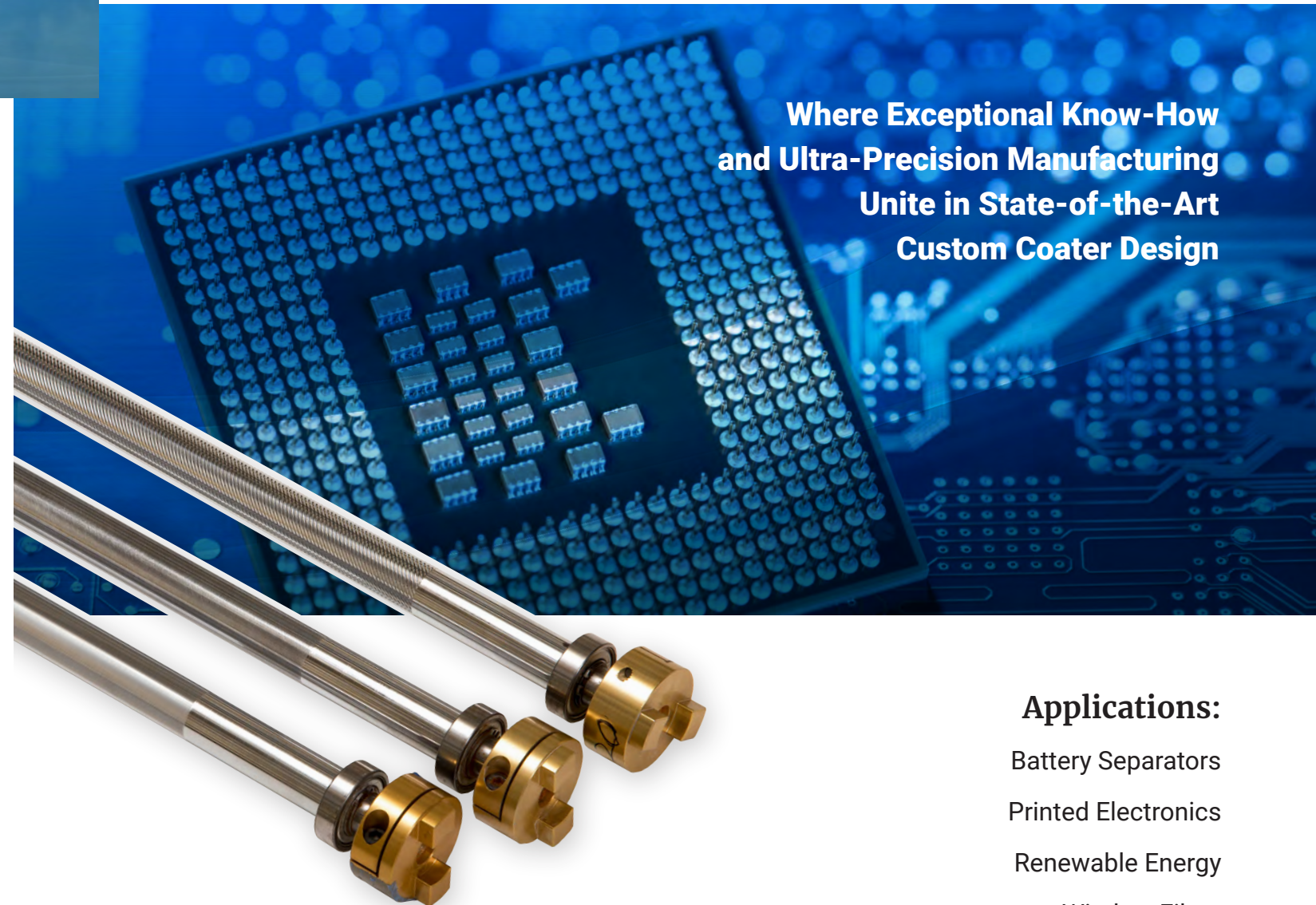


MICROGRAVURE™

US Patents D355,669 & D346,397



**Where Exceptional Know-How
and Ultra-Precision Manufacturing
Unite in State-of-the-Art
Custom Coater Design**



US Branch
Yasui Seiki - MIRWEC Coating

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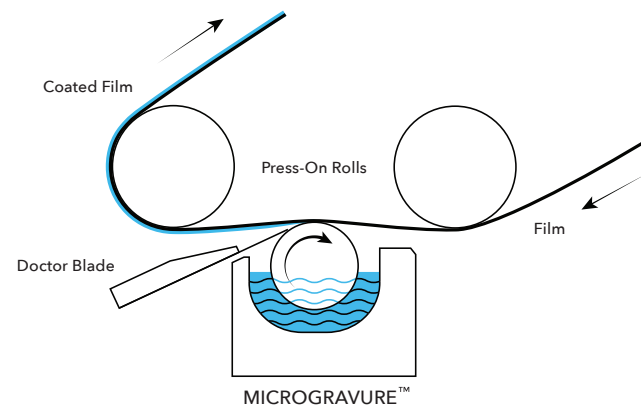


MICROGRAVURE™

Applications:

Battery Separators
Printed Electronics
Renewable Energy
Window Films
Displays

Yasui Seiki is the inventor and original patent owner of the world-famous MICROGRAVURE™ coating method.

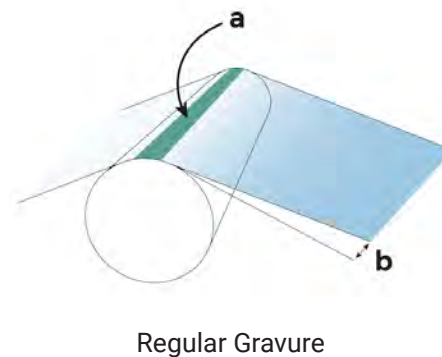


Why Is MICROGRAVURE™ Better Than Regular GRAVURE?

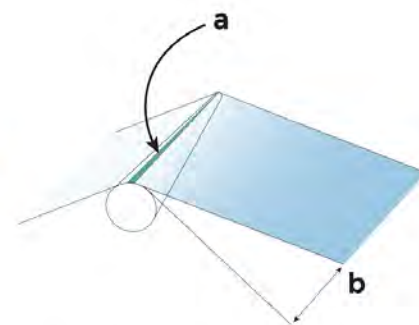
- The smaller diameter provides a much smaller contact area (a), which allows for an exceptionally stable bead of solution that is critical for thin, uniform, and glossy coatings
- The larger web-to-roller distance (b) minimizes streaks and offers cleaner lines
- No backing roll
 - No Creasing
 - Smaller contact area
 - Prevents spillover to the other side
- Can Coat low-viscosity solutions
- Lightweight cylinder means faster and easier changeover
- Reverse coating creates shearing, which results in a smoother surface

What Is MICROGRAVURE™?

MICROGRAVURE™ uses a smaller diameter gravure roll engraved with patterns or cells to provide a specific coating volume. It is used in a reverse kiss coating method in which the roll is partially submerged in a pan of solution. The roll rotates in the opposite direction of the web, and the cells pick up the coating solution. The flexible doctor blade lightly smooths off the excess and the precisely measured solution in the cells is then transferred to the web.



Regular Gravure



MICROGRAVURE™

A majority of smartphones and tablets sold in the US contain at least one layer coated by a Yasui Seiki MICROGRAVURE™ coating system.

What Can MICROGRAVURE™ Do?

- Coats 1 to 80 microns wet, as thin as 5 nanometers dry
- Coats low viscosity solutions (0-1000 cP), both aqueous and solvent based
- Coats on a thin substrates such as PET, PC, PP, aluminum, copper, stainless steel, paper, and fabric
 - Example: as thin as 3 μm PET and as thick as 750 μm PC
- Offers exceptional uniformity: $\pm 2\%$ tolerance
 - Example: 0.5% tolerance on 8 μm dry coating (300 mm wide, 100 m long test)

What Material is MICROGRAVURE™ Available in?

- **NEW!** Winkote® DLC (diamond-like carbon) over stainless steel (SUS304)
- **NEW!** Hard chrome over stainless steel (SUS304)
- Hard chrome over special steel alloy
- Hard chrome with a nickel underplate over special steel alloy
- Winkote® DLC (diamond-like carbon) over special steel alloy

