box** An Equipment Procurement Guide

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It's no accident that the *CrossFit Journal's* inaugural issue in 2002 was titled “[The Garage Gym](#)” and was all about creating a more functional—and affordable—alternative to “big-box” gyms everywhere. That issue includes broad explanations of the concept and its ramifications as well as specific nuts-and-bolts advice on what to buy and why. Here I want to build on that tradition by providing an updated guide to outfitting a box, whether it's a personal garage or basement gym, a portable equipment cache for outdoor workouts, a 5,000-square-foot CrossFit affiliate, or anything in between. The training potential that comes with wider adoption of the garage-gym concept is enormous.

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## Outfit Your Box (continued...)

In June 2006, I wrote a article in the *CrossFit Journal* on “[Strategic Shopping](#)” that was more about circumnavigating costly purchases than about locating inexpensive gear. In this article, I’ll revisit a few points from that article and talk about a bunch of new items. As always, I concentrate on value. (If money is no issue for you, then you can stop reading here. Go forth and purchase wantonly.)

What should I buy? How do I go about it? Why should I buy those particular items? How do various models and brands compare? When do I need to purchase my own stuff? These are more great questions that will have different answers according to your personal preference, timeline, experience, and budget.

### What you can afford: Visualizing the box

The first step is to identify a realistic budget. And, if you will be outfitting an affiliate or training groups, you’ll also need to visualize your anticipated class size six months from now. Don’t just come up with a number, though; actually try to imagine yourself training groups and what that will look like. What do you need, how much, why, how will the space and workouts be organized, what can be shared, and at what point will you need more based on increased numbers? For instance, if you run any of CrossFit’s benchmark workouts with a group of ten, determine how many of each equipment item you’d need to do that properly. Then determine whether you can afford that much and where you can compromise on equipment without compromising the experience.

Think also about which items are must-haves, what you’re willing to “make do” with, whether you’ll have time and money later to revisit the shopping and purchasing process to upgrade or add to your inventory, and whether you’re open to used or homemade equipment and how much time, expertise, and patience you have for custom fabrication or do-it-yourself projects.

A key point is that there isn’t a cookie-cutter approach that will work for everyone. The gear recommendations you’ll find in this article and elsewhere will make a lot more sense if you go in armed with these visualizations and understandings of your needs.

### What you need: Priority hierarchies

I think of the world of CrossFit equipment as a set of concentric circles, with the innermost circle consisting of the most necessary and useful items, and each larger

ring adding the next set of priorities.

The way I break it down, the core of every garage gym or affiliate contains the following staple items:

- Pull-up bars or stations
- Adjustable squat stands
- Men’s and women’s Olympic barbells
- Bar collars
- Rubber bumper plates
- Small metal plates
- Rings
- Medicine balls
- Dumbbells
- Small metal “change” plates
- PVC pipe or wooden dowels

Working our way outward, my second ring of essentials comprises the following items:

- Glute-ham developers
- Light training barbells (10, 15, 22, or 25 pounds)
- Concept2 rowers
- Plyo boxes
- Flat benches
- Kettlebells
- Jump ropes
- Parallettes
- Climbing rope
- Rubber flooring
- Rubber stretch bands for assisting bodyweight exercises

My third rung contains “premium” items. These are things that you can get by without for a long time, but, when you have enough basic equipment to comfortably support a wide range of group workouts and when your budget allows, you might consider seeking out some of these items:

- Power cages or half racks
- Platforms
- Punching bags
- Parallel bars
- Stall bars
- Bikes (stationary or [not](#))

As I said earlier, this hierarchy is fluid and might change a bit according to your needs and budget. Different trainers and gym owners might order their lists a bit differently. And, of course, there are always more things you could add to the list.

## Outfit Your Box (continued...)

A smart way to think about it is to concentrate on the items that offer the maximum returns—that is, the tools that produce the greatest fitness benefit per item (our version of the most bang for your buck), that provide the greatest benefit to the greatest number of people, or that serve a unique purpose that can't be otherwise duplicated or approximated.

For example, think about everything that you can do with a barbell set (bar, bumper plates, change plates, and collars). Here's some of what comes to mind: power and squat clean, power and squat snatch, deadlift, Romanian deadlift, sumo deadlift high pull, thruster, back squat, front squat, overhead squat, press, push press, bench press, Sots press, push jerk, split jerk, rack jerk, good morning, bent-over row, Turkish get-up and the “odd lifts,” and so on. So, a barbell set may not be cheap, but it allows a whole lot of fundamentally important, varied, functional training for a lot of people.

If you want to go a bit nuts thinking about return on investment, you could even go the lengths of calculating the cost of per exercise for each piece of equipment. For the barbell set, we've listed 22 different exercises above, so if you divide the cost of the set (\$410) by that number, you get \$18.63. That's pretty good. In comparison, a glute-ham developer yields more like \$106.25 per exercise (four GHD exercises—back extension, hip extension, glute-ham sit-up, and glute-ham raise—at a cost of \$425).

### How much you need: Size and population

For some, this breakdown won't help much. Another way to think about is in terms of the number of trainees (or potential trainees) that need to be served. I use a simple rule of three. Multiply the number of equipment items by three to get a rough estimate of how many people you can train (of course, your programming competence and creativity is a huge factor in this). For example, a decent starting barbell count for a small affiliate is six (four men's 20-kg bars and two women's 15-kg ones). According to the rule of three, this will accommodate 18 people.

Or, you might just keep it simple and think in terms of whether you are outfitting a small, medium, or large facility. In my reckoning, small is up to 1500 square feet, medium is 1500 to 3500, and large is greater than 3500 square feet. Of course, the numbers of trainees in the gym both through the course of a day and at any

one time—and how those numbers fit with the square footage numbers—are just as relevant.

At the Garage Gym Store, we've set up packages based on affiliate size, to keep things simple. Whether or not you might buy any of these packages, these equipment lists can help guide your thinking about what items you need as well—just increase or decrease quantities according to comfort, usage numbers, and budget. We have three different levels of [CrossFit affiliate packages](#), for various size gyms (155 square feet or less, 1500-3500 square feet, and over 3500 square feet), plus three different [garage gym packages](#).

The affiliate packages contain various quantities of the following kinds of items:

- Standard (“men’s”) barbells
- Women’s barbells
- Lighter training barbells
- Bumper plates
- Smaller metal weight plates
- Weight clamps
- Medicine balls
- Rings
- Glute-ham developers
- Squat stands
- Jump ropes
- Plyo boxes and boosters
- Concept 2 indoor rowers
- Climbing ropes
- Dumbbells

### When you need to expand: Growing up

At what point do you need to purchase more equipment? The best answer to that is, “When you can’t afford not to.” Do you find that clients are constantly waiting on bars during WODs? Are there workouts and training that you can’t do because you don’t have a GHD? Do you run out of medicine balls when you do med ball warm-ups or try to run a group through “Karen”? Buy more. Why? Clearly you have the demand (more people than equipment).

As a gym owner, it is your responsibility to see to it that neither the stimulus nor the training experience is adversely affected by inadequate gear. At the point when you know you could provide a better service and create better athletes if you had more or better equipment, do what it takes. Especially if taking that next step is as simple as adding some additional pieces of gear.



## Outfit Your Box (continued...)

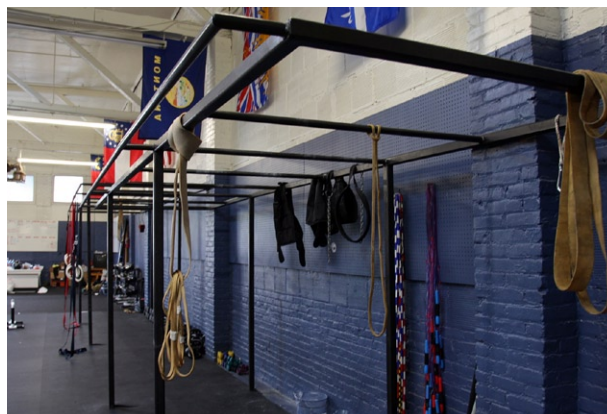
### Which items you want: Particulars

#### Pull-up bars

Unless you're in a personal garage, you'll likely need a pull-up station that accommodates multiple users at once and not the typical chin/dip station that will fit only one person. Unfortunately, a pull-up station like this isn't mass-produced, yet. We've identified a manufacturer who can build to suit, but the shipping costs are likely to divert your interest. Local steel fabricators are best suited to assist you here. Above-right is a photo of CrossFit San Diego's structure, although multiple affiliates have since improved upon our design (see, for example, details about CrossFit Ann Arbor's version in Doug Chapman's "Mobility in Design: A Portable Pull-Up Structure" in [CFJ 67](#) [March 2008]).

Wall-mounted pull-up bars work great, but a few things must be present: solid concrete walls, strong wood studs, and a comfort with additions to your walls. Additionally, even a seven-foot length of bar takes up a large "footprint" along the wall (though it has the converse advantage of not having supports come up from the floor). Standard, mass-produced wall-mounted pull-up bars typically don't accommodate the kipping pull-up (although custom ones that will do so can certainly be fabricated, either locally or by select equipment manufacturers).

If you are in a garage, you could just purchase a doorway pull-up or chin/dip station or Studbar or use a power cage, if you have one. A doorway pull-up bar can also be hung between exposed rafters (use caution here if you do). At 250 pounds, this is my preference for my personal garage gym. The chin/dip combo station works well with strict movement, but not with dynamics of the kipping pull-up, and it takes up considerable floor space. If you can tolerate it, weigh it down (sandbags, weights, etc.) and see if that will support kipping (especially if you or your clients are relatively light). It helps, but there's no guarantee it'll remain perfectly static. A full or half cage works but not everyone welcomes the bulk and it doesn't help allow multiple simultaneous users.



(top-to-bottom): Locally manufactured pull-up bar at CrossFit San Diego; Custom pull-up bar at CrossFit Eastside; Locally manufactured wall-mounted pull-up bar at CrossFit Eastside

## Outfit Your Box (continued...)

### Barbells

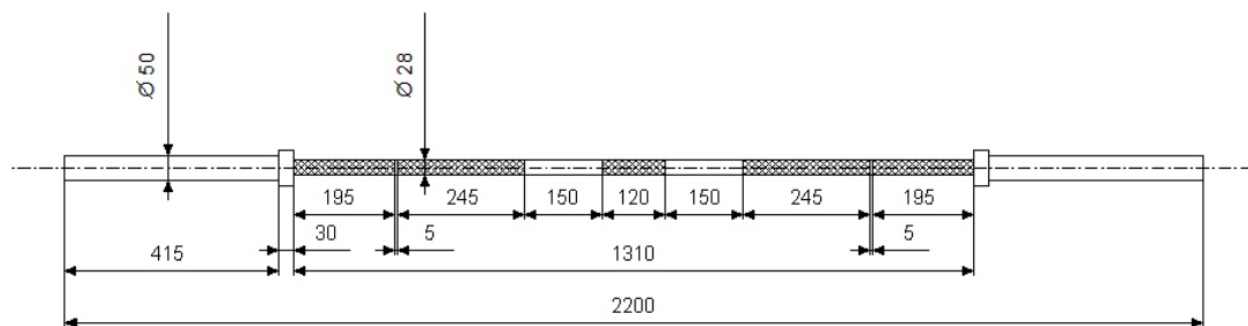
Barbells may be the equipment purchases people are most finicky about. There are a variety of features, variations, manufacturing specs, materials, prices, and other factors to consider. There is much to say about barbells (including the nitty-gritty details covered in the article “Where Barbells Come From” in [CFJ 60](#) [August 2007]), but we’ll stick with the basics here.

A men’s bar in the Olympic lifting community is one that meets International Weightlifting Federation specs (figure 1). Some of the basic identifiers are a shaft diameter of 28 mm, a weight of 20 kg, and an overall length of 2200 mm. A men’s barbell in the powerlifting world is the same weight and length but

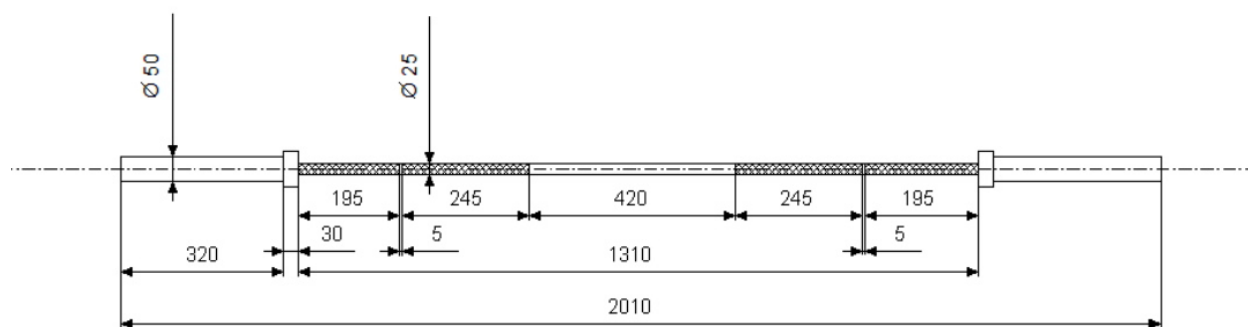
has a shaft diameter “not to exceed 29mm or be less than 28mm,” according to the Technical Rules Book of the International Powerlifting Federation, with 29 mm being the norm (figure 3).

A less well-known but also important type of barbell is the women’s bar. IWF specs dictate that this bar be 25 mm in diameter (figure 2), which is better suited to smaller hands. It’s also lighter (15 kg) and shorter (2010 mm).

Training barbells are simply lighter bars (anywhere from 10 to 22 pounds). They allow any segment of the population to learn proper mechanics and practice barbell movements with lighter loads. They’re a great transition between PVC or dowels and fullsize barbells.



Men's bar - Figure 1

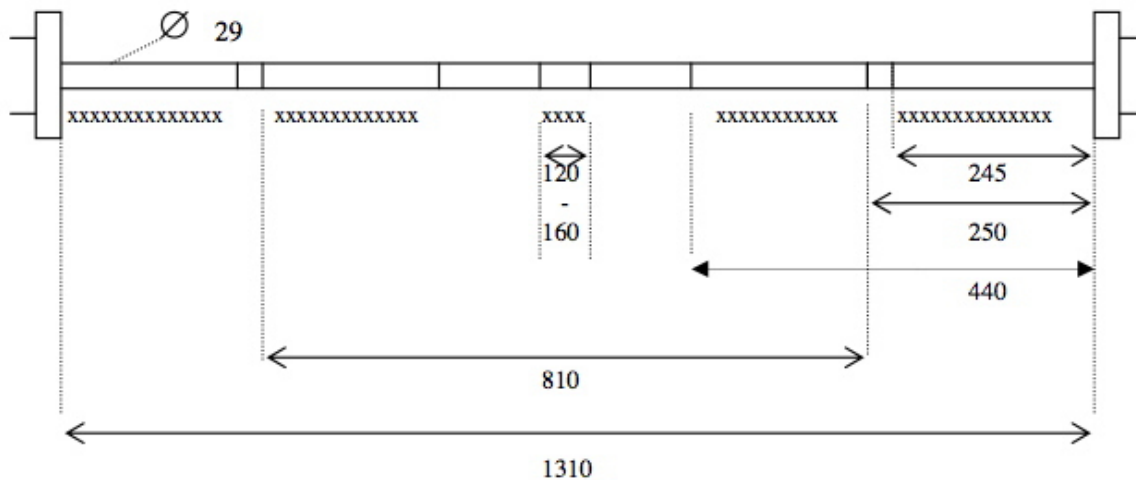


Women's bar - Figure 2

## Outfit Your Box (continued...)

- (a) The bar shall be straight and well knurled and grooved and shall conform to the following Dimensions:
1. Total overall length not to exceed 2.2 m.
  2. Distance between the collar faces is not to exceed 1.32 m or be less than 1.31 m.
  3. Diameter of the bar is not to exceed 29 mm or be less than 28 mm.
  4. Weight of the bar and collars are to be 25 kg.
  5. Diameter of the sleeve not to exceed 52 mm or be less than 50 mm.
  6. There shall be a diameter machined marking on the bar taped so as to measure 81 cm between marking or tape.

### IPF recognized powerlifting bar Guideline of knurling distances



Measurements in mm (knurling distances inside the collar sleeves)

Figure 3

|                              | Insert | Texture | US/Metric | Max Load      | "Bounce" | Price                    |
|------------------------------|--------|---------|-----------|---------------|----------|--------------------------|
| <b>Hi Temp/<br/>Powermax</b> | Steel  | Rough   | lb / kg   | 495lb / 220kg | High     | \$1.45 /lb               |
| <b>Apollo</b>                | Steel  | Smooth  | kg Only   | 720lb / 320kg | Low      | \$1.20 /lb               |
| <b>G2S</b>                   | Steel  | Smooth  | lb / kg   | 720lb / 320kg | Low      | \$1.20 /lb               |
| <b>Kraiburg/<br/>York</b>    | Brass  | Smooth  | lb / kg   | 495lb / 220kg | Moderate | \$1.40 /lb<br>\$2.40 /lb |
| <b>BFL</b>                   | Brass  | Smooth  | lb Only   | 495lb / 220kg | Moderate | \$1.98 /lb               |

Figure 4

## Outfit Your Box (continued...)

### Bumper plates

Bumper plates allow you to drop weight to the ground without fear of damage to uncovered (no mats) floors or the lifter. For a thorough review of some of the varieties of bumper plates available, see the accompanying video and feature comparison chart (figure 4).

Bumper plates  
review



### Metal plates, a.k.a. “change”

Small metal plates, commonly referred to as “change” plates, commonly come in 10-, 5-, and 2.5-pound denominations. (Metric change plates, in 5-, 2.5-, 2-, 1-, and .5-kilo denominations are also available, but, unfortunately, they’re considerably more expensive, at least in the U.S.) As you and your clients get stronger and closer to your maximal lifts, the margins by which you will increase your lifts get smaller. As a result, smaller-denomination plates become increasingly important. They’re also useful for gradual incremental loading for smaller or weaker beginning lifters. Some would even go as far and say wherever they’re absent the facility lacks maturity.

(Note: When you use rubber bumper plates and metal plates together, a good rule of thumb is that only one pair of metal plates should be on the bar at a time. Loading more and more change plates on top of a single pair of bumpers puts additional wear and tear on the barbell. For instance, if you have 205 pounds set up (a pair of 45-pound bumpers a pair of 25-pound bumpers, and a pair of metal 10s) and then want to increase the weight to 225, don’t do it by adding an additional 10-pound plate to each side. Instead, take off the 25s and 10s and replace them with 45-pound bumpers.

### Dumbbells

In order to maximize usable space, affiliates frequently avoid storage racks. Hexagonal dumbbells allow you to stack them as high as you’re comfortable and will generally house more dumbbells in the same cubic space as a storage rack (or less).

Unavoidably, people will throw, or drop, dumbbells to the floor, either by accident or in exhaustion (and hopefully not due to anger). If you have uncovered floors, rubber-head dumbbells are a must. And even

if your floors are protected, they’re a hedge against damage to other objects or limbs. However, they are more expensive than cast metal dumbbells, and the heads are typically screwed onto the handles in a way that can cause them to loosen temporarily (which is probably not dangerous but can be annoying, and can make them harder to stack neatly).

### Kettlebells

There are numerous kettlebell manufacturers out there. As the popularity of this tool has grown immensely in the past few years, so have the numbers of manufacturers and brands available, with subtle but important variations in materials, adjustability, handle diameter, size and shape, texture, color—and, of course, price. As with all equipment, even these relatively low-tech tools have enough variability to make it somewhat confusing to balance value, durability, usability, and personal preference and style. For a review of four of the readily available brands, see the accompanying kettlebell video review.

Kettlebell review



### Medicine balls

Light, medium, and heavy medicine balls are necessary items. Nearly every exercise that can be done with a barbell set can also be done with a med ball, including others that you can’t do with the barbells. They’re great for clients who struggle with the bar, for large groups, for a somewhat different stimulus, and for all kinds of ball-specific drills and exercises.

We prefer a soft, large-diameter medicine ball. While you can find traditional soft medicine balls (think boxing), we like ones with a large, biomechanically



## Outfit Your Box (continued...)

functional diameter. Currently, the only one that meets these two criteria is the Dynamax ball, which is 14 inches in diameter (although Powermax is supposed to soon launch its own version at a fraction of the cost). This type of ball is forgiving when it comes in contact with your hand, body, face, or clients, and the larger diameter enables ideal body positioning.

### Where we go from here: A future vision for equipment fabrication and supply

Every time I imagine my equipment manufacturing utopia, the term “steel curtain” comes to mind. This label may conjure up images of an impenetrable 1970s Steelers defensive line for you, but, as someone who spends an inordinate amount of time trying to figure out how to make high-value functional fitness equipment available to CrossFitters everywhere, for me it has an altogether different meaning. It describes my dream of a network of local steel fabricators, unified under one aim, company umbrella, and set of production standards, that can serve our community and augment the production of exercise equipment by existing reputable manufacturers.

I’ve spent the better part of a year trying to reduce the price of equipment for the customer (actual equipment cost plus freight charges), whether by reducing manufacturing costs and product prices or by strategizing purchases to reduce freight costs. Yet, no matter how far product prices are driven down, freight costs continue to rise and are difficult to influence (and it doesn’t look like it’s going to get better any time soon). I have a handle on the first part, but freight, even after sales engineering, can’t be eliminated, or even satisfactorily controlled. Or can it?

How do you eliminate the need and associated costs of transporting heavy objects? You manufacture them locally.

Many affiliates already turn to local fabricators to construct everything from small to colossal pull-up stations, as well as a variety of things like dip stands, squat racks, parallel bars, stall bars, flat benches, cages, peg boards, wall ball targets, weight trees, bar and dumbbell racks, and GHD frames made locally. Typically these kinds of shops—whether large or small, or just small, independent welding operations—can create just about anything made of steel. (Larger shops may even have in-house design and engineering services you can draw on.)

Now, if only an abundance of CAD or drafted equipment designs, a portable powder coating machine, access to product stickers, inexpensive materials, and “hungry” steel workers were readily available, we would be one step closer to freight elimination. Guess what? That “if” is becoming a reality.

Online services such as Odesk.com or Elance.com will find you a CAD designer for \$7 to \$15 per hour. The Xiom 1000 and 5000 are portable powder coat machines that are currently available at an approachable price. Imported steel is inexpensive and can be delivered custom cut. And every town has steel workers who welcome the extra income.

Even where custom work or specialty parts are required (GHD pads, spring-loaded pins, custom webbing, and other non-stock parts), these items can be purchased separately from local or overseas manufacturers. For instance, instead of importing entire GHD units, split pads, foot plates, and guide rods can be purchased in bulk and sent to the appropriate fabricator for assembly. This is fundamentally no different than what’s being done at a company such as Dell (engineering and design takes place in one place, different parts are made in different countries and delivered to a final assembly and location). The aim is to outsource what can be done cheaper, faster, and hopefully better by others and concentrate on what you do best or are best suited for. Only in this case, it could look like this: standard equipment blueprints could remain open source (peer developed and reviewed) or purchased if patented, and then equipment could be manufactured locally, powder coated on site, and picked up at the shop or delivered at a fraction of current costs.



Eddie Lugo and Lisa Lugo own and operate [The Garage Gym Store](#), an online equipment supplier dedicated to offering the lowest possible prices, providing expert advice and guidance to individual buyers and gym owners, and enabling wide adoption of CrossFit. The Lugos are also the founders and owners of [CrossFit San Diego](#).