SPINBALL

iPitch® Smart Pitching Machine
Owner's Manual

Updated 3/10/21

CAUTIONS

● This machine is not a toy! Use under adult supervision only.

● Machine will throw balls and strikes- batters must stay alert and always wear a helmet.

● Use only regulation sports balls or balls specifically designed for machine use.

● Use a grounded (3 prong) outlet only. Use a GFCI outlet when machine is operated outdoors. Do not use the machine in wet conditions. Besides the electrical hazard, wet baseballs will be very inaccurate.

● Do not store the machine with the urethane wheel tread compressed against the ground. Flat spots will develop.

● Machine operator (person feeding balls into machine) should stay behind a protective screen.

FAST, FREE, FRIENDLY HELP

For assistance assembling or using your machine, please view our videos online at www.spinballsports.com, call us at 618-244-4587, or email us at info@spinballsports.com.

ASSEMBLY & SETUP

REMOVE MACHINE FROM BOX   Lift the machine out of the box and place it flat on the ground or floor with the control panel facing up. The machine is heavy and we recommend using two or more people.

LEGS   Slide all three legs into the sockets on the tripod base until the spring loaded buttons pop up. See Figure 1. Lift the machine up, pivoting it on the front two legs, and install the back leg. Again, this is much easier with two or more people.

MOTOR / WHEEL POSITION   The gap between wheels is a critical adjustment to maximize pitch speed and accuracy. The optimal distance between wheels depends on the size and compressibility of the ball being used. Softer, more compressible balls require a smaller gap than harder balls do. And of course, softballs require a much larger gap than baseballs. Too small of a gap will slow the wheels noticeably when pitches are thrown, producing a loud "thunk". Too large of a gap will not

Figure 1: *Install legs while machine is on the ground, then lift it to an upright position, pivoting the machine on the front two legs.*

generate enough squeezing force on the ball, and pitches will be too slow, without enough spin.

Each motor & wheel assembly has two profiled blocks that interlock with profiled pockets in the frame. There are 11 possible locations. By counting the number of empty notches on either side of the blocks, you can quickly and precisely locate each of the wheels. See Figures 2 and 3 for the typical positioning for real baseballs and softballs. Each wheel and motor assembly should be moved one step inward from these locations when using soft dimpled balls, creating a tighter grip on the compressible ball.

The wheels are moved by loosening or removing the clamping knob or locknut that holds each motor to the frame. Be sure to support the motor / wheel assembly when removing the knobs (or nuts) – do not let the motor fall or hang by its cord. Reposition each motor & wheel assembly as desired, then re-tighten the clamping knob (or nut).

The positions shown in Figures 2 & 3 are just starting points and may require adjustment for optimal performance. Each motor does not need to be set at the same distance from center, but they should not be more than one setting apart. Machines are shipped set for real baseballs.
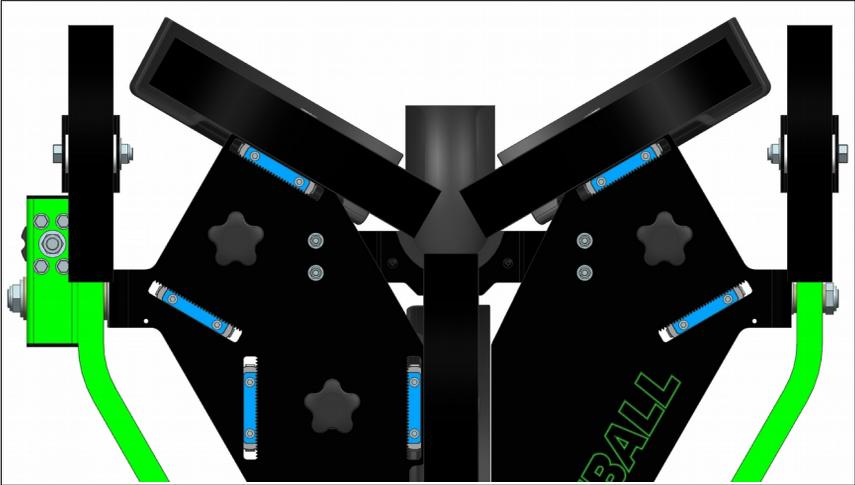
Figure 2: Typical motor / wheel positioning for real baseballs. Motors are located one step in from center position.
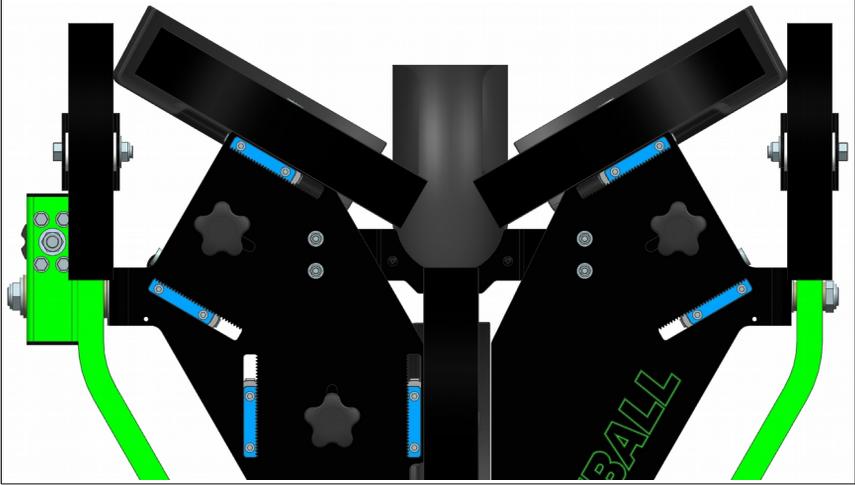

Figure 3: Typical motor / wheel positioning for real softballs. Motors are located at outermost position.

Feel free to experiment and deviate from these suggestions to determine the optimal wheel gap for your situation. For example, cold weather will cause both the balls and wheels to harden somewhat, requiring a larger wheel gap than when the same machine is used in hot weather. Also, once the wheels begin to wear, they will need to be moved closer together to compensate.

OPERATION

Wi-Fi CONNECTION   The iPitch machine can be controlled by any device with Wi-Fi capability. We recommend using the Samsung Galaxy Tab A or A7 tablet shipped with the machine because it is the only device we test with, but any Android device should work. When powered, the machine creates a Wi-Fi hotspot or access point (AP) with the SSID (network name) of iPitchXXXX, where XXXX is the machine's serial number.

There are two ways to connect the tablet to the machine:

1.) Using the Android system. Go to Settings > Connections > Wi-Fi and select the desired iPitch network. The iPitch Wi-Fi password is "Spinball". If you receive a warning that the Wi-Fi network is not connected to the internet, indicate that you want to stay connected anyway.

2) Using the iPitch app. From the opening Connections screen, select the "search" button. GPS must be enabled to search for networks. The app will search for available machines and display a list to choose from. Select a machine and the app will try to connect.

Only one device can connect to an iPitch machine at a time. If you have trouble connecting, make sure no other device has already connected to the iPitch's Wi-Fi network. Wi-Fi devices can only connect to one Wi-Fi network at a time, so you can connect to the iPitch or your own network, but not both at the same time.

STARTUP / CONNECTION SCREEN   Turn the machine on before starting the app, and it should immediately create its Wi-Fi AP (access point). When you start the app, it checks if the tablet is already connected to an iPitch Wi-Fi network, and if so, it displays the network SSID. If not, the screen will indicate that the app is in Demo Mode. Demo Mode is used to demonstrate the app's functionality without being connected to a machine. It can also be used to create and edit pitches, pitchers, and sequences, although the pitches can not be aimed properly without a machine connected.

If not already connected to the desired machine, use one of the two methods listed above to connect, then press the "Aim" button to move to the next screen.

AIM SCREEN   The Aim Screen sets the baseline target point for all pitches. Aim for all other pitches is based on this pitch. You should always throw at least one test pitch with this screen to be sure the machine is aimed correctly. If you want to change the aim of an individual

pitch, you must change the pitch definition using the Pitch Screen. When you use the Aim Screen, you are changing the aim for every pitch.

The "Power Wheels" button sets the wheels to a 75mph fastball, or turns them off. The status window shows the horizontal and vertical coordinates of the target point. The background color of the status window is blue when the machine is off, red when the machine is adjusting, and green when ready to throw. The directional arrows move the pitch either 1 or 10 inches in the indicated direction, depending on where on the arrow you press. The app will remember the target point coordinates when power is turned off, but it's always best to throw a test pitch to make sure the machine hasn't been moved. Please note that the aim coordinates are stored on the tablet, not the machine. If you have several machines and mix up the tablets, you will have to reset the aim. If an automatic feeder is attached, a "Throw Pitch" button will appear next to the "Power Wheels" button to automatically feed a single test pitch. The button is only enabled when the wheels have reached their commanded speed.

The target point is saved automatically, so when you are satisfied with the pitch location, you can move on to any other screen.

SETTINGS SCREEN
The Settings Screen is used to set all the various parameters of machine operation. These settings include:

Distance to plate: Set the distance from the machine's release point to the plate. When pitches are aimed, they are only accurate at that distance. If the machine is moved, the pitch aims must change too. Automatic adjustment for different distances is under active development and will be included in future versions of the app, however this setting currently isn't used. The default value is 56 ft and not 60.5 ft because pitchers release the ball several feet in front of the rubber.

Automatic Feeder: Is an automatic ball feeder attached? If so, at what time interval should balls be fed into the machine? How many balls are in a "batch"? (Batch size is only used in batch mode on the BP screen).

Location Zone Size: Used to set the size of the target zones in the BP Screen. In other words, how much should the aim point move when a new zone is selected? Please note that the machine does not become more accurate by making the zones smaller. It just moves the aim point a smaller distance from the base target point.

Aiming Speed: Sets how fast the machine should adjust its aim. Slow speeds can be used to disguise aim changes to the hitter.

BATTING PRACTICE SCREEN The Batting Practice (BP) screen is composed of several sections.

Pitcher information: The upper left section displays information on the currently selected pitcher: name, throwing arm, and top pitch speed. As pitches are selected, the current pitch name also appears in this area.

Zone: There are nine blocks representing nine target points in the strike zone. The currently selected zone number is shown in red. The zone sizes can be adjusted in the Settings screen. Changing pitches does not change the target zone. Please note that balls may or may not always impact in the selected zone. Changing the zone only changes the target point, and there is always some deviation from the ideal target point.

Status Window: Contains a short summary of the machine's status. The status window is blue when the machine is off, red when the machine is adjusting, and green when it is ready to pitch. NEVER FEED A BALL WHEN THE STATUS WINDOW IS RED. When red, the machine is still adjusting from one pitch to another and the resulting pitch will be unpredictable.

Pitch Buttons: A list of up to 12 available pitches. The currently selected pitch is highlighted in red. If no pitcher is selected, no pitch buttons appear.

Pitch Check Boxes: The check boxes are only used during random pitch selection. If checked, the pitch can be selected. If not, it can't.

Random 1: Select a new pitch at random.

Random Seq: Turn on random sequence mode. A new pitch will be selected at random when this button is pressed, and again each time a ball is thrown. It is possible for the machine to randomly select the same pitch several times in a row.

New Pitcher: Select a new pitcher from the list of available pitchers.

Mode: Set machine operating mode.
- Off - Turns wheels off
- Manual – Used for feeding balls into the machine manually
- Autofeed One – Automatically feed one ball whenever a pitch button is pressed. Random sequences can not be used in this mode. (Use Random 1.)
- Autofeed Batch – Automatically feed a batch of balls. The batch quantity is set in the Settings screen.

- Autofeed Continuous – Automatically feed balls continuously

PITCHER SCREEN Used to create custom pitchers and modify factory pitchers. A pitcher is defined as a name or description, throwing arm, and a list of up to 12 pitches. Pitcher names must be unique.

To add a pitch to a pitcher's list, the pitch must already exist in the database. Pitches can not be modified from this screen. Use the Pitch screen to create or modify individual pitches.

You can create realistic pitchers or specialty ones for drills. For example, you can create a pitcher that only throws different speed fastballs to work on hitter timing. You could also create pitchers who throw both balls and strikes to work on pitch selection.

Load Pitcher: Loads a new pitcher into memory to modify their pitch selection. The pitcher's list of pitches appears on the screen.

Top / Up / Down / Bottom: Once a pitcher is loaded, the order of their pitches can be changed by selecting a pitch on the list and using the Top or Bottom buttons to move the pitch to the top or bottom of the list, or the Up or Down buttons to move the pitch up or down one position. Pitch buttons will be shown in this order on the BP screen.

Add Pitch: Add a new pitch to the end of the list. Select from any of the pitches in the database. Use the filter bar at the top of the list to ease the search.

Remove Pitch: Remove the currently selected pitch from the list. This does not delete the pitch from the database.

New Pitcher: Clears all fields to create a new pitcher. The pitcher is not added to the database until saved.

Save Pitcher: Saves the current pitcher to the database. The pitcher is now available for use on the BP screen.

Delete Pitcher: Removes the current pitcher from the database.

To create a new pitcher, select New Pitcher, type in a unique name or description, add pitches to the list, then save.

PITCH SCREEN   Used to create custom pitches or to modify factory supplied pitches. When a pitch is modified on this screen, it is modified everywhere it is used.

Pitches are defined by setting the pitch speed, spin direction, and spin amount. The machine uses these inputs to automatically adjust the individual wheel speeds required to generate the selected pitch speed and ball spin. You will still need to aim the machine using the directional arrows. Once a pitch is aimed correctly, save it, and the machine will recall the aim automatically whenever this pitch is selected.

Pitch Name / Description: Name the pitch or use a description. This text will be used when selecting the pitch from the database and must be unique. When simulating real pitchers, consider using a combination of the pitcher's name and the pitch name to name each pitch.

Button Name: The name that appears on the pitch button on the Batting Practice screen. Must be reasonably short to fit on the button.

Pitch Speed: Set pitch speed in MPH with the slider or by typing a number in the text box. Value must be between 50 and 100.

Spin Rate: Set ball spin rate in RPM with the slider or by typing a number in the text box. The greater the spin rate, the more the ball will break. Value must be between 0 and 3000.

Spin Direction Point the arrow in the direction you want the ball to spin and curve, or use the time selector to set an exact angle. See Figures 4 and 5 for the spin directions of various pitches. Most ball tracking companies like Rapsodo and HitTrax use this analog clock face system to define spin direction.
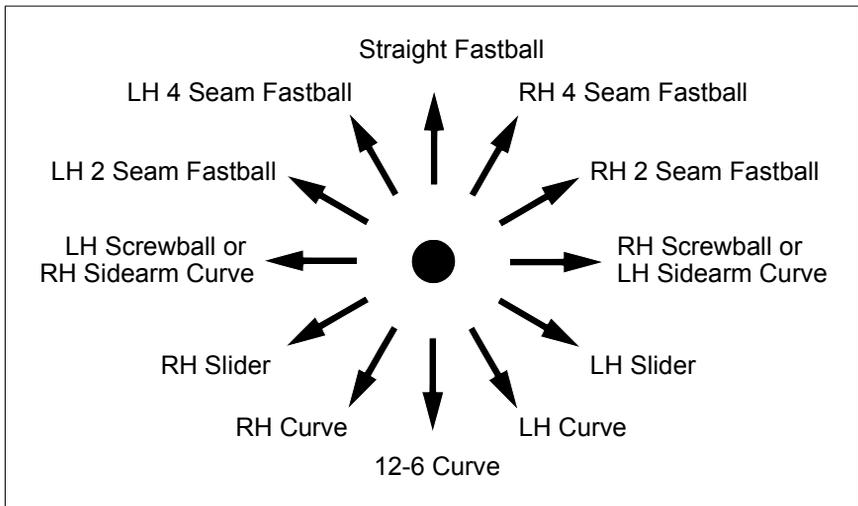

Figure 4: Spin direction for various baseball pitches

The ball doesn't curve in exactly the same direction as its spin because gravity always causes the ball to drop. For example, an overhand fastball with pure backspin (spin direction: up) won't actually curve upward, but it will drop less than it would have without spin. A ball with horizontal spin will curve sideways from the spin and drop from gravity, resulting in a diagonal break.

Pitches with no spin are knuckleballs and move randomly, but they usually have some sort of drop. When the machine is set for no spin, the spin direction setting has no effect.
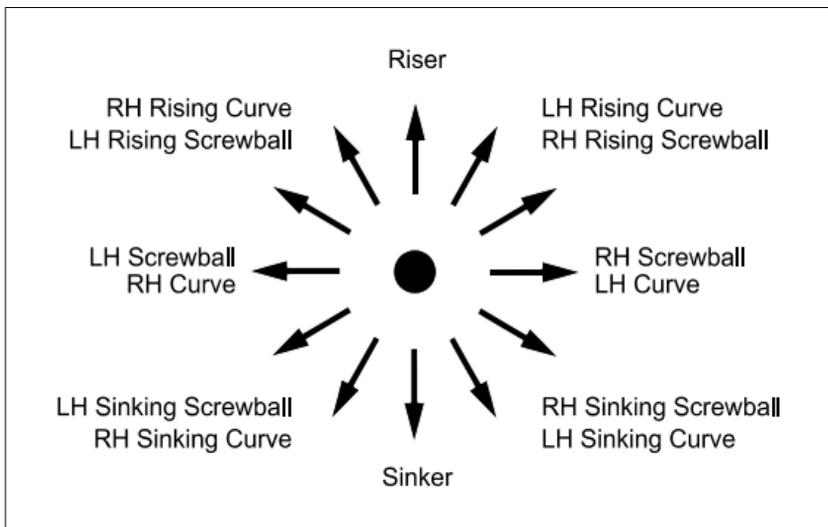

Figure 5: Spin direction for various softball pitches

Aim   Aim pitches using the directional arrows. The machine's aim point will move 1 or 10" depending where on the arrow you touch.

Load Pitch   Loads a new pitch into memory to view or modify the pitch definition. Select from any pitch in the database. Use the filter bar to ease pitch selection.

New Pitch: Clears all fields to create a new pitch. The pitch is not added to the database until saved.

Save Pitch: Saves the current pitch to the database. The pitch is now available for selection on the Pitchers screen.

Delete Pitch: Removes the current pitch from the database.

Power: Turns the machine on and off.

PITCH MODELING One of the core features of the iPitch is the ability to simulate any pitcher by using measured data to replicate their pitches. To do this, you must understand spin angle (also called spin direction) and spin efficiency.

Spin angle describes the direction the ball is spinning, which is also the direction it will break. It is common practice to use an analog clock face to define the spin direction as seen from the pitcher's point of view. See Figure 4 above for some examples. Of course, individual pitches vary, which is the whole point of creating custom pitches.

Spin efficiency is a measure of how much of a pitch's spin is useful in generating break. Only spin that is perpendicular to the ball's path causes the ball to curve. In other words, gyro spin (also known as rifle spin or football spiral spin) does nothing, but topspin, backspin, and side spin do. Pitching machines always throw with 100% spin efficiency (no gyro spin), so if you want to accurately simulate a pitch with a low spin efficiency, you must reduce the spin rate setting as shown in the equation below.

$$\text{machine setting} = (\text{actual spin rate}) \times (\text{spin efficiency})$$

For example, if you want to throw a slider that has an actual spin rate of 2200 RPM and a spin efficiency of 75%, set the machine to a spin rate of

$$2200 \text{ RPM} \times 75\% = 1650 \text{ RPM}.$$

This value is also known as the effective spin rate or active spin rate. If you are setting the machine to mimic a specific pitch, be sure to check whether your data is actual spin or effective spin.

DATABASES SCREEN The iPitch® app uses a combination of online databases and locally defined (created at the tablet) data to define three types of data: pitches, pitchers, and sequences. Each of these three types may be factory defined or user defined. Spinball controls factory defined data and we will update and expand that data on an ongoing basis. Factory defined data may be deleted or modified at the tablet level as desired by the user, and it can always be restored from the online database. User defined data is optional, but it is stored and used in exactly the same way as factory data.

Google Sheets online spreadsheets are used to store data online. There are a total of 6 Sheets used in the iPitch app:

    1) Factory pitchers
    2) Factory pitches

3) Factory sequences
4) User defined pitchers
5) User defined pitches
6) User defined sequences

Using Sheets is completely optional, but the larger your collection of pitches, pitchers, and sequences, the easier it will be to maintain them with Sheets. A single Sheet can support an unlimited number of tablets, so this is an ideal solution for organizations with multiple machines that need access to the same data. Pitch aiming must still be conducted manually. Once the pitches are aimed, that aim data can be entered in the Sheet for storage and distribution throughout the organization. Data flow is currently one-way only. Tablets can only read the Sheets, they can not write to them.

Spinball will maintain the factory databases for pitches, pitchers, and sequences. You can download and modify the data from these Sheets at any time, but you can not edit the Sheets themselves. Users must create and maintain their own Sheets separate from the factory databases.

To create a Google Sheet from the Chrome browser, go to Apps, and select Sheets. Once you have created a new sheet, you can name it anything you like, but you will need to create separate sheets for pitches, pitchers, and sequences.

Pitch Sheet: The Pitch Sheet consists of an unlimited number of rows, each row defining one pitch. There are seven columns:

A: pitch name or description – **must be unique**
B: button name – short name displayed on button on BP screen
C: speed in mph
D: spin rate in rpm
E: spin angle expressed as a time – must use ":"
F: horizontal aim
G: vertical aim

There can be no other data in the sheet – no headings or notes are allowed. Here is a short example of a user defined Pitch Sheet:

Bob's Fastball	Bob's FB	94	2500	12:00	0	-21
Bob's Curve	Bob's CV	76	2650	7:00	27	92
Bob's Slider	Bob's SL	82	2375	8:30	45	23

Once your Sheet is created, you must enter a portion of its URL (web address) into the tablet to access it. This is a tedious process, but you

only need to do it once per Sheet as the tablet will save the URL.

For our example Sheet, the URL as shown in the browser is:

https://docs.google.com/spreadsheets/d/1Vpyt8aJ1zoYRNmTVehr8SAsBSQ90o_h_deHiaQ6hvHk/edit#gid=0

Your Sheet's URL will have the same format, but with a different string in the highlighted section. Enter the text from the highlighted section only into the text box for user defined pitches and press the "⏎" button to save it. Then press the "Import from online DB" button, and the new pitches will appear in your local database, ready for use. Remember that while you can create pitches online without a machine, you will still have to aim them with a machine, and then enter those aim values into the Sheet to complete the process.

Pitcher Sheet: The Pitcher Sheet consists of an unlimited number of rows, each row defining one pitcher. There are between three and fourteen columns for each pitcher:

> A: pitcher name or description – **must be unique**
> B: throwing arm code: R = right, L = left
> C: name of pitch 1
> D: name of pitch 2
> E: name of pitch 3
> ...
> N: name of pitch 12

If a pitcher has less than 12 pitches, leave those cells blank. **Pitch names must be an exact match with the names used in the Pitch database.** Pitchers can be defined to throw both factory and user pitches.

Here is a very short example of a user defined Pitcher Sheet that works with our Pitch Sheet example:

Bob	R	Bob's Fastball	Bob's Curveball	Bob's Slider

The URL for this example Pitcher Sheet is:

https://docs.google.com/spreadsheets/d/1W2-cUrPhYX1PXOyWRkWcTTCGyWQ0BFa2t_4u54HYQtg/edit#gid=0

Importing a Sheet does not delete your existing data. That must be done manually. When importing, you are given the option to overwrite or skip duplicate entries. New entries are added regardless of your selection.

Sequences Sheet: The Sequences Sheet is similar to the Pitchers Sheet. It consists of an unlimited number of rows, each row defining one sequence. There should be a minimum of three columns, with no maximum:

> A: pitcher name or description – **must be unique**
> B: name of pitch 1
> C: name of pitch 2
> D: name of pitch 3
> … etc.

Pitch names must be an exact match with the names used in the Pitch database. Each sequence can contain a different number of pitches and can be defined to throw both factory and user pitches.

Here is a very short example of a user defined Sequence Sheet that works with our Pitch Sheet example:

Seq1	Bob's Fastball	Bob's Fastball	Bob's Curve	Bob's Fastball
Seq2	Bob's Curve	Bob's Fastball	Bob's Curve	Bob's Slider

The URL for this example Sequences Sheet is:

https://docs.google.com/spreadsheets/d/
<mark>1KjIygYwc_IPW5E3Fmgk1rg3ueE5RH_GB_Oq5wUKrlEo</mark>/edit#gid=0

Importing a Sheet does not delete your existing data. That must be done manually. When importing, you are given the option to overwrite or skip duplicate entries. New entries are added regardless of your selection.

MISCELLANEOUS

ACCURACY The primary factor behind pitch accuracy is the consistency of the balls. While you can use many types of balls (real or dimpled, high or low seam, compressible or hard) you can not mix them in one setup and get consistent results. They must be dry and in good condition. Dimpled machine balls will be more accurate than leather baseballs, especially after use. Softer balls tend to be more accurate than harder balls because the wheels grip them better. Lower seams are better than high seams and cause less wear. The more consistent the balls are, the more consistent the pitches will be.

Another key factor is the distance between wheels - see Motor / Wheel Position earlier in this manual for a full discussion.

A third factor is the cleanliness of the wheels. After use, especially with new balls (both dimpled and laced), the wheels can accumulate a residue from the balls. The residue is slick and prevents the wheel from grabbing the ball sufficiently. The wheels can be cleaned with solvent cleaners such as lacquer thinner, scrubbed with Scotch Brite pads.

DO NOT use synthetic leather baseballs. They wear quickly and leave excessive residue. This includes the Wilson A1010S. (Apparently the 'S' stands for synthetic.)

Jugs Pearl® baseballs will not give good results in our machines. They are much slicker than standard baseballs so the accuracy suffers.

MAINTENANCE If stored outdoors, always keep the machine covered to protect it from rain. Tarps are available at any local hardware store, but even a large black trash bag will work. Do not leave the machine outside during storms. High winds can blow the machine over and damage the wheels and / or motor shafts. This is not normal use, and is therefore not covered by warranty. Ball residue may be cleaned from the wheel tread with a solvent cleaner such as lacquer thinner applied with a Scotch Brite pad.

WARRANTY If your machine doesn't perform like you expect, please contact Spinball and we will attempt to diagnose the problem for you. If a part fails during the warranty period and you feel confident you can install it yourself, we will send the replacement part for free. If something goes wrong during the first 30 days you have the machine, you can also choose to exchange it for a new one. After 30 days, if you need to return the machine for repairs, you will have to pay for return shipping. We will repair the machine and return the machine back to you at our expense.

All components of your machine are covered for non-commercial use for five years from the date of purchase, but wheels are wear items which are prorated like car tires. For example, if a wheel only lasts 3 years (60% of rated life), you will receive 40% off the price of a new one. The warranty does not cover cosmetic issues, normal wear, or misuse of the product. For commercial use, the warranty period is one year. Warranties are not transferable.

We don't want anyone to be unhappy with their purchase, so products may be returned at your expense for any reason within 30 days for a full refund minus a 15% restocking fee. This fee is the lowest in the industry and covers both our outgoing shipping costs and minor cosmetic damage to the machine. Refunds will be reduced to cover any non-cosmetic damage.