

04 Spec Sheets

Measurements · Drilling · Records

- 4.1 — Terminology & Concepts
 - 4.1.1 Understanding acronyms: F (Full Span), C (Cut to Cut), O (Oval)...
 - 4.1.2 Span types explained: Full Span vs. Cut to Cut vs. Oval Span
 - 4.1.3 Grip type definitions: Finger Tip vs. Conventional
 - 4.1.4 Pitch terminology: Forward, Reverse, Lateral, Zero pitch explained
 - 4.1.5 Bridge: standard bridge sizes and their purpose
 - 4.1.6 Insert OD: drill bit sizing for STD and VACU grips
- 4.2 — Creating a Spec Sheet
 - 4.2.1 Creating a blank spec sheet for a bowler
 - 4.2.2 Naming a spec sheet (ball name, date, notes)
 - 4.2.3 Selecting grip type on the spec sheet
 - 4.2.4 How to identify the type of grip from measurement sheet
 - 4.2.5 Cloning a spec sheet to preserve old measurements
 - 4.2.6 Printing a spec sheet
 - 4.2.7 Cloning an existing spec sheet
- 4.3 — Finger Measurements
 - 4.3.1 Entering finger hole size (ring and middle fingers)
 - 4.3.2 Entering span measurements (Full Span and Cut to Cut)
 - 4.3.3 Inputting Vertical and Lateral pitch for fingers
 - 4.3.4 CLT (Corrected lateral tilt) angle and its effect on lateral pitch
 - 4.3.5 How to input a finger oval measurement (no inserts)
 - 4.3.6 Ring Finger 5/16" rule — auto and manual calculation
 - 4.3.7 Insert type and size: STD vs. VACU, selecting drill bit OD
- 4.4 — Thumb Measurements (Round)

- 4.4.1 Selecting "Round" thumb hole on the spec sheet
- 4.4.2 Entering thumb hole size
- 4.4.3 Entering bowler's span (Full and Cut to Cut)
- 4.4.4 Entering vertical and lateral pitch for thumb
- 4.4.5 Installing a pre-drilled thumb insert

- 4.5 — Thumb Measurements (Oval)
 - 4.5.1 Selecting "Oval" thumb hole on the spec sheet
 - 4.5.2 Entering Starting Bit, Oval Width, Oval Degree, and Taper
 - 4.5.3 How the system calculates the oval cut from your inputs
 - 4.5.4 Entering thumb oval span and pitch information

4.1 — Terminology & Concepts

4.1.1 Understanding acronyms: F (Full Span), C (Cut to Cut), O (Oval)...

Understanding acronyms: F (Full Span), C (Cut to Cut), O (Oval)...

4.1.1 [glossary](#)

Spectre Cloud uses a set of standard acronyms throughout spec sheets, settings, and the oval calculator to refer to span types, measurement conventions, and drilling operations. Understanding what each acronym means — and when each applies — is essential for reading and creating spec sheets accurately. This page is a reference for the core acronyms used across the platform, with plain-language explanations of each.

Span Type Acronyms

The three most frequently encountered acronyms in Spectre Cloud are the span type identifiers. These appear on spec sheets, in settings, and throughout the oval calculator. Every spec sheet is associated with one of these three span types — the choice determines how distances between finger and thumb holes are measured and recorded.

F — Full Span

The **Full Span (F)** measurement is taken from the **tip of the middle finger** to the near edge of the thumb hole, with the fingers inserted to the correct depth for the bowler's grip style. It represents the total distance the thumb must travel to reach its hole from the fully inserted finger position.

- ☐ The most widely used span measurement convention in pro shop fitting.
- ☐ Intuitive for most bowlers to understand — it describes the actual reach from fingertip to thumb.
- ☐ IBPSIA-recognised standard; used as the reference measurement in most published fitting charts.
- ☐ Best for: general fitting across all skill levels; shops where most bowlers use fingertip or conventional grips.

C — Cut to Cut

The **Cut to Cut (C)** measurement is taken from the **near edge of the finger holes** to the near edge of the thumb hole — edge to edge rather than fingertip to edge. It describes the actual distance between the drilled openings of the finger and thumb holes as they sit on the ball.

- ☐ More directly related to the physical geometry of the drilled ball than Full Span.
- ☐ Particularly useful when inserts are in use — the hole edge position is directly relevant to insert seating.
- ☐ Preferred by some fitters who work primarily from physical hole measurements rather than hand-based fitting.
- ☐ Best for: insert-based fittings; shops that cross-reference measurements against drilled hole geometry.
- ☐ Less intuitive for bowlers to visualise than Full Span — the measurement is taken from the ball, not the hand.

O — Oval

The **Oval (O)** designation indicates that a hole has been drilled as an **oval shape** rather than a round hole. An oval hole extends the round cut in one or both directions to accommodate the bowler's finger or thumb geometry — particularly useful for bowlers who need more room for natural finger movement through the release.

- ☐ Oval holes are most commonly applied to the thumb — the thumb's range of motion during the release often benefits from an oval rather than a perfectly round hole.
- ☐ The oval's dimensions are defined by the starting (round) bit size and the additional cut in the vertical and/or horizontal direction — see the Oval Calculator section (Book 05) for

full detail.

- □ In Spectre Cloud, a spec sheet field or measurement tagged with O indicates the oval calculator has been applied and an oval dimension is recorded.
- □ Not all holes require an oval — round holes are standard for most finger positions and for thumbs with sufficient clearance.

□ F, C, and O at a Glance

Acronym	Full Name	Measured From	Measured To	Most Common Use
F	Full Span	Tip of middle finger (inserted)	Near edge of thumb hole	General fitting; IBPSIA-standard charts
C	Cut to Cut	Near edge of finger holes	Near edge of thumb hole	Insert-based fitting; hole geometry reference
O	Oval	Round bit starting point	Extended oval cut direction(s)	Thumb oval drilling; finger oval where required


□ Additional Acronyms Used in Spectre Cloud

Beyond the three primary span type acronyms, Spectre Cloud uses a number of additional shorthand terms throughout its interface. The following reference covers the most commonly encountered.

Acronym	Full Name	Where Used	What It Refers To
PAP	Positive Axis Point	Bowler profile; layout fields	The point on the ball's surface at the end of the bowler's initial axis of rotation at release — the geometric anchor for all structured layout systems
VAL	Vertical Axis Line	Layout fields (VLS, Dual Angle)	The vertical line running through the bowler's PAP — used as a reference for pin and mass bias placement in VLS and Dual Angle layouts






Acronym	Full Name	Where Used	What It Refers To
MB	Mass Bias	Layout fields	The heaviest point of the ball's core — its placement relative to the grip center affects the ball's flare potential and backend motion
VLS	Versatile Layout System	Layout type selector; spec sheets	Storm Bowling's chart-based layout system for traditional thumb bowlers — see 2.5.1.1
2LS	Two-Layout System	Layout type selector; spec sheets	Storm Bowling's layout system designed for two-handed bowlers — see 2.5.1.2
PAL	Performance Axis Layout	Layout type selector; spec sheets	Three-input layout system (drilling angle, pin distance, VAL angle) — referred to as Dual Angle in Spectre Cloud's UI — see 2.5.1.3
CLT	Center Line Transformation	Bowler profile; Auto-CLT setting	A fitting measurement that defines how a bowler's finger centerline relates to the ball's grip center — used to derive lateral finger pitch — see 2.6.3
OD	Outside Diameter	Insert fields; spec sheets	The outer diameter of a finger insert — the drill bit must match this dimension for the insert to seat correctly — see 2.6.6
RG	Radius of Gyration	Arsenal Plus; ball detail fields	A measure of how the ball's mass is distributed relative to its axis — lower RG = earlier roll, higher RG = longer skid
diff / differential	Differential of RG	Arsenal Plus; ball detail fields	The difference between a ball's highest and lowest RG values — higher differential = more flare potential and stronger backend reaction
V	Vertical	Oval calculator; milling settings	The vertical axis of oval cut movement — see 2.3.5 and 2.3.6
H	Horizontal	Oval calculator; milling settings	The horizontal axis of oval cut movement — see 2.3.5 and 2.3.6

Acronym	Full Name	Where Used	What It Refers To
RPM	Revolutions Per Minute	Bowler profile (rev rate field)	The unit used to record a bowler's rev rate — how many times the ball rotates on its axis per minute during lane travel
RH / LH	Right-Handed / Left-Handed	Bowler profile; pitch settings; Auto-Invert	Shorthand for the bowler's dominant hand — affects pitch sign conventions, layout orientation, and Auto-Invert behaviour

Note:  Verify with your Spectre team: confirm the complete list of acronyms used in Spectre Cloud's UI and add any that are missing from this reference table. Also confirm whether any acronyms listed above are displayed differently in the app — for example, whether the app uses "Cut to Cut" or "CTC" rather than "C" in certain contexts.

Acronyms on Spec Sheets — What You Will See

When reading a completed spec sheet in Spectre Cloud, acronyms appear as field labels, section headers, and value indicators. Knowing what each stands for prevents misreading a spec sheet under pressure — particularly when a sheet is being read at the drill press rather than at a desk.

-  The span type (**F**, **C**, or **O**) appears as a label alongside the span measurement value — a value labelled **F 3 7/8"** means a Full Span of 3 7/8".
-  Layout acronyms (**VLS**, **2LS**, **PAL**) appear as the layout type header above the layout input fields on the spec sheet.
-  **PAP**, **VAL**, and **MB** appear as field labels within the layout section.
-  **V** and **H** appear as column headers in the oval calculator output section.
-  **OD** appears as a field label in the insert section alongside the drill bit size.

Related Sections

- 4.1.2 — Spec sheet overview: sections and layout (*if applicable*)
- 2.3.2 — Span type configuration: Full Span, Edge, Center
- 2.5.1 — Default layout type: VLS, 2LS, Dual Angle, None
- 2.6.3 — Auto-CLT: lateral pitch of fingers based on CLT chart
- 2.6.6 — Autofill Insert OD: auto drill bit size per insert type and grip
- 5.x — Oval Calculator: overview
- 9.x — Tips and Troubleshooting: glossary of bowling fitting terms

Tip: Print this page and keep a copy at the drill press during onboarding of new staff. Acronym familiarity is one of the first barriers a new team member faces when reading a spec sheet under time pressure — having a quick reference to hand removes that barrier in the first few sessions and builds confidence faster than repeated explanation alone.

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4.1.2 Span types explained: Full Span vs. Cut to Cut vs. Oval Span

Span types explained: Full Span vs. Cut to Cut vs. Oval Span

4.1.2 concept

The **span type** setting on a Spectre Cloud spec sheet defines the measurement convention used to record the distance between the finger holes and the thumb hole. Choosing the right span type — and understanding what each one measures — ensures that spec sheet values are interpreted and drilled correctly every time. This page explains how each of the three span types works, how they differ from each other, and how to choose between them for a given bowler or fitting workflow.

Note: This page explains the span types conceptually. For the specific settings that control how each span type is configured in Spectre Cloud, see **chapter 2.3**. For the acronyms used to represent span types on spec sheets, see **4.1.1**.

☐☐ What Is a Span Measurement?

A span measurement records the distance between a bowler's finger holes and their thumb hole on a drilled bowling ball. It is the primary dimension that determines how far the thumb must reach — and how comfortable and consistent the grip feels through the swing and release. All three span types measure this same fundamental distance, but they differ in **where on the hole the measurement begins and ends**.

- ☐ Span is one of the most important measurements on a spec sheet — an incorrect span produces a grip that is either too stretched or too cramped, directly affecting ball control and release consistency.
- ☐ The same bowler measured in two different span types will produce different numeric values — the numbers are not interchangeable without conversion.
- ☐ Spectre Cloud stores the span type alongside the measurement value on every spec sheet, ensuring the value is never interpreted without its corresponding convention.

☐☐ Full Span (F)

A **Full Span** measurement is taken from the **tip of the middle finger** — with the finger inserted to the correct depth for the bowler's grip style — to the **near edge of the thumb hole**. It measures the full distance the thumb must reach from the fingertip position to its hole.

How Full Span Is Measured

1. Have the bowler insert their middle and ring fingers into the finger holes to the correct depth for their grip style.
2. With the fingers seated, measure from the tip of the middle finger to the nearest edge of the thumb hole.
3. Record the measurement in inches, to the nearest 1/16" or in decimal as appropriate for your display setting.

When to Use Full Span

- ☐ The most widely used span convention in the industry — the default for most pro shops and IBPSIA-published fitting charts.
- ☐ Intuitive for bowlers to understand — describes the actual reach from finger to thumb.
- ☐ Best choice when using IBPSIA standard charts as a starting point, since most published values assume Full Span.
- ☐ Suitable for all grip styles — fingertip, conventional, and semi-fingertip.
- ☐ Requires the fingers to be physically inserted to the correct depth during measurement — measurement accuracy depends on consistent finger insertion.

☐☐ Cut to Cut (C)

A **Cut to Cut** measurement is taken from the **near edge of the finger holes** to the **near edge of the thumb hole** — edge to edge, entirely on the ball's surface. It does not involve the bowler's hand in the measurement itself; instead it measures the distance between the physical openings of the drilled holes.

How Cut to Cut Is Measured

1. With the ball on the fitting jig or bench, identify the near edge of the finger holes (the edge closest to the thumb hole).
2. Measure from that edge to the near edge of the thumb hole.
3. Record the measurement in inches, to the nearest 1/16" or in decimal.

When to Use Cut to Cut

- ☐ Preferred by fitters who work primarily from physical ball measurements rather than hand-based fitting.
- ☐ More reproducible across different fitters — the measurement point is fixed on the ball rather than dependent on finger insertion depth.
- ☐ Particularly useful when inserts are in use — the hole edge position is directly relevant to how inserts seat and the effective grip geometry.
- ☐ Useful for verifying a drilled ball against spec — the Cut to Cut can be measured post-drilling to confirm accuracy.
- ☐ Less intuitive for bowlers — the measurement is taken from the ball, not the hand, and does not directly describe the bowler's reach.
- ☐ Values are not directly comparable to Full Span values — converting between the two requires knowing the hole diameter and insertion depth.

☐☐ Oval Span (O)

An **Oval Span** spec sheet is one where at least one hole — most commonly the thumb — has been drilled as an oval shape rather than a round hole. The oval designation does not replace the span measurement; rather it indicates that the hole dimensions include an oval cut, and that the oval calculator values (starting bit, oval width, V/H movement) are part of the spec.

What Makes a Span "Oval"

A standard round hole has a single diameter. An oval hole has been extended beyond the round cut in the vertical direction, the horizontal direction, or both — creating an elongated opening that accommodates the bowler's natural thumb movement through the release.

- The oval's dimensions are defined by the **starting bit size** (the round hole) and the **additional cut** in V and/or H directions.
- Oval spans are most common for the thumb — the thumb's rotation during release often benefits from an oval that follows the thumb's natural path.
- The span measurement itself (Full Span or Cut to Cut) is still recorded on an oval spec sheet — the oval designation adds the oval dimensions on top of the standard span record.
- In Spectre Cloud, the oval calculator (Book 05) generates the V/H movement values and oval width from the bowler's span and thumb measurements.
- Oval holes require additional care at the drill press — the movement direction, flip settings, and diff values must all be correctly configured before drilling.

When to Use Oval Span

- When a bowler's thumb does not clear a round hole cleanly through the release.
- When a bowler reports thumb discomfort, hanging, or inconsistent exit on a correctly sized round hole.
- When thumb swelling is a recurring issue — an oval provides more clearance without requiring a larger round hole that would be too loose when swelling subsides.
- For bowlers with a pronounced thumb rotation or side-roll through the release.

□□ Span Types Compared

	Full Span (F)	Cut to Cut (C)	Oval Span (O)
Measurement reference	Fingertip to thumb hole edge	Finger hole edge to thumb hole edge	As F or C, plus oval cut dimensions
Measured from	Bowler's hand (finger inserted)	Ball surface only	Ball surface; oval from calculator
Reproducibility	Depends on consistent finger insertion	High — fixed points on ball	Depends on base span type used
IBPSIA chart compatibility	Direct — charts assume Full Span	Requires conversion	Oval dimensions from calculator
Insert fitting suitability	Good	Best — directly references hole edge	Good; oval adds clearance for thumb
Common use	General fitting; most shops	Insert-based; post-drill verification	Thumb clearance; rotation accommodation

⚠ Do Not Mix Span Types Within a Bowler's History

Once a span type has been established for a bowler, it should be used consistently on all subsequent spec sheets. Mixing span types across a bowler's history makes values appear different when they are actually equivalent — or appear the same when they are actually different — depending on the conversion.

- ☐ Do not copy a Full Span value onto a Cut to Cut spec sheet without converting — the resulting span will be incorrect for the bowler's hand.
- ☐ Do not assume that because two span values are numerically close they represent the same physical measurement — the same bowler measured in F and C will produce different numbers.
- ☐ If a bowler's span type needs to change — for example, when transitioning from a shop that uses Full Span to one that uses Cut to Cut — measure the bowler fresh in the new convention rather than converting from the old value.
- ☐ Note the span type change in the bowler's profile notes with the date — future staff reviewing the history will understand why early spec sheets show different values.

☐☐ Span Type and Spectre Cloud's Auto-Suggestions

Spectre Cloud's auto-suggestion features — including Auto-Calculate Ring Span (2.6.8) and Autofill Cut to Cut (2.6.9) — are aware of the span type selected on the current spec sheet and apply their calculations accordingly. The 5/16" ring span offset and the Cut to Cut derivation both operate within the selected span type's convention.

- ☐ Selecting Full Span on a spec sheet triggers Full Span-appropriate autofill behaviour.
- ☐ Selecting Cut to Cut triggers the Autofill Cut to Cut calculation chain (see 2.6.9).
- ☐ Oval span sheets additionally trigger oval calculator fields — the V/H movement values, diff, and oval width appear as part of the spec. ⚠ *Verify with your Spectre team: confirm exactly how the oval span type selection interacts with the oval calculator fields in the spec sheet UI.*

Related Sections

- 4.1.1 — Understanding acronyms: F, C, O and other Spectre Cloud shorthand

- 4.1.3 — Creating a new spec sheet (*if applicable*)
- 2.3.2 — Span type configuration: Full Span, Edge, Center
- 2.6.8 — Auto-Calculate Ring Span: based on 5/16" rule
- 2.6.9 — Autofill Cut to Cut: based on insert type/size
- 5.x — Oval Calculator: overview and getting started
- 9.x — Tips and Troubleshooting: converting between span types

Tip: If your shop is establishing its span type convention for the first time, Full Span is the lowest-friction choice — it aligns with IBPSIA charts, is familiar to most experienced fitters, and is intuitive to explain to bowlers. Cut to Cut becomes the better choice when your workflow is heavily insert-based or when post-drill verification against the ball is part of your standard process. Oval is not an alternative to the other two — it is an addition to whichever base span type you use.

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4.1.3 Grip type definitions: Finger Tip vs. Conventional

Grip type definitions: Finger Tip vs. Conventional

4.1.3 concept

A bowler's **grip type** defines how deeply their fingers are inserted into the ball — and it is one of the most consequential decisions in a pro shop fitting. Grip type determines the standard span, pitch, bridge, and insert values that apply to a bowler, and it is the first meaningful fitting choice for any new bowler purchasing their first personal ball. This page explains the two primary grip types — **Fingertip** and **Conventional** — how they differ physically and in terms of ball motion, and how the choice is reflected throughout Spectre Cloud.

Note: Spectre Cloud also supports a **Semi-Fingertip** grip type, which falls between Fingertip and Conventional in insertion depth. Semi-Fingertip is covered briefly at the end of this page. The primary focus here is on Fingertip and Conventional, which together account for the overwhelming majority of fittings in most pro shops.

Fingertip Grip

In a **fingertip grip**, the middle and ring fingers are inserted into the ball **to the first knuckle only** — the fingertip. This is a shallower insertion than conventional, leaving the bulk of the finger outside the ball and relying on the fingertip's contact with the hole edge (or insert) to hold and release the ball.

Physical Characteristics

- ☐ Fingers inserted to the **first knuckle** — approximately to the first crease of the finger from the tip.
- ☐ Produces a longer lever arm from the wrist to the finger contact point — this increases the torque available at the moment of release.
- ☐ The thumb exits the ball before the fingers, allowing the fingers to impart lift and rotation — the primary source of revolutions and hook for most competitive bowlers.
- ☐ Almost universally used with **finger inserts** — the shallower insertion depth means the fingertip bears significant load, and inserts cushion this contact point and provide a consistent grip surface.

Ball Motion Characteristics

- ☐ Higher rev rate potential than conventional — the longer lever arm allows more rotation to be imparted at release.
- ☐ Greater hook potential — more axis rotation and tilt are achievable with a fingertip grip.
- ☐ More sensitive to release technique — small changes in finger lift angle produce noticeable changes in ball path.
- ☐ Preferred by the majority of league and competitive bowlers for its performance potential.

Fitting Standards — Fingertip

- ☐ **Standard bridge:** — the narrower bridge suits the shallower insertion depth and the extended finger position.
- ☐ **Standard forward pitch:** typically to forward — less forward pitch than conventional because the fingertip grip's lever arm naturally positions the finger for exit.
- ☐ **Inserts:** strongly recommended — most fingertip bowlers use inserts on both middle and ring fingers.
- ☐ **Span:** longer than an equivalent conventional span for the same hand — the shallower insertion places the fingertip further from the thumb hole.

☐☐ Conventional Grip

In a **conventional grip**, the middle and ring fingers are inserted into the ball **to the second knuckle** — past the first crease, with a deeper portion of the finger inside the hole. This is a more secure, fuller grip than fingertip.

Physical Characteristics

- ☐ Fingers inserted to the **second knuckle** — approximately to the second crease from the tip.
- ☐ Produces a shorter lever arm than fingertip — the deeper insertion places the contact point closer to the palm.
- ☐ The ball is held more securely in the hand — less reliance on finger strength to maintain the grip through the swing.
- ☐ Typically used **without inserts** — the deeper insertion provides sufficient grip surface from the ball hole itself, though inserts can be used if preferred.

Ball Motion Characteristics

- ☐ Lower rev rate than fingertip — the shorter lever arm limits the rotation imparted at release.
- ☐ Straighter ball path — less hook potential makes conventional grip better suited to targeting-based play styles.
- ☐ More forgiving of release inconsistency — the deeper, more secure grip reduces the sensitivity to finger angle variations at release.
- ☐ Preferred by beginners, youth bowlers, senior bowlers, and those prioritising control and consistency over hook potential.

Fitting Standards — Conventional

- ☐ **Standard bridge:** $\frac{3}{8}$ " — the wider bridge accommodates the deeper insertion depth and the more upright finger position.
- ☐ **Standard forward pitch:** typically $\frac{1}{4}$ " to $\frac{1}{2}$ " forward — more forward pitch than fingertip to accommodate the deeper finger angle and ease thumb extraction.
- ☐ **Inserts:** optional — many conventional bowlers use bare holes; inserts can be added for comfort or consistency.
- ☐ **Span:** shorter than an equivalent fingertip span for the same hand — the deeper insertion places the contact point closer to the thumb hole.

☐☐ Fingertip vs. Conventional — Side-by-Side

	Fingertip	Conventional
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Insertion depth	To first knuckle	To second knuckle
Lever arm	Longer — more torque at release	Shorter — more secure hold
Rev rate potential	Higher	Lower
Hook potential	Higher	Lower
Release sensitivity	Higher — technique-dependent	Lower — more forgiving
Standard bridge	1/4"	3/8"
Standard forward pitch	0 to 1/4" forward	1/4" to 1/2" forward
Inserts	Strongly recommended	Optional
Typical bowler profile	League, competitive, performance-oriented	Beginner, youth, senior, recreational
Autofill Bridge in Spectre Cloud	1/4" (2.6.5)	3/8" (2.6.5)

☐☐ Semi-Fingertip Grip

The **semi-fingertip grip** positions the fingers at a depth **between the first and second knuckle** — deeper than fingertip but shallower than conventional. It is less commonly fitted than either primary grip type and is most often used as a transitional option for bowlers moving from conventional toward fingertip.

- ☐ Offers a middle ground between the security of conventional and the rev potential of fingertip.
- ☐ Can suit bowlers who find full fingertip insertion uncomfortable or technically difficult to maintain consistently.
- ☐ Less standardised than the two primary grip types — fitting charts and IBPSIA standards are less comprehensive for semi-fingertip.
- ☐ Less commonly requested — most bowlers transition from conventional to fingertip directly rather than spending significant time at semi-fingertip.
- ☐ Autofill Bridge and insert OD defaults for semi-fingertip in Spectre Cloud may be less precise than for the two primary grip types — verify with your Spectre team. [△ Verify with your Spectre team: confirm what autofill defaults Spectre Cloud applies for semi-fingertip grip, consistent with the question raised in 2.6.5.](#)

☐☐ Grip Type in Spectre Cloud

Grip type is recorded on the bowler's profile (see 3.1.2) and is used throughout Spectre Cloud to drive autofill defaults and IBPSIA-standard suggestions. Selecting the correct grip type at profile creation ensures every subsequent spec sheet starts with the right baseline values.

- **Autofill Bridge (2.6.5)** — applies 1/4" for fingertip, 3/8" for conventional.
- **Autofill Insert OD (2.6.6)** — insert OD lookup is grip-sensitive; fingertip and conventional grips may use different insert seating approaches for the same insert model.
- **Pitch Suggestion (2.6.2)** — forward pitch norms differ between grip types; the suggestion engine applies grip-appropriate starting values.
- **Span suggestions** — IBPSIA span starting points differ by grip type; selecting the correct type ensures span autofill applies the correct baseline.
- Grip type can be updated on the bowler's profile at any time — see 3.2.2 for editing guidance.

☐☐ Advising Bowlers on Grip Choice

For bowlers purchasing their first personal ball — particularly those transitioning from house balls — grip type is often the most impactful early decision in their development as a bowler. A few practical guidelines for the fitting conversation:

- A bowler who wants to develop a hook and improve their game long-term is almost always best served by starting with **fingertip** — even if it feels less secure initially, it is the grip that enables skill development.
- A bowler who prioritises comfort, security, and a straight ball path — or who is elderly, has grip strength limitations, or is fitting a child — is better served by **conventional**.
- There is no wrong answer for the right bowler — the grip that matches the bowler's goals and physical capability is always the correct choice.
- Grip type can be changed on a future ball if the bowler's goals or physical circumstances change — it is not a permanent commitment.

Related Sections

- 4.1.2 — Span types explained: Full Span vs. Cut to Cut vs. Oval Span
- 4.1.1 — Understanding acronyms: F, C, O and other Spectre Cloud shorthand
- 3.1.2 — Required fields: name, hand, grip type
- 2.6.5 — Autofill Bridge: auto standard bridge (1/4" fingertip, 3/8" conventional)
- 2.6.6 — Autofill Insert OD: auto drill bit size per insert type and grip
- 2.6.2 — Pitch suggestion: auto forward pitch based on hand flexibility
- 4.1.4 — Creating a new spec sheet (*if applicable*)

Tip: When a bowler is unsure which grip to choose, a useful demonstration is to have them hold a house ball with their fingers inserted to each depth in turn — without the thumb — and feel the difference in finger load and ball weight distribution. The grip that feels more natural and controllable in that static test is usually the better starting point for their first fitted ball.

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4.1.4 Pitch terminology: Forward, Reverse, Lateral, Zero pitch explained

Pitch terminology: Forward, Reverse, Lateral, Zero pitch explained

4.1.4 concept

Pitch is the angle at which a finger or thumb hole is drilled relative to the centre of the ball. Adjusting pitch changes how the bowler's finger or thumb sits in the hole — affecting grip comfort, ball retention through the swing, and the ease and consistency of the release. This page explains the four core pitch terms used throughout Spectre Cloud spec sheets and settings: **Forward**, **Reverse**, **Lateral**, and **Zero** pitch.

Note: This page covers pitch terminology conceptually. For the Spectre Cloud settings that control how pitch values are displayed and signed on spec sheets, see **chapter 2.4**. For the auto-suggestion settings that generate pitch recommendations, see **2.6.2** and **2.6.3**.

What Is Pitch?

When a hole is drilled straight through the ball toward its centre, the hole is said to have **zero pitch** — it is perpendicular to the ball's surface at that point. Pitch is introduced by angling the drill

slightly in a specific direction, tilting the hole opening toward or away from the fingers, or laterally toward or away from the adjacent finger hole. The amount of pitch is measured in fractions of an inch — specifically, the distance the hole's centreline at the ball's surface is offset from zero in the given direction.

- Pitch is applied to both the **thumb hole** and the **finger holes** — though thumb pitch is more frequently adjusted than finger pitch.
- Pitch values are small — typically ranging from to in either direction for most bowlers.
- Even small changes in pitch produce perceptible differences in grip feel and release timing — pitch is one of the most fine-tuned variables in pro shop fitting.
- Spectre Cloud stores forward/reverse pitch and lateral pitch as separate values on each spec sheet — they are independent adjustments that can be applied simultaneously.

Forward Pitch

Forward pitch tilts the hole opening **toward the fingers** — the hole leans in the direction of the fingertips rather than pointing straight toward the ball's centre. From the bowler's perspective, the opening faces slightly upward when the ball is held in the delivery position.

Physical Effect

- The thumb or finger is drawn deeper into the hole by gravity and grip pressure — forward pitch increases the security of the grip through the swing.
- Reduces the tendency for the thumb to fall out or feel loose at the top of the backswing.
- Can slow the thumb's exit slightly — the hole's angle works against the thumb's release path rather than with it.

When Forward Pitch Is Used

- Bowlers with less flexible thumbs — forward pitch compensates for a thumb that does not naturally align with a zero-pitch hole.
- Conventional grip bowlers — deeper insertion combined with forward pitch produces a secure, comfortable fit.
- Bowlers who report the ball feeling loose or dropping early — forward pitch increases grip security.
- Bowlers with thumb swelling or arthritis — more forward pitch eases insertion and extraction.

Typical Range

Most bowlers use between and forward pitch on the thumb. forward is the most common IBPSIA starting point for average hand flexibility.

Reverse Pitch

Reverse pitch tilts the hole opening **away from the fingers** — the hole leans away from the fingertips, angling toward the back of the hand. From the bowler's perspective, the opening faces slightly downward when the ball is held in delivery position.

Physical Effect

- The hole's angle assists the thumb's exit path — the thumb is more easily expelled from the hole at the moment of release.
- Produces a faster, cleaner thumb exit — the ball transitions from thumb-in to thumb-out more quickly, increasing the window for finger lift.
- Can reduce grip security if overapplied — too much reverse pitch makes the ball feel insecure through the swing for bowlers without sufficient thumb control.

When Reverse Pitch Is Used

- Competitive and higher rev-rate bowlers seeking a faster, more consistent thumb exit.
- Bowlers with highly flexible thumbs — less forward pitch (or mild reverse pitch) accommodates a thumb that naturally sits at a flatter angle.
- Bowlers who report the thumb feeling stuck, hanging, or causing the ball to loft — reverse pitch promotes a cleaner exit.

Typical Range

Reverse pitch is less commonly applied than forward pitch. Most bowlers who use it fall between and reverse. Values beyond reverse are rare and should be verified physically before drilling. *△ Verify with your Spectre team: confirm whether Spectre Cloud enforces any input range limits on reverse pitch values.*

Lateral Pitch

Lateral pitch tilts the hole opening **toward or away from the adjacent finger hole** — sideways rather than forward or backward. For the thumb, lateral pitch moves the opening toward or away from the ring finger side. For the finger holes, lateral pitch moves the opening toward or away from the centre of the bridge.

Physical Effect

- Lateral pitch on the thumb adjusts the thumb's natural resting angle within the hole — reducing pinching or relieving pressure on one side of the thumb.
- Lateral pitch on the fingers adjusts how the finger loads against the hole edge during the release — affecting the direction and consistency of finger lift.
- Even small amounts of lateral pitch — as little as $\frac{1}{8}$ " — can meaningfully relieve grip discomfort for a bowler whose thumb or finger geometry does not naturally align with the hole's centreline.

Direction Conventions

Lateral pitch direction is described relative to the **ring finger side** of the hand:

Direction	Right-Handed Bowler	Left-Handed Bowler
Toward ring finger	Tilts opening to the right	Tilts opening to the left
Away from ring finger	Tilts opening to the left	Tilts opening to the right

Note: This is why dominant hand is a required field on a bowler profile — lateral pitch direction is physically opposite for RH and LH bowlers, and the Auto-Invert setting (2.6.4) handles this automatically when cloning or templating across handedness.

When Lateral Pitch Is Used

- Derived from the bowler's CLT (Center Line Transformation) measurement — the Auto-CLT setting (2.6.3) automates this lookup.
- Bowlers who report finger or thumb pinching on one side of the hole — lateral pitch redistributes the contact pressure.
- Bowlers with a pronounced natural lateral alignment in their grip — lateral pitch aligns the hole with the bowler's actual thumb or finger geometry rather than forcing an adjustment.

Typical Range

Most lateral pitch applications fall between 0 and 3/8" in either direction. 1/8" toward the ring finger is among the most common lateral pitch values for the thumb.

Zero Pitch

Zero pitch — also referred to as **manufacturer's pitch** or **no added pitch** — means the hole is drilled perpendicular to the ball's surface at the chosen location, angled directly toward the ball's centre with no additional tilt in any direction. The ball's natural curvature provides a small inherent forward pitch from zero; zero pitch means no adjustment is added beyond this baseline.

- The simplest pitch configuration — no offset to calculate or communicate to the press.
- A valid and appropriate choice for many bowlers — not a placeholder or an incomplete spec.
- Common for both forward/reverse and lateral axes simultaneously — a bowler with zero forward/reverse pitch and zero lateral pitch has a fully defined pitch spec.
- Used as the starting point for a first fitting when no prior measurements are available.
- Not appropriate for all bowlers — the natural curvature of the ball surface means zero pitch does not suit every hand geometry; physical fitting should confirm zero pitch is comfortable before drilling.

Pitch Summary Table

Pitch Type	Direction	Primary Effect	Typical Use Case	Typical Range
Forward	Toward fingers	Increases grip security; slows exit	Less flexible thumbs; conventional grip; ball feels loose	0 to 1/2" forward
Reverse	Away from fingers	Faster, cleaner thumb exit	Competitive bowlers; flexible thumbs; thumb hangs	1/16" to 1/4" reverse
Lateral	Toward/away from ring finger	Relieves lateral pinch; aligns with hand geometry	CLT-based fitting; finger or thumb side pressure	0 to 3/8" either direction
Zero	None — perpendicular to surface	Neutral; no added adjustment	First fittings; bowlers whose geometry suits zero pitch	0 (by definition)

⚙️ How Pitch Appears in Spectre Cloud

On a Spectre Cloud spec sheet, forward/reverse pitch and lateral pitch are stored as separate fields for both the thumb and fingers. The sign and direction indicators that appear alongside pitch values depend on the settings configured in chapter 2.4:

- Whether forward pitch displays as positive or negative is controlled by **2.4.2**.
- Whether right lateral pitch displays as positive or negative is controlled by **2.4.1**.
- Whether directional arrows or labels appear alongside pitch values is controlled by **2.4.3**.
- The auto-suggestion engine proposes forward pitch values based on hand flexibility (**2.6.2**) and lateral pitch based on CLT (**2.6.3**).
- All pitch values on a spec sheet respect the dominant hand setting — lateral pitch directions are correctly oriented for RH and LH bowlers automatically when Auto-Invert (**2.6.4**) is enabled.

Related Sections

- 4.1.3 — Grip type definitions: Fingertip vs. Conventional
- 4.1.2 — Span types explained: Full Span vs. Cut to Cut vs. Oval Span
- 2.4.1 — Does your machine display right pitch as positive? Y/N
- 2.4.2 — Does your machine display forward thumb pitch as positive? Y/N
- 2.4.3 — Display +/- in pitch tiles: showing direction arrows to avoid errors
- 2.6.2 — Pitch suggestion: auto forward pitch based on hand flexibility
- 2.6.3 — Auto-CLT: lateral pitch of fingers based on CLT chart
- 2.6.4 — Auto-invert standard lateral pitches when changing from RH to LH
- 4.1.5 — Creating a new spec sheet (*if applicable*)

Tip: When explaining pitch to a bowler, a useful analogy is a door hinge. A door hung at zero pitch swings equally easily in both directions. Forward pitch is like a door that is easier to push open than to pull — it naturally wants to stay closed (the thumb stays in). Reverse pitch is the opposite — the door swings open easily in one direction, making exit effortless. The fitter's job is to find the hinge angle that matches the bowler's natural motion.

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4.1.5 Bridge: standard bridge sizes and their purpose



Bridge: standard bridge sizes and their purpose

4.1.5 concept

The **bridge** is the distance between the near edges of the middle and ring finger holes on a drilled bowling ball. It is one of the smallest measurements on a spec sheet — typically between $\frac{3}{16}$ " and $\frac{1}{2}$ " — but it directly influences finger comfort, grip stability, and the consistency of the release. This page explains what the bridge does, what the standard sizes are and why they differ by grip type, and when a non-standard bridge is appropriate.

What the Bridge Does

The bridge serves two related purposes: it provides the structural integrity of the land area between the two finger holes, and it determines how closely the middle and ring fingers sit together on the ball during the grip and release.

-  A correctly sized bridge allows both fingers to load evenly against their respective hole edges — or insert surfaces — without crowding or spreading.
-  Too narrow a bridge risks weakening the land area between the holes, potentially causing cracking under repeated impact — particularly in harder coverstock materials.

- ☐ Too wide a bridge forces the fingers apart, reducing the sense of a unified two-finger contact point and potentially affecting the angle of finger lift at release.
- ☐ The bridge measurement is recorded on every Spectre Cloud spec sheet and is used by the **Autofill Bridge** setting (2.6.5) to pre-populate the correct standard value based on grip type.

☐☐ Standard Bridge Sizes

Two standard bridge widths are recognised by IBPSIA and used as the default starting points in Spectre Cloud:

Grip Type	Standard Bridge	Rationale
Fingertip	1/4"	The shallower insertion depth of a fingertip grip places the fingers closer together on the ball surface — a narrower bridge maintains comfortable finger proximity without crowding
Conventional	3/8"	The deeper insertion depth of a conventional grip positions the fingers at a wider natural spacing — a slightly broader bridge accommodates this without creating a gap that feels unnatural

Note: These standard values suit the overwhelming majority of bowlers in each grip category. In Spectre Cloud, the **Autofill Bridge** setting (2.6.5) applies these values automatically when grip type is recorded on the bowler's profile — the fitter is only required to intervene when a non-standard bridge is needed.

☐☐ The Full Bridge Size Range

While 1/4" and 3/8" are the standard starting points, bridge sizes can be adjusted in both directions to suit individual bowler anatomy. The table below covers the common range and the fitting scenarios each size typically addresses.

Bridge Size	Typical Use Case	Notes
3/16"	Bowlers with very closely spaced fingers; youth bowlers with small hands	Narrowest commonly used bridge — verify land area integrity before drilling, particularly on reactive resin balls

Bridge Size	Typical Use Case	Notes
1/4"	Standard fingertip grip	IBPSIA standard for fingertip; default in Spectre Cloud for fingertip bowlers
5/16"	Fingertip bowlers with slightly wider natural finger spacing; transitional semi-fingertip	One step wider than fingertip standard — a common adjustment for bowlers who find 1/4" slightly cramped
3/8"	Standard conventional grip; wider fingertip fittings	IBPSIA standard for conventional; default in Spectre Cloud for conventional bowlers
7/16"	Conventional bowlers with wide finger spacing; larger hands	Less common — verify that the wider bridge does not create an uncomfortable gap between fingers during delivery
1/2"	Largest hands; specific anatomical requirements	Uncommon — used only when smaller bridges consistently produce finger crowding or discomfort; physical fitting essential

Note: ⚠ Verify with your Spectre team: confirm the full range of bridge values supported as input in Spectre Cloud's spec sheet bridge field, and whether values outside the common range require manual text entry or are available as selectable increments.

☐ Factors That Influence Bridge Size Selection

For the majority of bowlers, the standard bridge for their grip type is the correct choice and requires no adjustment. The following factors are the most common reasons a fitter might deviate from the standard:

Finger Spacing

The natural spacing between a bowler's middle and ring fingers at rest — before any intentional spreading — is the primary driver of non-standard bridge selection. Bowlers whose fingers naturally sit closer together than average benefit from a narrower bridge; those whose fingers naturally sit further apart may prefer a wider one.

- ☐ Observe the bowler's natural hand position before measuring — do the fingers sit together, or is there a visible gap between them?

- □ A quick physical test: have the bowler grip a fitted ball and note whether the middle and ring fingers appear crowded against each other or comfortably separated.

Hand Size and Age

- □ Youth bowlers with small hands often benefit from a narrower bridge — $\frac{3}{16}$ " is common for younger children.
- □ Adult bowlers with very large hands may find the standard bridge too narrow regardless of grip type — a wider bridge provides more comfortable finger separation.

Insert Type

- □ Some insert styles — particularly those with wider flanges or non-standard profiles — can affect the effective finger spacing. [△ Verify with your Spectre team: confirm whether Spectre Cloud's Autofill Insert OD setting \(2.6.6\) accounts for insert flange width when suggesting a bridge value, or whether bridge and OD are calculated independently.](#)

Injury or Physical Condition

- □ Bowlers recovering from finger injuries, or those with joint conditions affecting finger mobility, may require a non-standard bridge to reduce stress on the affected joint.
- □ Record any injury-related bridge adjustments in the bowler's profile notes — future fittings should reference this context rather than defaulting to the standard value without checking.

Land Area Integrity

The **land area** is the surface of the ball between the two finger holes. As the bridge narrows, the land area shrinks — and below a certain width, the land area may not provide sufficient structural support between the holes under the repeated impact of bowling.

- □ The land area concern is most relevant at bridge sizes of $\frac{3}{16}$ " or below — at these widths, verify that the ball's coverstock and construction can support the narrow land before drilling.
- □ Harder, denser coverstock materials (urethane, particle) are generally more tolerant of narrow bridges than softer reactive resin covers.
- □ The total land area also depends on finger hole diameter — larger holes on a narrow bridge produce a smaller land area than smaller holes on the same bridge. Account for both dimensions when evaluating a narrow bridge spec. [△ Verify with your Spectre team:](#)

confirm whether Spectre Cloud displays or calculates land area from the bridge and hole diameter values on a spec sheet, or whether this calculation is left to the fitter.

- Do not drill a bridge narrower than without careful assessment of the specific ball and coverstock — some ball manufacturers publish minimum land area guidelines for their products.

Bridge and the Auto-Suggestion Chain

The bridge measurement is one of several values that feed into Spectre Cloud's downstream calculations. It is part of the input set used by **Autofill Cut to Cut (2.6.9)** to derive the Cut to Cut span from insert dimensions — a correct bridge value is essential for an accurate Cut to Cut autofill result.

- If a non-standard bridge is entered manually on a spec sheet, the Cut to Cut autofill will use the manually entered value — not the standard default.
- If the bridge is changed after the Cut to Cut has been autofilled, confirm whether the Cut to Cut value updates automatically. *△ Verify with your Spectre team: confirm live update behaviour for Cut to Cut when bridge is changed on an in-progress spec sheet, consistent with the question raised in 2.6.9.*

Bridge on the Spec Sheet

The bridge field appears in the insert and finger hole section of the Spectre Cloud spec sheet. When **Autofill Bridge (2.6.5)** is enabled and grip type is recorded, the field is pre-populated with the standard value for the bowler's grip. The value can be overridden at any time by entering a different measurement directly.

- The autofilled bridge value is displayed in whatever unit and format is set for the account — fractional or decimal, consistent with chapter 2.3 display settings.
- A manually entered bridge is saved to the spec sheet history and is visible when the sheet is reviewed or cloned.
- When cloning a spec sheet, the bridge value carries forward — confirm it is still appropriate for the new ball before saving. *△ Verify with your Spectre team: confirm that bridge is included in the cloned field set, consistent with the clone behaviour questions raised in 3.2.4.*

Related Sections

- 4.1.4 — Pitch terminology: Forward, Reverse, Lateral, Zero pitch explained
- 4.1.3 — Grip type definitions: Fingertip vs. Conventional
- 4.1.2 — Span types explained: Full Span vs. Cut to Cut vs. Oval Span
- 2.6.5 — Autofill Bridge: auto standard bridge (1/4" fingertip, 3/8" conventional)
- 2.6.9 — Autofill Cut to Cut: based on insert type/size
- 4.1.6 — Creating a new spec sheet (*if applicable*)
- 9.x — Tips and Troubleshooting: land area and narrow bridge considerations

Tip: The bridge is the one spec sheet measurement that is as much about the ball as it is about the bowler. When in doubt, default to the IBPSIA standard for the grip type — it is the value that works correctly for the widest range of bowlers and ball constructions, and it is the value Spectre Cloud will suggest automatically. Non-standard bridges should always be the result of a specific observed fitting need, not a default assumption.

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4.1.6 Insert OD: drill bit sizing for STD and VACU grips


Insert OD: drill bit sizing for STD and VACU grips

4.1.6 concept

When drilling finger holes for bowlers who use inserts, the drill bit must match the insert's **Outside Diameter (OD)** — the outer dimension of the insert that determines the hole size required for a correct fit. Two insert seating systems are widely used in pro shops: **STD (Standard)** and **VACU (Vacuum)**. Each system uses a different seating mechanism, and the drill bit sizing approach differs accordingly. This page explains both systems, how OD sizing works for each, and how Spectre Cloud's **Autofill Insert OD** setting (2.6.6) handles the distinction.

What Is Insert OD?

The **Outside Diameter (OD)** of a finger insert is the outer measurement of the insert — the dimension that must match the drilled hole for the insert to seat correctly. If the hole is drilled too small, the insert cannot be pressed in without risk of cracking the ball. If the hole is drilled too large, the insert will be loose and may spin, fall out, or produce an inconsistent grip surface.

-  OD is a physical property of the insert — it is published by the insert manufacturer and is specific to each insert model and size.

- □ The drill bit size used for an insert hole must match the insert's OD — not the bowler's finger size.
- □ The bowler's finger size determines the insert's **inner diameter (ID)** — the measurement used to select the correct insert size for the bowler's finger.
- □ OD and ID are related but independent — a larger finger requires a larger insert ID, but the OD for any given insert model is fixed regardless of the ID selected.

Note: ⚠ *Verify with your Spectre team: confirm whether Spectre Cloud stores and displays both OD and ID for inserts on spec sheets, or whether only OD (the drill bit dimension) is recorded.*

□ STD (Standard) Inserts

Standard inserts are press-fit into the finger hole — the insert is pushed into the hole and held in place by friction between the insert's outer surface and the ball's coverstock. The hole must be drilled to the insert's exact OD for the press-fit to work correctly.

Drill Bit Sizing for STD Inserts

- □ The drill bit size equals the insert's published OD — a direct, one-to-one match.
- □ Most STD insert manufacturers publish their OD in fractions of an inch — the drill bit is selected to match this value exactly.
- □ A correctly fitted STD insert requires firm hand pressure or a seating tool to press into the hole — it should not drop in freely, nor should it require excessive force.
- □ If the insert spins freely after seating, the hole was drilled slightly too large — insert adhesive can be used as a remediation, but re-drilling to the correct size is preferable for a new ball.
- □ STD inserts that are too tight — drilled fractionally undersized — risk cracking the ball surface when pressed in. Never undersize an STD hole.

Common STD OD Values

STD insert OD values vary by manufacturer and model. The following represents the general range — always verify against the specific insert's published specification before drilling. ⚠ *Verify with your Spectre team: confirm STD OD values for the insert brands carried by your shop and populate this reference with verified figures.*

Insert Brand / Model	System	Published OD
Storm Sure-Fit	STD	⚠ <i>Verify with Spectre team</i>
Vise IT	STD	⚠ <i>Verify with Spectre team</i>
Turbo Switch Grip	STD	⚠ <i>Verify with Spectre team</i>

Insert Brand / Model	System	Published OD
Vise VACU Grip	VACU	⚠ <i>Verify with Spectre team</i>
<i>Additional brands</i>	—	—

Note: OD values have been left blank pending verification — publishing incorrect OD figures would directly cause drilling errors. Do not fill in these values without confirmation from the Spectre team or the relevant manufacturer's current specification sheet, consistent with the note in 2.6.6.

☐ VACU (Vacuum) Inserts

VACU inserts use a vacuum-seal seating mechanism rather than a simple press-fit. The insert incorporates a sealing flange that creates a partial vacuum when seated — this vacuum holds the insert in place without relying solely on friction between the insert OD and the hole wall. As a result, VACU holes are typically drilled **slightly larger** than the insert's nominal OD to allow the vacuum seal to engage correctly.

Drill Bit Sizing for VACU Inserts

- ☐ VACU holes are drilled to a size specified by the insert manufacturer — typically fractionally larger than the insert's body OD to allow the sealing flange to engage.
- ☐ The exact drill bit size for a VACU insert is published by the manufacturer — do not assume it is the same as the insert's body OD.
- ☐ A correctly drilled VACU hole allows the insert to be pressed in and seated with the sealing tool — the vacuum is created when the insert is fully seated and released.
- ☐ VACU inserts can be removed and resealed — this is one of their primary advantages for bowlers whose thumb size fluctuates or who share equipment across sessions.
- ☐ Drilling a VACU hole to the body OD rather than the specified seating size will prevent the vacuum mechanism from engaging — the insert will either not seat correctly or will not hold.

STD vs. VACU — Key Differences

	STD (Standard)	VACU (Vacuum)
Seating mechanism	Friction press-fit	Vacuum seal with seating flange
Drill bit size	Equals insert OD exactly	Specified by manufacturer — typically slightly larger than body OD
Removability	Permanent once seated — removal risks damage	Removable and reusable — designed for removal

	STD (Standard)	VACU (Vacuum)
Thumb swelling accommodation	Fixed size — no adjustment after drilling	Inserts can be swapped for a different size as thumb changes
Seating tool required	Typically seated by hand or with a press tool	Requires VACU seating tool to engage vacuum correctly
Common use case	General fingertip fitting; most insert-based fittings	Bowlers with thumb size variability; thumbless-compatible setups

⚙️ How Spectre Cloud Handles STD vs. VACU

The **Autofill Insert OD** setting (2.6.6) populates the drill bit size field on a spec sheet based on the insert type and grip style recorded for the bowler. For the autofill to produce the correct drill bit size for VACU inserts, the insert type must be recorded as VACU — not simply by brand name — so that Spectre Cloud can apply the manufacturer's specified seating size rather than the body OD.

- ☐ When insert type is recorded as STD, Autofill Insert OD applies the insert's published OD as the drill bit size.
- ☐ When insert type is recorded as VACU, Autofill Insert OD applies the manufacturer's specified seating size — which accounts for the vacuum flange geometry. *△ Verify with your Spectre team: confirm whether Spectre Cloud distinguishes between STD and VACU insert types in its autofill logic, and whether VACU seating sizes are stored separately from body OD values in the insert database.*
- ☐ If the insert type is not recorded or is not in Spectre Cloud's database, the OD field will remain blank — manual entry is required. See 2.6.6 for guidance on unlisted inserts.

☐☐ Insert OD and the Spec Sheet Record

The drill bit size — whether autofilled or manually entered — is saved as part of the spec sheet record. For shops that re-drill or refit inserts, having the correct OD on record ensures future sessions start from a verified figure rather than a guess.

- ☐ The OD is visible in the spec sheet detail view and in the bowler's drilling history.
- ☐ When a spec sheet is cloned for a new ball, the insert type and OD carry forward — confirm both are still correct for the new ball before saving.

- ☐ If a bowler switches insert systems — from STD to VACU, for example — create a new spec sheet rather than editing an existing one, so the historical record accurately reflects which system was drilled on each ball.

☐ Tips for Accurate Insert OD Drilling

- ☐ Always verify OD against the current manufacturer specification before drilling — insert dimensions can change between product generations even when the product name remains the same.
- ☐ Keep a physical reference card at the drill press listing the OD for each insert brand and model your shop carries — this provides a fast cross-check against the spec sheet value before drilling.
- ☐ For VACU inserts, confirm the seating tool is in good condition before drilling — a worn or damaged seating tool produces an unreliable vacuum seal even when the hole is correctly sized.
- ☐ Test-seat the insert before the ball leaves the shop — a quick press-fit or vacuum test confirms the hole size is correct before the bowler throws their first game.

Related Sections

- 4.1.5 — Bridge: standard bridge sizes and their purpose
- 4.1.4 — Pitch terminology: Forward, Reverse, Lateral, Zero pitch explained
- 4.1.3 — Grip type definitions: Fingertip vs. Conventional
- 2.6.6 — Autofill Insert OD: auto drill bit size per insert type and grip
- 2.6.7 — Auto-Repeat Insert Size: mirror size from ring to middle finger
- 4.1.7 — Creating a new spec sheet (*if applicable*)
- 9.x — Tips and Troubleshooting: insert seating issues and OD mismatches

Tip: The single most common insert-related drilling error is using the body OD for a VACU hole. If a shop is transitioning from STD to VACU inserts — or adding VACU to its product offering for the first time — brief every driller on the size difference before the first VACU ball is drilled. One clear conversation at the press prevents a class of errors that is entirely avoidable.

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4.2 — Creating a Spec Sheet

4.2.1 Creating a blank spec sheet for a bowler

Creating a blank spec sheet for a bowler

<https://www.youtube.com/embed/M5h9ZUvjZag?si=wsWGHsmpoCpXZEQw>

1. Access Bowler Profiles

Click "Bowlers" to open the list of bowler profiles in Spectre Proshop .

Access Bowler Profiles

2. Select Bowler

Select the bowler to view the specific bowler's profile details.

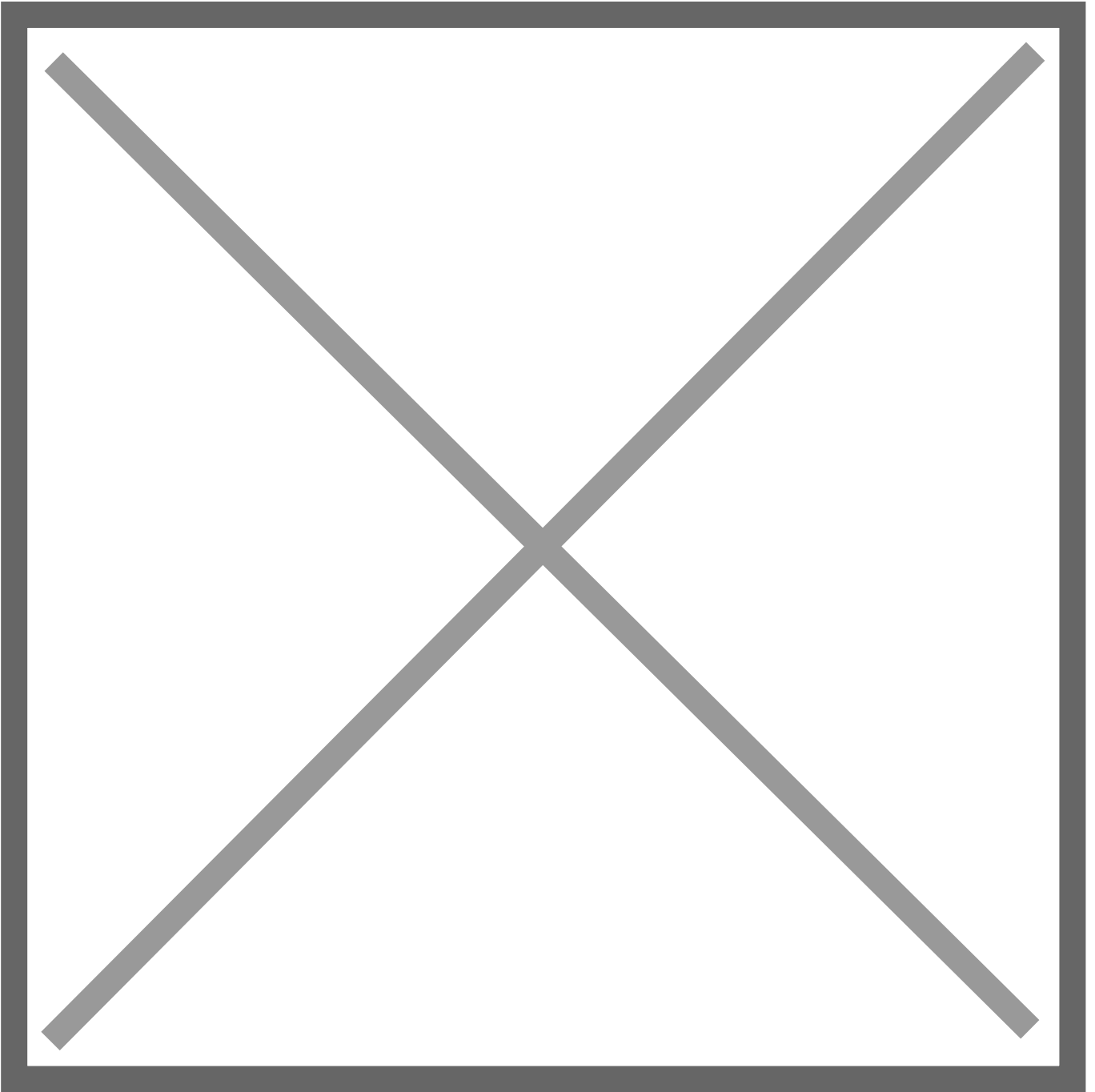
Select Bowler Email

3. Open Spec Sheets Addition

Click "Add Spec Sheets" to begin adding a new spec sheets for the selected bowler.

Open Spec Sheets Addition

4. Lets create a new spec sheet for an already existing profile.



5. Select a bowler

Select your already existing bowlers profile.

[Choose Spec Sheet Email](#)

6. Open Additional Options

[Click here to add a new spec sheet to the bowler.](#)

[Open Additional Options](#)

7. Access Further Spec Sheet Settings

Click here to modify the name of the spec sheet

[Access Further Spec Sheet Settings](#)

8. Select Spec Sheet Name Field

Click "Spec Sheet Name" to edit the name of the spec sheet.

[Select Spec Sheet Name Field](#)

9. Confirm Spec Sheet Addition

Click here to finalize and save the new spec sheet.

[Confirm Spec Sheet Addition](#)

4.2.2 Naming a spec sheet (ball name, date, notes)

Naming a spec sheet (ball name, date, notes)

4.2.2

step-by-step

When you create a new spec sheet, Spectre Cloud asks you to identify the ball and add any relevant context before drilling details are entered. The three fields — **ball name**, **date**, and **notes** — form the spec sheet's identity and make it easy to find, review, and compare records later.

Ball Name

The **Ball Name** field is the primary label for the spec sheet. It appears in the bowler's spec sheet list, in their arsenal, and on any printed or exported records.

- Enter the full ball name as it appears on the ball or packaging — for example, `Storm Phaze II` or `Hammer Black Widow 2.0`.
- Be consistent with naming across clients so searches and comparisons are easier.
- If the bowler has more than one of the same ball model, consider adding a distinguishing suffix — for example, `Storm Phaze II (spare)` or `Storm Phaze II #2`.
- Avoid abbreviations or shorthand that only make sense to you — other staff members accessing the record should immediately understand which ball is being described.

Arsenal Plus tip: If the **Arsenal Plus** plugin is active, you can also link a spec sheet to a ball in the bowler's arsenal using barcode scanning or the `bowlingdatabase.com` integration, which can pre-

fill ball details automatically. See *Arsenal Plus — Linking Spec Sheets to Arsenal Balls* for details.

Date

The **Date** field records when the ball was drilled or when the spec sheet was created. Spectre Cloud defaults this to today's date, but you can change it to reflect the actual drill date if you are entering a record retroactively.

- The date is displayed in the spec sheet list, making it easy to identify the most recent drilling for a given ball.
- Accurate dates are especially useful when a bowler has multiple spec sheets for the same ball model drilled at different times.
- When reviewing a bowler's history, spec sheets are sorted chronologically — a correct date keeps the timeline accurate.
- Leaving a retroactive entry with today's date can cause confusion when reviewing a bowler's drilling history over time.

Notes

The **Notes** field is a free-text area for any additional context about this spec sheet that does not belong in the drilling fields themselves.

Common uses for Notes

- Recording why a layout was chosen — for example:
- Logging any post-drill adjustments, such as surface changes or weight hole additions.
- Flagging follow-up items — for example:
- Noting the staff member who performed the drilling if your shop tracks this outside of a formal job board workflow.
- Adding context for a cloned spec sheet — for example:

Tip: The Notes field is plain text — keep entries concise and scannable. If your shop uses the **Job Board** plugin, detailed service history per ball lives there instead, and Notes can stay brief.

☐☐ How These Fields Appear in Spectre Cloud

Field	Where it appears	Editable after saving?
Ball Name	Spec sheet list, arsenal view, print/export	<input type="checkbox"/> Yes
Date	Spec sheet list, drilling history timeline	<input type="checkbox"/> Yes
Notes	Spec sheet detail view	<input type="checkbox"/> Yes

Note: All three fields can be updated at any time by opening the spec sheet and editing the header section. Changes are saved to the cloud immediately and sync across all devices. *Verify with Spectre team: confirm whether editing the date or ball name on a spec sheet linked to an arsenal ball updates the arsenal entry as well.*

Related Sections

- 4.2.1 — Creating a new spec sheet
- 4.2.3 — Selecting span type (F, C, O)
- 4.3 — Cloning a spec sheet
- 7.1 — Arsenal overview (linking balls to spec sheets)

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4.2.3 Selecting grip type on the spec sheet

Selecting grip type on the bowler's spec sheet

https://www.youtube.com/embed/I_KN5y9Vudc?si=G2mmAaRgChle_Fo8

1. Access Bowler Section

Click "Bowlers" to open the bowler management section in Spectre Proshop Management.

Access Bowler Section

2. Select Bowler

Select the bowler.

Select Bowler

3. Click on grip type

Click here to access the grip type.

Open First Profile Option

4. Click on the drop down

Click here to access the drop down.

Open Second Profile Option

5. Select grip type

Select the grip type you would like.

Choose Conventional Style

4.2.4 How to identify the type of grip from measurement sheet

How to identify the type of grip from measurement sheet

4.2.4 step-by-step

Before entering span and pitch measurements into a spec sheet, you need to identify which **grip type** the bowler uses. The grip type determines how the fingers sit in the ball and directly affects which measurements are relevant. Most fitting sheets — whether handwritten, printed, or from a previous software system — record grip type either explicitly or implicitly through the measurements themselves.

The Three Standard Grip Types

Spectre Cloud supports the three IBPSIA-standard grip types. Understanding how each is defined helps you read any fitting sheet accurately.

Grip Type	Finger insertion depth	Typical bowler profile
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Conventional	Fingers inserted to the second knuckle (middle joint)	Beginners, recreational bowlers, seniors, youth
Fingertip	Fingers inserted to the first knuckle (tip joint only)	Most competitive and league bowlers; the most common adult grip
Semi-Fingertip	Fingers inserted between the first and second knuckle	Transitioning bowlers; less common

Note: The overwhelming majority of adult league and competitive bowlers use a **fingertip grip**. If a fitting sheet does not explicitly state a grip type, fingertip is the most likely default for an adult bowler — but always confirm with the bowler directly.

☐☐ How to Read Grip Type from a Fitting Sheet

☐☐ When grip type is stated explicitly

Many printed and digital fitting sheets include a dedicated **Grip Type** or **Style** field. Look for labels such as:

- ☐ Grip: Fingertip / FT / F/T
- ☐ Grip: Conventional / Conv / C
- ☐ Grip: Semi-Fingertip / Semi / S/F

When you see any of these, select the matching grip type in Spectre Cloud before entering span measurements.

☐☐ When grip type is implied by span measurement style

Older or simpler fitting sheets may not label the grip type, but you can often infer it from **how the span is recorded**:

- ☐ A sheet with a single **span measurement** (e.g., Middle: 4½", Ring: 3⅞") and no further qualifiers typically indicates a **conventional grip** — the span is measured to the second knuckle.
- ☐ A sheet with span measurements labeled as **Full Span** (F) or with a separate **Cut-to-Cut** (C) or **Oval** (O) notation indicates a **fingertip grip** — these are the three span sub-

types used exclusively for fingertip drilling.

- A sheet with inserts noted (e.g., or a specific insert size listed) almost always indicates a **fingertip grip**, since inserts are standard practice for fingertip bowlers.
- Semi-fingertip is rarely recorded on older sheets — if the span measurements seem unusually long for fingertip but short for conventional, flag it and confirm with the bowler.

When grip type is implied by pitch notation

Pitch values can also hint at grip type. **Conventional grips** typically record fewer pitch measurements or use zero/reverse pitches throughout. **Fingertip grips** commonly include forward pitch on the fingers (e.g., or) to accommodate the shallower insertion depth.

Tip: Pitch alone is not a reliable indicator — many conventional bowlers use forward pitch and many fingertip bowlers use zero pitch. Use pitch only as a supporting clue, not a primary identifier.

Selecting Grip Type in Spectre Cloud

1. Open the spec sheet you are creating or editing.
2. Locate the **Grip Type** selector in the spec sheet header or measurement section.
3. Choose , , or based on your reading of the fitting sheet.
4. Spectre Cloud will adjust the available span fields and IBPSIA auto-suggestion logic to match the selected grip type.

Important: Selecting the wrong grip type will cause span fields to mismatch the bowler's actual measurements and may produce incorrect IBPSIA auto-suggestions. If you are unsure, choose **Fingertip** as the default for adults and verify with the bowler at their next visit. *Verify with Spectre team: confirm the exact UI label and location of the grip type selector within the spec sheet form.*

Tips for Transferring Legacy Fitting Sheets

- ☐ When importing data from handwritten cards or Ebonite ProShop Coordinator records, review grip type field by field — legacy systems used inconsistent abbreviations.
- ☐ If a bowler is getting a new ball drilled at the same time you are entering their history, confirm their grip type in person rather than relying solely on the old sheet.
- ☐ For youth bowlers whose hands have grown since their last fitting, treat all old grip and span data as a starting reference only — re-measure before drilling.

Related Sections

- 4.2.3 — Selecting span type (F, C, O)
- 4.2.5 — Entering span measurements
- 4.2.6 — Entering pitch values
- 4.5 — IBPSIA auto-suggestions

Tip: Not sure which grip type a new walk-in bowler uses? Ask them to hold their hand flat and look at where their fingers naturally curl — fingertip bowlers typically have calluses or grooving at the first knuckle from years of fingertip use.

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4.2.5 Cloning a spec sheet to preserve old measurements

Cloning a spec sheet to preserve old measurements

4.2.5

TIP

step-by-step

<https://www.youtube.com/embed/wdOS00SmEOU?si=Dcx92TbcvtdfV4-e>

When a bowler returns to have a new ball drilled with the same layout and measurements as a previous ball, **cloning a spec sheet** saves time and prevents transcription errors. Instead of re-entering every measurement from scratch, you duplicate an existing spec sheet and then make only the changes needed for the new ball. The original spec sheet is never altered.

☐☐ What Cloning Does

- ☐ Creates a complete copy of the selected spec sheet — including span, pitch, grip type, layout, and notes.
- ☐ Assigns today's date to the new sheet by default (editable before saving).
- ☐ Leaves the **Ball Name** field blank or pre-filled with the original name so you can update it for the new ball.
- ☐ Saves the clone as a separate, independent record — changes to the clone never affect the original.

- Does *not* automatically link the clone to an arsenal ball — that step is done separately if you use the Arsenal or Arsenal Plus features.

Tip: Cloning is also useful when drilling the same layout on two different balls for the same bowler simultaneously — clone first, then adjust only the ball name and any minor layout differences on each copy. *Verify with Spectre team: confirm whether the clone pre-fills the ball name or leaves it blank.*

How to Clone a Spec Sheet

1. Open the bowler's profile by selecting them from the **Bowlers** list.
2. Navigate to the **Spec Sheets** tab for that bowler.
3. Find the spec sheet you want to clone. Use the date and ball name to confirm you have the right record.
4. Open the spec sheet, then select the **Clone** option — look for the clone or duplicate icon in the spec sheet action menu.
5. Spectre Cloud creates a copy and opens it for editing.
6. Update the **Ball Name** to reflect the new ball.
7. Update the **Date** if needed (defaults to today).
8. Edit any measurements, pitches, or layout details that differ from the original.
9. Save the cloned spec sheet.

Note: The clone action is available from both the spec sheet list view and the individual spec sheet detail view. *Verify with Spectre team: confirm exact label and location of the clone action (e.g., whether it is a button, a dropdown menu item, or a context menu icon).*

What to Review After Cloning

Even when a bowler wants the "exact same" drilling, it is good practice to review every field before saving the clone. Measurements that worked well on a previous ball may need minor adjustments due to differences in the new ball's core, coverstock, or surface finish.

Field	Typical action after cloning
Ball Name	Always update — this is the primary identifier for the new record.
Date	Update if drilling on a different day than today.
Span measurements	Keep unless the bowler's hand has changed or a different span type is being used.

Field	Typical action after cloning
Pitch values	Keep unless adjusting for a different ball weight or finger insert change.
Layout / drilling angles	Update if the new ball has a different core that requires a layout adjustment.
Notes	Update to reflect the reason for the new drilling — e.g., Cloned from Storm Phaze II. Adjusted VAL angle for asymmetric core.

Cloning Across Devices

Because Spectre Cloud syncs in real time, a spec sheet cloned on one device is immediately available on all other logged-in devices. If you start a clone on a desktop workstation and then move to a tablet at the drill press, the record will be waiting for you without any manual transfer.

□ Why Cloning Preserves Your History

One of the most common mistakes when re-drilling a bowler is accidentally overwriting or editing the old spec sheet instead of creating a new one. Cloning prevents this by design — the original record is **read-only from the perspective of the clone operation**. Your complete drilling history for each bowler remains intact, which is valuable for:

- □ Reviewing what layouts have worked for a bowler over time.
- □ Explaining past decisions to a bowler who wants to understand their history.
- □ Reverting to a previous layout if a newer drilling is not performing as expected.
- □ Providing accurate records if a bowler transitions to another pro shop and requests their fitting history.

Related Sections

- 4.2.2 — Naming a spec sheet (ball name, date, notes)
- 4.2.1 — Creating a new spec sheet
- 4.4 — Viewing spec sheet history for a bowler
- 7.1 — Arsenal overview (linking cloned spec sheets to arsenal balls)

Tip: Get into the habit of updating the **Notes** field on every cloned sheet with a brief reason for the new drilling. Over time, these notes become a valuable record of a bowler's equipment evolution

and make it much easier to have informed conversations about future ball choices.

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4.2.6 Printing a spec sheet

Printing a spec sheet

Once a spec sheet is complete, you can print it directly from Spectre Cloud to use at the drill press, hand to a colleague, or file for your records. Spectre Cloud generates a clean, formatted printout that includes all measurements, layout details, and notes for the selected spec sheet.

☐☐ How to Print a Spec Sheet — Desktop

1. Open the bowler's profile and navigate to their **Spec Sheets** tab.
2. Open the spec sheet you want to print.
3. Select the **Print** option — look for the print icon or button in the spec sheet action menu.
4. Spectre Cloud opens a print-ready view of the spec sheet in your browser.
5. Your browser's standard print dialog will open. Select your printer, adjust page size if needed, and confirm.

Tip: For best results, use **portrait orientation** on standard letter (8.5" × 11") or A4 paper. If the layout looks crowded, check that your browser's print scale is set to 100% or **Fit to page**. *Verify with Spectre team: confirm recommended paper size and whether a specific scale setting is advised.*

☐☐ How to Print a Spec Sheet — Mobile / Tablet

1. Open the bowler's profile and navigate to their **Spec Sheets** tab.
2. Open the spec sheet you want to print.
3. Tap the **Print** icon in the spec sheet action menu.
4. Your device's share or print dialog will open. Select a printer connected to your network, or choose **Save as PDF** to create a digital copy.

Note: Printing from a smartphone is most reliable when the device is connected to a **network-enabled printer** (AirPrint on iOS/iPadOS, or a compatible printer on Android). A minimum **8" screen** is recommended for comfortable use of Spectre Cloud — for printing workflows, a tablet is preferable to a phone. *Verify with Spectre team: confirm whether the mobile print action triggers the browser's native print dialog or a Spectre-specific share flow.*

☐☐ What Appears on the Printout

The printed spec sheet includes all the information entered in Spectre Cloud for that record. Typical fields on the printout include:

- ☐ Bowler name and contact reference
- ☐ Ball name and drill date
- ☐ Grip type and span type (F, C, or O)
- ☐ Span measurements for middle and ring fingers
- ☐ Pitch values (forward, reverse, lateral) per finger and thumb
- ☐ Layout / drilling angles
- ☐ Oval measurements (if applicable)
- ☐ Notes field content
- ☐ Pro shop name (pulled from your **Profile** settings)

Verify with Spectre team: confirm the exact fields included on the printed output, and whether the pro shop logo (if uploaded) appears on the printout.

☐☐ Saving as a PDF Instead of Printing

If you do not need a paper copy, saving the spec sheet as a PDF is a clean way to archive it, email it to a bowler, or store it alongside a digital job record.

- On **Windows**: in the browser print dialog, select `Microsoft Print to PDF` or `Save as PDF` as the destination.
- On **macOS**: in the print dialog, click the **PDF** dropdown in the bottom-left corner and choose `Save as PDF`.
- On **iOS/iPadOS**: tap **Share** → **Print**, then pinch out on the preview to open it as a PDF in the Files app.
- On **Android**: select `Save as PDF` from the printer list in the print dialog.

☐ Printing and the Job Board Plugin

If your shop uses the **Job Board** plugin, spec sheet printing integrates with your workshop workflow — you can print a spec sheet directly from an open job card without navigating back to the bowler's profile. This keeps the drill press queue moving without switching between sections of the app. *Verify with Spectre team: confirm whether Job Board has its own print trigger on the job card view.*

☐ Tips for a Clean Printout

- ☐ Make sure the spec sheet is **fully saved** before printing — unsaved changes will not appear on the printout.
- ☐ If your browser is adding unwanted headers or footers (URL, date, page number), disable them in your browser's **More settings** or **Headers and footers** option in the print dialog.
- ☐ For shops that print frequently, consider bookmarking the bowler list or keeping a dedicated browser tab open to speed up the print workflow.
- ☐ Chrome and Edge generally produce the most consistent print output across platforms — if a printout looks misformatted in another browser, try printing from Chrome.

Related Sections

- 4.2.2 — Naming a spec sheet (ball name, date, notes)
- 4.2.5 — Cloning a spec sheet to preserve old measurements
- 4.4 — Viewing spec sheet history for a bowler
- 8.1 — Profile settings (pro shop name and logo)

- Book 07 — Job Board plugin

Tip: Saving spec sheets as PDFs and storing them in a shared folder (Google Drive, Dropbox, or a network drive) gives your whole team instant access to drilling records even when Spectre Cloud is not open in front of them.

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4.2.7 Cloning an existing spec sheet

<https://www.youtube.com/embed/le56yuwS0jc>

1. Open Bowler Profile

Select a bowler you would like to clone their spec sheet

Open Bowler Profile

2. Hit the CLONE button

Click here to create a clone of the default spec sheet.

Open Specification Options

3. Give the cloned sheet a specific name

Click "Spec Sheet Name" to name the clone of the spec sheet.

Select Spec Sheet Name

4. Confirm name

Once you have renamed the spec sheet, click here to confirm.

Access Additional Options

4. Modify the necessary fields

You can now proceed to make modifications to the bowler's specs.

Open Further Specification Settings

You have successfully created a clone spec sheet for an already existing bowler

4.3 — Finger Measurements

4.3.1 Entering finger hole size (ring and middle fingers)

Entering finger hole size (ring and middle fingers)

<https://www.youtube.com/embed/J0770yAFMco?si=YRWgTj2ggYnGC9oC>

1. Select Customer Account

Click and select the bowler
Select Customer Account

2. Hole size

Click on hole size
Access Customer Options Menu

3. Open drop down

Click here to open the drop down.
Open Customer Details

4. Select the size

Click and select the size of the hole

Choose Appointment Date

5. Hole size

Repeat the same process for the other finger.

Open Date Options

6. Open drop down

Open the drop down

Confirm Date Selection

7. Select the size

Select the size

Select Product Size

4.3.2 Entering span measurements (Full Span and Cut to Cut)

Entering span measurements (Full Span and Cut to Cut)

<https://www.youtube.com/embed/qvs9ONhVLC0?si=7B14sm9wtKOk2ZZm>

Span measurements define the distance between the thumb hole and each finger hole on a bowling ball. Spectre Cloud supports two primary span measurement methods — **Full Span** and **Cut to Cut** — and it is important to enter the correct type to ensure accurate drilling. Using the wrong method will produce holes that are drilled in the wrong position, even if every number looks correct on screen.

☐☐ Understanding the Two Span Types

Full Span (F)

A **Full Span** measurement is taken from the **near edge of the thumb hole** to the **near edge of the finger hole** — that is, the distance measured along the surface of the ball from the edge of one hole to the edge of the other, with the bowler's hand in its natural relaxed position over the ball.

- ☐ The most common measurement method used in North American pro shops.
- ☐ Measures the actual gap between the two holes — the distance of ball surface the bowler's skin bridges.
- ☐ Easy to take with a standard span gauge or ruler directly on the ball blank.

Cut to Cut (C)

A **Cut to Cut** measurement is taken from the **center of the thumb hole** to the **center of the finger hole**. It is a center-to-center measurement rather than an edge-to-edge measurement.

- ☐ Common in some European fitting traditions and in certain legacy pro shop software systems.
- ☐ Produces a consistent reference point regardless of hole diameter — useful when hole sizes vary significantly.
- ☐ Less intuitive to measure directly on a hand — typically calculated or taken from a fitting device rather than measured freehand.

☐☐ The Relationship Between Full Span and Cut to Cut

Because Full Span measures edge-to-edge and Cut to Cut measures center-to-center, the two values differ by the **radius of the thumb hole** and the **radius of the finger hole** combined. In practical terms:

- Cut to Cut is always **larger** than Full Span for the same bowler.
- The difference equals half the thumb hole diameter plus half the finger hole diameter.
- For a typical adult fingertip bowler, Cut to Cut runs roughly $\frac{1}{2}$ " to $\frac{3}{4}$ " longer than Full Span — but this varies with hole size.

Important: Never enter a Cut to Cut value into a Full Span field, or vice versa. Even a small mismatch will result in holes drilled in the wrong location. If you are unsure which method was used on a legacy fitting sheet, check the raw numbers against typical ranges for your bowlers — Full

Span for an adult fingertip bowler typically falls between $3\frac{5}{8}$ " and $4\frac{5}{8}$ "; Cut to Cut values for the same bowler will read higher. When in doubt, re-measure.

☐☐ Entering Span Measurements in Spectre Cloud

1. Open the spec sheet and confirm the **Span Type** is set correctly — F for Full Span or C for Cut to Cut — before entering any numbers. The span type selector must match the method used to take the measurement.
2. Enter the **middle finger span** in the Middle field.
3. Enter the **ring finger span** in the Ring field.
4. Double-check both values against the fitting sheet before moving on — transposing middle and ring span is one of the most common data-entry errors.

Verify with Spectre team: confirm the exact field labels and UI layout for span entry — specifically whether Middle and Ring are entered as separate fields or as a combined span with an offset value.

☐☐ Recording Span from a Hand Measurement

If you are measuring a bowler's hand directly rather than copying from an existing fitting sheet, follow these steps for a Full Span measurement:

1. Ask the bowler to place their hand flat and relaxed on a flat surface or span gauge.
2. Align the gauge (or ruler) from the crease of the thumb — the point where the thumb meets the palm — toward the middle and ring fingers.
3. For a **fingertip grip**, measure to the first knuckle crease of each finger.
4. For a **conventional grip**, measure to the second knuckle crease of each finger.
5. Record middle and ring measurements separately — they are almost always different.

Tip: Always measure both hands if the bowler is new to your shop, even if they bowl with only one hand. Hand dimensions can vary between left and right, and having both on file is useful if the bowler ever requests a second opinion or switches equipment.

☐ Typical Span Ranges for Reference

Bowler type	Grip	Typical Full Span (middle)	Typical Full Span (ring)
Adult male	Fingertip	4 $\frac{1}{8}$ " - 4 $\frac{1}{2}$ "	3 $\frac{7}{8}$ " - 4 $\frac{1}{4}$ "
Adult female	Fingertip	3 $\frac{3}{4}$ " - 4 $\frac{1}{8}$ "	3 $\frac{1}{2}$ " - 3 $\frac{7}{8}$ "
Adult (either)	Conventional	4 $\frac{1}{2}$ " - 5"	4 $\frac{1}{4}$ " - 4 $\frac{3}{4}$ "
Youth	Conventional	3" - 4"	2 $\frac{3}{4}$ " - 3 $\frac{3}{4}$ "

Note: These ranges are general references only — individual hand anatomy varies widely. Never reject a measurement simply because it falls outside a typical range. Flag outliers for a second look, but trust a careful measurement over a table.

☐ Common Mistakes to Avoid

- ☐ **Mixing span types** — entering a Cut to Cut value in a Full Span field is the single most common span entry error. Always confirm the span type selector before entering numbers.
- ☐ **Transposing middle and ring** — middle span is almost always longer than ring span for the same bowler. If your middle value is shorter than ring, double-check before saving.
- ☐ **Copying from a worn or faded fitting card without verifying units** — some older cards recorded spans in millimeters. Spectre Cloud uses inches. *Verify with Spectre team: confirm whether Spectre Cloud supports millimeter entry or inches only.*
- ☐ **Using a tight or forced hand position during measurement** — always measure with the hand relaxed. A forced stretch or curl produces a span that will feel uncomfortable once drilled.

Related Sections

- 4.2.3 — Selecting span type (F, C, O)
- 4.2.4 — How to identify grip type from a measurement sheet
- 4.3.3 — Entering pitch values
- Book 05 — Oval Calculator (for Oval span type)

Tip: If a returning bowler says their previous ball always felt slightly stretched or cramped, the first thing to check is whether the original spec sheet used Full Span or Cut to Cut — and whether that

matches what was actually drilled. A span type mismatch is one of the most common causes of an otherwise correct-looking spec sheet producing an uncomfortable fit.

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4.3.3 Inputting Vertical and Lateral pitch for fingers

Forward and lateral pitch for fingers

4.3.3

measurement

<https://www.youtube.com/embed/s8Ec4t9hpZ8?si=anmPbEwhmubHYKHD>

Pitch describes the angle at which each finger hole is drilled into the ball — not straight down, but tilted in a specific direction to match the natural resting angle of the bowler's finger. Spectre Cloud records two pitch values for each finger hole: **vertical pitch** (the tilt toward or away from the bowler's palm) and **lateral pitch** (the tilt toward or away from the thumb). Entering both values accurately is essential to a comfortable, repeatable fit.

Understanding Vertical Pitch

Vertical pitch describes the angle of the finger hole along the **palm-to-fingertip axis** — that is, whether the hole tilts toward the palm (forward) or away from it (reverse).

Direction	What it means	Typical use
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Forward	Hole tilts toward the bowler's palm. The bottom of the hole leans in the direction of the thumb.	Most common for fingertip grips. Helps the finger seat naturally at the first knuckle without strain.
Zero (0)	Hole drilled perpendicular to the ball surface — no tilt in either direction.	Used for some conventional grips and as a neutral baseline.
Reverse	Hole tilts away from the bowler's palm. The bottom of the hole leans away from the thumb.	Less common for fingers; used occasionally for conventional grips or when a bowler has a specific release preference.

Typical vertical pitch ranges for fingers

- **Fingertip grip:** $\frac{1}{4}$ " to $\frac{1}{2}$ " forward is the most common starting range for both middle and ring fingers.
- **Conventional grip:** 0" to $\frac{1}{4}$ " forward is typical — conventional bowlers generally need less forward pitch than fingertip bowlers.
- Vertical pitch beyond $\frac{3}{4}$ " forward for fingers is unusual and should be confirmed before drilling — it may indicate a measurement error or an atypical hand anatomy that warrants a closer fitting.

↔ Understanding Lateral Pitch

Lateral pitch describes the angle of the finger hole along the **thumb-to-little-finger axis** — whether the hole tilts toward the thumb side of the hand or away from it.

Direction	What it means	Typical use
Toward thumb (inward / medial)	Hole tilts in the direction of the thumb. For a right-handed bowler, the middle and ring finger holes tilt left.	The most common lateral direction for finger holes — mirrors the natural inward curl of the fingers.
Zero (0)	No lateral tilt — hole drilled straight relative to the lateral axis.	Used as a starting point or when a bowler has a very square finger position.
Away from thumb (outward / lateral)	Hole tilts away from the thumb. Less common for finger holes.	Occasionally used for bowlers with a pronounced outward finger angle or specific release mechanics.

Typical lateral pitch ranges for fingers

- **Most bowlers:** 0" to $\frac{1}{4}$ " toward thumb for both middle and ring fingers.

- Middle and ring fingers often carry the same lateral pitch, but they do not have to — record each finger independently.
- Lateral pitch beyond $\frac{3}{8}$ " in either direction for finger holes is uncommon and worth double-checking.

□□ Entering Pitch Values in Spectre Cloud

1. In the spec sheet, locate the **pitch section** for the middle finger and ring finger — each finger has its own vertical and lateral pitch fields.
2. For each finger, enter the **vertical pitch value** — the amount in inches (e.g., $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$) — and select the direction: **Forward**, **Zero**, or **Reverse**.
3. Enter the **lateral pitch value** and select the direction: **Toward Thumb**, **Zero**, or **Away from Thumb**.
4. Repeat for both the middle and ring finger.
5. Review all four pitch entries (vertical + lateral for each finger) before moving on to thumb pitch.

Verify with Spectre team: confirm whether pitch is entered as a fraction (e.g., $\frac{1}{4}$ ") or a decimal (e.g., 0.25"), and whether direction is selected via a dropdown, radio buttons, or a +/- toggle. Also confirm the exact field labels used in the UI.

□□ How Pitch Is Recorded on Fitting Sheets

Legacy and handwritten fitting sheets record pitch in a variety of ways. Here is how to interpret the most common notations when transferring records into Spectre Cloud:

Notation on fitting sheet	How to enter in Spectre Cloud
$\frac{1}{4}$ F / $\frac{1}{4}$ Fwd / $\frac{1}{4}$ Forward	Vertical: $\frac{1}{4}$ ", direction: Forward
0 / Zero / Neutral	Vertical or lateral: 0", direction: Zero
$\frac{1}{4}$ R / $\frac{1}{4}$ Rev / $\frac{1}{4}$ Reverse	Vertical: $\frac{1}{4}$ ", direction: Reverse
$\frac{1}{4}$ T / $\frac{1}{4}$ In / $\frac{1}{4}$ toward thumb	Lateral: $\frac{1}{4}$ ", direction: Toward Thumb
$\frac{1}{4}$ Out / $\frac{1}{4}$ Lat / $\frac{1}{4}$ away	Lateral: $\frac{1}{4}$ ", direction: Away from Thumb

Notation on fitting sheet	How to enter in Spectre Cloud
3° / 5° (degrees)	Convert to inches using your drill press conversion chart, then enter. <i>Verify with Spectre team: confirm whether Spectre Cloud accepts degree entry directly or requires conversion to inches.</i>

□ Tips for Accurate Pitch Entry

- □ Enter middle finger pitch and ring finger pitch **separately** — they are often the same, but do not assume. Many bowlers carry slightly different pitches on each finger.
- □ When in doubt on lateral pitch for a new bowler, 0" to ¼" toward thumb is a safe starting point. You can refine on future visits.
- □ If a bowler reports finger soreness or difficulty releasing after a drilling, pitch is usually the first adjustment to consider — noting the original pitch values accurately makes future corrections much easier.
- □ Do not confuse vertical and lateral pitch fields when entering data from a handwritten sheet — double-check the axis before saving.
- □ Do not leave pitch fields blank if the original fitting sheet shows zero — enter 0" explicitly so the record is unambiguous.

IBPSIA tip: Spectre Cloud's auto-suggestion feature can recommend starting pitch values based on grip type and span measurements. These are reference points, not prescriptions — always defer to a measured fitting or a returning bowler's known preferences over a suggested value. See 4.5 — *IBPSIA Auto-Suggestions* for details.

Related Sections

- 4.3.2 — Entering span measurements (Full Span and Cut to Cut)
- 4.3.4 — Inputting thumb pitch
- 4.2.4 — How to identify grip type from a measurement sheet
- 4.5 — IBPSIA auto-suggestions
- Book 05 — Oval Calculator

Tip: Keep a laminated pitch reference card at your drill press with common notation translations. When transferring a stack of legacy fitting cards, having the conversion table visible saves time and prevents the most common transcription errors.

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4.3.4 CLT (Corrected lateral tilt) angle and its effect on lateral pitch

CLT (Corrected lateral tilt) angle and its effect on lateral pitch

https://www.youtube.com/embed/KVp3njbLgFY?si=D_GTkj2VdMHaalHv

When a bowler places their hand on a ball during a fitting, the natural resting angle of the fingers is rarely perfectly vertical. **Corrected Lateral Tilt (CLT)** is a measurement — taken in degrees — that captures how far the bowler's fingers deviate from vertical when seated in the grip. Spectre Cloud uses this value to automatically apply a correction to the lateral pitch, ensuring that what gets drilled matches the bowler's actual hand angle rather than an idealized flat-hand measurement.

CLT is entered by the operator as a direct measurement taken during the fitting process. Spectre Cloud handles the correction calculation internally — you do not need to do the math yourself.

☐☐ What CLT Measures

When a bowler grips a ball, gravity, hand anatomy, and finger flexibility all cause the fingers to tilt slightly to one side. A lateral pitch value entered without accounting for this tilt may feel correct on paper but produce a grip that pulls or torques the fingers during the release.

CLT quantifies this tilt by measuring the angle — in degrees — between the bowler's finger axis and true vertical, taken while the bowler's hand is actually in the ball during the fitting.

- ☐ A CLT of 0° means the bowler's fingers sit perfectly vertical — no correction is needed.
- ☐ A positive CLT value means the fingers tilt in one direction; a negative value means they tilt the other way. *Verify with Spectre team: confirm the sign convention — which direction is positive and which is negative, and how this maps to toward-thumb vs. away-from-thumb tilt.*
- ☐ Most bowlers will show a small but measurable CLT — a reading of 0° is the exception rather than the rule.

☐☐ How to Measure CLT During a Fitting

1. Have the bowler place their hand in the ball in their natural grip position — fingers and thumb seated, hand relaxed, not forced.
2. Observe the angle of the middle and ring fingers relative to vertical. Use a protractor, fitting gauge, or tilt measurement tool to capture the angle.
3. Record the measurement in degrees. Note the direction of tilt.
4. Enter the value into the **CLT field** in the Spectre Cloud spec sheet.

Verify with Spectre team: confirm the recommended measurement tool or technique for taking the CLT reading — whether a specific gauge, a phone-based level app, or a visual estimation method is standard practice, and whether middle and ring finger CLT are measured and entered separately or as a single shared value.

⚙️ How CLT Affects Lateral Pitch

Once a CLT value is entered, Spectre Cloud applies a correction formula to the raw lateral pitch value. The corrected lateral pitch — not the raw value — is what is used for the actual drilling.

- The correction is applied **automatically** — you enter the raw lateral pitch and the CLT measurement independently, and Spectre Cloud computes the adjusted drilling value.
- The greater the CLT angle, the more the effective lateral pitch deviates from the raw entered value.
- For bowlers with a CLT close to , the correction is negligible — the drilled result will be very close to the raw lateral pitch entry.
- Do not manually pre-adjust your lateral pitch entry to try to compensate for CLT yourself — entering both a manually adjusted pitch *and* a CLT value will result in double correction and an inaccurate drilling.

Verify with Spectre team: confirm and document the exact formula Spectre Cloud uses to derive corrected lateral pitch from the raw lateral pitch and CLT values, for operators who want to understand the underlying calculation.

CLT in Practice — What to Expect

CLT reading	What it indicates	Effect on lateral pitch
<input type="text" value="0°"/>	Fingers sit perfectly vertical in grip	No correction applied — drilled lateral pitch equals entered value
Small angle (e.g. <input type="text" value="2°-5°"/>	Slight natural tilt — very common	Minor correction; noticeable on precise fittings
Moderate angle (e.g. <input type="text" value="6°-10°"/>	Pronounced tilt — often seen in bowlers with larger hands or strong release habits	Meaningful correction; skipping CLT entry would produce a noticeably off lateral pitch
Large angle (<input type="text" value=">10°"/>	Significant tilt — worth double-checking the measurement before proceeding	Substantial correction; verify the reading is genuine and not a measurement error

Verify with Spectre team: confirm the realistic expected range of CLT values seen in practice, and whether Spectre Cloud flags or warns on unusually large CLT entries.

Tips for Accurate CLT Entry

- Always measure CLT with the bowler's hand in a **relaxed, natural grip** — a forced or exaggerated position will produce a CLT value that does not reflect real drilling conditions.
- If a bowler reports that a previously drilled ball pulls their fingers sideways during the release, check whether CLT was measured and entered on that spec sheet. A missing or incorrect CLT entry is a common cause of lateral discomfort.

- ☐ For returning bowlers with a known CLT, clone their existing spec sheet — the CLT value carries over with all other measurements, saving time and ensuring consistency across balls.
- ☐ Do not skip CLT for bowlers who seem to have a "normal" grip. A small but consistent tilt left uncorrected compounds across multiple balls and can contribute to long-term finger strain.
- ☐ Do not enter CLT in a lateral pitch field by mistake — they are separate inputs and serve different purposes in the spec sheet.

Related Sections

- 4.3.3 — Inputting vertical and lateral pitch for fingers
- 4.3.5 — Inputting thumb pitch
- 4.3.2 — Entering span measurements (Full Span and Cut to Cut)
- 4.5 — IBPSIA auto-suggestions
- 4.2.5 — Cloning a spec sheet to preserve old measurements

Tip: CLT is one of the measurements that separates a precise professional fitting from a basic one. Taking the extra minute to measure and record it — especially for competitive bowlers who care about consistency across their arsenal — is a tangible demonstration of the quality of service your shop provides.

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4.3.5 How to input a finger oval measurement (no inserts)

How to input a finger oval measurement (no inserts)

<https://www.youtube.com/embed/vA3pY0rBNUo?si=xUc5KGRw75crGbEc>

For bowlers who do not use finger inserts, the oval measurement captures the natural shape of each finger hole needed to achieve a comfortable, secure fit. Because fingers are not perfectly round in cross-section, drilling a round hole to a round measurement often produces a grip that feels loose or allows unwanted rotation. The oval measurement corrects for this by recording the finger's true cross-sectional dimensions — its **width** and **depth** — so the hole can be drilled to match.

This page covers how to enter oval measurements directly in the spec sheet. For the full oval calculation workflow, including how to derive oval dimensions from hand measurements, see *Book 05 — Oval Calculator*.

What an Oval Measurement Consists Of

An oval measurement for a finger hole has two components:

- **Width** — the measurement across the finger in the lateral direction (side to side, across the knuckle).
- **Depth** — the measurement through the finger in the vertical direction (front to back, from the pad to the back of the finger).

Together, width and depth define the elliptical shape of the hole. When width and depth are equal, the hole is effectively round. When they differ, the hole is a true oval — wider than it is deep, or deeper than it is wide, depending on the bowler's finger geometry.

Note: Oval measurements are recorded separately for the **middle finger** and the **ring finger**. Do not assume both fingers share the same oval — most bowlers have measurable differences between the two. *Verify with Spectre team: confirm whether Spectre Cloud also records an oval for the thumb on this same form section, or whether thumb oval is handled separately.*

How to Enter Oval Measurements in Spectre Cloud

1. In the spec sheet, locate the **Oval** section for the finger measurements. This is separate from the span and pitch fields.
2. Ensure the spec sheet span type is set to (Oval) if oval measurements are being used as the primary span reference, or confirm with the Spectre team whether oval dimensions can be entered alongside an F or C span type. *Verify with Spectre team: clarify whether oval entry is only available when span type O is selected, or whether it is always accessible regardless of span type.*
3. Enter the **width** measurement for the middle finger.
4. Enter the **depth** measurement for the middle finger.
5. Repeat for the **ring finger** — enter its width and depth independently.
6. Review all four values before saving.

Verify with Spectre team: confirm the exact field labels used in the UI for oval width and depth, and whether measurements are entered in inches (fractions or decimal) or millimeters.

How to Take Oval Measurements from the Bowler's Hand

Oval measurements are taken directly from the bowler's finger, typically using a dedicated oval gauge or digital calipers. For no-insert fittings, the goal is to measure the finger at the **point of insertion** — the first knuckle for fingertip grips, the second knuckle for conventional grips.

1. Ask the bowler to extend their finger naturally — relaxed, not tensed or fully straightened.
2. Position the measuring tool at the appropriate knuckle joint.
3. Measure the **width** — across the finger, parallel to the knuckle crease.
4. Measure the **depth** — through the finger, perpendicular to the knuckle crease.
5. Record both values for middle and ring fingers before moving to the ball.

Tip: Take oval measurements with the bowler's hand warm and relaxed. Cold or tense hands can cause fingers to appear narrower than their natural resting size, resulting in a hole that fits correctly in the shop but feels tight after a few frames once circulation increases.

Oval vs. Round — When It Matters

Situation	Oval recommended?	Notes
Width and depth differ by $\frac{1}{32}$ " or more	<input type="checkbox"/> Yes	Even a small oval difference produces a meaningfully better fit for most bowlers.
Width and depth are equal or within $\frac{1}{64}$ "	Round hole is acceptable	A round hole will fit well — oval entry is still good practice for record accuracy.
Bowler reports finger rotation or looseness in a previously round-drilled ball	<input type="checkbox"/> Yes — measure and record	Switching to an oval hole is often the solution for a grip that feels sloppy without being oversized.
Youth bowler with rapidly changing hand size	Situational	Record oval for accuracy, but note in the spec sheet that re-measurement is expected at the next visit.

Tips for No-Insert Oval Entry

- Record the oval even when width and depth are nearly equal — having both values on file gives you a complete history if the bowler's fingers change over time.
- If you are cloning a spec sheet for a new ball, verify the oval measurements are still current before drilling — finger dimensions can shift with age, weight change, or injury.
- Label your measurement notes clearly when taking readings in a busy shop — it is easy to transpose middle and ring values when moving quickly between a fitting and the

keyboard.

- ☐ Do not use insert size as a proxy for oval on a no-insert fitting — insert sizes account for the insert wall thickness and are not equivalent to bare finger oval dimensions.
- ☐ Do not estimate oval by eye. Even experienced fitters can misjudge the depth dimension, which is harder to eyeball than width. Use a gauge.

Related Sections

- 4.3.3 — Inputting vertical and lateral pitch for fingers
- 4.3.4 — CLT (Corrected Lateral Tilt) angle and its effect on lateral pitch
- 4.3.6 — Inputting finger insert measurements
- Book 05 — Oval Calculator (full oval derivation workflow)
- 4.2.3 — Selecting span type (F, C, O)

Tip: The Oval Calculator in Book 05 can derive recommended oval dimensions from a set of hand measurements if you do not have a dedicated oval gauge available. Use it as a starting point, then verify with a physical measurement where possible.

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4.3.6 Ring Finger 5/16" rule — auto and manual calculation

Ring Finger 5/16" rule — auto and manual calculation

<https://www.youtube.com/embed/eYbYv1w38Ho?si=3TMOFJgntVeFAP8k>

When setting up a spec sheet, the ring finger span is rarely measured independently from scratch. Instead, it is derived from the middle finger span using the **5/16" Ring Finger Rule** — a fitting convention that accounts for the natural anatomical difference between the two fingers. Spectre Cloud can apply this calculation automatically, or you can enter the ring finger span manually if you prefer to measure directly.

The Anatomy Behind the Rule

With a bowler's hand laid flat on a bowling ball, the second joint lines of the middle and ring fingers — measured from the base of each finger — do not line up evenly. The ring finger's second joint sits closer to the palm than the middle finger's. This difference, referred to here as **d**, is the key variable in the calculation.

If the two joint lines were perfectly aligned (**d = 0"**), the ring finger span would need to be **5/16"** longer than the middle finger span to produce an equivalent fit. Because **d** is almost never zero,

the actual ring finger span adjusts up or down from that baseline depending on each bowler's individual anatomy.

☐☐ The Formula

The ring finger span is calculated as follows:

$$\text{Ring Finger Span} = \text{Middle Finger Span} + (5/16" - d)$$

Where **d** is the observed difference between the second joint lines of the middle and ring fingers, measured while the bowler's hand is laid flat on the ball.

Working through the formula

Scenario	d value	Adjustment (5/16" - d)	Effect on ring span
Ring joint sits exactly 5/16" closer to palm than middle joint	5/16"	0"	Ring span equals middle span — no adjustment needed
Ring joint sits closer to palm than average (large d)	> 5/16"	Negative	Ring span is shorter than middle span
Ring joint sits further from palm than average (small d)	< 5/16"	Positive	Ring span is longer than middle span
Ring and middle joint lines are level (d = 0)	0"	+5/16"	Ring span is 5/16" longer than middle span

Note: It is entirely normal for the ring finger span to come out longer than the middle finger span for bowlers whose joint lines are close together. Do not assume the ring span must always be shorter — the formula determines the correct value, not anatomical intuition.

☐☐ How to Measure d

1. Ask the bowler to place their hand flat and relaxed on the ball, fingers together in their natural resting position.
2. Observe the second joint line (the joint closest to the base of the finger, not the fingertip joint) of the middle finger and the ring finger.
3. Measure the distance between the two joint lines along the finger axis — from the middle finger's joint line to the ring finger's joint line.
4. Record this as **d**. Note which finger's joint line sits closer to the palm — this determines the sign of the adjustment in the formula.

Tip: A small span ruler or fitting gauge works well for measuring d . The measurement does not need to be taken to finer than $\frac{1}{32}$ " precision for most fittings — but consistency matters more than extreme precision. Use the same technique each time.

Auto Calculation in Spectre Cloud

When using the **auto calculation** mode for the ring finger span, Spectre Cloud applies the $\frac{5}{16}$ " rule on your behalf:

1. Enter the **middle finger span** as measured.
2. Enter the **d measurement** in the designated field.
3. Spectre Cloud calculates and displays the ring finger span automatically using the formula: $\text{Ring Span} = \text{Middle Span} + (\frac{5}{16}'' - d)$.
4. Review the calculated ring span before saving — confirm it looks anatomically reasonable for the bowler in front of you.

Verify with Spectre team: confirm the exact field label used for the d measurement input in the Spectre Cloud UI, and whether the calculated ring span is displayed as a read-only result or as an editable field the operator can still override.

Manual Entry Override

If you prefer to measure the ring finger span directly — or if a bowler has an unusual hand geometry where the calculated value does not feel right — you can enter the ring finger span manually, bypassing the auto calculation entirely.

- Manual entry is appropriate when you have taken independent measurements of both fingers and want to record exactly what you measured.
- Manual entry is also useful when transferring records from a legacy fitting sheet that already contains explicit ring span values taken by another fitter.
- If the auto-calculated value and your direct measurement disagree by more than $\frac{1}{16}$ ", remeasure both the middle span and d before deciding which to use.
- Do not use manual entry simply to avoid measuring d — skipping d and guessing the ring span is the most common source of ring finger fit complaints.

Verify with Spectre team: confirm how the operator switches between auto and manual mode for ring span entry — whether it is a toggle, a checkbox, or simply leaving the d field blank to enable direct ring span input.

□ Tips for Consistent Results

- □ Measure d every time, even for returning bowlers — finger joint alignment can shift subtly with age, weight change, or injury, and the d value is quick to check.
- □ When cloning a spec sheet, the d value carries over with the other measurements. Verify it is still current before using the auto calculation for the new ball.
- □ Document the d measurement in the **Notes** field as a backup — if a question arises later about the ring span derivation, having d on record makes it easy to reconstruct the calculation.
- □ Do not conflate d with the ring finger span itself — d is an input to the formula, not a span measurement.

Related Sections

- 4.3.2 — Entering span measurements (Full Span and Cut to Cut)
- 4.3.3 — Inputting vertical and lateral pitch for fingers
- 4.3.5 — How to input a finger oval measurement (no inserts)
- 4.5 — IBPSIA auto-suggestions
- Book 05 — Oval Calculator

Tip: The 5/16" rule produces a starting span — not an immutable prescription. If a bowler tries the ball and reports that the ring finger feels consistently tighter or looser than the middle finger despite a correct-looking spec sheet, the d measurement is the first thing to recheck. A remeasure in-shop takes under a minute and often reveals a small error that explains the fit complaint.

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4.3.7 Insert type and size: STD vs. VACU, selecting drill bit OD

Insert type and size: STD vs. VACU, selecting drill bit OD

4.3.7 measurement

Once span, pitch, and oval measurements are recorded, the spec sheet needs to know what is going into the finger holes — bare finger, a standard insert, or a VACU-style insert — and what drill bit outer diameter (OD) to use. These entries directly determine the physical size of the holes drilled in the ball, so accuracy here is just as important as the span and pitch values that position them.

Insert Types: STD vs. VACU

No Insert (Bare Finger)

If the bowler does not use finger inserts, select the bare finger or no-insert option. In this case the hole is drilled to the bowler's oval or round finger measurement directly, with no allowance for insert wall thickness. See [4.3.5 — How to input a finger oval measurement \(no inserts\)](#) for how oval dimensions are entered for bare finger fittings.

STD (Standard Insert)

A **standard insert** is pressed into a hole drilled to a tight tolerance — the hole diameter is sized so the insert fits snugly and does not move once seated. The insert's inner diameter then becomes the effective finger hole the bowler uses.

- □ The most common insert type across all grip styles and skill levels.
- □ Available in a wide range of inner diameters and materials from multiple manufacturers.
- □ Once pressed in, a standard insert sits flush and stays fixed under normal use.
- □ If the pilot hole is drilled slightly oversized, a standard insert can work loose over time — precision on the OD entry matters.

VACU (Vacuum-Style Insert)

A **VACU-style insert** uses a different fit philosophy. The pilot hole is drilled slightly **larger** than it would be for a standard insert of the same finger size, allowing a slightly **smaller** insert to be used. When the bowler inserts their finger, the insert expands to fill the gap and conforms to the finger's shape under pressure.

- □ The expansion fit produces a more custom, form-fitting feel for many bowlers — particularly those who find standard inserts uncomfortable at the first knuckle.
- □ Useful for bowlers with irregular finger cross-sections where a rigid standard insert does not seat comfortably.
- □ The slightly larger pilot hole means there is more tolerance in the drilling — a small OD variance has less impact on the final fit than with a standard insert.
- □ Not suitable for all insert materials — confirm the insert manufacturer supports VACU-style installation before selecting this option.
- □ Because the insert is smaller than it would be for a standard fit, selecting the wrong insert size for a VACU installation will produce a hole that is either too loose or unable to expand correctly.

	STD	VACU
Pilot hole vs. insert	Tight fit — hole sized to grip the insert	Loose fit — hole slightly larger than insert OD
Insert behaviour	Fixed once pressed in	Expands to conform under finger pressure
Best for	Most bowlers; standard fitting workflow	Bowlers wanting a form-fitting feel or irregular finger geometry
OD entry in Spectre Cloud	OD of the insert — hole drilled to match	OD adjusted upward to allow expansion gap

Verify with Spectre team: confirm whether Spectre Cloud automatically adjusts the pilot hole OD calculation when VACU is selected, or whether the operator enters the adjusted OD manually. Also confirm the standard expansion gap allowance used for VACU calculations.

☐☐ Selecting Drill Bit OD

The **drill bit outer diameter (OD)** is the size of the bit used to drill the finger hole — or the pilot hole for an insert. The OD entry in Spectre Cloud determines the final hole size and must account for whether the bowler is using a bare finger, a standard insert, or a VACU insert.

For bare finger (no insert)

The OD is set to match the bowler's finger measurement directly — either their round hole size or the larger dimension of their oval. The hole is the finger hole; there is no insert wall to account for.

For standard inserts

The OD is set to match the **outer diameter of the insert** being used. The insert manufacturer's sizing chart determines which insert OD corresponds to the bowler's inner finger size. The hole is drilled to grip the insert; the insert's inner diameter is the effective fit dimension.

For VACU inserts

The OD is set slightly **larger** than the insert's outer diameter to provide the expansion gap. The exact allowance depends on the insert material and manufacturer recommendation.

Verify with Spectre team: confirm whether Spectre Cloud provides a drill bit OD lookup, dropdown of common sizes, or a free numeric entry field — and whether it cross-references insert manufacturer sizing data to suggest an OD automatically when an insert brand and size are selected.

☐☐ Entering Insert Type and OD in Spectre Cloud

1. In the spec sheet, locate the **Insert** section for the middle and ring finger fields.

2. Select the insert type for each finger: , , or . Middle and ring can differ — enter each independently.
3. Enter or select the **drill bit OD** for each finger. This should reflect the insert's outer diameter (STD), the adjusted pilot hole size (VACU), or the bowler's direct finger measurement (no insert).
4. Double-check that the OD entry is consistent with the insert type selected — a VACU OD entered against an STD selection, or vice versa, will produce a hole sized incorrectly for the intended insert.

Note: Middle and ring finger insert types and OD values are entered independently. It is not uncommon for a bowler to use a larger insert on the middle finger than the ring finger, or to use VACU on one finger and STD on the other. Record what the bowler actually uses — do not default both fingers to the same values without checking.

□ Tips for Accurate Insert and OD Entry

- □ When transferring records from a legacy fitting sheet, check whether the recorded hole size is the **insert OD** or the **inner finger size** — these are different values and the distinction is not always clear on older cards.
- □ Keep a reference card at the drill press with common insert brand OD sizes. Different manufacturers use slightly different OD standards for nominally equivalent insert sizes.
- □ If a returning bowler is switching insert brands, do not copy the OD from their previous spec sheet without checking the new brand's sizing — a OD difference between brands is common and will affect the fit.
- □ For VACU inserts, note the insert brand and model in the **Notes** field — the expansion gap allowance may differ between products and having the reference on record avoids ambiguity on future visits.
- □ Do not enter the insert's **inner** diameter as the OD — the inner diameter is the bowler's finger size; the OD is the size of the hole drilled in the ball.

Related Sections

- 4.3.5 — How to input a finger oval measurement (no inserts)
- 4.3.6 — Ring finger 5/16" rule — auto and manual calculation
- 4.3.8 — Inputting thumb measurements
- 4.5 — IBPSIA auto-suggestions
- Book 05 — Oval Calculator

Tip: When drilling for a bowler for the first time, ask which insert brand they have been using — not just the size. Bringing their preferred insert to the fitting and measuring its OD directly with

calipers is the most reliable way to ensure the pilot hole is drilled to exactly the right size, regardless of what the manufacturer's chart says.

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4.4 — Thumb Measurements (Round)

4.4.1 Selecting "Round" thumb hole on the spec sheet

Selecting "Round" thumb hole on the spec sheet

4.4.1 thumb

The thumb hole is the largest hole on the ball and the one most responsible for the bowler's ability to release cleanly and consistently. Before entering thumb measurements, the spec sheet requires you to specify the thumb hole shape. Selecting **Round** tells Spectre Cloud that the thumb hole will be drilled as a standard circular hole — no oval shaping — and sets the measurement fields accordingly.

☐☐ What "Round" Means for the Thumb Hole

A round thumb hole has a single diameter measurement — the hole is circular in cross-section at the point of insertion. The bowler's thumb sits in a hole that is the same width in every direction, relying on pitch, depth, and hole size alone to produce a comfortable fit.

- ☐ The most common thumb hole shape across all grip types and skill levels.

- Simpler to drill and measure than an oval thumb hole — one diameter value determines the hole size.
- Appropriate for most bowlers, including those using thumb slugs or inserts.
- Works well when the bowler's thumb cross-section is close to circular at the insertion point.
- May not provide the most precise fit for bowlers whose thumbs are notably wider than they are deep — in those cases an oval thumb hole may be worth considering. See 4.4.2 — *Selecting "Oval" thumb hole on the spec sheet.*

Selecting Round in Spectre Cloud

1. In the spec sheet, navigate to the **Thumb** section.
2. Locate the thumb hole shape selector and choose .
3. Spectre Cloud will display the measurement fields appropriate for a round thumb hole — a single diameter entry rather than separate width and depth fields.
4. Proceed to enter the thumb hole diameter, pitch, and any slug or insert details in the fields that follow.

Verify with Spectre team: confirm the exact label and UI element used for the thumb hole shape selector — whether it is a dropdown, radio buttons, or a toggle — and whether Round is the default selection when a new spec sheet is created.

Round vs. Oval — Choosing the Right Shape

Bowler situation	Recommended shape
Thumb cross-section is approximately circular	<input type="checkbox"/> Round
Bowler uses a thumb slug or moulded insert	<input type="checkbox"/> Round (slug is shaped to the bowler separately)
Bowler has a noticeably wider-than-deep thumb	Consider Oval — see 4.4.2
Returning bowler — previous spec sheets used Round	<input type="checkbox"/> Round (match existing records unless fit has changed)
New bowler, no previous fitting history	<input type="checkbox"/> Round as starting point — review after first few games
Bowler reports thumb feels loose in one direction only	Consider Oval — measure before deciding

☐ What Happens After Selecting Round

Once Round is selected, the thumb section of the spec sheet activates the following fields for completion:

- ☐ **Thumb hole diameter** — the size of the round hole, entered as a single measurement.
- ☐ **Forward/reverse pitch** — the vertical tilt of the thumb hole.
- ☐ **Lateral pitch** — the side-to-side tilt of the thumb hole.
- ☐ **Slug / insert type** — whether a slug, standard insert, or no insert is used in the thumb hole.
- ☐ **Drill bit OD** — the outer diameter of the bit used to drill the hole or the pilot hole for a slug.

Verify with Spectre team: confirm the complete list of thumb fields that appear after Round is selected, and whether any fields differ from those shown for the Oval option.

☐ Tips for Round Thumb Entry

- ☐ Measure the bowler's thumb diameter at the **widest point of insertion** — for most bowlers this is just below the first knuckle joint, not at the tip or base.
- ☐ For returning bowlers, always verify the current thumb diameter before cloning and drilling — thumb size is the measurement most likely to change between visits due to temperature, time of day, weight fluctuation, or injury.
- ☐ If the bowler will be using a **thumb slug**, the round hole is drilled to accept the slug's outer diameter — not the bowler's thumb directly. The slug is then shaped or sized to the thumb separately. Record the slug OD in the drill bit OD field, not the bowler's thumb measurement.
- ☐ Do not measure the thumb at its thickest point — the goal is the measurement at the point of comfortable insertion depth, which is typically slightly narrower.
- ☐ Do not carry a thumb diameter forward from an old spec sheet without re-measuring. Thumb size is the single most variable measurement in a bowler's fitting history.

Related Sections

- 4.4.2 — Selecting "Oval" thumb hole on the spec sheet
- 4.4.3 — Thumb pitch (forward, reverse, lateral)
- 4.4.4 — Thumb slug and insert entry

- 4.3.7 — Insert type and size: STD vs. VACU, selecting drill bit OD
- 4.3.5 — How to input a finger oval measurement (no inserts)

Tip: When in doubt between Round and Oval for a new bowler, start with Round. A round hole is quicker to drill, easier to adjust on a follow-up visit, and suitable for the vast majority of bowlers. Oval becomes the right choice once you have observed how the bowler's thumb actually sits in a round hole after a few sessions.

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4.4.2 Entering thumb hole size

Entering thumb hole size

4.4.2 thumb

Once the thumb hole shape is selected, the spec sheet requires the actual size of the thumb hole. Whether the bowler uses a bare thumb, a slug, or an insert, the size entry tells Spectre Cloud — and ultimately the drill press operator — exactly how large to make the hole. Getting this measurement right is critical: the thumb hole is the primary control and release point for the ball, and even a small sizing error has a noticeable effect on how the ball feels and performs.

What "Thumb Hole Size" Means

For a **round** thumb hole, size is a single diameter value — the width of the circular hole at the point of insertion. For an **oval** thumb hole, size is two values — width and depth — entered independently. In both cases, the size entered in Spectre Cloud represents the finished hole that the bowler's thumb will sit in, which may or may not be the same as the drill bit OD depending on whether a slug or insert is used.

Setup	What "size" refers to	What to measure
Bare thumb, no slug or insert	The hole drilled directly into the ball	The bowler's thumb at the point of insertion
Thumb slug	The inner diameter of the slug after installation	The bowler's thumb — the slug is sized or shaped to match; the pilot hole is drilled to the slug's OD
Thumb insert (STD or VACU)	The inner diameter of the insert	The bowler's thumb — the insert is selected to match; the pilot hole is drilled to the insert's OD

Important: The thumb hole size and the drill bit OD are two different values whenever a slug or insert is used. The size field records what the bowler's thumb fits into; the OD field records what goes into the ball. Do not enter the same value in both fields for slug or insert fittings. See 4.4.4 — *Thumb slug and insert entry* for OD details.

☐☐ How to Measure Thumb Hole Size

Thumb hole size is measured directly from the bowler's thumb during the fitting. The goal is to find the diameter (or width and depth, for oval) at the **point of comfortable insertion** — where the thumb naturally sits when gripping the ball.

1. Ask the bowler to relax their thumb completely — no tension, no forced straightening.
2. Using a thumb gauge, digital calipers, or a ring sizer, measure the thumb at the point of insertion. For most fingertip and conventional bowlers this is just below the first knuckle joint.
3. For a **round hole**, record a single diameter. If the thumb reads differently in two directions, note which dimension is larger — this may be an indication that an oval hole would serve the bowler better.
4. For an **oval hole**, record width (across the knuckle) and depth (front to back) independently.
5. Add the appropriate **fit allowance** to the raw thumb measurement before entering into Spectre Cloud — see below.

☐☐ Fit Allowance — Sizing the Hole Correctly

A thumb hole drilled to exactly the bowler's thumb measurement will be too tight — the thumb needs a small amount of clearance to insert and release cleanly. The fit allowance is added to the raw thumb measurement to produce the correct hole size.

- ☐ A typical fit allowance for a bare thumb hole is $\frac{1}{32}$ " to $\frac{1}{16}$ " over the raw thumb measurement — enough for a firm but comfortable fit with no wobble.
- ☐ Bowlers who prefer a **relaxed fit** (common for two-handed bowlers or those with a relaxed thumb release) may use a larger allowance — up to $\frac{3}{32}$ " or more.
- ☐ Bowlers who prefer a **snug fit** (common for players using thumb tape to fine-tune) typically use a smaller allowance and rely on tape to dial in the final feel.

- Do not drill to the raw thumb measurement without allowance — a zero-clearance hole will grip the thumb on release and cause injury risk over time.

Tip: Many experienced operators size the thumb hole to feel slightly loose at the time of drilling, knowing the bowler will use **thumb tape** inside the hole to tighten the fit to preference. If the bowler is a regular tape user, confirm their tape thickness preference before finalising the size entry — one layer of standard tape reduces the effective hole diameter by approximately .

Entering Thumb Hole Size in Spectre Cloud

1. In the spec sheet thumb section, confirm the hole shape is set correctly — or — before entering size. The shape selection determines which size fields are displayed.
2. For a **round hole**: enter the single diameter value in the thumb size field.
3. For an **oval hole**: enter the width value and the depth value in their respective fields.
4. Confirm the value includes your fit allowance — Spectre Cloud records what you enter; it does not automatically add clearance.
5. Proceed to the pitch and slug/insert fields.

Verify with Spectre team: confirm whether thumb hole size is entered in fractional inches, decimal inches, or millimeters — and whether Spectre Cloud displays the value in a different unit than it is entered. Also confirm whether the IBPSIA auto-suggestion feature offers a recommended thumb hole size based on the measured thumb diameter.

Typical Thumb Hole Size Ranges

Bowler type	Typical thumb hole diameter	Notes
Adult male	<input type="text" value="1 1/8"/> - <input type="text" value="1 1/4"/>	Wider range; hand size varies significantly
Adult female	<input type="text" value="1"/> - <input type="text" value="1 1/8"/>	Narrower range on average
Youth	<input type="text" value="3/4"/> - <input type="text" value="1"/>	Re-measure at every visit — thumb size changes quickly

Note: These ranges are general references only. Individual thumb anatomy varies widely and values outside these ranges are entirely normal. Never reject a measurement because it falls outside a typical range — measure carefully and trust the result.

□ Tips for Accurate Thumb Size Entry

- □ Measure the thumb at the **same time of day** the bowler typically bowls — thumbs swell slightly with warmth and activity. A measurement taken cold and relaxed in the morning may produce a hole that feels tight after three games in a warm bowling centre.
- □ If a returning bowler reports the thumb hole consistently feels tight after a few frames, check whether the previous spec sheet size accounted for swelling — a 1/32" increase in hole size often resolves the complaint.
- □ Record both the raw thumb measurement and the entered hole size in the **Notes** field for new bowlers — this makes it easy to reconstruct the fit allowance decision on future visits.
- □ Do not copy thumb hole size from a previous spec sheet on a different ball without re-measuring — thumb size is the measurement most likely to have changed between visits.
- □ Do not use the finger hole size as a reference for thumb size — they are unrelated measurements.

Related Sections

- 4.4.1 — Selecting "Round" thumb hole on the spec sheet
- 4.4.3 — Thumb pitch (forward, reverse, lateral)
- 4.4.4 — Thumb slug and insert entry
- 4.3.7 — Insert type and size: STD vs. VACU, selecting drill bit OD
- 4.5 — IBPSIA auto-suggestions

Tip: Thumb sizing is as much an art as a measurement — experienced operators develop a feel for how a given bowler's thumb behaves over time. Until that relationship is established, erring slightly large and letting the bowler manage final fit with tape is a safe, reversible approach. You can always add tape to tighten; you cannot un-drill a hole that is too small.

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4.4.3 Entering bowler's span (Full and Cut to Cut)

Entering bowler's span (Full and Cut to Cut)

4.4.3 thumb

https://www.youtube.com/embed/qvs9ONhVLC0?si=Z14lq_A6RaVHxgEX

This page walks through the process of entering a bowler's span measurements into the Spectre Cloud spec sheet form. For a full explanation of the difference between Full Span and Cut to Cut measurement methods, and how to take each measurement from a bowler's hand, see 4.3.2 — *Entering span measurements (Full Span and Cut to Cut)*. This page focuses on the form itself — what to select, where to enter values, and what to check before moving on.

☐☐ Step-by-Step: Entering Span in the Spec Sheet

1. Open the spec sheet and navigate to the **Span** section.
2. Confirm the **Span Type** selector is set correctly before entering any measurements:
 - — Full Span (edge of thumb hole to edge of finger hole)

- — Cut to Cut (center of thumb hole to center of finger hole)
 - — Oval (see *Book 05 — Oval Calculator*)
3. Enter the **middle finger span** in the Middle field.
 4. Enter the **ring finger span** in the Ring field — or use the **5/16" auto calculation** if you have measured d. See *4.3.6 — Ring finger 5/16" rule*.
 5. Review both values against your fitting sheet or hand measurement notes before proceeding.

Verify with Spectre team: confirm whether the Span Type selector appears at the top of the span section or inline with the measurement fields, and whether changing the span type after values have been entered clears the fields or retains the numbers.

⚠ Before You Save — Quick Checks

Span entry errors are among the most consequential mistakes on a spec sheet — a transposed value or wrong span type will position the holes incorrectly even if every other measurement is perfect. Before moving to the next section, run through these checks:

Check	What to look for
Span type matches measurement method	The <input type="checkbox"/> / <input type="checkbox"/> selector matches how the span was actually taken. A Cut to Cut value entered under Full Span — or vice versa — is the most common span error.
Middle span is entered in the Middle field	Transposing middle and ring is easy when working quickly. Middle span is almost always longer than ring span — if your middle value is shorter, double-check.
Values are in inches, not millimeters	If transferring from a legacy sheet that used millimeters, convert before entry. A millimeter value entered as inches will produce a hole drilled far too close to the thumb.
Values fall within a plausible range	Adult fingertip Full Span typically falls between <input type="text" value="3 5/8"/> and <input type="text" value="4 5/8"/> . A value well outside this range for an adult bowler is worth a second look before drilling.

📄 Changing Span Type After Entry

If you realise the wrong span type was selected after values have already been entered, correct the selector before saving — do not attempt to manually adjust the numbers to compensate. A span value is only meaningful in the context of the method used to take it. If you are unsure which method was used on a legacy fitting sheet, re-measure rather than guess.

Tip: If a bowler's new spec sheet is being created by cloning an existing one, the span type carries over automatically. Confirm it matches the method you intend to use for the new drilling before proceeding — especially if the bowler is switching from a Cut to Cut fitter to a Full Span workflow.

□ Common Entry Mistakes and How to Avoid Them

- □ **Wrong span type selected** — always set or first, before typing any numbers.
- □ **Middle and ring transposed** — read the values back from the screen against your notes before moving on.
- □ **Millimeter values entered as inches** — if a legacy card looks unusually high (e.g. for a middle span), it is almost certainly in millimeters.
- □ **Ring span copied from middle without applying the 5/16" rule** — even if both spans look similar, they are rarely identical. Use the auto calculation or measure independently.

Related Sections

- 4.3.2 — Entering span measurements (Full Span and Cut to Cut) — full conceptual explanation
- 4.3.6 — Ring finger 5/16" rule — auto and manual calculation
- 4.2.3 — Selecting span type (F, C, O)
- 4.4.4 — Thumb slug and insert entry
- Book 05 — Oval Calculator

Tip: Span is one of the few measurements on a spec sheet that does not change unless the bowler's hand changes — unlike thumb size, which can vary visit to visit. Once you have a confirmed, comfortable span on file for a returning bowler, cloning is reliable. The span type selector is the one thing always worth a visual confirmation before drilling.

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4.4.4 Entering vertical and lateral pitch for thumb

Entering vertical and lateral pitch for thumb

4.4.4 thumb

Thumb pitch works on the same principle as finger pitch — the hole is drilled at an angle rather than straight down, tilted to match the natural resting position of the bowler's thumb. However, thumb pitch has a proportionally larger effect on feel and release than finger pitch, because the thumb is the first finger to exit the ball during the delivery. Small pitch changes at the thumb produce noticeable differences in how the ball comes off the hand. Vertical and lateral pitch are entered separately for the thumb, just as they are for the fingers.

For a full explanation of how vertical and lateral pitch are defined and measured, see [4.3.3 — Inputting vertical and lateral pitch for fingers](#). This page covers thumb-specific considerations and how to enter the values in the spec sheet.

☐☐ Thumb Vertical Pitch — Key Differences from Finger Pitch

Vertical pitch for the thumb follows the same forward/zero/reverse axis as the fingers, but the typical ranges and their effects differ significantly.

Direction	What it means for the thumb	Typical use
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Forward	Hole tilts toward the palm. The bottom of the thumb hole leans toward the fingers.	Helps a bowler who grips tightly or has difficulty releasing — forward pitch encourages the thumb to exit cleanly.
Zero (0)	Hole drilled perpendicular to the ball surface.	A common neutral starting point, particularly for conventional grips.
Reverse	Hole tilts away from the palm. The bottom of the thumb hole leans away from the fingers.	The most common thumb vertical pitch for fingertip bowlers — reverse pitch on the thumb promotes a cleaner, earlier release.

Typical vertical pitch ranges for the thumb

- **Fingertip grip:** $\frac{1}{4}$ " to $\frac{1}{2}$ " reverse is the most common starting range.
- **Conventional grip:** 0" to $\frac{1}{4}$ " forward is typical — conventional bowlers generally benefit from less reverse or slight forward pitch at the thumb.
- **Two-handed bowlers:** thumb pitch varies widely and often requires individual assessment — many two-handed players use minimal reverse or zero pitch. *Verify with Spectre team: confirm whether Spectre Cloud has any specific field or flag for two-handed bowler configurations.*
- Reverse thumb pitch beyond $\frac{3}{4}$ " is uncommon and should be verified before drilling — it may indicate a measurement error or an atypical release that warrants closer discussion with the bowler.

Note: The thumb and finger pitches do not need to mirror each other. It is entirely normal — and common — for a bowler to have reverse pitch on the thumb and forward pitch on the fingers simultaneously. Each hole is fitted independently.

↔ Thumb Lateral Pitch — Key Differences from Finger Pitch

Lateral pitch on the thumb describes the tilt toward or away from the fingers (toward the middle finger side, or away from it). Because the thumb sits on the opposite side of the ball from the fingers, the directional language can feel counterintuitive when transferring from a legacy fitting sheet — take care with the direction entry.

Direction	What it means for the thumb	Typical use
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Toward fingers	Thumb hole tilts in the direction of the finger holes.	The most common lateral direction for the thumb — mirrors the natural inward angle of the thumb when gripping the ball.
Zero (0)	No lateral tilt.	Used as a neutral baseline or for bowlers with a very straight thumb position.
Away from fingers	Thumb hole tilts away from the finger holes.	Less common — occasionally used for bowlers with a pronounced outward thumb angle.

Typical lateral pitch ranges for the thumb

- **Most bowlers:** 0" to ¼" toward fingers is the standard starting range.
- Lateral thumb pitch beyond 3/8" in either direction is uncommon — verify before drilling.

Entering Thumb Pitch in Spectre Cloud

1. In the spec sheet, navigate to the **Thumb Pitch** fields within the Thumb section.
2. Enter the **vertical pitch value** — the amount in inches — and select the direction: , , or .
3. Enter the **lateral pitch value** and select the direction: , , or .
4. Review both entries against your fitting notes before moving to the next section.

Verify with Spectre team: confirm the exact direction labels used in the Spectre Cloud UI for thumb lateral pitch — specifically whether the app uses "toward fingers," "toward middle finger," or a left/right convention relative to the bowler's hand orientation. Also confirm whether pitch is entered as fractions or decimals for the thumb, consistent with finger pitch entry.

Transferring Thumb Pitch from Legacy Fitting Sheets

Legacy fitting sheets use a variety of notations for thumb pitch. The translation table from 4.3.3 applies here as well, with one additional consideration for lateral direction:

Legacy notation	How to enter in Spectre Cloud
$\frac{1}{4}$ R / $\frac{1}{4}$ Rev / $\frac{1}{4}$ Reverse	Vertical: $\frac{1}{4}$ " , direction: Reverse
$\frac{1}{4}$ F / $\frac{1}{4}$ Fwd / $\frac{1}{4}$ Forward	Vertical: $\frac{1}{4}$ " , direction: Forward
0 / Zero	Vertical or lateral: 0" , direction: Zero
$\frac{1}{4}$ In / $\frac{1}{4}$ toward fingers / $\frac{1}{4}$ T	Lateral: $\frac{1}{4}$ " , direction: Toward Fingers
$\frac{1}{4}$ Out / $\frac{1}{4}$ away	Lateral: $\frac{1}{4}$ " , direction: Away from Fingers
$\frac{1}{4}$ L or $\frac{1}{4}$ R used for lateral (left/right convention)	Determine whether left/right refers to the bowler's perspective or the ball face — then map to toward/away from fingers accordingly. When in doubt, confirm with the bowler or original fitter.

Tip: Left/right lateral notation on legacy cards is the single most common source of thumb pitch transfer errors. A $\frac{1}{4}$ " right entry means something different for a right-handed bowler than a left-handed bowler, and some older cards recorded lateral from the ball's perspective rather than the bowler's. Always clarify the convention before entering.

□ Tips for Accurate Thumb Pitch Entry

- When fitting a new bowler, the IBPSIA auto-suggestion feature in Spectre Cloud can provide a recommended starting thumb pitch based on grip type and span. Use it as a reference point, then adjust based on the bowler's release and any feedback from previous drillings.
- If a returning bowler reports that their thumb feels like it is catching or dragging on release, the vertical pitch is almost always the first thing to adjust — typically increasing the reverse pitch by $\frac{1}{16}$ " to $\frac{1}{8}$ ".
- Record the bowler's reported feel alongside the pitch values in the **Notes** field — knowing that a previous drilling at $\frac{1}{4}$ " reverse felt slightly tight helps you calibrate the next adjustment accurately.
- Do not assume thumb pitch from a previous ball applies unchanged to a new one — different ball weights, slug materials, and hole depths can all affect how a given pitch feels in practice.
- Do not confuse thumb vertical pitch with thumb forward/reverse pitch on legacy cards that use inconsistent terminology — confirm the axis before entering.

Related Sections

- 4.3.3 — Inputting vertical and lateral pitch for fingers

- 4.3.4 — CLT (Corrected Lateral Tilt) and its effect on lateral pitch
- 4.4.2 — Entering thumb hole size
- 4.4.5 — Thumb slug and insert entry
- 4.5 — IBPSIA auto-suggestions

Tip: Thumb pitch is the measurement bowlers are most likely to have strong opinions about — many competitive bowlers know their preferred pitch values from memory and will tell you exactly what they want. When a bowler gives you their pitch preferences directly, record them as stated and note in the **Notes** field that the values came from the bowler's own specification. This protects both the bowler and the shop if a fit question arises later.

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4.4.5 Installing a pre-drilled thumb insert

Installing a pre-drilled thumb insert

4.4.5

thumb

A pre-drilled thumb insert arrives from the manufacturer already bored to a standard inner diameter. Rather than drilling the thumb hole to the bowler's exact size and shaping it in place, the operator selects an insert whose inner diameter matches the bowler's thumb, installs it into the ball, and records the details in the spec sheet. This page covers both the physical installation procedure and how to enter the insert details into Spectre Cloud.

☐ What Is a Pre-Drilled Thumb Insert

A pre-drilled thumb insert — sometimes called a thumb slug — is a cylindrical plug, typically made from urethane, rubber, or a similar material, that is pressed or glued into the thumb hole of the ball. The bowler's thumb goes into the insert rather than directly into the ball surface. Pre-drilled inserts come in standard inner diameter sizes and a range of outer diameters to suit different pilot hole sizes.

- ☐ Provides a consistent, replaceable thumb hole — if the fit changes, the insert can be removed and replaced without re-drilling the ball.

- □ Available in a wide range of materials and hardnesses to suit different release styles and preferences.
- □ Standard inner diameters allow quick fitting from a size chart without custom drilling of the insert itself.
- □ Requires an accurately drilled pilot hole — a pilot hole that is too large will not hold the insert securely; too small and the insert cannot be seated correctly.

□□ Physical Installation Procedure

Step 1 — Select the correct insert size

1. Measure the bowler's thumb at the point of insertion as described in 4.4.2 — *Entering thumb hole size*.
2. Add the appropriate fit allowance (1/32" to 1/16" for most bowlers) to arrive at the target inner diameter.
3. Select a pre-drilled insert whose inner diameter matches the target. If the exact size is not available, size up rather than down — a slightly loose fit managed with thumb tape is preferable to an insert the bowler cannot release cleanly.
4. Note the selected insert's **outer diameter (OD)** — this determines the pilot hole size.

Step 2 — Drill the pilot hole

1. Set up the ball on the drill press with pitch and span measurements entered and confirmed in Spectre Cloud.
2. Select the drill bit whose OD matches the insert's outer diameter. For a **STD insert**, the pilot hole should be a tight press fit — typically the same size as the insert OD or 1/64" under. For a **VACU insert**, the pilot hole is drilled slightly larger to allow the insert to expand under finger pressure — see 4.3.7 — *Insert type and size* for the expansion gap allowance.
3. Drill the pilot hole to the correct depth for the insert length being used.
4. Clean the hole thoroughly — remove all ball material dust before attempting to seat the insert.

Step 3 — Prepare and seat the insert

1. Lightly scuff the outer surface of the insert with fine sandpaper if required by the manufacturer or your shop's standard practice — this improves adhesive bonding.
2. Apply a thin, even layer of bowling ball plug or approved insert adhesive to the outer surface of the insert and/or the walls of the pilot hole, per the adhesive manufacturer's

instructions.

3. Seat the insert into the pilot hole, aligning it so the grain or marking on the insert faces the correct direction if the insert is directional.
4. Press the insert firmly and evenly until it is fully seated and flush with — or very slightly proud of — the ball surface.
5. Wipe away any adhesive squeeze-out immediately.
6. Allow the adhesive to cure fully before the bowler uses the ball. Follow the adhesive manufacturer's cure time — do not rush this step.

Step 4 — Finish the insert

1. Once cured, check that the insert is fully seated and secure.
2. If the insert sits slightly proud, sand or file it flush with the ball surface.
3. Bevel the inner edge of the insert opening lightly if needed — a small bevel eases thumb entry and exit.
4. Have the bowler test the fit before leaving the shop — confirm the thumb enters and exits cleanly and that the fit feels correct with and without tape.

Tip: Always have the bowler test the insert fit with their bowling hand warmed up — a few minutes of light activity before the test gives a more accurate read of how the insert will feel during actual play than a cold, first-impression fit check.

Recording the Insert in Spectre Cloud

Entering insert details in the spec sheet

1. In the spec sheet, navigate to the **Thumb** section.
2. Select the insert type — or — from the insert type selector.
3. Enter the insert's **inner diameter** in the thumb hole size field — this is the effective hole size the bowler's thumb sits in.
4. Enter the insert's **outer diameter** in the drill bit OD field — this is the size of the pilot hole drilled in the ball.
5. Confirm the **vertical and lateral pitch** values are entered correctly — pitch applies to the pilot hole, not the insert itself.

Verify with Spectre team: confirm whether Spectre Cloud has a dedicated field for insert brand and model, or whether this information should be recorded in the Notes field. Also confirm whether the inner diameter and outer diameter are entered in separate labeled fields or whether the UI handles

this differently for insert vs. bare thumb fittings.

What to record in the Notes field

For pre-drilled thumb inserts, the Notes field is especially useful. Consider recording:

- Insert brand and model — different manufacturers use slightly different OD standards for nominally equivalent sizes.
- Insert material and hardness if known — useful context if the bowler wants to replicate the feel on a future ball.
- Adhesive used and cure time observed — helpful if the insert ever needs to be removed and replaced.
- Bowler's reported fit at test — e.g.
- Any beveling or finishing adjustments made after installation.

Insert Size Reference

Inner diameter (bowler fit)	Typical bowler	Notes
<input type="text" value="1"/> and under	Youth, small adult hands	Confirm fit carefully — range where sizing errors are most noticeable
<input type="text" value="1 1/16"/> - <input type="text" value="1 1/8"/>	Most adult female bowlers	Common range — keep a full size run in stock
<input type="text" value="1 3/16"/> - <input type="text" value="1 1/4"/>	Most adult male bowlers	Common range — keep a full size run in stock
<input type="text" value="1 5/16"/> and above	Large adult hands	Less commonly stocked — worth ordering ahead if a bowler is in this range

Note: These ranges are general references only — individual thumb anatomy varies widely. Always fit from measurement, not from assumptions about hand size.

Tips for Pre-Drilled Insert Fittings

- Keep a full size run of your most common insert brand on hand — being unable to match a bowler's thumb size on the day of drilling is avoidable with good stock management.

- ☐ When a bowler switches insert brands, measure the new insert's OD with calipers before drilling — do not rely solely on the manufacturer's stated OD. A $1/32$ " variance between brands is common.
- ☐ If a bowler uses thumb tape routinely, confirm how many layers they typically use before finalising the inner diameter selection — each standard layer reduces the effective inner diameter by approximately $1/32$ ".
- ☐ Do not reuse an insert removed from a previous ball without inspecting it for cracks, compression deformation, or adhesive residue — a compromised insert will not seat correctly or hold securely.
- ☐ Do not rush the adhesive cure. A partially cured insert that shifts or loosens during the bowler's first session is far more disruptive than the extra wait time at the bench.

Related Sections

- 4.4.1 — Selecting "Round" thumb hole on the spec sheet
- 4.4.2 — Entering thumb hole size
- 4.4.4 — Entering vertical and lateral pitch for thumb
- 4.3.7 — Insert type and size: STD vs. VACU, selecting drill bit OD
- 4.5 — IBPSIA auto-suggestions

Tip: Recording insert brand, model, and OD in the Notes field takes under thirty seconds and pays dividends every time the bowler returns. When a bowler comes back two years later asking for "the same insert as last time," having that detail on record means you can match it exactly — rather than approximating from memory and hoping for the best.

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4.5 — Thumb Measurements (Oval)

4.5.1 Selecting "Oval" thumb hole on the spec sheet

Selecting "Oval" thumb hole on the spec sheet

4.5.1




KEY

oval

Drilling an oval thumb hole requires more setup information than a round hole. In addition to the standard thumb measurements, Spectre Cloud needs four oval-specific inputs to generate the correct drilling sequence: the **starting bit size**, the **oval width**, the **oval degrees**, and the **taper**. Together these four values define the shape, orientation, and profile of the finished oval hole so the drill press operator knows exactly where and how to make each cut.

Starting Bit

The starting bit is the diameter of the initial round pilot hole drilled before any oval cuts are made. It must fit entirely within the narrowest dimension of the intended oval — typically the depth — so that all subsequent oval passes remove material outward from the pilot hole without cutting outside the intended oval boundary.

-  Select the largest round bit that fits comfortably within the oval's narrowest dimension (usually the depth measurement).
-  A larger starting bit means less material to remove on the oval passes, reducing the risk of tearout or an uneven finish.
-  Do not select a starting bit larger than the oval's narrowest dimension — it will cut outside the intended oval shape before the oval passes begin.

- Do not select a starting bit so small that an excessive number of oval passes are needed — this increases drilling time and the risk of the ball shifting in the fixture.

Tip: A starting bit sized to the depth measurement (the narrower axis for most thumbs) is a reliable default. If depth and width are close in value, size down by to give yourself a clean margin on the oval passes.

↔ Oval Width

The oval width is the finished width of the thumb hole — the larger of the two oval dimensions, measured across the thumb at the point of insertion. This is the target dimension the oval passes will open the starting pilot hole out to.

- Oval width should include the appropriate fit allowance above the raw thumb width measurement — the same to clearance used for round hole sizing.
- The difference between the oval width and the starting bit diameter determines how much material the oval passes must remove on each side.
- Do not confuse oval width with the starting bit size — they are different values. The starting bit is always smaller than the oval width.

Verify with Spectre team: confirm whether Spectre Cloud also requires a separate oval depth entry field in addition to oval width, or whether depth is derived from the starting bit size and the width entry together.

▭▭ Oval Degrees

Oval degrees define the **orientation** of the oval cut — the angle at which the width axis of the oval is positioned relative to the thumb hole, using the hole as a 360° circle with / at the top, toward the fingers.

Because the thumb does not sit perfectly vertical in the hole — it rests at a natural angle unique to each bowler's hand — the oval must be oriented to match that angle rather than defaulting to a horizontal cut.

Degree value	Clock position equivalent	What it means
<input type="text" value="0°"/> / <input type="text" value="360°"/>	12:00	Oval width axis points directly toward the fingers — cuts made at top and bottom of the hole
<input type="text" value="45°"/>	~1:30	Oval width axis rotated 45° clockwise from top

Degree value	Clock position equivalent	What it means
90°	3:00	Oval width axis runs horizontally — cuts made at left and right of the hole
135°	~4:30	Oval width axis rotated 135° clockwise from top — a common angle for right-handed bowlers whose thumb naturally rests toward the lower-right quadrant
180°	6:00	Oval width axis points directly away from the fingers


How to determine the correct oval degrees for a bowler

1. Ask the bowler to place their thumb into a round hole of approximately the correct size — either a fitting gauge or a previously drilled ball of similar sizing.
2. Observe the natural resting angle of the thumb inside the hole — specifically, which direction the thumb presses most firmly against the hole wall.
3. Identify the clock position that corresponds to that contact point — this is the direction the oval width axis should face.
4. Convert the clock position to degrees using the 0° = 12:00 convention and enter the value in Spectre Cloud.

Tip: For most right-handed bowlers, the thumb naturally rests toward the lower-right of the hole — oval degrees in the 120°–150° range are common starting points. For left-handed bowlers, the natural resting angle typically mirrors this toward the lower-left — 210°–240°. These are starting references only; always observe the individual bowler's thumb position directly. *Verify with Spectre team: confirm whether Spectre Cloud's degree convention is clockwise from 0° at top-toward-fingers, as described here.*

Taper

Taper describes how much larger the top of the thumb hole is compared to the bottom. The thumb is not a uniform cylinder — it widens toward the base, and the amount of widening varies significantly between bowlers. A hole with the correct taper allows the thumb to seat fully at its natural depth without binding at the base or feeling loose at the tip.

-  A bowler with a **meaty or thick thumb base** — where the thumb widens significantly below the first knuckle — requires **more taper**. Without it, the base of the thumb will bind against the narrower lower portion of the hole before the thumb is fully seated.

- A bowler with a **slender or tapered thumb base** — where the thumb stays relatively consistent in diameter from tip to base — requires **less taper**. Excess taper on a slender thumb produces a hole that feels sloppy at insertion depth.
- Taper is assessed visually and by feel during the fitting — observe how the bowler's thumb narrows or widens from the insertion point toward the base.

Verify with Spectre team: confirm the unit in which taper is entered in Spectre Cloud — whether it is expressed in degrees, as a measurement difference between top and bottom diameter (e.g. larger at top than bottom), or as a categorical selection (e.g. none / light / standard / heavy). Also confirm the typical range of taper values entered in practice.

Entering All Four Values in Spectre Cloud

1. In the spec sheet thumb section, confirm is selected as the hole shape.
2. Enter the **starting bit** diameter — the largest round bit that fits within the oval's narrowest dimension.
3. Enter the **oval width** — the finished width of the oval hole including fit allowance.
4. Enter the **oval degrees** — the orientation angle of the oval width axis, measured clockwise from at top-toward-fingers.
5. Enter the **taper** value — the amount by which the top of the hole is larger than the bottom, per the bowler's thumb profile.
6. Review all four values before proceeding — an error in any one of these inputs will affect the drilling sequence generated by Spectre Cloud.

Tips for Oval Input Accuracy

- Take your time with oval degrees — it is the most judgement-dependent of the four inputs and the most common source of oval thumb fit complaints. When in doubt, observe the bowler's thumb in a round hole before committing to a degree value.
- Record your fitting observations in the **Notes** field alongside the entered values — e.g. This context is invaluable on future visits.
- For a bowler's first oval thumb fitting at your shop, consider scheduling extra time — the observation and measurement steps take longer than a standard round fitting.
- Do not estimate oval degrees without observing the bowler's thumb in a hole. The natural resting angle varies enough between individuals that a default assumption will produce a poor fit for a meaningful proportion of bowlers.

Related Sections

- 4.5.1 — Selecting "Oval" thumb hole on the spec sheet
- 4.5.3 — How the system calculates the oval cuts from your inputs
- 4.5.4 — Entering the span with an oval thumb
- 4.4.1 — Selecting "Round" thumb hole on the spec sheet
- Book 05 — Oval Calculator

Tip: An oval thumb hole, done well, is one of the most significant fit improvements you can offer a competitive bowler. The extra inputs and observation time are an investment in a result that round drilling simply cannot match for bowlers whose thumbs do not sit symmetrically in a circular hole.

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4.5.2 Entering Starting Bit, Oval Width, Oval Degree, and Taper

Entering Starting Bit, Oval Width, Oval Degree, and Taper

4.5.2

oval

TODO — write this page.

4.5.3 How the system calculates the oval cut from your inputs

How the system calculates the oval cut from your inputs

4.5.3 oval

Once the four oval inputs — starting bit, oval width, oval degrees, and taper — have been entered into the spec sheet, Spectre Cloud calculates the drilling instructions needed to produce the finished oval hole. Rather than requiring the operator to work out the geometry manually, the system outputs a set of **x-axis and y-axis offset movements** that tell the driller exactly how to reposition the ball relative to the drill bit to elongate the pilot hole into the correct oval shape.

What the System Calculates

The starting pilot hole is round — drilled straight down to the starting bit diameter. The oval cuts extend that hole along the line defined by the oval degrees entry, opening it out to the full oval width. Spectre Cloud resolves the oval degrees angle into two linear components — horizontal (**x-axis**) and vertical (**y-axis**) — so the driller can execute the cuts using the drill press's standard lateral adjustment controls rather than needing a rotary fixture.

- The **x-axis value** is the horizontal distance the ball must be moved relative to the bit — left or right — to position the cut correctly along the oval degrees line.

- □ The **y-axis value** is the vertical distance the ball must be moved relative to the bit — forward or back — to complete the movement along the same line.
- □ Together, x and y define a straight line through the center of the pilot hole at exactly the angle specified by the oval degrees entry — the finished hole will be elongated along this line to the full oval width.
- □ Taper is factored into the depth profile of the cuts — the system accounts for how much wider the top of the hole needs to be than the bottom when generating the offset values.

In plain terms: The system is doing trigonometry on your behalf. You enter an angle (oval degrees) and a target width — Spectre Cloud converts those into the horizontal and vertical movements your drill press can actually execute.

□□ How X and Y Relate to Oval Degrees

The relationship between the oval degrees angle and the x/y output values follows standard trigonometric decomposition. The oval width defines the total distance to travel along the oval degrees line; x and y are the horizontal and vertical components of that travel.

Oval degrees	Clock position	X component	Y component
0°	12:00	Zero — no horizontal movement needed	Full travel — all movement is vertical (toward/away from fingers)
45°	~1:30	Moderate horizontal movement	Equal to x — movement split evenly between axes
90°	3:00	Full travel — all movement is horizontal	Zero — no vertical movement needed
135°	~4:30	Moderate horizontal movement	Equal to x but in opposite vertical direction
180°	6:00	Zero — no horizontal movement needed	Full travel in opposite direction to 0°

Note: The x and y values output by Spectre Cloud are always positive distances paired with a direction indicator — the system tells you both how far to move and which way. Read both the value and the direction before making any drill press adjustment. *Verify with Spectre team: confirm how direction is indicated in the output — whether as +/- signs, labeled arrows, or explicit left/right/forward/back text labels.*

☐☐ How to Use the Calculated Output at the Drill Press

1. Drill the starting pilot hole straight down — no lateral movement, centered on the thumb hole position as marked on the ball.
2. Without removing the ball from the fixture, read the x and y offset values from the Spectre Cloud spec sheet output.
3. Move the ball along the **x-axis** by the specified distance in the specified direction.
4. Move the ball along the **y-axis** by the specified distance in the specified direction.
5. With the ball held at the offset position, make the oval cut — the bit will now remove material along the oval degrees line, elongating the pilot hole toward the full oval width.
6. Return the ball to center and make the mirror cut in the opposite direction along the same axis to complete the oval — the hole is now elongated symmetrically around the original pilot hole center.
7. Apply taper cuts as indicated — the system's taper calculation specifies how much additional material to remove at the surface relative to depth to match the bowler's thumb profile.

Verify with Spectre team: confirm whether the oval cut is made in two passes (one in each direction from center) or as a single continuous pass through center, and whether the taper instructions are output as a separate set of values or integrated into the main x/y offset sequence.

☐☐ Checking the Output Before Drilling

Before making any cuts, review the calculated x/y values against the inputs to confirm the output looks reasonable. This is a quick sanity check that catches data entry errors before they become drilling errors.

- ☐ If oval degrees is close to or , the x value should be close to zero and the y value should carry most of the travel — confirm this matches the output.
- ☐ If oval degrees is close to , the y value should be close to zero and x should carry most of the travel.
- ☐ If oval degrees is close to or , x and y should be approximately equal — confirm both values are similar in magnitude.
- ☐ The combined travel distance (the hypotenuse of x and y) should approximately equal half the difference between the oval width and the starting bit diameter — if it looks significantly larger or smaller, recheck the width and starting bit entries.

- ☐ If either x or y is zero when the oval degrees entry is between 10° and 80° (or between 100° and 170°), something has been entered incorrectly — a non-cardinal angle should always produce non-zero values on both axes.

☐ Tips for Working with the Calculated Output

- ☐ Print or display the spec sheet at the drill press before beginning — having the x/y values visible throughout the drilling sequence prevents errors from misremembering a value mid-cut.
- ☐ Make small, controlled movements when repositioning the ball for oval cuts — drill press lateral adjustments on a ball fixture have little margin for overshoot.
- ☐ If your drill press uses a digital readout for lateral positioning, zero the readout after drilling the pilot hole so the x and y offsets can be dialed in directly from the Spectre Cloud output values.
- ☐ Do not estimate the x/y movements by eye — the precision of the oval depends on executing the calculated offsets accurately. A $1/32''$ error in lateral positioning produces a visibly off-center oval.
- ☐ Do not skip the sanity check on the output values before cutting — a transposed oval degrees entry (e.g. 45° entered as 54°) produces x/y values that look plausible but will orient the oval incorrectly on the ball.

Related Sections

- 4.5.2 — Entering starting bit, oval width, oval degrees and taper
- 4.5.4 — Entering the span with an oval thumb
- 4.5.1 — Selecting "Oval" thumb hole on the spec sheet
- 4.4.4 — Entering vertical and lateral pitch for thumb
- Book 05 — Oval Calculator
- Book 06 — Drilling Your First Ball

Tip: The first time you drill an oval thumb hole using Spectre Cloud's calculated output, go slowly and check your positioning at each step. Once you have drilled a few oval thumbs using the x/y offset workflow, it becomes a fast and reliable part of the drilling sequence — but the first time deserves extra care.

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4.5.4 Entering thumb oval span and pitch information

Entering thumb oval span and pitch information

4.5.4

oval

For most spec sheets, span is measured and entered the same way regardless of thumb hole shape. Oval thumb holes introduce one specific scenario where the entered span requires an adjustment — when the driller chooses to make oval cuts in **both directions** from the pilot hole center. Understanding when this adjustment applies, and how to account for it, ensures the finished span matches the bowler's fitting measurement after all cuts are complete.

☐☐ Two Approaches to Making Oval Cuts

When executing the x/y offset cuts calculated by Spectre Cloud, the driller has a choice about where to place the material removal:

Option 1 — Cuts made at the bottom of the hole only

All oval material is removed from the side of the hole **away from the finger holes**. The top edge of the thumb hole — the edge closest to the finger holes — remains at the original pilot hole boundary and does not move.

- ☐ Span is unaffected — the top of the thumb hole stays exactly where it was drilled, so the distance to the finger holes remains consistent with the entered span measurement.
- ☐ No span adjustment is needed in Spectre Cloud when using this approach.

Option 2 — Cuts made in both directions (bidirectional)

Oval material is removed from **both sides** of the pilot hole — including the side facing toward the finger holes. For example, at oval degrees, cuts are made at both the position and the position on the clock face of the hole.

- ☐ Produces a more symmetrically centred oval — some drillers prefer this approach for the finished appearance and feel.
- ☐ The cut at the top of the hole (in the example above) moves the top edge of the thumb hole **toward the finger holes** — effectively shortening the span if no adjustment is made.
- ☐ If the finger holes were drilled first and no span allowance was added, the finished span will be shorter than the bowler's measurement requires.

☐☐ The Span Allowance for Bidirectional Cuts

When bidirectional oval cuts are planned and the finger holes have already been drilled, the span entered in Spectre Cloud must include an allowance equal to the distance the top-of-hole cut will travel toward the finger holes. This ensures that after the cut is made, the effective span — from the finished top edge of the thumb hole to the finger holes — matches the bowler's measured span.

The allowance is determined by the **y-axis component** of the oval cut at the top of the hole — specifically, how much of the bidirectional cut travel moves in the direction of the finger holes.

- ☐ At oval degrees (cuts at 12:00 and 6:00), the top cut moves directly toward the finger holes — the full y-axis travel distance becomes the span allowance.
- ☐ At oval degrees (cuts at 3:00 and 9:00), neither cut moves toward or away from the finger holes — no span allowance is needed even with bidirectional cuts.

- At **45°** oval degrees (cuts at 1:30 and 7:30) or **135°** (cuts at 4:30 and 10:30), only the y-axis component of the top cut contributes to span encroachment — the allowance is the y-axis portion of the offset travel, not the full cut distance.
- Spectre Cloud's calculated x/y output gives you the y-axis value directly — use this as the basis for the span allowance when bidirectional cuts include a top-of-hole pass with a y-axis component toward the fingers.

Verify with Spectre team: confirm whether Spectre Cloud prompts the operator to specify bidirectional vs. bottom-only cuts and calculates the span allowance automatically, or whether the operator is expected to calculate and apply the allowance manually before entering the span value.

☐ Entering Span for an Oval Thumb in Spectre Cloud

1. Determine which oval cut approach the driller will use — **bottom-only** or **bidirectional**. Confirm this before entering the span, not after drilling.
2. If using **bottom-only cuts**: enter the span as measured — no adjustment needed.
3. If using **bidirectional cuts**:
 1. Review the y-axis value from the Spectre Cloud oval cut output for the top-of-hole pass.
 2. Add this y-axis value to the measured span before entry — this is the span allowance.
 3. Enter the adjusted span value in the span field.
4. Note in the **Notes** field which cut approach was used and whether a span allowance was applied — e.g. `Bidirectional oval cuts. Span adjusted +3/32" for top cut y-axis encroachment.`

Important: The span allowance only applies when the **finger holes are drilled first**. If the thumb hole is drilled first, the finger holes are positioned relative to the finished thumb hole edge after the oval cuts are complete — no pre-adjustment is needed. Confirm the drilling order before deciding whether to apply the allowance. *Verify with Spectre team: confirm whether Spectre Cloud tracks or prompts for drilling order (thumb first vs. fingers first) as part of the spec sheet workflow.*

☐ Span Adjustment — Quick Reference

Cut approach	Oval degrees	Finger holes drilled first?	Span adjustment needed?
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Bottom-only	Any	Yes or No	<input type="checkbox"/> No — top edge of thumb hole unchanged
Bidirectional	<input type="text" value="90°"/>	Yes	<input type="checkbox"/> No — top cut has no y-axis component toward fingers
Bidirectional	<input type="text" value="0°"/> or <input type="text" value="180°"/>	Yes	<input type="checkbox"/> Yes — top cut moves directly toward fingers; full y-axis value is the allowance
Bidirectional	Any angle with y-axis component toward fingers	Yes	<input type="checkbox"/> Yes — y-axis component of top cut is the allowance
Bidirectional	Any	No (thumb drilled first)	<input type="checkbox"/> No — finger holes positioned after oval cuts complete

Tips for Oval Thumb Span Entry

- Decide on the cut approach — bottom-only or bidirectional — as part of the fitting conversation, before the bowler leaves the counter. Changing approach after the finger holes are drilled is too late to adjust the span.
- Document the cut approach and any span allowance in the Notes field every time. On a future visit when a ball is being cloned, this note prevents the next driller from applying or omitting an allowance incorrectly.
- If you are unsure which approach a previous driller used on a cloned spec sheet with no notes, measure the finished thumb hole on the existing ball — a symmetrical oval indicates bidirectional cuts; an oval that extends only to one side of the pilot center indicates bottom-only.
- Do not apply a span allowance when drilling thumb-first — the allowance only compensates for encroachment on already-drilled finger holes. Applying it unnecessarily will push the finger holes further from the thumb than the bowler's measurement requires.

Related Sections

- 4.5.2 — Entering starting bit, oval width, oval degrees and taper
- 4.5.3 — How the system calculates the oval cuts from your inputs
- 4.5.1 — Selecting "Oval" thumb hole on the spec sheet
- 4.4.3 — Entering bowler's span (Full and Cut to Cut)
- 4.3.2 — Entering span measurements (Full Span and Cut to Cut)
- Book 06 — Drilling Your First Ball

Tip: The span allowance for bidirectional oval cuts is a small detail that is easy to overlook — but a bowler who comes back reporting their ball feels slightly cramped after an oval thumb drilling is almost always experiencing the result of a missing allowance. Making it standard practice to note the cut approach on every oval spec sheet eliminates this class of complaint entirely.

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