

Feature Article from Maximum Velocity

New Cub Scout Pinewood Derby Wheels

If you follow pinewood derby racing, then you will have heard rumors that BSA is changing the wheels in their Cub Scout Grand Prix Pinewood Derby kit. These rumors started many months ago with an occasional sighting of these reclusive wheels. But in recent weeks, the wheels have become widely available, at least in the replacement wheel packs.

Today, we will take a look at the new wheels, and compare them with the previous wheels. Also, for race leaders we'll discuss how these new wheels will affect your race.¹

New Wheel Specifications

Regardless of the rationale by BSA for creating new wheels (likely cost), the mold designers stayed true to the older design, and did a truly nice job on the molds. The new wheels look very much like the older wheels, but (so far) tend to be more accurate than their predecessors.



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Photo comparison of Old and New Wheel

Outside

From the outside, the only obvious differences are the slight font change on the raised lettering, the change from the trademark insignia (TM) to the registered trademark insignia (R), and the addition of a recessed ring in the outer hub. This recessed ring is likely counterproductive to performance, as it will change the contact point with a beveled axle head, resulting in more braking torque.²

Inside

The changes on the inside of the wheel are more apparent. In addition to the font change for the raised lettering, the inner hub is reduced in diameter and coned, and the tread is slightly thinner. These latter changes result in a wheel with less weight (better performance).

Tread Surface

Yes, the mold mark on the tread surface is gone. This is welcome news as less work is needed to prepare a wheel, and the wheels tend to run truer out of the box.³

Comparison With Old Wheels

So, how do the new wheels compare with the old wheels? The basic measurements are shown in the following table. But in summary, the new wheels are lighter, smaller in diameter, and generally more accurate.

Specification	Old	New
Outside Diameter	1.193	1.184
Tread Thickness	0.09	0.068
Hub Diameter	0.272	0.227
Bore Diameter	0.096	0.096
Overall Width	0.438	0.427
Weight (grams)	3.6	2.7

All measurements (except weight) are in inches, and are typical numbers.

Mold Comparison

Are there differences in the various molds that produce the wheels? Yes, there is variation, but not as substantial as with the old wheels. The table below gives a comparison of the sixteen mold number.

Mold #	Round	Left-Right	Bore Size
1	Okay	Good	Typical
2	Excellent	Okay	Typical
3	Excellent	Excellent	Typical
4	Okay	Good	Typical
5	Okay	Okay	Typical
6	Okay	Okay	Typical
7	Good	Good	Typical
8	Excellent	Excellent	Typical
9	Good	Okay	Typical
10	Okay	Okay	Typical
11	Okay	Good	Typical
12	Excellent	Excellent	Typical
13	Good	Okay	Typical
14	Okay	Good	Typical
15	Excellent	Excellent	Typical
16	Good	Good	Typical

Notes on measurements:

Measurements made in August of 2009. Ten wheels from each mold were randomly selected from 2,000 wheels. The wheels were examined and the results averaged.

In general, all of the wheels are good - much better than the previous wheel version. The difference between the Excellent, Good, and Okay ratings is a few thousandths of an inch.

The bore size on all mold numbers measured within one thousandth of an inch.

For Race Leaders

Race leaders need to be aware that these wheels will affect your race in several ways.

Rules

Many packs use rules that are very specific as to the treatment that can be applied to wheels. One common rule is a minimum diameter of 1.180. Given that the new wheels are typically 1.184 in OD out of the box, even a tiny amount of tread sanding/polishing will reduce the diameter to less than 1.180. So this minimum diameter number should be reduced to (for example) 1.170 to accommodate the new wheels.

Some packs regulate wheel weight. Obviously, the lower weighted wheel will require a change to the minimum wheel weight.

Finally, some packs do not allow the inner hub to be coned. Since the new wheels come coned out of the box, this rule will need to be changed.

Car Performance

As of this writing, the pinewood derby kits are generally shipping with the older wheels, while replacement sets are generally shipping with the new wheels⁴, so it is very likely that some cars will be entered in your race with the old wheels, and others with the new wheels. Due to the better accuracy and the lower wheel weight, out of the box the new wheels will generally outperform the older wheels. Therefore, if both wheel types are allowed in the same race, the cars with the newer wheels will have an advantage.

So, a decision must be made at the appropriate level (pack, district, or council) as to whether to require the old wheels, the newer wheels, or run a two-class race (or ignore the issue and let the chips fall where they may). As a side note, if you are entering a car in a race that allows the new wheels, then you certainly want to use them.

Summary

Change is inevitable, and the transition is not always smooth. The new wheels will require a carefully thought out transition during the coming season. If you are involved in running a race, make sure to consider how you will accommodate the new wheels. If you are racing a car then make sure to know the local rules regarding the new wheels, and then use them if you can.

¹There is also a rumor that the axle nails are changing, the difference being that the new axles are shorter. However, in all of the new sets we have received, the axles are unchanged. So, if and when we see an axle change, we will let you know the specifics.

²To resolve this issue, DerbyWorx is removing the recessed ring on their machined wheels.

³The mold mark on the tread is replaced with three small mold marks on the inside of the wheel. These can be seen in the photo showing the inside of the wheel.

⁴But be aware that old and new wheels can be found mixed in a tube of replacement wheels, and will likely be mixed in the kits as well.