



Glovepedia Series: TOUCHSCREEN



WWW.IRONCLAD.COM

**TOOLS
EVOLVE.**

**SO
HAVE
GLOVES.**

TAKE
COMMAND™

Can you pick up the kids?

and get milk?

and Becca has soccer.

Yes dear



Basics of Capacitive Touchscreen



Touchscreen technologies have come a long way in the last decade and have become an integral part of our everyday life. To take full advantage of this new technology, worker's PPE must evolve as well. To fully and effectively accomplish this, it is important to know how this technology works. There are two primary types of common touch devices that are widely available today: Single Capacitance & Projected Capacitance.* Both single and projected capacitance require the ability for electricity to transfer from the device to the user, so conductive materials must be used to allow this transfer to take place.

Single Capacitance Touch

Single Capacitance touchscreen devices work by applying a small charge to each of the 4 corners of the device, creating a small electric field across the surface of the device. When you touch the device, current from the screen transfers to the user, resulting in a voltage drop. The processor then measures the change in voltage at each corner, allowing it to triangulate the position of the touch. The limitation of this type of device is that it does not accurately record multiple touch points. As a result, it is commonly used at self serve kiosks and in basic industrial control settings.

Projected Capacitance Touch

Projected Capacitance expands on single capacitance by incorporating a grid of microscopic electrodes with a capacitor at each intersection built into the screen. When the screen is touched it creates a voltage drop, which can be measured in each direction and assigned an X-Y coordinate on the grid. Because each electrode on the grid is independent, multiple sets of coordinates can be read, allowing for multi-touch input. This type of screen is commonly used in laptops, cell phones, and tablets due to its versatility.

**Note: Some older devices use pressure based resistive touch technologies that have a thin, conductive top layer that comes into contact with a sensing bottom layer when pressed. These devices do not require conductive inputs to operate, so they will work with any of our work gloves.*

Single Capacitance:



Projected Capacitance :

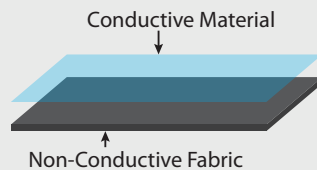


► Touchscreen Glove Types

Touchscreen input devices, such as tablets and cellphones, play a very large role in our daily lives. Accordingly, multiple attempts have been made to create gloves that are capable of operating them. Each technology has succeeded in making gloves that are “touchscreen capable”, however these different technologies typically have significant drawbacks. The section below explains the most common methods for making gloves compatible with touchscreen devices, along with their unique set of benefits and drawbacks.

Conductive Surface Treatment

A thin, flexible, conductive material is adhered to the top of a fabric to create a composite touchscreen fabric thick enough to be used for work gloves.



Pros:

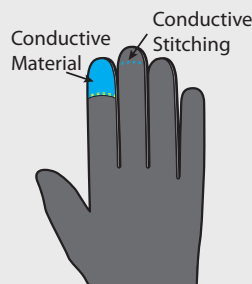
- Easy to Apply
- Material is Very Thin & Dexterous

Cons:

- Wears Off With Use
- Low Durability
- Poor Functionality in Cold or Dry Weather

Conductive Patches & Stitching

A conductive material, such as a woven metal, is sewn onto finger tips of gloves. Alternatively, conductive thread is sewn into finger tips



Pros:

- Can Be Durable
- Low Cost

Cons:

- Uncomfortable
- Limited Touchscreen Coverage
- Exposed Seams
- Poor Functionality in Cold or Dry Weather

Stylus

A tool with a conductive tip is used to control the surface rather than the finger, circumventing the need for touchscreen gloves.



Pros:

- High Resolution
- High Durability

Cons:

- Very Easy to Lose
- Not an Integrated Solution

Command™ Technology

Conductive nanoparticles are introduced into the manufacturing of the material, creating a durable, conductive fabric on the palm.



Pros:

- Full Palm Touchscreen
- More Conductive Than Skin
- Works in ALL Conditions
- Does Not Wear Out
- Increased Durability

Cons:

- Available in One Color Only

► Touchscreen in the Workplace



While touchscreen only started to gain mass appeal a little over a decade ago, the effects have been profound. Touchscreen devices have become entrenched in our daily lives and this trend is only expected to continue. Approximately 89% of Americans aged 18-65 owned a smart phone in early 2019[†], up from an already high 84% in 2017 for the same age group^{††}. These devices aren't just for personal use anymore either. It is increasingly common for warehouse employees to use tablets to check stock in and out, or to find the exact picking location of a product in the warehouse, saving time and allowing inventory data to be accurately recorded/reflected in real-time.

Industry 4.0 and the Internet of Things (IoT) are just around the corner for the manufacturing sector. In a recent Boston Consulting Group survey, over 70% of auto manufactures said that plant digitization would be *highly* relevant in the next decade. This digitization, of course, will need to be available in real-time, being both recorded and accessed through touchscreen devices. Aside from their interconnectivity, touch devices also offer the benefit of adaptability. For example, multiple pieces of machinery can be run from one touchscreen device that changes input options based on what is being operated. If there is ever an issue with the machinery the touch device can determine which options are available and adjust the screen image to show how to correct the issue in real-time, saving both time and money.

Of course, the effects of touch devices in streamlining work are not limited to large manufacturing companies. Everyday, millions of workers use their phones or tablets in the field to make their jobs easier as well. For example, a construction worker who encounters an issue can take a picture and send it back to the corporate office for immediate resolution, a plumber can take a photo of a leak in a hard to reach place to share with a client, or a repair technician can pull up repair schematics on a tablet. All of these scenarios are already happening everyday thanks to cellphones and other touch devices.

This is only the tip of the iceberg, as touchscreen technology is here to stay. From cellphones and tablets, to kiosks and industrial controls, touchscreen technology has left a lasting change in the way the world interacts, communicates, and works.

[†] Pew Research Center. "Mobile Fact Sheet" June 12, 2019. <https://www.pewinternet.org/fact-sheet/mobile/>

^{††} Pew Research Center. "10 Facts About Smartphones" June 28, 2017. <https://www.pewresearch.org/fact-tank/2017/06/28/10-facts-about-smartphones/>

[‡] Boston Consulting Group. "The Factory Of The Future" December 6, 2016. <https://www.bcg.com/en-us/publications/2016/learning-manufacturing-operations-factory-of-future.aspx>

► In Action: Ss Brewtech



Ss Brewtech is one of the premier brewing equipment manufacturers in the world. Specializing in mid-size brewing equipment and professional home brew setups, their equipment is used by countless microbreweries, restaurants, and hobbyists around the country. They pride themselves on being on the cutting edge of brewing technology, and continue to push the envelope: they are bringing brewing into the 21st century with the introduction of their new touchscreen control centers.

By taking professional level brewing equipment and scaling it down in size, Ss Brewtech is also able to bring professional level brewing to home brewing enthusiasts. This enables their home brewers to have the best possible brewing experience, and to brew better beer - a win-win scenario for everyone.

With an assortment of available products, from small home brew kits to full brew houses and single brew tanks with up to 60 barrel capacity (1800+ gallons), Ss Brewtech has a professional solution for every level of brewer. All of their equipment is assembled and tested in California prior to shipment, where they rely on Command Series™ touchscreen gloves to keep them safe from impacts, cuts, and general wear and tear during assembly, testing, and shipping.



With touchscreen technology rapidly entering the work world, Ironclad realized there was a significant gap in work glove technology. If workers must remove their gloves to enter data or capture images on phones, tablets or data entry devices, then productivity will be lost and hand safety will be significantly compromised. After 18 months of development, Ironclad introduced the Command Series™ line of work gloves. This is the first glove line to utilize embedded nanoparticle technology into the glove palm, allowing users to take full advantage of touchscreen input devices without having to remove their gloves. Workers no longer have to sacrifice safety and efficiency for the gains in productivity, communication and convenience that touchscreen devices bring to the working environment.

Command Technology



Our Command™ technology incorporates touchscreen into the very fibers of our gloves. By fusing conductive nanoparticles into the fibers of the synthetic leather, we are able to ensure that not only is conductivity present throughout the entirety of the material, but also that the material stays conductive throughout its entire lifespan. Our touchscreen won't wear off, rip off, or wash off like typical touchscreen work gloves.

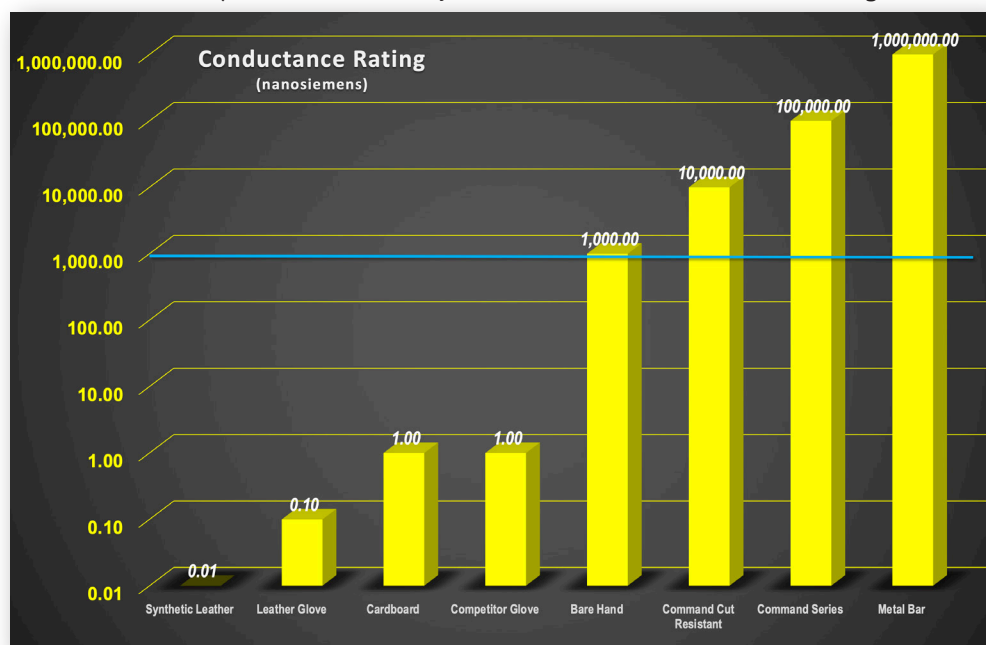
We employ a similar technology in our knit gloves. Conductive nanoparticles are introduced at the beginning of production ensuring that there is a consistent, homogeneous mix during the coating process. This ensures that for as long as the glove is useful, it will remain fully touchscreen compatible.

More Conductive Than Your Finger

To determine the effectiveness of our technology, we performed a series of comparison tests that pitted our Command™ touchscreen materials against several other conductive materials, including several competitors' gloves, non touchscreen gloves, metal, and even the human hand without a glove.

The test results are outlined in the graph below: the blue line is the threshold for what is considered to be conductive (material that is at least as conductive as a bare hand). It is immediately noticeable that the Command™ gloves not only perform exponentially better than the competition, but they are also significantly more conductive than the human hand itself.

Aside from being highly conductive, our Command™ Material is also significantly more abrasion resistant than traditional synthetic leather, and even most work leathers as well. With ANSI Abrasion Level 3 rated protection, and our 16 point glove fit system Command™ technology is designed to ensure that you have a high performing and durable work glove that meets all the demands you can throw at it.



COMMAND SERIES



UTILITY BLACK
IEX-MUG



PRO BLACK
IEX-MPG



GRIP BLACK
IEX-MGG



IMPACT BLACK
IEX-MIG



UTILITY BROWN
IEX-PUG



PRO BROWN
IEX-PPG



GRIP BROWN
IEX-PGG



IMPACT BROWN
IEX-PIG



UTILITY YELLOW
IEX-HSY



UTILITY ORANGE
IEX-HSY



PRO HI-VIZ
IEX-HVP



IMPACT HI-VIZ
IEX-HZI



PRO WATER RES.
IEX-MWR



PRO REINFORCED
IEX-MPRE



PRO WINTER
IEX-NMTW



PRO LEATHER
IEX-MPLW



PRO LEATHER
IEX-MPLG



IMPACT LEATHER
IEX-MIGL

▶ Command Series™: Cut Resistant



FOAM NITRILE
KKC1FN
ANSI Cut A0



POLYURETHANE
KKC1PU
ANSI Cut A0



FOAM NITRILE
KKC2FN
ANSI Cut A2



POLYURETHANE
KKC2PU
ANSI Cut A2



POLYURETHANE
KKC2PU-Y
ANSI Cut A2



FOAM NITRILE
KKC3FN
ANSI Cut A3



FOAM NITRILE
KKC3KV
ANSI Cut A3



FOAM NITRILE
KKC4FN
ANSI Cut A4



POLYURETHANE
KKC4PU
ANSI Cut A4



FLAT NITRILE
KKC4N
ANSI Cut A4



FOAM NITRILE
KKC5KV
ANSI Cut A5



FOAM NITRILE
KKC6FN
ANSI Cut A6



TOUCHSCREEN | CUT RESISTANT

▶ Command Series™: Tactical



PRO BLACK
IEXT-PBLK



GRIP BLACK
IEXT-GBLK



IMPACT BLACK
IEXT-IBLK



TRIGGER
IEXT-FRIBLK



GRIP IMPACT
IEXT-GIBLK



FINGERLESS
IEXT-FIBLK



PRO COYOTE
IEXT-PCOY



GRIP COYOTE
IEXT-GCOY



IMPACT COYOTE
IEXT-ICOY



PRO OD GREEN
IEXT-PODG



GRIP OD GREEN
IEXT-GODG



IMPACT OD GREEN
IEXT-IODG

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