

## **Ricoh Develops Photo (UV)-curable Inkjet Ink that Significantly Reduces Allergies on Skin**

**Tokyo, September 6, 2012** – Ricoh Company, Ltd. (President and CEO: Shiro Kondo, hereinafter “Rico<sup>h</sup>”) has developed a photo (UV)-curable inkjet ink (\*1) that significantly reduces skin sensitization (\*2), which causes allergic dermatitis, such as itching or irritation of skin. The physical burden on people working in the printer industry is expected to fall with no loss in properties of conventional photo-curable ink.

Photo-curable inkjet ink is cured instantly when irradiated, so it is effective for applications that require quick-drying or printing on materials that are not easily penetrated by liquids. That is why it has been used to print on plastics and similar materials. Recent years have also seen it used in 3D printers. The influence on the human body of photo-curable inks in their liquid state before photo irradiation has not always been taken into account. Improved resistance to skin sensitization is needed.

Ricoh has developed a photo-curable inkjet ink with the three following features:

### **1. No material with the potential to cause skin sensitization is used**

We eliminated skin sensitive substances using methacrylate, used also in dental care, as a raw material for the ink. Although many kinds of ordinary methacrylate are poor at preventing reactivity against photo-irradiation, we found a specific molecular structure that bears favorable curing reactivity. We also devised additives to materialize ink discharge properties and curing reactivity comparable to conventional inks.

### **2. Adopted a radical polymerization technique to allow use of inexpensive, widely used raw materials**

The new ink can be manufactured by a commonly used radical polymerization technique (\*3). With it, inexpensive raw materials can be used, so the ink cost is lowered. Further, since neither an acid nor an alkali is generated, there are no restrictions regarding acid tolerance for ink print head or printer components. This results in greater flexibility in selecting materials.

### **3. Achieved high adhesion on print target material; it is also applicable to polypropylene film**

Adhesion to the print target material, an issue with the radical polymerization technique, was also improved with new additives we developed. We confirmed that sufficient adhesion was acquired also on a polypropylene film, which is a typically difficult material regarding adherence.

Ricoh will publish this technology at the NIP28 international conference (The 28th International Conference on Digital Printing Technologies) to be held in Quebec City, Canada, September 9 to 13.

Photo-curable inkjet technology is used for various applications at present, but Ricoh expects safety improvements in terms of effects on the human body. While maintaining the conventional cost and performance of photo-curable inkjet ink, this will lead to expanded applications. Ricoh will continue improvements toward commercialization, with the goal of providing this ink to printer vendors.

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- \*1 Because water is the principal constituent of the water inkjet ink currently used for home printers, the ink is safe, but coated paper is recommended for printing. To print on materials that do not penetrate liquid, such as plastic film, drying takes time, so heating is required. Photo-curable inkjet ink is quick-drying because it is cured instantly by photo-irradiation. Ultraviolet rays (UV) are used for photo-irradiation, so it is called UV inkjet ink.
  - \*2 The generation of skin inflammation (allergic contact dermatitis), such as a swelling, rash, and itchiness.
  - \*3 The photo-polymerization technique long used in many fields, such as printing inks, paints, and adhesive agents.

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#### **| About Ricoh |**

Ricoh is a global technology company specializing in office imaging equipment, production print solutions, document management systems and IT services. Headquartered in Tokyo, Ricoh Group operates in more than 200 countries and regions. In the financial year ending March 2012, Ricoh Group had worldwide sales of 1,903 billion yen (approx. 23 billion USD).

The majority of the company's revenue comes from products, solutions and services that improve the interaction between people and information. Ricoh also produces award-winning digital cameras and specialized industrial products. It is known for the quality of its technology, the exceptional standard of its customer service and sustainability initiatives.

Under its corporate tagline, *imagine. change.* Ricoh helps companies transform the way they work and harness the collective imagination of their employees.

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