

Tiered Certification Research Report MAY 2025

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OVERVIEW

Since April of 2022, the United States Bowling Congress has been conducting center inspections under the Tiered Center Certification Program. The program includes USBC staff completing the inspections, using the Automatic Certification Evaluation (ACE) tool. As of May 1, 2025, 2,670 centers have been inspected and certified, comprising 57,341 certified lanes. Any active centers remaining are set to be inspected in 2025.

The data collected from these centers, along with continued industry stakeholder feedback, has led USBC to announce the following changes to the program, effective January 1, 2026:

- USBC will tier bowling centers into the following tiers based on compliance
 - \circ $\;$ Gold: 90.0 to 100.0% compliance $\;$
 - Silver: 80.0 to 89.9% compliance
 - Bronze: 70.0 to 79.9% compliance
 - Standard: up to 69.9% compliance.
- Inspections will be conducted on a 5-year cycle at a cost of \$8 dollars per lane per year.
- New Updates to the Data Collection to ensure the new digital tools are providing the same results as the pervious inspection tools.

The changes to the program will occur after the first inspection of every USBC certified center is completed.

RESEARCH

ACE TOOL OVERVIEW



The ACE (Automatic Certification Evaluation) tool is a combination of several precisionmeasuring devices that work together to make center inspections more efficient and accurate. ACE was developed in-house by our Equipment Specifications and Certifications team, with important help from several team members in other departments.

ACE utilizes five digital dial indicators with custom-designed sleds, three digital levels and four digital laser distance measuring tools. These tools all connect, via Bluetooth technology, to the inspector's laptop, where a custom-made software records the data and



loads it into a data collection spreadsheet. This all works to allow one inspector to complete the requirements for an annual inspection in less than five minutes per lane.

For the traditional center certification process, 36 data points are collected by the ACE tool on each lane. Six topography measurements are recorded on five locations of the lane for a total of thirty measurements on the lane. An additional six measurements are recorded in the pit area of the lanes.

Topography measurements of the lane at 5 locations are:

- 1) Crosswise tilt of the Lane
- 2) Crowns and Depressions on the left 10 board
- 3) Crowns and Depressions on the left 15 board
- 4) Crowns and Depressions on the center 20 board
- 5) Crowns and Depressions on the right 15 board
- 6) Crowns and Depressions on the right 10 board

Items measured in the pit area are:

- 1) Crosswise tilt of the pin deck at the rear row of pins
- 2) Lengthwise tilt of the pin deck between the four and seven pins
- 3) Lengthwise tilt of the pin deck between the six and ten pins
- 4) Seven-pin side gutter depth
- 5) Ten-pin side gutter depth
- 6) Spacing between the kickback walls.

The data is pulled directly from the digital tools into a spreadsheet that is designed to calculate the percentage of measurements that meet USBC specifications. The final percentage of compliant measurements determines the center's result. The following table illustrates how a center's compliance rating is calculated:

CENTER	LANES	MEASUREMENTS IN SPEC		COMPLIANCE	
A	8	288	243	84.4%	
В	40	1,440	1,354	94.0%	
С	24	864	847	98.0%	

Additional measurements by the inspectors include testing the foul detectors and checking the pin spotting accuracy. Those results are documented and shared with the center but do not change the center's compliance rating.

The following histogram shows the distribution of compliance scores for all centers inspected so far.





The average center compliance score is 91.4%. The median inspection score so far is 93.1%. That means exactly half of the inspections have had results of 93.1% or better. That's about 33 out of 36 measurements per lane being within specifications.

LANE TOPOGRAPHY FINDINGS

To evaluate the individual elements of the lanes, we can view the data points collected by each tool at each location and apply process capability analysis. Process capability is a method used to evaluate the conformance of parts to specifications limits. In this scenario, the parts are the bowling lanes themselves and the limits, USBC specifications.





For crosswise tilts and crowns and depressions the specification limit on an annual inspection is +/- 0.040 inches. This process capability report shows us crosswise tilts of the lanes had an overall non-conformance of 137,742 defects per million opportunities (ppm) that is about 13.8% with 9.4% coming from data points above the upper specification limit (USL) and 4.4% coming from data under the lower specifications limit (LSL).

Crowns and depressions are measured with a dial indicator as a deviation from a flat line parallel to the crosswise lane level of the ACE tool. A reading right next to the foot of the level would read 0.000", crowns are positive deviations up towards the level, and depressions are negative deviations down away from the lane level. The following charts for process capability on each of the boards measured will show you: readings tend toward more depressions (negative readings) and the crowns and depressions tend to be worse along the center 20 board, which is to be expected.

















Altogether for crowns and depressions we see single digit defect rates from about three to seven percent of the measurements being outside of specifications. The following table gives the breakdown for each measurement.

METRIC	PPM > USL	PPP < LSL	PPM TOTAL	DEFECT RATE
Crosswise Tilt	44145	93597	137742	13.8%
Left 10 Board	13874	17226	31100	3.1%
Left 15 Board	17572	35799	53371	5.3%
Center 20 Board	14455	60357	74812	7.5%
Right 15 Board	17347	45274	62622	6.3%
Right 10 Board	15309	23560	38869	3.9%

PIT MEASUREMENTS

We can apply the same process capability analysis to the pit area measurements to look at the compliance of each location:





In the pit area of the lane, crosswise tilts of the pin deck are taken with the crosswise level of the ACE tool sitting along the rear row of pins. The results are indicating the that the pin decks have a larger defect rate with crosswise tilts than the lanes do. Approximately 21.9% of pin decks have an out of specifications crosswise tilt.

For the lengthwise tilts on both sides of the pin deck, those are measured with two additional digital level sensors on the trailing levels of the ACE tool. Each level is positioned such that it rests in the proper positions to collect the measurements simultaneously.

The defect rates for lengthwise tilts are much lower than crosswise tilt, partly due to the larger specification range of +/- 0.187 inches. We see an overall defect rate of 5.3% on the 4-7 side, and similarly, 5.3% defect on the 6-10 side.









Gutter depths are measured with Bosch CM-50 laser range finders aimed down from a known height above the surface of the pin deck. A reading is taken from the tool and the know height from the pin deck is subtracted out. That allows us to get an accurate measurement for just the depth of the gutter.







For gutter depths we can see the distribution is centered right on the middle of the specification range at 3.5 inches. However, we see large amounts of defects both over the upper specifications limit and the lower specifications limit resulting in approximate 38.9% defects on the seven-pin side gutters and 35.7% defects on the ten-pin side gutters.





Similar to the gutter depths, the kickback spacing measurements are taken using two Bosch CM-50 laser range finders, aimed outward toward the kickbacks on both sides of the ACE tool. A known spacing constant between the two tools is added to both measurement readings to determine the final kickback spacing. For kickbacks we are seeing a 29.0% rate with more readings under the lower specifications versus over the upper specifications. The following table breaks down the data for each pit measurement.

METRIC	PPM > USL	PPP < LSL	PPM TOTAL	DEFECT RATE	
Crosswise Tilt	83415	135692	219108	21.9%	
Lengthwise Tilt (4-7)	48799	4407	53207	5.3%	
Lengthwise tilt (6-10)	47957	4592	52549	5.3%	
Gutter Depth 7- pin Side	177175	212305	389481	38.9%	
Gutter Depth 10-pin side	167100	189427	356528	35.6%	
Kickback Spacing	92839	197004	289844	29.0%	

Flat gutters and kickback spacing were the most identified as out of specifications items in centers inspected. Comparing our new digital tools to the previous generation of equipment identified a discrepancy. The previous tools, the gutter gage and the pit-end gage measured in increments of one-eight of an inch and one-sixteenth of an inch respectfully. With those tools, the inspectors were always trained to give the center benefit of the doubt when a



measurement was right on the border line, when a gutter gauge read like the following image, it would be treated as in specification. Our new gauges are calling it out of specification by thousandths of an inch.



Upon further investigation, USBC has concluded that to keep our inspections consistent with our past practices, the best accommodation is to round these measurements from the new tool to the nearest sixteenth of an inch. This change does not significantly alter any centers' compliance score, but uses a more common sense approach to giving data to the centers that they can act upon using the tools they have to make corrections. Our recommendation to all centers when working in these areas is to aim for the center of the specification instead of the upper and lower limits, that way they can be confident in achieving compliant measurements.

INSPECTION FREQUENCY AND COST

Another item USBC has looked at over the last few years is movement in centers over time. In 2015, the USBC Equipment Specifications team visited 64 centers and mapped 1,000 lanes with the Kegel Lane Mapper. USBC has since visited many of those same centers with the ACE tool for the current inspection process.

We then spoke to the centers that have measured with both tools, and asked about their lane levelling protocols. For centers that did no major work such as lane levelling or lane replacement, we compared the topography readings taken with the two tools to identify how much the lanes may have moved over the eight or nine years between inspections. The table below shows the amount of movement the lanes saw over the course of this time.



CENTER	LANES	MEASUREMENTS	AVERAGE MOVE	2015 LANE COMPLIANCE	2023 LANE COMPLIANCE	COMPLIANCE DIFFERENCE
А	60	1800	0.015	99.4%	95.8%	-3.6%
В	10	300	0.018	89.7%	92.0%	2.3%
С	12	360	0.024	86.4%	84.4%	-2.0%
D	12	360	0.012	94.4%	98.3%	3.9%
E	12	360	0.030	90.6%	94.4%	3.8%
F	12	360	0.014	97.5%	99.4%	1.9%
G	12	360	0.010	82.8%	87.5%	4.7%
Н	12	360	0.012	89.7%	95.6%	5.9%
I	12	360	0.014	93.6%	93.3%	-0.3%
J	12	360	0.003	95.8%	93.6%	-2.2%
K	64	1920	0.018	99.8%	95.1%	-4.7%
L	40	1200	0.016	84.6%	84.3%	-0.3%
	270	8100	0.016	92.0%	92.8%	0.8%

Lanes on average have moved the thickness of two playing cards over 8 years.

The information in the green box shows that the topography changes over eight years averaged 0.016" in these centers. The last two columns also show an analysis of the percentage of compliant measurements in these centers from 2015 and 2023. The average change in compliance scores was less than 3%. It is also worth noting that some of these centers saw movement of the lanes that was closer to 0.000". This shows that not all lane settling makes the lanes more out of spec or worse.

Given this data, the working groups and the Equipment Specifications committee felt that the frequency of inspections could be extended. Instead of the three-year cycle being used from 2023-2025, USBC will begin inspecting centers on a five-year rotation in 2026. This will allow the centers more time to make any corrections they may choose to make.



USBC will still measure new centers, new lane installations, and centers requesting reinspection between the set schedules.

With a slightly decreased amount of travel each year, the decision was also made to change the inspection cost to centers. The current \$30 per lane fee for a three-year certification (\$10 per lane per year) will end in 2025, and the new cost will be \$40/lane for a five-year certification (\$8 per lane per year).

TIERED STRUCTURE

Given the above examples, and from reviewing the data collected since the Tiered Program announcement in 2022, USBC has worked with two industry stakeholder groups and the Equipment Specifications Committee to determine the following structure for the tiered program.

- Gold: 90.0 to 100.0% compliance
- Silver: 80.0 to 89.9% compliance
- Bronze: 70.0 to 79.9% compliance
- Standard: up to 69.9% compliance.

Thes tiering levels should result in the following distribution of centers falling into each tier.





CONCLUSIONS

USBC will continue the current process for the rest of this three-year cycle, then begin comparing data in the fourth year of the program to the data collected in the first year. This will provide an additional comparison of how much lanes and pin deck areas may be changing over time.

Additionally, the centers being inspected moving forward will now be given their tier level upon completion of the inspection. Centers will then use their own discretion regarding how to share the data/results as they see fit.

The data collected from these centers, along with continued industry stakeholder feedback, has led USBC to announce the following changes to the program, effective January 1, 2026:

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For more information on the tiered program, click here to view an FAQ of the program.

