

# TECHNICAL REPORT

To designers who are considering entirely-new design for automobile, home appliance, and smartphone.

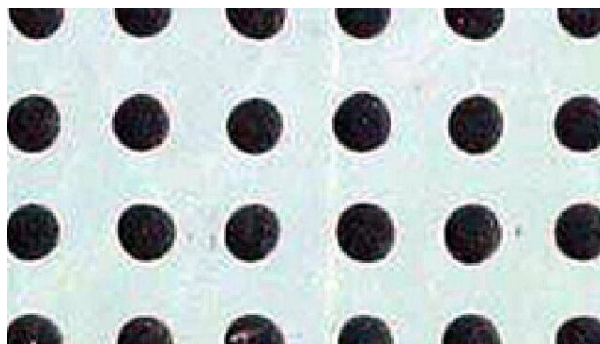
Realization of both fine design of 100μm level and beautiful solid printing.

## Introduction of High Quality and High Definition Screen Printing Ink

We will introduce High Quality and High Definition Screen Printing Ink enabling both 100μm level fine design and beautiful solid printing which conventional printing method could not realize.

Note1) Now we still deliver High Definition Ink in Japan only.

Note2) High Definition Screen Printing Ink obtained patent.



## 1. Realization of both fine design of 100μm level, and deep and beautiful solid printing

### 1.1 Realization of both fine printing and beautiful solid printing beyond common sense of conventional printing technology

High Quality and High Definition Ink enables simultaneous printing of 100μm fine line of line & space, gradation of dot diameter 100μm, and deep and beautiful solid printing which used to be hard to realize by using conventional polyester stencil for decoration.

“Realization of both fine design with 100μm level and deep and beautiful solid printing” is technology of very high difficulty which other printing method cannot realize easily.

### 1.2 Comparison between conventional screen ink for decoration and High Quality and High Definition Ink

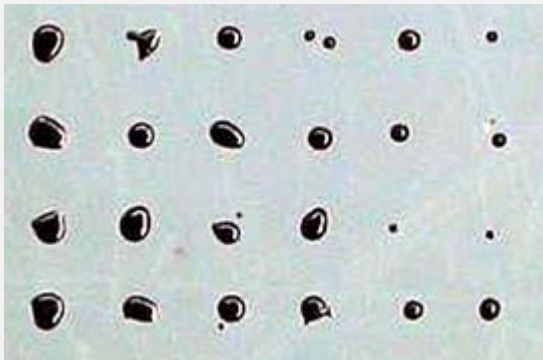
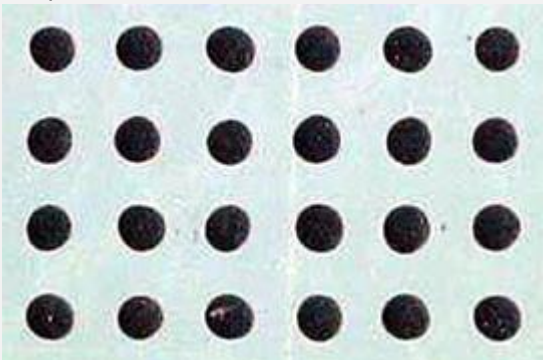
(\*) Printing examples of using general polyester stencil are as follows.

| Item for comparison                               | Conventional ink   | High Quality and High Definition Ink                      |
|---|--|---|
| L/S (Line & Space)                                | Hundreds of $\mu\text{m}$ of L/S is required for stable printing.              | <b>Stable printing of 100<math>\mu\text{m}</math> (*)</b> |
| Ink sagging width (one side)                      | Over 20 $\mu\text{m}$  | <b>Below 5 – 8<math>\mu\text{m}</math> (*)</b>            |
| Outline character (outline printing of fine line) | Hundreds of $\mu\text{m}$ of outline printing is required for stable printing. | <b>100<math>\mu\text{m}</math>(*)</b>                     |
| Dot diameter                                      | Hundreds of $\mu\text{m}$ dot diameter is required for stable printing.        | <b>100<math>\mu\text{m}</math>(*)</b>                     |

**– Comparison between line printing L/S=100 $\mu\text{m}$  and printing dot diameter 100 $\mu\text{m}$**



Printing conditions: Polyester stencil: (L355 mesh, thread diameter 27 $\mu\text{m}$ )

| Conventional ink<br>(IPX-HF 679 WHITE)  | High Quality and High Definition Ink<br>(XIP-HF 679 WHITE)                           |
|---|--|
| White line is thicker and ink sagging.  | White line maintains its fineness without ink sagging.                               |
|  |  |

| Conventional ink<br>(FMX-971 BLACK)   | High Quality and High Definition Ink<br>(XFM-HF 971 BLACK)                           |
|---|--|
| Deformation and skipping dot occurred.  | Reproduce true-circle-like beautiful dot.  |
|  |  |

– **Comparison of printing grate pattern by outline printing of 30μm width line**

Printing conditions: SUS stencil (HS-D650 mesh, thread diameter 14μm)

| Conventional ink<br>(ERX-971 BLACK)  | High Quality and High Definition Ink<br>(XER -971 BLACK)  |
|--|---|
| <p>Outlines are all blacked out.</p>  | <p>Reproduce outline of 25μm width in average.</p>  |

## 2. Introduction of advantage of realizing both fine design and beautiful solid printing

### 2.1 Advantage in simultaneous printing of fine line, gradation, and solid printing with one stencil

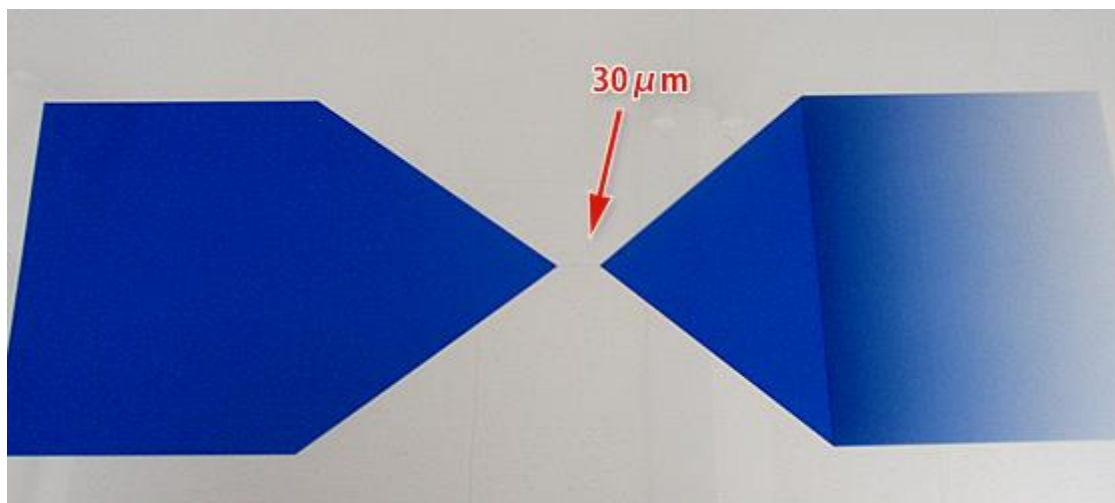
| Advantage obtained  | Detailed advantage   |
|---|--|
| Realize beautiful design which was used to be unrealizable. | Fine printing functions of 100μm level fine line and gradation, and deep and beautiful solid printing function enable beautiful design which conventional technology could not realize.  |
| Realize fine design and solid printing at low price.        | In conventional decoration screen printing, different stencils were used for fine line and solid printing separately, which increased cost. However, since High Quality and High Definition Ink enables printing fine design such as fine line, and solid pattern with one stencil, it reduces cost for stencil making and printing process. |

### 2.2 Printing fine line, gradation, and solid pattern with one stencil

This High Quality and High Definition Ink, is not the kind of ink existed before, and enables printing not only fine line but also various patterns such as solid printing and gradation printing, etc. at the same time and with high accuracy.

(Photos from left) Example of solid pattern, fine line (30μm), solid pattern and high definition gradation printing is as follows.

Printing conditions: HS-DS650 mesh, thread diameter 14μm



### 3. Product information of High Definition Ink (Official name: High Quality and High Definition Screen Printing Ink)

Product information of High Quality and High Definition Inks are as follows.

| Ink Series           | XER<br>Ink series  | XIP-HF<br>Ink series  | XGL-HF<br>Ink series  | XFM<br>Ink series   |
|----------------------|--|---|---|---|
| Type                 | 1 pack type  | 2 pack type   | 2 pack type   | 1 pack type   |
| Substrate            | Treated PET, PC  | Treated PET, PC   | Glass   | PC  |
| Basic<br>performance | Applicable to<br>printing name<br>plates.<br>Widely applicable<br>to halftone dot<br>with highly<br>graphic<br>characteristic and<br>solid printing. | Applicable to FIM<br>Improve stability<br>of image-forming<br>such as halftone<br>dot and hairline<br>of name plate for<br>forming, injection<br>molding. | For Mobile<br>communication<br>device such as<br>smartphones.<br>Applicable to<br>beautiful outline<br>character printing<br>and frame<br>printing. | Application of<br>forming<br>automotive name<br>plate. Applicable<br>to improve<br>design<br>characteristics<br>of name plates. |