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The Making Of A Perfect Olympic Plate — Part II

Urethane , Rubber, and Chrome Plates

By Tom Lincir, President and Founder, Ivanko Barbell Company

During a lull in activity at a recent trade show, a bunch of us were remarking that whenever we run into a club owner, the first words out of his or her mouth is, "What's new?" And the last thing any of us wants to say is "nothing." Clubs need to be unveiling new equipment and new programs on a regular basis in order to maintain member's interest level, and to keep them from dropping out or being lured away by more innovations elsewhere. So there's a great deal of pressure on suppliers of equipment and programs to come up with the latest "new thing", or a twist on an existing thing. And when something new "catches on", all the suppliers and all the clubs start a stampede to jump on the bandwagon.

This doesn't mean a company should just throw together a new gimmick with a lot of hype and put it out there. In the fitness industry, and especially in the weight training segment, there can be costly consequences if a hastily developed product or program causes member injury, frustration, or boredom. Every new idea has some advantages and some disadvantages, some strengths and some weaknesses, some virtues and some flaws. Sometimes under the pressure to be first with a new innovation, a company will toss something out there with a lot of the shortcomings intact. Then they create advertising that touts all the advantages while obscuring the disadvantages, dumbing down the customer's knowledge base in order to sell products and make a fast buck. In my opinion, that's the wrong way to innovate.

It doesn't take much more money, time, and sweat to take a step back and do a little homework, in order to design away some of the weaknesses and flaws before offering your innovation to the marketplace. That's the right way to innovate. Striving to give clubs and members something better is how Ivanko approached developing its own unique quality versions of urethane plates, rubber plates, and chrome plates.

Urethane Coatings

In 1983 Ivanko embarked on an effort to make the perfect Olympic bumper plate. "Bumper plates" are those that are loaded on a barbell, and often dropped to the floor after completing the lift. "Loading plates" are those that are loaded on machines, and since they are not dropped, they do not have to take as much punishment.

We began our development process by purchasing all the best bumper sets available at the time, including products from Sweden, Poland, and Russia. In the course of our research, we encountered urethane. At first, we were excited by certain advantages that it had over rubber — the quality and range of colors that were possible, the lower cost of tooling, and the ease of attaining weight accuracy.

But we chose not to pursue urethane because of its disadvantages compared to rubber. It is much more expensive than rubber. In addition, the urethane coating develops flat spots when left on the floor too long, especially in warm areas, and it sometimes splits when dropped. Considering that bumper plates will often be dropped, and that rubber takes more punishment and costs less, we settled on rubber as our material of choice.

To my knowledge, the first bona fide pioneer in urethane coated Olympic bumper plates was Superior Barbell in 1985, under the ownership of Greg Greer. The surface appearance was

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beautiful, but as we foresaw, Superior had problems with the urethane coating splitting when the plates were dropped.

The second legitimate competitor to make urethane coated Olympic bumper plates was Bigger Faster Stronger (BFS) in 1991. Here's how Rick Anderson, Vice President, describes their efforts to eliminate the problem of splitting. "We had a miserable time with our urethane bumper plates splitting in the beginning. Over time, we tweaked the formula and improved our production methods. We have eliminated the problem for the most part by both doing a better manufacturing job and training our customers not to overload the bar."

As time goes on, urethane is gaining in popularity, and a growing number of our customers are asking us to jump on the bandwagon. To do it the right way, however, we have taken a step back to thoroughly assess the shortcomings and problems before moving ahead.

So let's step back and take stock of some facts:

1. Urethane made in the U.S. is better than urethane made in Asia, extraordinarily so. I first discovered this when the wheels on my pallet jack began to flake off. Looking closer, I realized that although the basic unit was "American Made", the wheels were "Made In China." Since I replaced the wheels with "American Made" urethane wheels, I have had no further problems. American companies have done a good job of producing superior urethane, and protecting their proprietary formulas. Others are finding there's more to it than simply mixing up some chemicals.

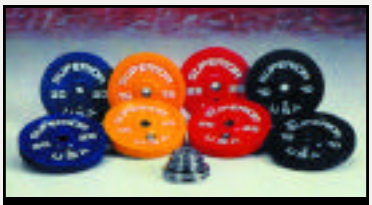
2. Urethane currently is still too hard to prevent chipping the powder coating on benches, racks, and machines, a major reason for weight plate and dumbbell coatings in the first place. This degree of hardness is necessary where engraving is used, so ideally we need to strike a balance between maintaining engraving quality and protecting equipment finishes to the extent possible.

3. Urethane is slippery, due to a low coefficient of friction, and this is a safety concern. Without a sure grip on the plate, it can slip out of the user's hand. We have tried a number of methods to eliminate this problem, such as sand blasting the mold, but we have not found the right solution yet. Members should be cautioned to wipe their hands before handling the plates, to secure a good grip, and to be careful.

4. Urethane is not scratch proof. It looks great when it's brand new and shiny, but like the urethane wheels on a skate board, take a look at it after it's "been around the block" a few times.

5. Urethane's specific gravity or weight density is much less than iron or rubber. Assuming the standard Olympic plate circumference is held constant, a 45 pound pure iron plate would have to be 3/4 inches thick, a pure rubber plate 3-1/2 inches thick, and a pure urethane plate 4-1/2 inches thick. If you coat identical plates with urethane and rubber, the urethane coating has to be thicker to achieve the same final weight accuracy. This can result in gripping areas that are too thick, sacrificing safety and ease of handling.

Determining the optimum thicknesses of the iron core and urethane coating is a balance between cost, quality of coverage, and cushioning. Urethane costs about 10 times as much as iron, so you don't want to make it any thicker than necessary to deliver the desired benefits. A loading plate requires less cushioning, less thickness than a bumper plate. However, if you make the coating too thin, you risk getting areas where the iron core could be exposed. In addition, attempting too thin a tolerance might make manufacturing more difficult, which would offset the savings in material. The balancing act is to make it thick enough to deliver quality coverage and the amount of bounce required for loading or lifting, without making it unaffordable.



Introduced in 1985, Superior Barbell's urethane plates were beautiful, but the coatings would sometimes split if the plates were dropped.

In 1991, Better Faster Stronger was the second legitimate manufacturer to introduce a line of urethane coated plates.

Ideally for a loading plate you need 1/2" on the perimeter edge and 3/8" on the sides, or no less than 3/8" on the perimeter and 1/4" on the sides. Before making a purchase decision, you can examine the urethane thickness by sticking a pin into the coating to check the depth. You don't want to overpay for inadequate thickness, or overspend for superfluous thickness.

Ivanko's Urethane Olympic Bumper Plate represents the ideal balance between cost considerations, cushioning, and safe handling.

Rubber Encased Plates

Encouraged by the overwhelming success of our Rubber Dumbbells, and the many advantages of rubber over other materials, we decided to encase Olympic Exercise Plates in Rubber. The results were better than expected. The painted frames of the Benches and machines still looked new after a year, because "Nothing protects like rubber". Gym owners were also getting positive comments from members that they liked the quietness. In fact, it has been shown that Rubber Plates & Dumbbells reduce gym noise by 30%.

Another advantage of rubber over painted, chromed and especially urethane plates is that rubber offers the best gripping surface, greatly increasing the safety of the user.

The most important factors determining the performance qualities and longevity of rubber encased Olympic plates are:

a) The formula of the rubber used.
b) The type of bonding agent used.
c) The correct curing time.

"By choosing the right material and curing agents, the odor problem associated with rubber can for all practical purposes be eliminated."

The formula of rubber has a significant impact on the durability and odor properties. For example, natural virgin rubber cured with sulphur results in an unpleasant odor. In addition, some countries have been known to dump used crankcase oil into their rubber formula as an inexpensive way to get rid of their toxic waste. This is the reason some rubber products smell from ten feet away at a trade show. By choosing the right material and curing agents, the odor problem associated with rubber can for all practical purposes be eliminated.

Bonding agents determine whether the rubber coating will peel off, or be inseparable from the surface of the iron core. If done correctly, the bond between the iron core and the rubber is stronger, and has a higher tensile strength than the rubber itself. Strong permanent bonding requires extra steps and more costly materials that many manufacturers choose to skip. And they often get away with it because poor bonding doesn't show up until months after purchase, when it's too late.

Ivanko's Rubber Encased E-Z Lift Olympic Plate, is considered one of the most beautiful Olympic plate designs ever manufactured.

Curing time for rubber coatings is critical. Like everything else in life, doing it right costs more money, and the unsuspecting purchaser might not detect the difference until it's too late. To cut costs, many manufacturers pull the product out of the mold before it is properly cured.

It took nearly 20 years of experimentation, trial and error to fine-tune and master these and all the other variables. More important, the more daunting challenge has been to train outside vendors how to do it right, and then to monitor their ongoing compliance. Knowing how is often the easier part. Watching over everything and everybody to insure quality control is the hard part.

When you do it right, the end product will be characterized by very clean material, little or no odor, permanent bonding to the iron core, and years of satisfactory service.

Our latest best effort is the Rubber Encased E-Z Lift Olympic Plate, considered one of the most beautiful Olympic plate designs ever manufactured.

Chrome Plates (Cast Iron)

Ivanko probably sells more chrome plates than anyone else, even though we do not recommend them for commercial use. We sell most of our chrome plates to showcase homes and private individuals.

Chrome plating cast iron has always been difficult primarily due to the porosity of the metal, which varies from plate to plate.

The three most important points to keep in mind in making quality chrome plates are:

a. Make a separate pattern specifically for the chrome plates.
b. Thoroughly clean the plate before plating.
c. Eliminate all sharp edges.

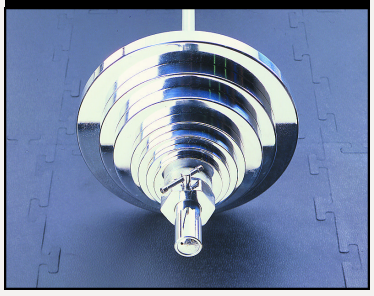
a. Make A Separate Pattern

Most manufacturers use the same pattern for both the painted and the chrome plates, with the result that most chromed cast iron Olympic plates are underweight. That's because in order to yield a shiny chrome surface, the plate requires extra machining and polishing, which takes weight off. This can be corrected by using a separate, slightly larger size pattern for the chrome plate.

b. Thoroughly Clean The Plate Before Plating

Before chrome plating, the plate must be polished if it is to attain a shiny silver luster. To get an idea of what happens if it is not polished, look at the inside recessed area of a chrome plate. This area is seldom polished due to the expense, and you can see that it is a dull silver.

Thorough polishing and cleaning the surfaces before plating yields a beautiful end result that is well worth the effort.



Since cast iron is porous, it needs to be cleaned thoroughly after polishing, to get all the abrasives, dirt, grease, and other impurities out of the microscopic nooks and crannies. On the most stubborn plates, this may require up to 2 days in the cleaning tanks. Whatever it takes, you have to ensure thorough cleaning. Further, the cleaning chemicals must be replenished frequently to ensure consistent quality and a strong bond between the plating layers and the cast iron surface. If you are going to incur the expense of chrome plating, you might as well take the time to properly prepare and clean the surfaces to achieve the most flawless end result.

c. Eliminate All Sharp Edges

For highest quality, all the edges must be rounded off so that there are no sharp angles. This is because sharp corners are high current density areas and consequently cause excess chrome buildup, which will eventually chip off over time. Eliminating these sharp edges is another reason why a separate pattern is recommended, and why proper surface preparation is critical.

"This requires that the plates spend up to 2 days in the cleaning tanks, and that the cleaning chemicals be replenished frequently to ensure consistent quality and a strong chrome bond."

Hard Chrome

The latest new gimmick that some manufacturers are touting is "hard chrome".

One manufacturer who claims their hard chrome will never chip or peel, beats their products to smithereens to demonstrate this claim. However, the only way hard chrome can be chip resistant is through "flash chroming," a process that makes the plating so thin that there is nothing to chip or peel! But plating this thin will easily allow rust.

Hard chrome is a dull gray color resembling unpolished aluminum, and lacks the good looks of shiny silver chrome. Hard chrome is, however, "harder" because it is plated directly on the iron or steel surface. In contrast, shiny chrome is achieved by first applying a layer of copper to smooth out the porous surface, then a layer of nickel to create the luster and depth, and finally a layer of chrome for hardness and protection. These additional layers make shiny chrome more susceptible to chipping. But this can be minimized by eliminating sharp edges, proper polishing, and most importantly, by ultra thorough cleaning described earlier.

In summary, hard chrome protects a little better against chipping, but lacks the good looks of shiny silver chrome, and is susceptible to rust. To demonstrate this last point, we have put some hard chrome products on the Ivanko roof along with some of our own stainless steel products. Now, one year later, we are ready to bring the results to IHRSA so that everyone can see the difference 30 years of experience makes.

No Right Answers

Introducing new products and programs to inject excitement into the club experience is good for everyone. And the differences that each innovation brings to the marketplace is less a question of a right way and a wrong way than it is about tradeoffs between durability, safety, ease of use, aesthetics, and costs, to name a few. With weight plates, as in other fitness categories, it is the user's circumstances that determine which product fits his or her particular needs.

Whatever the case, it is important for manufacturers to do a proper job of homework before rushing into the marketplace with their latest innovation. And it is important for club owners to demand high standards and hold manufacturers to those standards. I believe that a well-informed customer is a repeat customer, one that will be around for years to come.

Ivanko Barbell Company was founded by Tom Lincir in 1967, and it is the leading provider of professional and commercial grade barbell and dumbbell products worldwide. Your comments or questions are welcome. Write Tom Lincir at Ivanko Barbell Company, P.O. Box 1470, San Pedro, CA U.S.A. 90733. Or phone (310) 514-1155, fax (310) 514-1363, or email tom@ivankobarbell.com.

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