

How many components are necessary to manufacture a modern smartphone? As incredible as it may seem, present day cellular phones require over 200 billion transistors. The devices we casually utilize to call our loved ones, send an email or snap a picture have, through time, grown into an astonishingly complex labyrinth of semiconductors, sensors and capacitors. Since their invention, electronic devices have never ceased to improve, and this observation can be extrapolated to almost all industrial sectors. From semiconductor and medical equipment to transportation, human innovation knows but two limits: the manufacturing techniques it masters and the materials it employs. And while brand names such as Apple and Sony are frequently credited for new innovations, true improvement is often found behind the scenes; hidden in the hands of invisible – yet indispensable – manufacturers that provide the technologies necessary to enable creativity and to push the boundaries of the impossible.

Some years ago for example, an Osaka-based company by the name of Nippon Seisen revolutionized the production of ultrasmall laminated capacitors, components crucial to the functioning of modern electronic devices. Led by Mr. Motoshi Shinkai, an engineer by trade who today presides over Nippon Seisen, the firm is pushing the boundaries of the impossible in stainless steel wires. The company successfully developed Super Fine Stainless Steel Wires that allowed electronic manufacturers to accurately improve screen printing, a process that enabled breakthrough advances in display quality. *"When producing laminated capacitors, component manufacturers cannot make their screen printing circuit design without our Super Fine Wires,"* says Mr Shinkai, President & CEO of Nippon Seisen. To achieve this technological prowess, the company developed *Micro & Fine Technology*. Nippon Seisen used this

# Thinner, Stronger and More Precise: The Relentless quest of Nippon Seisen

**A global niche leader in stainless steel wires and metal fibres, Nippon Seisen, an R&D-centred enterprise, has been pushing the boundaries of stainless-steel wire applications thanks to its Micro & Fine Technology.**



Stainless steel wires



Stainless Steel Fiber NASLON®



NASLON® Filter for Polymer



NASclean® for Semiconductor Gas Filter

technology to reduce the diameter of its Super Fine Wires to 11  $\mu\text{m}$  (0.011mm). To properly understand this engineering miracle, consider that a normal human hair has a thickness of 80 $\mu\text{m}$ (0.080mm)... making Nippon Seisen's wires up to eight times thinner than a single strand of hair.

It is therefore no surprise to find that since its creation in 1951, Nippon Seisen has maintained its position as a global niche leader in stainless steel and metal fibres. Thanks to decades of research, the firm developed its proprietary *"Micro & Fine Technology,"* a unique manufacturing philosophy dedicated to the development of next generation applications for stainless steel. Today, the firm uses its technological acumen to produce highly functional Spring Wires that are widely demanded in medical

equipment manufacturing, among other industries. The development of high-function stainless steel spring wires allows Nippon Seisen to meet specific requirements. Their HYBREM-S, for example, is used in hydrogen atmospheric conditions found inside fuel cells for vehicles, while their TouPH Stainless allows for the optimal balance between maintaining high levels of strength against heat and corrosion resistances. These applications are expanding the utility of the company's products like never before.

By applying proprietary drawing technologies, Nippon Seisen also developed its NASLON products. NASLON is a stainless steel fibre that allows manufacturers to carry out processing in similar fashion to synthetic fibres while maintaining the innate rigidity of a metal. Strong on technical expertise, Nip-



Motoshi Shinkai, President, Nippon Seisen Co., Ltd.

pon Seisen also produces NASclean, a Semiconductor Gas Filter technology used to filtrate highly corrosive Bulk and Process gases. *"Our metal gas filters are used inside semiconductor production machines,"* explains Mr. Shinkai. To match the evolving demands of semiconductor makers, the company harnessed its NASLON technology to transform NASclean products into ultra-precision filtration metal gas filters.

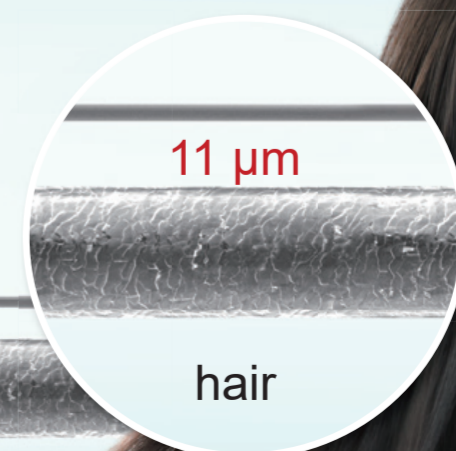
*"The trend in the semiconductor industry indicates that the current gas filtering model, which requires us to filter out 2.5 nm impurities, will fall short of expectations. In the future, not only will we be asked to develop products that can filtrate up to 1.5 nm impurities, but we will also be asked to supply gas filters that can withstand high corrosive gas and achieve low pressure loss,"* he predicts.

For technology to continue its relentless stride forward, tomorrow's manufacturers will be required to push the boundaries of the impossible. But in front of such challenges, how can success be ensured? *"As the old adage goes: 'the whole is greater than the sum of its parts'"* adds Mr. Shinkai. *"Japan's strength lies in the close-knitted relationships that exist between manufacturers from raw materials to end-products. In the future, this collaborative spirit will remain our guide."*

 **NIPPON SEISEN CO., LTD.**

**Micro & Fine Technology**

[www.n-seisen.co.jp/en](http://www.n-seisen.co.jp/en)



11  $\mu\text{m}$

hair