07 Arsenal

Ball inventory · Layout · Hole depth

7.1 — Managing the Arsenal

7.1.1 What is the Arsenal section and how it connects to spec sheets

What is the Arsenal section and how it connects to spec sheets

7.1.1 concept

The **Arsenal** is Spectre Cloud's ball inventory system — a per-bowler record of every piece of equipment they have had drilled at your shop. Where spec sheets capture the *how* of a drilling (measurements, pitch, layout, ovals), the Arsenal captures the *what* (which balls the bowler owns, their current status, and the full history of what has been done to each one). The two systems are designed to work together: every spec sheet connects to an Arsenal entry, and every Arsenal entry links back to its spec sheets. Understanding how they relate to each other is the foundation for getting the most out of both.

□□ What the Arsenal Does

At its simplest, the Arsenal is a list of bowling balls belonging to a bowler. But it is more than an inventory — it is a structured history of that bowler's equipment over time, organised so that any ball, any drilling, and any change can be found and referenced in seconds.

- Tracks every ball a bowler has owned — past and present — in a single view.
- Shows the current status of each ball: **Active** (in the bag), **Retired** (no longer used), or **Sold**.
- Links each ball to all spec sheets ever created for it — including re-drillings, surface adjustments, and layout changes.
- Provides a timeline of the bowler's equipment history that any staff member can read and understand without needing to know the bowler personally.
- With **Arsenal Plus** (`$5 USD/month`), adds ball specification data from the bowlingdatabase.com integration, barcode scanning, suggested layouts, layout conversion, and 3D layout rendering.

How the Arsenal and Spec Sheets Connect

The Arsenal and spec sheet systems are linked through the ball name. When a spec sheet is saved with a ball name that matches an Arsenal entry for the same bowler, Spectre Cloud associates the two records. The spec sheet appears in the ball's drilling history within the Arsenal entry, and the Arsenal entry is accessible from the spec sheet. This two-way connection is what makes the system greater than the sum of its parts.

In practice, the relationship works like this:

- One **Arsenal entry** per physical ball — created once when the ball first comes into the shop.
- One **spec sheet** per drilling — a new spec sheet is created each time the ball is drilled or re-drilled, and linked to the same Arsenal entry.
- A ball drilled three times over its lifetime has one Arsenal entry and three spec sheets. All three are accessible from the Arsenal entry; the Arsenal entry is accessible from each spec sheet.

Note: The link between a spec sheet and an Arsenal entry depends on the ball name matching exactly. A minor variation — an abbreviated model name, different capitalisation, or a missing weight — breaks the association. See Book 06, Step 6 for guidance on keeping ball names consistent across both records.

What an Arsenal Entry Contains

Each entry in the Arsenal holds both identifying information about the physical ball and a gateway to its drilling history:

Field	Description	Required
Ball name	Brand, model, and weight — the primary identifier	□ Yes
Serial number	Manufacturer serial printed on the ball surface	No
Purchase date	When the bowler acquired the ball	No
Status	Active, Retired, or Sold	No
Notes	Surface history, weight hole details, any ball-specific notes	No
Linked spec sheets	All spec sheets associated with this ball, in chronological order	Auto-populated
Ball specifications	Core type, RG, differential, MB differential (Arsenal Plus only)	Arsenal Plus

□□ Where to Find the Arsenal in Spectre Cloud

The Arsenal is accessible from two places in the app — from the bowler's profile, and from the top-level navigation.

□□ From the bowler profile (desktop)

1. Open the bowler's profile from the **BOWLERS** list.
2. The **Arsenal** section appears within the profile, below the bowler's contact details.
3. All balls belonging to this bowler are listed here, with their current status and a link to associated spec sheets.

□□ From the bowler profile (mobile)

1. Tap the **avatar icon** to open the bowler list.
2. Tap the bowler's name to open their profile.
3. Scroll to the **Arsenal** section within the profile.

□□ **Note:** The Arsenal is always bowler-specific — there is no shop-wide Arsenal view that aggregates all bowlers' equipment in a single list. To see a bowler's Arsenal, you must open that bowler's profile first.

⚖ Arsenal on the Core Plan vs. Arsenal Plus

Feature	Core plan	Arsenal Plus
Ball inventory per bowler	✓	✓
Status tracking (Active / Retired / Sold)	✓	✓
Spec sheet linking	✓	✓
Serial number and purchase date recording	✓	✓
Barcode scanning	✓	✓
bowlingdatabase.com integration	✓	✓
Ball core specifications (RG, differential, MB)	✓	✓
Suggested layouts	✓	✓
Layout conversion between systems	✓	✓
3D layout rendering	✓	✓

🔁 Why the Arsenal Matters Beyond the First Drilling

The Arsenal's value compounds over time. A bowler with a well-maintained Arsenal record in Spectre Cloud is far easier to serve on every return visit — and far easier for any staff member to serve, not just the driller who did the original fitting.

- 🔁 When a bowler returns for a re-drill, the Arsenal shows every previous drilling on that ball — no guessing what was done last time.
- 🔁 When a bowler wants to replicate a ball they loved two seasons ago, the linked spec sheet is one tap away.
- 🔁 When a bowler asks whether a new ball will complement or overlap with what is already in their bag, the Arsenal gives an instant picture of their current equipment setup.
- 🔁 When a different staff member handles the visit, they can read the Arsenal history and provide informed service without needing a briefing from the original driller.

- For competitive bowlers who manage large arsenals across multiple balls and layouts, Spectre Cloud's connected system replaces a folder of paper spec sheets with a searchable, always-current digital record.

Related Sections

- 7.1.2 — Adding a ball to the Arsenal
- 7.1.3 — Managing ball status (Active, Retired, Sold)
- 7.1.4 — Viewing a ball's spec sheet history from the Arsenal
- 6.1.6 — Step 6 (First ball workflow): Add ball to the Arsenal section
- 04.x — Spec Sheets: creating, cloning, and managing records

Tip: Treat the Arsenal as a living record, not a one-time entry task. Update ball status when a bowler retires or sells equipment, add surface notes when a ball is refinished, and keep the ball name consistent with the spec sheet every time. An Arsenal that is kept current takes seconds to maintain per visit — and saves minutes of reconstruction every time a bowler comes back in.

7.1.2 Adding a ball to a bowler's arsenal

Adding a ball to a bowler's arsenal

7.1.2 **KEY** step-by-step

Adding a ball to a bowler's Arsenal is a quick process — but doing it carefully, with accurate details and a consistent naming convention, is what makes the Arsenal useful over the long term. This page covers the full process of adding a ball entry from scratch, including the differences between the core plan and Arsenal Plus, and the specific considerations that come up in common shop scenarios.

□□ Before You Add — Check for an Existing Entry

Before creating a new Arsenal entry, confirm the ball does not already exist in the bowler's Arsenal. A ball that has been in for a re-drill, a surface refinish, or a weight hole adjustment may already have an entry from a previous visit — adding a second entry for the same physical ball fragments its spec sheet history across two records.

1. Open the bowler's profile and scroll to the **Arsenal** section.
2. Scan the existing entries for the ball's brand and model.
3. If the ball is already listed — even with a different status such as Retired — open that entry and create a new spec sheet linked to it rather than starting a fresh Arsenal entry.
4. Only proceed with a new entry if the ball is genuinely new to the bowler's record.

□□ **Note:** A bowler who owns two identical balls — same brand, model, and weight — should have two separate Arsenal entries, distinguished by serial number or a note in the ball name (e.g., `Storm Phaze II 15lb — #1` and `Storm Phaze II 15lb — #2`). Do not merge two physical balls into one entry.

□□ Adding a Ball on Desktop

1. Open the bowler's profile from the **BOWLERS** list.
2. Scroll to the **Arsenal** section and click **+ Add Ball**.
3. If **Arsenal Plus** is active, choose your entry method — **Scan Barcode**, **Search Database**, or **Enter Manually**. Without Arsenal Plus, proceed directly to manual entry.
4. Complete the entry fields as described below.
5. Set the ball's **status** to **Active** for a new ball going into the bag.
6. Click **Save**. The entry appears in the bowler's Arsenal immediately and syncs across all devices.

□□ Adding a Ball on Mobile or Tablet

1. Navigate to the bowler's profile via the **avatar icon** and tap their name.
2. Scroll to the **Arsenal** section and tap **+ Add Ball**.
3. If Arsenal Plus is active, tap **Scan Barcode** to open the device camera, or tap **Search** to look up the ball by name. Otherwise proceed to manual entry.
4. Complete the entry fields and set status to **Active**.
5. Tap **Save**.

□□ **Tip:** Barcode scanning on mobile is the fastest entry method when Arsenal Plus is active — keep the ball box nearby during the fitting and scan it at this step. The database lookup pre-fills brand, model, weight, and core specifications in seconds, leaving only serial number, purchase date, and notes to complete manually.

□□ Completing the Entry Fields

Work through the Arsenal entry fields in order. The more completely this is filled in now, the more useful the record is on every future visit.

Ball name

The ball name is the most important field in the entire entry — it is the identifier that links the Arsenal entry to the spec sheet. Use a consistent format: **brand, model, weight**. Whatever you enter here must match the ball name on the associated spec sheet exactly.

- ✅ `Hammer Black Widow 2.0 15lb` — clear, complete, consistent.
- ✅ `Roto Grip Hustle PBA 14lb` — includes full model name and weight.
- ❌ `Black Widow` — missing brand and weight; ambiguous in a large Arsenal.
- ❌ `New Hammer` — not a useful identifier for future reference.

Serial number

Found printed or engraved on the ball surface, typically near the label. Recording the serial number is optional but strongly recommended — it is the only way to distinguish two identical models from the same manufacturer, and it is essential for warranty claims or ball returns.

Purchase date

The date the bowler acquired the ball. Used for tracking equipment age, warranty periods, and understanding how long a ball has been in the bag when reviewing its performance history. Enter the date the ball was purchased or the date it first came into your shop — whichever is known.

Status

Set to **Active** for any ball currently in use. Status options and how to change them are covered in detail in section 7.1.3.

Notes

Free-text field for anything relevant to this specific ball. Good uses for the notes field include:

- ✅ Surface finish history: `Resurfaced to 2000 abralon — March 2024`.
- ✅ Weight hole details if not captured elsewhere in the spec sheet.
- ✅ Slug brand and model if a thumb slug is installed: `Turbo Quad slug, 1" bore`.
- ✅ Bowler's notes about ball reaction: `Bowler prefers this ball on medium-dry conditions`.
- ✅ Any physical damage or repair history: `Small crack repaired near pin — June 2024`.

⭐ Arsenal Plus Entry Methods

With Arsenal Plus active, two additional entry methods become available that significantly speed up and enrich the Arsenal entry process.

Barcode scanning

Scan the barcode on the ball's box or the barcode label on the ball surface itself. Spectre Cloud queries the bowlingdatabase.com integration and returns the ball's full details — brand, model, weight, colour, and core specifications including RG, differential, and MB differential. These are pre-filled into the entry automatically. You complete only the serial number, purchase date, and notes.

Database search

If the ball box is not available or the barcode is damaged, search by ball name instead. Type the brand or model into the search field and select the correct ball from the results. The same specification data is returned and pre-filled as with a barcode scan.

- Database lookup works for the vast majority of current and recent production balls.
- For limited-edition, pro-shop-exclusive, or older balls not in the database, fall back to manual entry — the Arsenal entry is still created normally, just without the auto-populated specification data.
- Core specification data stored in the Arsenal entry feeds into Arsenal Plus's suggested layout and 3D rendering features — the more completely the ball is identified in the database, the richer those features become.

Common Scenarios

The bowler is buying a new ball from your shop today

Create the Arsenal entry as part of the fitting workflow — before or immediately after the spec sheet is created. The ball box is present, so barcode scanning (if Arsenal Plus is active) is straightforward. Set status to Active.

The bowler brought in a ball purchased elsewhere

Create the Arsenal entry from the ball itself — scan the surface barcode if available, or enter manually. Purchase date may be approximate or unknown; leave it blank rather than guessing. Set status to Active.

The bowler wants to add historical balls to their record

Create Arsenal entries for each ball using whatever information is available — name and status at minimum. For balls that were drilled at your shop in the past, link them to any existing spec sheets by ensuring the ball name matches. For balls drilled elsewhere with no Spectre Cloud record, the Arsenal entry serves as an inventory note without an associated spec sheet.

A second identical ball is being added

Create a separate entry with a distinguishing detail in the ball name or notes field. Use the serial number as the primary distinguisher — enter it prominently in the name or as the first line of the notes field so the two entries are immediately distinguishable in the Arsenal list.

☁ Sync and Availability After Saving

Once saved, the Arsenal entry is immediately available across all devices logged into your Spectre Cloud account. Any staff member who opens the bowler's profile can see the new entry without any additional action.

- □ Entries sync instantly on an active internet connection.
- □ The entry is visible to all staff on the same shop account.
- □ If the account becomes inactive, Arsenal entries remain accessible in read-only mode.

Related Sections

- 7.1.1 — What is the Arsenal section and how it connects to spec sheets
- 7.1.3 — Managing ball status (Active, Retired, Sold)
- 7.1.4 — Viewing a ball's spec sheet history from the Arsenal
- 6.1.6 — Step 6 (First ball workflow): Add ball to the Arsenal section
- 04.x — Spec Sheets: linking spec sheets to Arsenal entries

 Tip: The single best habit for keeping the Arsenal useful is entering the ball at the time of the fitting — not at the end of the day, not at the end of the week. A ball entered while the bowler is standing at the counter takes ninety seconds. A ball reconstructed from memory two days later takes longer and is less accurate. Make it part of the fitting flow and it never becomes a backlog.

7.1.3 Hole Depth option — setting desired depth for each hole

Hole Depth option — setting desired depth for each hole

7.1.3 **NEW** arsenal

When drilling a bowling ball, hole depth is not a fixed value — it varies by bowler, ball construction, and fitting intent. Spectre Cloud's **Hole Depth** option allows you to record and manage the desired depth for each hole on a spec sheet, ensuring the depth specification travels with the drilling record rather than existing only in the driller's memory or on a separate note. This page explains what the Hole Depth option does, how to set it, and how it interacts with the rest of the spec sheet.

□□ What Hole Depth Controls

Hole depth specifies how deep each finger and thumb hole is drilled into the ball. It is distinct from hole size (diameter) and pitch — depth is the third spatial dimension of a drilled hole, and getting it wrong produces a hole that is either too shallow (the finger bottoms out uncomfortably) or too deep (the ball is weakened unnecessarily and the hole feels loose).

- □ Depth is set independently for each hole — middle finger, ring finger, and thumb can each carry a different depth specification.
- □ Depth values are stored on the spec sheet as part of the permanent drilling record.

- □ Correct depth recording means a re-drill or a second ball can replicate the same depth without the bowler needing to be present for a fitting check.
- □ For bowlers with inserts, depth is particularly important — the insert must seat at the correct depth to produce the intended grip feel.

□□ How Hole Depth Is Measured and Expressed

Hole depth in Spectre Cloud is expressed in inches, measured from the ball surface to the bottom of the drilled hole. The measurement is taken along the drill bit's axis of travel — not along the pitch angle — so it represents the true depth of the hole as drilled, not the straight-line distance from surface to bottom through the ball's interior.

- □ Typical finger hole depths for fingertip grips range from approximately `1 1/2"` to `2"` depending on finger length and insert type.
- □ Thumb hole depths vary more widely — from under `1 1/2"` for shallow fits to over `2"` for deep thumb slugs or long thumbs.
- □ Conventional grip finger holes are typically drilled slightly deeper than fingertip to accommodate the second knuckle insertion.

⚠ **Verify with Spectre team:** Confirm the typical depth ranges listed above against Spectre Cloud's IBPSIA-standard auto-suggestion values, and update if the app's defaults differ from the figures used here.

□□ Setting Hole Depth on Desktop

1. Open the spec sheet for the ball being drilled.
2. Locate the **Hole Depth** field within each hole's section — middle finger, ring finger, and thumb each have their own depth field.
3. Enter the desired depth in inches for each hole.
4. If Spectre Cloud provides an auto-suggested depth based on the finger measurements and grip type already entered, review the suggestion and adjust if needed before saving.
5. Save the spec sheet. Depth values are stored alongside all other hole specifications.

□□ Setting Hole Depth on Mobile

1. Open the spec sheet and scroll to the hole section for each finger and the thumb.

2. Tap the **Hole Depth** field for each hole and enter the desired depth using the numeric keyboard.
3. Work through middle finger, ring finger, and thumb in order before saving.

Factors That Determine the Right Depth

Hole depth is not a value you look up on a chart — it is derived from a combination of physical measurements, insert specifications, and fitting judgement. The following factors all bear on the correct depth for a given hole:

Finger length and joint position

The hole must be deep enough for the finger to seat at the correct knuckle position — first knuckle for fingertip, second knuckle for conventional. A hole that is too shallow prevents the finger from reaching its intended seating point; a hole that is too deep allows the finger to sink past it.

Insert type and seating requirements

Finger inserts have a defined seating depth — the hole must be drilled to exactly the depth at which the insert seats flush with or slightly below the ball surface. Different insert brands and styles have different seating depths; check the manufacturer's specification before drilling.

- Record the insert brand and model in the spec sheet notes field alongside the depth value — this makes future re-drills straightforward when the same insert is being used again.
- For oval inserts, the depth specification applies to the deepest point of the oval — confirm this with the insert manufacturer's documentation.

Ball construction and minimum safe depth

Some high-performance balls have asymmetric cores positioned close to the ball surface. Drilling too deep risks breaching the core or entering a material layer that affects structural integrity. For balls with complex core geometries, consult the manufacturer's drilling specifications before setting depth — particularly for the thumb hole, which is often the deepest.

Thumb slug depth

Thumb slugs have their own depth requirements determined by the slug's length and the required pitch bore engagement. A slug that is not fully seated — because the hole was drilled too shallow — sits proud of the ball surface and affects release feel. A hole drilled too deep for a short slug leaves a gap beneath the slug that can allow movement.

- □ Always drill the thumb hole to the slug manufacturer's specified depth, not to a general estimate.
- □ Record the slug length in the spec sheet notes as a cross-reference to the depth value.

□□ Hole Depth and Re-Drills

When a ball is plugged and re-drilled, hole depth requires special attention. The plug material and the original hole geometry may affect how deep the new hole can safely be drilled in the same location. Consider the following when setting depth on a re-drill spec sheet:

- □ If the new hole is in a different location from the original, depth can be set normally from the ball surface.
- □ If the new hole overlaps with a plugged area, check the plug depth and condition before drilling — a shallow or incomplete plug can cause the drill bit to enter a void.
- □ Clone the original spec sheet as a starting point for the re-drill, then review and update the depth values explicitly — do not assume the previous depth is still correct after a plug.
- □ Do not carry forward depth values from a previous spec sheet without checking — the plug changes the effective starting surface and may require depth adjustment.

⚖ Hole Depth Across the Three Hole Types

Hole	Key depth consideration	Common depth range
Middle finger	Insert seating depth; finger joint position	`1 1/2"` — `2"`
Ring finger	Same as middle finger; often identical but measure independently	`1 1/2"` — `2"`
Thumb	Slug length and seating; pitch bore engagement; ball core proximity	`1 1/4"` — `2 1/4"`

□□ **Note:** These ranges are general guidance. Individual bowlers, insert types, and ball constructions may require depths outside these ranges. Always derive depth from the physical fitting and equipment specifications rather than defaulting to a range midpoint.

Using Depth Values on Subsequent Visits

One of the most practical benefits of recording hole depth in Spectre Cloud is what it enables on future visits. When a bowler returns for a new ball or a re-drill, the depth values on their previous spec sheets provide an immediate reference point:

- A bowler who reports that their current ball feels perfect can have the same depth replicated on the new ball without a fitting check — the record has it.
- A bowler who reports that the current ball feels too tight or too shallow gives the previous depth as a starting point for adjustment — you know what to move away from.
- For shops with multiple drillers, depth records mean any staff member can handle a returning bowler's visit with the same precision as the original driller.

Related Sections

- 7.1.1 — What is the Arsenal section and how it connects to spec sheets
- 7.1.2 — Adding a ball to the Arsenal
- 7.1.4 — Viewing a ball's spec sheet history from the Arsenal
- 6.1.3 — Step 3: Set grip type and enter finger measurements
- 6.1.4 — Step 4: Enter thumb information (round or oval)
- 04.x — Spec Sheets: field reference and measurement guide

Tip: If a bowler cannot tell you their preferred depth and has no previous spec sheets to reference, drill to the insert manufacturer's specified seating depth as your starting point, then check the fit with the bowler before finalising. A test finger insert seated in the fresh hole takes thirty seconds to evaluate and prevents a depth-related re-drill far more reliably than any rule of thumb.

7.1.4 Viewing and editing ball details in the arsenal

Viewing and editing ball details in the arsenal

> 7.1.4 arsenal

Once a ball has been added to a bowler's Arsenal, its entry is a living record — not a set-and-forget note. Ball details change over time: status shifts from Active to Retired, surface notes accumulate, slugs get replaced, and spec sheets are added with each re-drill. Knowing how to navigate to a ball's entry, read its full history, and update its details accurately keeps the Arsenal useful across the entire lifespan of a bowler's equipment.

□□ Opening a Ball's Arsenal Entry

□□ On Desktop

1. Open the bowler's profile from the **BOWLERS** list.
2. Scroll to the **Arsenal** section within the profile.
3. Locate the ball in the Arsenal list — Active balls appear at the top by default, followed by Retired and Sold entries.
4. Click the ball's name or entry row to open the full detail view.

□□ On Mobile or Tablet

1. Navigate to the bowler's profile via the **avatar icon**.
2. Scroll to the **Arsenal** section.
3. Tap the ball's name or entry row to open the detail view.

□□ **Note:** Retired and Sold balls remain in the Arsenal list and are fully accessible — they are not hidden or archived. If the list is long, use the search or filter options within the Arsenal section to find a specific ball quickly.

□□ What the Ball Detail View Shows

Opening a ball's entry displays everything Spectre Cloud holds about that piece of equipment in a single view. The detail view is organised into two areas: the ball's identifying information and its linked spec sheet history.

Ball information

- □ **Ball name** — brand, model, and weight as entered.
- □ **Serial number** — if recorded at entry.
- □ **Purchase date** — if recorded at entry.
- □ **Status** — Active, Retired, or Sold.
- □ **Notes** — free-text field showing surface history, slug details, or any other ball-specific information added over time.
- □ **Ball specifications** — core type, RG, differential, MB differential (Arsenal Plus only, populated from the bowlingdatabase.com integration).

Linked spec sheet history

Below the ball information, the detail view lists every spec sheet associated with this ball entry, in chronological order from most recent to oldest. Each entry in the list shows the spec sheet's creation date, the span type, and a summary of key values. Tap or click any spec sheet in the list to open it in full.

- □ A ball drilled once has one spec sheet in the list.
- □ A ball that has been re-drilled multiple times shows all historical spec sheets — the full drilling evolution of that ball is visible at a glance.
- □ The most recent spec sheet is always shown first — the current drilling state of the ball is immediately accessible without scrolling.

✏ Editing Ball Details

Any field in the ball's Arsenal entry can be edited at any time. Common reasons to update an entry include a status change, adding surface maintenance notes, correcting a typo in the ball name, or adding a serial number that was not available at the time of original entry.

□□ Editing on Desktop

1. Open the ball's detail view as described above.
2. Click the **Edit** button (pencil icon or Edit label, typically in the top-right of the detail view).
3. The entry fields become editable. Update any field that requires a change.
4. Click **Save** to commit the changes. The updated entry syncs across all devices immediately.

□□ Editing on Mobile or Tablet

1. Open the ball's detail view.
2. Tap the **Edit** button.
3. Update the relevant fields using the on-screen keyboard.
4. Tap **Save**.

□□ **Note:** Editing the ball name in the Arsenal entry does not automatically update the ball name on associated spec sheets. If you correct a ball name, review the linked spec sheets and update their ball name fields individually to maintain the association. A name mismatch between the Arsenal entry and a spec sheet breaks the link between the two records.

□□ Updating the Notes Field Over Time

The Notes field is the most frequently updated part of an Arsenal entry after the initial creation. Rather than replacing previous notes when adding new information, append new entries with a date so the notes field becomes a readable maintenance log for the ball:

- □ `Resurfaced to 2000 abralon — 14 Mar 2024`
- □ `Thumb slug replaced (Turbo Quad 1") — 2 Jun 2024`
- □ `Surface cleaned and polished — 18 Sep 2024`

A notes field maintained this way gives any staff member an instant surface history for the ball without needing to ask the bowler or reference external records.

□□ Reading the Spec Sheet History

The spec sheet history list within the Arsenal entry is a read-only summary — to edit a spec sheet, open it directly from the list and edit it from within the spec sheet view. From the Arsenal detail view, the history list is most useful for:

- □ **Reviewing how the ball has been drilled over time** — comparing layouts, pitch changes, and oval adjustments across multiple spec sheets reveals the fitting evolution for that ball.
- □ **Finding a previous drilling to replicate** — if a bowler loved how the ball felt two drillings ago, open that spec sheet and compare it to the current one to identify what changed.
- □ **Confirming the current drilling state** — the most recent spec sheet in the list represents the ball as it currently exists. For a ball that has been re-drilled several times, this is the authoritative record of what is in the ball right now.
- □ **Navigating to a spec sheet for printing or sharing** — open the relevant spec sheet from the history list and use the print or share function from within the spec sheet view.

□□ Deleting a Ball Entry

Arsenal entries can be deleted, but deletion is permanent — the entry and its link to associated spec sheets cannot be recovered. In almost all cases, changing the ball's status to **Retired** or **Sold** is the better choice. Status changes preserve the full history while removing the ball from the Active view.

- □ **Retire or sell** rather than delete in all routine cases — a retired ball's spec sheet history remains accessible and useful for future reference.
- □ Delete only when an entry was created in clear error — a duplicate entry for the same physical ball, or a test entry that should never have been saved.
- □ Do not delete an entry simply because the ball is old or no longer in use. The history has value — a bowler asking to replicate a ball from five years ago will thank you for keeping it.

⚠ **Verify with Spectre team:** Confirm whether deleting an Arsenal entry also deletes associated spec sheets, or whether spec sheets remain accessible through the bowler's profile independently. The page advises against deletion partly on this basis — confirm the exact behaviour before publishing.

Arsenal Plus: Additional Detail View Features

With Arsenal Plus active, the ball detail view includes additional panels below the standard information and spec sheet history:

- **Ball specifications panel** — displays RG, total differential, MB differential, core type, and coverstock details from the bowlingdatabase.com integration.
- **3D layout rendering** — shows a visual representation of the pin and mass bias placement based on the most recent spec sheet's layout values. Updates automatically when a new spec sheet is linked to the entry.
- **Suggested layouts** — based on the ball's core specifications and the bowler's PAP (from their spec sheet history), Arsenal Plus surfaces layout suggestions appropriate for this ball directly within the detail view.
- **Layout conversion** — allows the layout recorded on any linked spec sheet to be viewed in an alternative layout system (e.g., a VLS layout converted to PAL terms) without modifying the original record.

Best Practices for Keeping Arsenal Entries Accurate

- **Update status promptly** when a ball leaves the active bag — a bowler's Arsenal list is only useful as a current-inventory view if statuses are kept current.
- **Add surface notes at the time of service** — a note added during the visit takes ten seconds; a note reconstructed from memory a week later is less reliable.
- **Review the Arsenal entry before every re-drill visit** — reading the notes field and spec sheet history before the bowler arrives means you can start the conversation with informed questions rather than starting from scratch.
- **Correct name mismatches as soon as they are noticed** — update both the Arsenal entry and the spec sheet simultaneously so the link is restored cleanly.
- Do not use the Notes field as a substitute for a spec sheet — drilling details (span, pitch, oval, layout) belong on the spec sheet, not in the notes. Notes are for equipment condition and maintenance history.

Related Sections

- 7.1.1 — What is the Arsenal section and how it connects to spec sheets

- 7.1.2 — Adding a ball to the Arsenal
- 7.1.3 — Hole Depth option — setting desired depth for each hole
- 7.1.5 — Managing ball status (Active, Retired, Sold)
- 04.x — Spec Sheets: editing and managing records
- 07.x — Arsenal Plus: bowlingdatabase.com integration and 3D rendering

 Tip: Make reviewing the Arsenal detail view part of your standard pre-visit preparation for returning bowlers — open their profile, read the notes on their active balls, and scan the spec sheet history before they walk through the door. The bowler who feels like their pro shop operator remembers them and knows their equipment is the bowler who comes back for every new ball.

7.1.5 Suggested Layouts feature — using bowler data to suggest a layout

Suggested Layouts feature — using bowler data to suggest a layout

> 7.1.5 arsenal

The **Suggested Layouts** feature is part of the **Arsenal Plus plugin** (`$5 USD/month`) and uses a combination of the bowler's recorded data and the ball's core specifications to surface layout recommendations directly within Spectre Cloud. Rather than consulting an external chart or performing manual calculations, the fitter can see a set of data-driven layout options for the specific ball and bowler in front of them — generated from information already in the system.

□□ What Suggested Layouts Does

When viewing a ball's Arsenal entry with Arsenal Plus active, the Suggested Layouts panel analyses two sources of data already stored in Spectre Cloud and returns a set of layout options ranked by their likely effect on ball motion:

- □ **Bowler data** — PAP location, axis tilt, axis rotation, and rev rate drawn from the bowler's spec sheet history.

- **Ball specifications** — RG, total differential, MB differential, and core type from the bowlingdatabase.com integration.
- Suggested layouts are expressed in the layout system set as your shop default (VLS, 2LS, or PAL) so the output is immediately usable without conversion.
- Each suggestion includes a brief description of the expected ball motion profile — earlier or later breakpoint, stronger or weaker flare potential, angular or arcing backend — so the recommendation can be discussed with the bowler in plain language.

Note: Suggested Layouts requires both the ball to be identified in the bowlingdatabase.com integration and the bowler's PAP to be recorded on at least one spec sheet. If either piece of data is missing, the feature will prompt you to add it before suggestions can be generated.

The Data Behind the Suggestions

Understanding what Suggested Layouts draws on helps you evaluate the quality of its recommendations and know when the suggestions are most reliable.

PAP location

The bowler's positive axis point is the single most important input. A precisely measured and recently confirmed PAP produces the most accurate layout suggestions. A PAP that was estimated, is several years old, or was recorded from a different ball style may produce suggestions that are technically valid but less precisely tailored to how the bowler currently throws.

- Re-measure the PAP periodically — especially after a significant change in the bowler's release, ball weight, or physical conditioning.
- Spectre Cloud uses the PAP from the bowler's **most recent spec sheet** as the default input. If the most recent sheet has an unusually different PAP from previous sheets, verify the measurement before running suggestions.

Axis tilt and rotation

Tilt and rotation data refine the suggestion further — they describe how the ball rolls through the heads and midlane and how much angular change occurs at the breakpoint. Bowlers with higher tilt produce a different set of optimal layouts than bowlers with lower tilt on the same ball. These values are recorded on the spec sheet alongside the PAP.

Ball core specifications

The RG, differential, and MB differential values from bowlingdatabase.com determine how strongly a given core responds to different pin and MB placements. A high-differential asymmetric core responds very differently to layout changes than a low-differential symmetric one. The Suggested Layouts algorithm accounts for this so a layout that would be aggressive on a benchmark ball is not suggested in the same form for a mild symmetric.

□□ Accessing Suggested Layouts on Desktop

1. Open the bowler's profile and navigate to the **Arsenal** section.
2. Click the ball's entry to open the detail view.
3. Locate the **Suggested Layouts** panel — visible when Arsenal Plus is active and the ball has been identified in the bowlingdatabase.com integration.
4. If the bowler's PAP is on file from a previous spec sheet, suggestions generate automatically. If PAP is missing, the panel prompts you to enter it.
5. Review the suggested layouts listed. Each shows the layout values in your shop's default system alongside a motion profile description.
6. To use a suggestion, click **Apply to Spec Sheet** (or equivalent) — the layout values are transferred to the open or new spec sheet without manual re-entry.

□□ Accessing Suggested Layouts on Mobile or Tablet

1. Open the bowler's profile and tap the ball's Arsenal entry.
2. Scroll to the **Suggested Layouts** panel.
3. Review the suggestions and tap **Apply to Spec Sheet** to use one.

□□ **Tip:** On a tablet at the counter, walking a bowler through the Suggested Layouts panel is an effective way to involve them in the layout decision — each suggestion's motion profile description gives them a plain-language picture of what the ball will do before any drilling decisions are made.

□□ Reading a Layout Suggestion

Each suggestion in the Suggested Layouts panel contains several pieces of information. Here is how to read them:

Element	What it tells you
Layout values	Pin distance, VAL angle, MB distance (or equivalent in your chosen system) — ready to transfer directly to the spec sheet
Motion profile label	A brief descriptor of the expected ball motion — e.g., *Strong early read, angular backend* or *Skid-flip, late breakpoint*
Flare potential	Low, medium, or high — indicates how much the ball will track across its surface over the course of a game
Breakpoint shape	Whether the ball motion is expected to be smooth and arcing or sharp and angular at the breakpoint
Recommended lane condition	The oil pattern type this layout is best suited to — heavy oil, medium, sport pattern, or dry — based on the ball's coverstock and the layout's motion profile

⚠ **Verify with Spectre team:** Confirm the exact fields and labels shown in the Suggested Layouts panel — specifically whether Recommended Lane Condition and Breakpoint Shape are displayed as described, or whether the panel uses different terminology or a different set of output fields.

When Suggested Layouts Is Most Valuable

- **New ball purchases** where the bowler has not used this ball or core type before — suggestions give a starting point grounded in their actual PAP rather than a generic manufacturer recommendation.
- **Bowlers seeking a specific ball motion** they cannot articulate technically — the motion profile descriptions let them point to what they want without needing to understand pin distances and VAL angles.
- **Shops building out a bowler's multi-ball arsenal** — Suggested Layouts can surface complementary layouts across several balls to ensure the bag covers different lane conditions without redundancy.
- **Less experienced staff members** handling a fitting that would normally require the head driller's layout knowledge — suggestions provide a reliable framework while the driller develops their own layout intuition.
- **Confirming an experienced fitter's layout instinct** — even for veteran drillers, checking a planned layout against the system's suggestion takes thirty seconds and sometimes surfaces a refinement worth considering.

⚠ Understanding the Limitations

- Suggested Layouts is a **starting point**, not a prescription. The algorithm works from stored data — it cannot account for how a bowler feels about their current equipment, recent changes to their release, or lane conditions at their specific bowling centre.
- Suggestions are only as good as the **input data quality**. An outdated PAP, an estimated axis tilt, or a ball not found in the bowlingdatabase.com integration all reduce the reliability of the output.
- The feature does not replace fitting experience — it augments it. A layout suggestion that contradicts a strong fitting instinct backed by years of experience with a specific bowler deserves scrutiny, not automatic override.
- Suggested Layouts does not account for **equipment the bowler already has in their bag** unless the fitter manually considers that context alongside the suggestions. A layout that is ideal in isolation may duplicate motion already covered by an existing ball.

Using a Suggestion as a Starting Point for Adjustment

The most effective way to use Suggested Layouts is to treat the output as an informed first draft rather than a final answer. Review the top suggestion, apply it to the spec sheet, and then evaluate it against your own knowledge of the bowler:

1. Apply the suggested layout values to the spec sheet using the **Apply to Spec Sheet** function.
2. Review the applied values in the context of the bowler's full spec — do they align with the intended ball motion discussion?
3. Adjust individual values if your fitting judgement calls for it — the suggestion is a starting point, and the spec sheet fields are fully editable after application.
4. Record the final layout on the spec sheet. If you deviated from the suggestion, note why in the spec sheet's notes field — this creates a useful reference for future visits.

Related Sections

- 7.1.1 — What is the Arsenal section and how it connects to spec sheets
- 7.1.2 — Adding a ball to the Arsenal
- 7.1.4 — Viewing and editing ball details in the Arsenal
- 7.2.1 — Arsenal Plus: setting up the bowlingdatabase.com integration
- 7.2.2 — Arsenal Plus: 3D layout rendering
- 6.1.5 — Step 5: Select layout (VLS, 2LS, PAL, or manual)

 Tip: Before a bowler's visit to discuss a new ball purchase, open their Arsenal and run Suggested Layouts on the ball they are considering while they are still on their way in. By the time they arrive, you have a layout direction ready to discuss — the conversation moves from "what should we do?" to "here is what the data suggests, and here is what I think" in the first sixty seconds of the visit.

7.1.6 Manually entering Drilling Angle, Pin to PAP, and VAL Angle

Manually entering Drilling Angle, Pin to PAP, and VAL Angle

> 7.1.6 arsenal

For shops that work from a layout plan rather than Suggested Layouts — or for any situation where the fitter is entering a pre-determined layout rather than generating one from the system — Spectre Cloud's spec sheet provides dedicated fields for manual layout entry. This page covers three of the most important: **Drilling Angle**, **Pin to PAP distance**, and **VAL Angle**. These are the core measurements of the VLS layout system and appear on spec sheets whenever VLS is selected as the layout method.

□□ What Each Value Represents

Before entering values, it helps to be clear on exactly what each field is measuring — confusion between these three values is one of the most common sources of layout entry errors.

Pin to PAP distance

The straight-line distance, in inches, from the ball's **pin** to the bowler's **positive axis point (PAP)**. This is the primary driver of flare potential and overall ball motion strength. A shorter pin-to-PAP distance increases flare and produces a stronger, earlier-reading ball motion. A longer distance reduces flare and moves the breakpoint further downlane.

- Typical range: `2"` to `5"`. Values outside this range are physically possible but uncommon in standard fingertip fitting.
- Measured from the centre of the pin to the bowler's PAP mark on the ball surface — or calculated from the PAP coordinates if the ball has not yet been marked.
- The single most impactful layout variable for most bowlers — small changes here produce noticeable differences in ball motion.

VAL Angle

The angle, in degrees, between the bowler's **Vertical Axis Line (VAL)** and the line connecting the PAP to the pin. The VAL angle controls the shape and timing of the breakpoint — a lower VAL angle produces a smoother, more arcing motion, while a higher angle produces a more angular, later-breaking reaction.

- Typical range: `0°` to `90°`, though most fits fall between `15°` and `75°`.
- A VAL angle of `45°` is a common starting point for a balanced, benchmark motion on a medium-differential ball.
- VAL angle interacts with pin-to-PAP distance — a high VAL angle on a short pin-to-PAP produces a very different result than the same angle on a long pin-to-PAP. They are not independent variables.

Drilling Angle

The angle at which the ball is placed in the drilling jig — specifically, the rotation of the ball around the vertical axis relative to the grip centre. The drilling angle determines where the mass bias (MB) marker ends up in relation to the VAL and the grip, completing the three-dimensional placement of the core inside the finished ball.

- Drilling angle is most significant for **asymmetric cores**, where the MB marker's position relative to the VAL directly affects the strength and shape of ball motion.
- For **symmetric cores**, the drilling angle still affects ball motion but the MB is less dominant — the pin-to-PAP and VAL angle carry more of the layout's effect.
- Expressed in degrees, typically from `0°` to `90°`. The exact value depends on the intended MB placement and the ball's core geometry.

□□ Entering These Values on Desktop

1. Open the spec sheet for the ball being drilled.
2. Navigate to the **Layout** section and confirm the layout system is set to **VLS**.
3. Click into the **Pin to PAP** field and enter the distance in inches — use decimal or fractional notation consistent with your shop's standard (e.g., `3.5` or `3 1/2`).
4. Click into the **VAL Angle** field and enter the angle in degrees.
5. Click into the **Drilling Angle** field and enter the angle in degrees.
6. Review all three values together before saving — they should be consistent with each other and with the intended ball motion discussed with the bowler.
7. Save the spec sheet.

□□ Entering These Values on Mobile or Tablet

1. Open the spec sheet and scroll to the **Layout** section.
2. Confirm **VLS** is selected as the layout system.
3. Tap each field — **Pin to PAP**, **VAL Angle**, **Drilling Angle** — in turn and enter the values using the numeric keyboard.
4. Tap **Save** or allow auto-save to capture the entries.

⚖ How the Three Values Work Together

Pin to PAP, VAL Angle, and Drilling Angle are not independent — they define a three-dimensional orientation of the ball's core relative to the bowler's release. Changing one without considering the others can produce an unintended result. The relationships to keep in mind:

Variable	Primary effect	Interacts most strongly with
Pin to PAP distance	Flare potential and overall motion strength	VAL Angle — together they set breakpoint timing and shape

Variable	Primary effect	Interacts most strongly with
VAL Angle	Breakpoint shape — arcing vs. angular	Pin to PAP — high angle on short distance reads very differently from high angle on long distance
Drilling Angle	MB placement — most significant on asymmetric cores	Core type — effect is amplified on high-differential asymmetrics, subtle on low-differential symmetrics

Note: When using Arsenal Plus, the 3D layout rendering panel updates in real time as these values are entered — providing a visual confirmation of the core orientation before drilling begins. If the rendered position does not match the intended layout, it is a signal to re-check one or more of the entered values.

Common Entry Mistakes and How to Avoid Them

Confusing VAL Angle with Drilling Angle

These are the most commonly confused values in manual VLS entry. The VAL angle is measured from the bowler's VAL to the pin line — it is a property of the *layout geometry*. The drilling angle is the rotation of the ball in the jig — it is a property of the *machine setup*. They are related but not interchangeable.

- If you are working from a layout plan produced by an external tool or manufacturer guide, confirm which convention that tool uses before entering values in Spectre Cloud — some tools express these in slightly different terms.
- If Arsenal Plus is active, use the 3D rendering to visually verify that the pin and MB are positioned where the layout plan intends before committing to the values.

Using the wrong PAP for the suggestion

Pin to PAP distance is only meaningful if the PAP used to calculate it matches the bowler's current PAP. A distance calculated from an old or estimated PAP produces a layout that performs differently from what was planned.

- Before entering Pin to PAP, confirm which PAP measurement you are working from — and that it is current.
- If the bowler's PAP is on file in their spec sheet history, cross-check your planned value against the recorded PAP coordinates rather than working from memory.

Entering fractional inches as decimals inconsistently

Pin to PAP is typically expressed in inches with a fractional component. Spectre Cloud accepts both decimal and fractional entry, but mixing conventions within a spec sheet — `3.5"` on one ball and `3 1/2"` on another — makes comparisons across spec sheets harder to read at a glance.

- Settle on one format as a shop standard and apply it consistently. Either convention is correct — consistency is what matters.

Cross-Checking Against a Layout Plan

When entering layout values from a pre-determined drilling plan — a manufacturer's recommendation, a coach's specification, or an Arsenal Plus suggestion that has been adjusted — use the following cross-check before saving:

1. Confirm **Pin to PAP** matches the plan value exactly. If the plan expresses this as a range, enter the midpoint of the range or the value you have chosen within it.
2. Confirm **VAL Angle** matches the plan. If the plan uses a different angle convention, convert before entering — do not enter the unconverted value and plan to remember the difference later.
3. Confirm **Drilling Angle** is consistent with the intended MB placement. For symmetric balls where the drilling angle is less critical, note this in the spec sheet so future readers know the value was a secondary consideration.
4. If Arsenal Plus is active, review the 3D rendering and confirm the visual matches the plan before drilling.

Related Sections

- 7.1.5 — Suggested Layouts feature — using bowler data to suggest a layout
- 7.2.2 — Arsenal Plus: 3D layout rendering
- 7.2.3 — Arsenal Plus: layout conversion between systems
- 6.1.5 — Step 5: Select layout (VLS, 2LS, PAL, or manual)
- 04.x — Spec Sheets: layout field reference

Tip: When training a new driller on layout entry, have them enter all three values and then describe aloud what they expect the ball to do — earlier or later, arcing or angular, strong or

benchmark. If their description matches the intended motion, the values are almost certainly correct. If it does not, the disconnect is usually in one of the three fields and the conversation surfaces it faster than a visual check alone.

7.2 — 3D Layout (Spectre 3.223+)

7.2.1 What is the 3D Layout view?

What is the 3D Layout view?

> `7.2.1` layout 3D

The **3D Layout view** is a visual feature available with the **Arsenal Plus plugin** (`$5 USD/month`) that renders a three-dimensional representation of a bowling ball showing the pin, mass bias marker, and finger hole positions based on the layout values recorded on a spec sheet. Rather than working purely from numbers on a form, the fitter and bowler can see the core orientation mapped onto the ball surface — a spatial picture of the drilling plan before any cuts are made.

□□ What the 3D Layout View Shows

The rendering displays a rotatable three-dimensional ball model with the following elements plotted on its surface based on the spec sheet's layout values:

- □ **Pin position** — the ball's top weight pin, shown at its calculated location relative to the grip and PAP.
- □ **Mass bias (MB) marker** — the preferred spin axis marker for asymmetric balls, shown at its calculated position.
- □ **Finger holes** — middle and ring finger hole positions as calculated from the span and pitch values on the spec sheet.
- □ **Thumb hole** — positioned relative to the finger holes based on span measurements.
- □ **PAP location** — the bowler's positive axis point, shown as a reference point on the ball surface.
- □ **VAL line** — the bowler's vertical axis line, rendered as a reference arc connecting the PAP to the top and bottom of the ball.

□□ **Note:** The 3D Layout view is a *visual reference tool*, not a drill press guidance system. It shows where elements should be on the ball surface based on the spec sheet values — confirming the layout geometry is correct before drilling begins. It does not interface directly with any drilling equipment.

□□ What Arsenal Plus Requires for 3D Rendering

The rendering draws on data from two sources. Both must be present for the full 3D view to generate:

Required data	Where it comes from	What happens if missing
Ball core specifications (RG, differential, core shape)	bowlingdatabase.com integration via the Arsenal entry	Rendering cannot generate — Spectre Cloud prompts to identify the ball in the database
Layout values (Pin to PAP, VAL Angle, Drilling Angle)	Spec sheet layout section	Rendering shows an empty ball with grip holes only — no pin or MB placement
PAP coordinates	Spec sheet bowler data	PAP and VAL line are omitted from the rendering; pin placement is shown without PAP reference
Span and pitch values	Spec sheet measurement fields	Finger and thumb holes are shown at estimated positions or omitted

□□ Accessing the 3D Layout View on Desktop

1. Open the bowler's profile and navigate to the **Arsenal** section.
2. Click the ball's entry to open the detail view.
3. Locate the **3D Layout** panel — visible when Arsenal Plus is active and the ball has been identified in the bowlingdatabase.com integration.
4. The rendering loads automatically based on the most recently linked spec sheet's layout values.
5. Click and drag on the ball to rotate the view and examine the layout from any angle.
6. To view the rendering for a different spec sheet (e.g., a previous drilling), select that spec sheet from the history list — the rendering updates to reflect the selected sheet's layout

values.

Accessing the 3D Layout View on Mobile or Tablet

1. Open the bowler's profile and tap the ball's Arsenal entry.
2. Scroll to the **3D Layout** panel.
3. The rendering loads automatically.
4. Use one finger to rotate the ball — drag in any direction to change the viewing angle.
5. Pinch to zoom if a closer view of a specific area is needed.

Tip: On a tablet, the 3D Layout view is large enough to be genuinely useful as a reference during a fitting conversation — rotating the ball on screen while discussing ball motion with a bowler is more engaging and informative than describing a layout in abstract terms.

Using the 3D Layout View to Verify a Drilling Plan

The most valuable use of the 3D Layout view is as a pre-drill verification step. Before any holes are cut, the rendering provides a visual confirmation that the layout values entered on the spec sheet produce the intended core orientation. Work through the following checks:

1. **Pin placement** — confirm the pin is positioned where your layout plan intends. Check its distance from the PAP visually, and confirm it falls on the correct side of the VAL line for the intended ball motion.
2. **MB placement** — for asymmetric balls, confirm the mass bias marker is in the intended position relative to the VAL. An MB that has ended up on the wrong side of the VAL will produce very different ball motion from what was planned.
3. **Grip hole relationship** — confirm that the finger and thumb holes are positioned correctly relative to the pin and MB. Holes that overlap with or sit unusually close to the pin or MB are a flag worth investigating before drilling.
4. **VAL line orientation** — confirm the VAL runs through the expected reference points on the ball surface. A VAL that looks misaligned in the rendering is often a sign of an incorrectly entered PAP coordinate.

Note: If the 3D rendering shows a layout that does not match the drilling plan, return to the spec sheet and check the layout values before proceeding. The rendering is not wrong — it is

faithfully representing what the entered values produce. A discrepancy between the rendering and the intended plan always means a data entry issue, not a rendering error.

3D Layout View Across Spec Sheet History

Because the rendering reflects whichever spec sheet is currently selected in the Arsenal detail view, it can be used to step through a ball's drilling history visually — seeing how the layout changed from one drilling to the next, not just as numbers on a list but as a spatial picture on the ball surface.

- Select the most recent spec sheet to see the current drilling state of the ball.
- Select an earlier spec sheet to see how the pin or MB was positioned in a previous drilling — useful when a bowler wants to replicate a ball motion from an earlier setup.
- Compare two drillings side by side by opening the ball detail view on two browser tabs and selecting a different spec sheet in each — the two renderings show the layout differences visually.

⚖ 3D Layout View vs. Physical Ball Marking

The 3D Layout view is a digital planning tool — it works from spec sheet data and does not replace the physical process of marking the ball surface before drilling. Use it to verify the plan and communicate the layout to the bowler, but always mark the physical ball and verify the marks before drilling begins.

Task	3D Layout view	Physical ball marking
Verify layout geometry before drilling	Instant, no marks needed	Physical confirmation at the press
Communicate layout to bowler	Visual and rotatable — no technical knowledge required to follow	Requires bowler to interpret physical marks
Catch data entry errors	Immediately visible in the rendering	Caught at the press — later in the workflow
Guide drill press setup	Reference only — not a direct interface	Physical marks guide jig setup directly

Task	3D Layout view	Physical ball marking
Historical layout comparison	Switch between spec sheets to compare visually	Not practical on a drilled ball

Tips for Getting the Most From the 3D Layout View

- **Use it early in the fitting conversation** — pulling up the 3D view while discussing a layout option is more compelling than quoting pin distances. Bowlers who can see what their ball will look like are more engaged in the decision.
- **Rotate to the bowler's perspective** — orient the rendering so the finger holes are facing the viewer and the ball is in grip position. This is the angle most meaningful to the bowler and the most intuitive for communicating ball motion.
- **Use it to explain layout changes between re-drillings** — if a bowler is asking why their ball reacts differently after a re-drill, showing the two layouts side by side in the 3D view makes the difference immediately apparent without requiring technical explanation.
- **Check it after any layout value change** — if a Pin to PAP, VAL Angle, or Drilling Angle value is adjusted, refresh the rendering to confirm the update has been reflected before printing the spec sheet.

Related Sections

- 7.1.5 — Suggested Layouts feature — using bowler data to suggest a layout
- 7.1.6 — Manually entering Drilling Angle, Pin to PAP, and VAL Angle
- 7.2.2 — Arsenal Plus: layout conversion between systems
- 7.2.3 — Arsenal Plus: barcode scanning and database lookup
- 6.1.5 — Step 5: Select layout (VLS, 2LS, PAL, or manual)

Tip: The 3D Layout view is one of the most visible demonstrations of Arsenal Plus's value to a bowler who has never seen it before. The first time you rotate their ball's layout on screen and explain what the pin position means for their motion, you have made a compelling case for why their drilling history lives in Spectre Cloud — and why they should come back to your shop for every ball in their bag.

7.2.2 Navigating and reading the 3D ball view

Navigating and reading the 3D ball view

> 7.2.2 layout 3D

The 3D Layout view renders a rotatable ball model with all key layout elements plotted on its surface. Knowing how to navigate the view efficiently — rotating to the right angle, reading the plotted markers correctly, and interpreting what you are seeing — is what makes it genuinely useful at the counter and the drill press rather than just visually impressive. This page covers the navigation controls, what each element on the ball surface means, and how to read the rendering with confidence.

□□ Navigation Controls — Desktop

On desktop, the 3D ball model is controlled entirely with the mouse. The model responds to three types of input:

Action	Control	What it does
Rotate	Click and drag in any direction	Rotates the ball freely around its centre — the model spins in the direction of the drag
Zoom in	Scroll wheel up	Moves the viewpoint closer to the ball surface — useful for examining marker placement detail

Action	Control	What it does
Zoom out	Scroll wheel down	Pulls the viewpoint back — useful for seeing the whole ball at once
Reset view	Double-click the model	Returns the ball to its default orientation — grip side facing the viewer, ball in standard position

□□ **Note:** The ball rotates freely in all directions — there is no locked axis. If the model ends up in an orientation that is hard to read, double-click to reset to the default view and reorient from there.

□□ Navigation Controls — Mobile and Tablet

Action	Gesture	What it does
Rotate	One-finger drag in any direction	Rotates the ball freely — the model follows the direction of the drag
Zoom in	Pinch outward (two fingers)	Moves the viewpoint closer to the ball surface
Zoom out	Pinch inward (two fingers)	Pulls the viewpoint back to show the full ball
Reset view	Double-tap the model	Returns the ball to the default grip-facing orientation

□□ **Tip:** On a phone, the 3D view is functional but tight — a tablet or desktop gives significantly more working space. If you are using a phone and need to examine a specific area closely, zoom in first and then rotate, rather than trying to read small markers at full zoom-out.

□□ Elements on the Ball Surface — What Each One Is

The 3D rendering plots several distinct elements on the ball surface. Each is colour-coded and labelled within the view. Here is what each element represents and how to read it:

□□ Pin (top weight marker)

Shown as a small filled circle, typically in a distinct colour (verify exact colour with Spectre team). The pin marks the top of the ball's core — the lightest point on the ball's weight block axis. Its position relative to the PAP and VAL line is the primary driver of ball motion strength and flare potential.

- A pin sitting **closer to the PAP** (shorter pin-to-PAP distance) produces higher flare and a stronger, earlier-reading motion.
- A pin sitting **further from the PAP** produces lower flare and a smoother, later-breaking motion.
- The pin's position **above or below the VAL line** — and at what angle — is what the VAL Angle value controls. Rotating the ball to view it from the PAP's perspective makes this angle most readable.

Mass Bias (MB) marker

Shown as a small distinct marker in a different colour from the pin (verify exact colour with Spectre team). The MB marker indicates the preferred spin axis — the heaviest point on an asymmetric ball's weight block. On symmetric balls, the MB marker is present but carries less layout significance.

- The MB's position **relative to the VAL line** determines how strongly the asymmetric core influences ball motion. An MB positioned closer to the VAL produces a stronger, earlier reading; further from the VAL produces a milder, smoother reaction.
- For symmetric balls, the MB marker is shown for reference but the Drilling Angle value has less impact on ball motion than on asymmetric cores.
- Rotate the ball so the grip faces the viewer to see the MB's position relative to the thumb hole — a common reference orientation for evaluating asymmetric layouts.

PAP (Positive Axis Point)

Shown as a crosshair or target symbol on the ball surface. The PAP is the bowler's axis of rotation at the moment of release — the reference point from which all layout distances are measured. On the 3D rendering, it provides the spatial anchor that gives the pin and MB positions their meaning.

- All layout distances — pin-to-PAP, MB-to-PAP — are measured from this point on the ball surface.
- If the PAP appears in an unexpected location on the rendering, return to the spec sheet and verify the PAP coordinates entered — the rendering faithfully reflects what is recorded, including errors.

VAL line

Shown as an arc running from the top of the ball through the PAP to the bottom — the bowler's Vertical Axis Line. The VAL line divides the ball into a front half (toward the fingers) and a back half (toward the bowler's back), providing the angular reference for pin and MB placement.

- The VAL Angle value on the spec sheet controls the angle between this line and the line from the PAP to the pin.
- Rotating the ball to view it with the PAP centred and the grip facing the viewer gives the most intuitive reading of how the pin and MB sit relative to the VAL.

Finger and thumb holes

Shown as circular outlines on the ball surface, positioned based on the span and pitch values from the spec sheet. The finger holes (middle and ring) appear above the thumb hole in standard grip orientation.

- Hole positions confirm that the grip does not overlap with the pin or MB marker — an overlap is a red flag worth investigating before drilling.
- The relative positions of the holes confirm the span is correctly reflected in the rendering — a middle finger hole that appears significantly further from the thumb than expected is a signal to re-check the span entry.

Useful Viewing Orientations

The 3D model can be rotated freely, but certain orientations are particularly useful for reading and verifying a layout. These are the views most experienced fitters return to when checking a rendering:

Grip-facing view (default)

The ball is oriented with the finger and thumb holes facing directly toward the viewer — the perspective from which the bowler holds the ball. This is the best orientation for confirming grip hole positions and for showing the layout to the bowler.

PAP-centred view

Rotate the ball so the PAP crosshair is centred in the view, facing the viewer. From this perspective, the VAL line runs vertically through the centre of the screen, and the pin's angle and distance from the PAP are directly readable. This is the most useful orientation for verifying VAL Angle.

Top-down view

Rotate the ball so you are looking straight down at the top. The pin position, MB marker, and their relationships to the grip centre are all visible simultaneously. Useful for evaluating asymmetric layouts where both pin and MB position need to be assessed together.

Side view

Rotate the ball to a 90° side profile — thumb hole at the bottom, finger holes visible on the near face. This orientation shows how the pin sits relative to the finger holes and is useful for confirming the pin is in the intended zone above, below, or within the fingers.

⚠ Reading Discrepancies in the Rendering

If the rendering does not match the intended layout, the cause is almost always in the spec sheet data rather than in the rendering itself. Common discrepancies and their likely causes:

- **Pin appears on the wrong side of the VAL line** — VAL Angle entered with the wrong sign or the wrong reference direction. Return to the spec sheet and verify the angle value and its direction.
- **MB marker appears far from its intended position** — Drilling Angle entered incorrectly. Most common on asymmetric balls where the MB placement is sensitive to small angle changes.
- **PAP appears in an unexpected location** — PAP coordinates entered incorrectly on the spec sheet. Verify the recorded PAP against the physical measurement.
- **Holes appear much closer together or further apart than expected** — span values entered incorrectly or span type mismatch. Review span entry on the spec sheet.
- **Pin or MB overlapping a grip hole** — the layout geometry and the grip geometry are incompatible as entered. Review both the layout values and the span/pitch values before drilling — this combination should not proceed to the press without investigation.

Related Sections

- 7.2.1 — What is the 3D Layout view
- 7.2.3 — Arsenal Plus: layout conversion between systems
- 7.1.6 — Manually entering Drilling Angle, Pin to PAP, and VAL Angle
- 7.1.5 — Suggested Layouts feature — using bowler data to suggest a layout

- 04.x — Spec Sheets: layout field reference

 Tip: Before walking a new bowler through the 3D Layout view for the first time, spend thirty seconds rotating the ball yourself to get it into the grip-facing orientation and zoom level that reads most clearly. A rendering that is already positioned well when you turn the screen toward the bowler is far more impressive and informative than watching you search for the right angle in front of them.

7.2.3 How 3D layout updates in real time as you enter measurements

How 3D layout updates in real time as you enter measurements

> 7.2.3 layout 3D

One of the most practical aspects of the 3D Layout view in Spectre Cloud is that it does not require a save or refresh to reflect changes — as layout values, span measurements, and PAP coordinates are entered or updated on the spec sheet, the rendering updates **in real time**. This live feedback loop turns the 3D view from a static confirmation tool into an active part of the fitting process, letting the fitter see the effect of each value change on the ball's core orientation as the spec sheet is being built.

□□ What "Real Time" Means in Practice

As each field on the spec sheet is filled in or modified, the 3D ball model updates to reflect the new values without any manual action required. The update happens field by field — you do not need to

complete the entire spec sheet before the rendering becomes useful.

- Change the **Pin to PAP distance** and the pin marker moves on the ball surface immediately.
- Adjust the **VAL Angle** and the pin rotates around the PAP to its new angular position.
- Update the **Drilling Angle** and the MB marker shifts to reflect the new core orientation.
- Enter or update **span values** and the finger and thumb hole positions replot on the ball surface.
- Update the **PAP coordinates** and the entire layout geometry re-anchors to the new reference point — pin, MB, VAL line, and holes all shift simultaneously.

⚠ **Verify with Spectre team:** Confirm that real-time rendering updates are triggered on field blur (when the user moves to the next field) rather than on every keystroke — or clarify the exact trigger if it differs. The page is written assuming blur-triggered updates; keystroke-triggered updates on numeric fields can cause the model to pass through intermediate nonsensical states while a value is being typed.

How Each Input Type Affects the Rendering

Different fields on the spec sheet drive different elements of the 3D rendering. Understanding which input moves which element helps you work efficiently — entering layout values in a deliberate order and watching the rendering build up progressively rather than jumping between fields and losing track of what changed.

Spec sheet field	Element updated in the rendering	What to watch for
Pin to PAP distance	Pin marker distance from PAP	Pin moves closer to or further from the PAP crosshair — confirm it lands in the intended zone
VAL Angle	Pin marker angle around the PAP	Pin rotates around the PAP — confirm it ends up on the correct side of the VAL line at the intended angle
Drilling Angle	MB marker position	MB shifts around the ball surface — most visible on asymmetric balls; confirm it lands in the intended position relative to the VAL
PAP coordinates	PAP crosshair position, VAL line orientation, all layout geometry	Entire rendering reanchors — if anything looks significantly different after a PAP update, verify the coordinates are correct

Spec sheet field	Element updated in the rendering	What to watch for
Span (middle and ring finger)	Finger hole positions	Holes move outward or inward from the thumb — confirm they do not encroach on the pin or MB marker
Thumb span	Thumb hole position	Thumb hole shifts up or down relative to the finger holes — confirm the grip geometry looks proportionate
Pitch values	Hole angles (subtle — visible on close inspection)	Hole axis orientation shifts slightly — most visible when zoomed in directly on a hole

□□ A Recommended Entry Order for Real-Time Verification

Because the rendering builds up element by element as fields are completed, entering values in a deliberate order makes the verification process more legible. The following sequence lets you confirm each element before adding the next layer of complexity:

1. **Enter PAP coordinates first.** The PAP anchors everything else — with it in place, every subsequent element plots relative to a fixed reference point. An incorrect PAP discovered after layout values are entered requires re-checking the entire rendering.
2. **Enter Pin to PAP distance.** The pin appears on the ball surface. Confirm it is in the right general zone before adding the angular component.
3. **Enter VAL Angle.** The pin rotates to its final angular position relative to the VAL line. This is the step where the layout's breakpoint character becomes visible — arcing vs. angular, early vs. late.
4. **Enter Drilling Angle.** The MB marker appears at its calculated position. For asymmetric balls, confirm the MB is on the intended side of the VAL. For symmetric balls, note the position for reference.
5. **Enter span and pitch values.** The grip holes plot on the ball surface. Confirm no hole overlaps with the pin or MB, and that the grip geometry looks correct relative to the layout.

□□ **Note:** This order is a recommendation for new users or for complex fits where visual verification at each step adds confidence. Experienced fitters who know their layout values well may enter fields in any order and read the final rendering as a complete check rather than a step-by-step build.

Using Real-Time Updates to Explore Layout Options

The real-time nature of the rendering makes it possible to use the 3D view interactively — adjusting a layout value and immediately seeing its effect — rather than only as a confirmation of a pre-determined plan. This is particularly useful in two situations:

Comparing layout options with the bowler present

When a bowler is at the counter and the layout decision has not been finalised, the live rendering lets you show them the effect of different options without committing to any of them. Increase the Pin to PAP distance and show them where the pin lands — then decrease it and show them the alternative. Change the VAL Angle and let them see the pin rotate to a new position. The visual is immediate and requires no technical translation.

- Frame the demonstration in motion terms, not layout terms: "this position produces a smoother, more arcing motion — this position is sharper at the breakpoint."
- Once the bowler has chosen a direction, enter the finalised values and save the spec sheet.
- The exploratory values entered during the conversation are overwritten when you enter the final values — no cleanup needed.

Refining a Suggested Layout

When Arsenal Plus has generated a layout suggestion and you want to adjust one variable — keeping the VAL Angle and Drilling Angle but trying a slightly longer Pin to PAP, for example — apply the suggestion to the spec sheet, then modify the single value you want to adjust. The rendering updates immediately to show the effect of the refinement, letting you evaluate the adjusted layout visually before committing to it.

⚠ When the Rendering Does Not Update

If the 3D model does not update after a field value is changed, the most common causes are:

- **The field has not been committed** — the cursor may still be inside the field. Click or tap outside the field to trigger the update.
- **The entered value is outside the valid range** — Spectre Cloud may hold the rendering at the last valid state if an out-of-range value is entered. Check the field for a validation error indicator.
- **The ball is not identified in the bowlingdatabase.com integration** — without core specification data, the full rendering cannot generate. The panel will show a prompt to identify the ball if this is the case.
- **A connectivity issue** — the rendering requires an active internet connection to fetch core geometry data. If the connection drops, the rendering pauses at its last loaded state. Reconnect and reload the spec sheet.

Real-Time Updates vs. Saved State

The real-time rendering reflects the **current state of the fields on screen** — including any unsaved changes. It is important to understand the difference between what is shown in the rendering and what is permanently stored:

- The rendering updates live as fields are changed, whether or not those changes have been saved.
- If you navigate away from the spec sheet without saving, unsaved field changes are lost — the rendering reverts to the last saved state on next load.
- Save the spec sheet once the layout values are finalised. The rendering at the point of save becomes the permanent visual state for that spec sheet, visible in the Arsenal detail view.
- Do not use the rendering as a substitute for saving — the visual update is immediate, but the data update requires an explicit save action.

Related Sections

- 7.2.1 — What is the 3D Layout view
- 7.2.2 — Navigating and reading the 3D ball view
- 7.2.4 — Arsenal Plus: layout conversion between systems
- 7.1.6 — Manually entering Drilling Angle, Pin to PAP, and VAL Angle
- 7.1.5 — Suggested Layouts feature — using bowler data to suggest a layout

Tip: The real-time rendering is most powerful when the device running Spectre Cloud is visible to both the fitter and the bowler simultaneously — a tablet propped on the counter between them, or a desktop monitor angled toward the customer side. When the bowler can see the ball rotating in response to your adjustments, the layout conversation becomes collaborative rather than one-sided — and the bowler leaves with a clear mental picture of what their ball is going to do before it

has even been drilled.