



# Wacom Generation 2 Tip Sensor

New Pen Components Enhance Performance

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Wacom is introducing new, advanced electro magnetic resonance (EMR) pen components which are first integrated into Intuos4, Wacom's new professional pen tablet product line, and will follow in future Wacom-branded and OEM products. This advancement represents a breakthrough in pressure-sensitive pen performance; it is attained, in part, due to the introduction of the Wacom Tip Sensor, Wacom's second generation proprietary tip switch. This white paper provides an orientation to the improved performance and feel of the Wacom pen, realized with the implementation of this new capacitive tip switch component and concomitant innovations.

## Creating a digital pen that feels real in every way

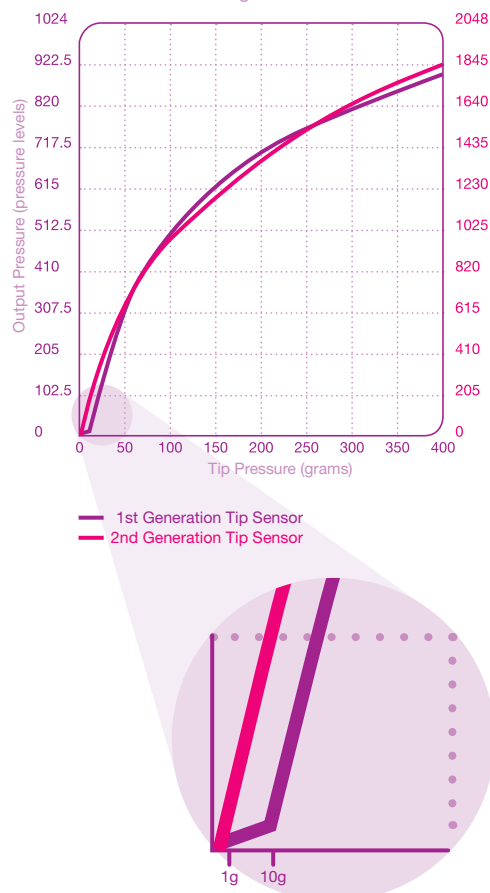
Wacom's mission is to bring people and technology together in very natural and intuitive ways. In line with this mission, the Wacom research and development team has endeavored to advance the digital pen to feel precisely like authentic physical writing instruments and art/design tools. Wacom has achieved this goal by attaining near-zero starting pressure as well as incremental refinements to the pressure curve, which together provide more consistent performance and deliver enhanced pressure sensitivity (See Diagram 1). These improvements are evident with enhanced consistency between devices and with more consistent performance over time.

## Near-zero starting pressure

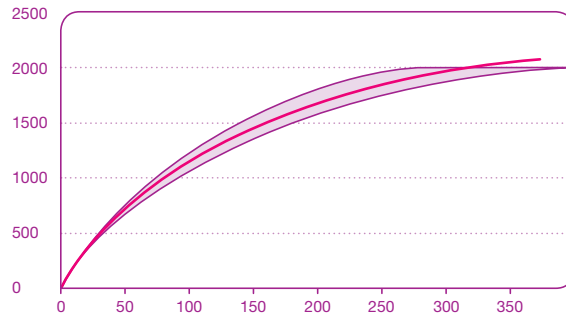
The first generation Tip Sensor (capacitor switch) remains far advanced relative to competitive alternatives. However, Wacom still sought to attain an experience of having near-zero starting pressure (See Diagram 1), an important attribute often requested by tablet users and software partners. Wacom achieved this goal with the second generation Tip Sensor, which recognizes the pen at one (1) gram of starting pressure.

The benefit of near-zero starting pressure is that any digital writing or art/design tool can now begin to work with a feather-like touch. This capability provides the ultimate latitude to emulate any physical tool in an authentic way – to lay down graphite, ink, chalk, or paint starting with the slightest nuance of pressure.

1st Generation Tip Sensor vs. 2nd Generation Tip Sensor  
Diagram 1



Wacom 2nd Generation Tip Sensor  
Life Span Pressure Curve  
Diagram 2



#### Enhanced Pressure Performance

Pressure performance is measured by levels of pressure resolution, or pressure sensitivity. Wacom consumer products start with 512 levels of pressure resolution, while professional products have offered 1024 levels of pressure.

With twice the pressure resolution, tablet users will experience more control and higher quality results with any software tool that leverages pressure-sensitivity. Fewer “do-overs” translate to better and faster work.

#### Consistent Pressure Curve Delivers Improved User Experience, Integrity with Software Integration

By improving the recognition of pressure at near-zero, Wacom has achieved a far superior pressure curve, which is how pressure is reported over the range of the Tip Sensor, from 0 grams up to about 400 grams. This is tantamount to the user exercising control and precision in their work.

In addition, earlier generations of pen components recorded variations in the pressure curve as experienced over time. For example, the pressure curve might feel different in the first year, than the second year, and again different in the fourth year. Now, due to Wacom’s new pen components, tablet users will see roughly a 45 percent reduction in variability of the pressure curve over the life span of the pen. The second generation Wacom Tip Sensor builds on the natural feeling of the pen’s pressure curve to implement up to 2048 levels of pressure resolution (See Diagram 2).

Equally important, Wacom software partners will realize advantages with Wacom’s enhanced pressure curve. The component design allows Wacom to maintain pressure characteristics already recognized in hundreds of software applications, assuring backwards compatibility for current software. In short, a near-zero starting pressure and improved consistency enhance what is already a strong industry standard while maintaining excellent backwards compatibility.

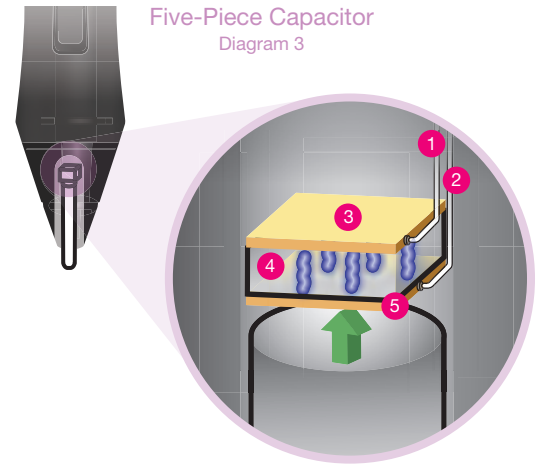
#### Advanced Industrial Design Feasibility

Wacom’s first and second generation Tip Sensors are proprietary and represent specialized know-how, differentiating all implementations of pen input solutions which integrate these components.

The second generation Tip Sensor utilizes a new dielectric material and ceramic condenser in an advanced mechanical structure that reduces the diameter from

7mm to 5mm. Its advanced design reduces part count from 7 to 5 pieces (See Diagram 3). The final result provides Wacom and our OEM partners with greater pen design flexibility for all types of end-use applications.

Five-Piece Capacitor  
Diagram 3



#### Durability and Low Power

The new Tip Sensor’s durability is far beyond market expectation. With its new components, Wacom guarantees the pen to perform at its highest benchmark of more than 20 million cycles, or strokes. This is twice the life span of first generation pen components. Of course, the number of pen strokes varies by the work habits of the end user and the software application. To translate into human terms, Wacom anticipates that a professional working in digital content creation may execute upwards of 8,000 strokes per day in an extremely heavy use scenario. This translates to roughly seven years of full-time, continuous use, assuming an eight-hour work day, 365 days per year.

In addition, the new integrated circuit in the Wacom pen consumes only 1  $\mu$ W of power. This is one-seventieth (1/70) of the power consumed by the pen in the Intuos3. Note that these numbers reflect only power consumption of the pen, and NOT that of the actual tablet and pen combined. The minimal power consumption required by Wacom’s second generation pen improves the operational stability of the pen and tablet (digitizer) solution, including the achievement of better signal-to-noise around the edge of the active area. This translates to customers enjoying better overall performance across the entire active area surface.

#### Conclusion

Wacom’s next generation pen components set a new standard for natural feeling and consistent performance over an appreciably extended life span. Extremely low starting pressure (1 gram), more consistent pressure performance over time, improved resilience to constant use and pressure, and low power requirements together establish a new standard for Wacom’s latest generation of pen solutions. Wacom’s natural pressure curve evolves from Wacom’s first generation of pen components to assure a consistently great experience across all platforms and applications that have been tuned to the extraordinary characteristics of the Wacom pen. Intuos4 is Wacom’s first official product line to introduce these new benefits and advances.

The final result provides Wacom and our OEM partners with greater pen design flexibility for all types of end-use applications.

