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The corporate philosophy of Canon is “kyosei”, which means living and working together for the common good.

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1. Principal policy

It goes without saying that any product destined for the market must be safe in its use. This booklet describes how Canon designs and manufactures equipment with safety for the human being and the environment in mind.

This booklet provides valuable information concerning safe site installation, safe use and some of the effective environmental factors for Canon products. It is not, however, a substitute for a thorough reading of the specific product operation manuals.

The world-wide policy of Canon is that each product sold should comply with the health, safety and environmental requirements and legislation of the countries or areas in which it is to be marketed.

To achieve this, we maintain contacts with the various International Standards Organisations and Trade Associations who participate in the drafting of standards. This normally enables any changing requirements to be included at an early stage.

In practice, our high standard of quality assurance ensures the general safety of our products, where this often exceeds the legal requirements. For example, our Canon standard has more exacting fire resistant requirements than many national standards. In keeping with this philosophy, we are able to evaluate the products and select components and materials very carefully. This includes standards for environmental protection and chemical safety (for toners and inks, etc.) as well as general product safety – with regard to users and technicians.



- 2.1 Electrical safety
 - Protection against electrical shock
 - Protection against energy hazards
 - Protection against combustion
- 2.2 Protection against mechanical hazards
- 2.3 Protection against radiation and emissions
 - Laser radiation
 - Ozone
 - Dust
 - Acoustic noise
- 2.4 Electromagnetic interference suppression

2. General product safety information

All Canon products are planned, designed and manufactured with consideration not only for performance but also for safety.

This often means protection features and special devices built in to assure added safety for our users and technicians. Safe design includes the overall construction, layout of internal components and caution markings. Caution markings are readily visible, properly located, and securely adhered.

To testify that Canon products have passed the appropriate safety standards, we generally attach the approval marks of authorised testing laboratories.

For countries within the European Community, this would also be accompanied by the CE mark, demonstrating compliance with the related European Commission Directives and applicable EN standards.

The applicable technical standards required for the CE marking are mentioned in the CE Declaration.

2.1 Electrical safety

Protection against electrical shock

Canon products are designed so that all components and circuitry involving hazardous voltages are inaccessible to the user, thereby reducing the risk of electrical shock. They are designed so that conductive objects such as coins and paper clips are unlikely to fall into them. All products are evaluated individually before shipment and are subjected to full electrical safety tests at the final stage of manufacture. These essential tests ensure that there are no defects or degradation in the products' electrical integrity.

Protection against energy hazards

Even in low-voltage circuits, the heat generated by a short-circuit in high-current supply circuits could melt components. To remove the danger of burns, such circuits are inaccessible to the user.

Some products utilize heat as part of the process function. Where this is the case, heat sources are completely confined and controlled to avoid any risk of overheating. When the product is opened for purposes of routine user maintenance, these are clearly identified with high visibility hazard warnings in both word and pictograms. This significantly reduces any risk of burns to the user.

Batteries or cells, for "backup" of memory functions etc., may also be employed in our products, in which case they are either attached to printed circuit boards or compartmentalized. Every consideration is given at the design stage to restrict user contact and reduce any risk of battery terminals becoming shorted together.

Protection against combustion

By selecting the appropriate circuitry (for the load imposed), suitable materials (with generally accepted fire retardant properties), a safe component layout and installing protective devices where needed, Canon reduces the risk of ignition and fire.



2.2 Protection against mechanical hazards

The general stability of the Canon product is given prime consideration from the very early stages of design and development. Any identified mechanical hazards are either "designed out" or supported by appropriate user protection devices or systems.

Covers or doors have switches or interlocks designed into the product to ensure that not only potentially "live" (electrically), but also moving parts are stopped and isolated when accessible to the user. Only qualified service representatives should be enabled to override such guards.

2.3 Protection against radiation and emissions

Laser radiation

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. A laser can be generated from gas, liquid or semiconductors. Unlike normal light, laser beams offer high intensity and coherence and can be focused very accurately. This last feature has led to their many applications in CD players, bar-code readers, etc. Some Canon office, home, and information products use semiconductor lasers in the printing or writing process as a technological advancement on previous methods. Laser radiation could be hazardous to the human eye. For this reason, laser radiation emitted inside our products such as Laser Beam Printers and Digital Copiers is completely sealed within the protective housing and external covers. In the normal use, no radiation can leak from the machine.

Canon laser-printing products are classified as Class 1 laser products by engineering design, in accordance with international laser radiation safety standards. This means that the product is safe in its normal usage with no accidental release of laser radiation.

Ozone

Ozone is a naturally occurring gas produced by sun rays and lightning. It is present in the air we breath, at typical concentrations of 0.002 to 0.1 mg/m³ (0.001 to 0.05 ppm). Ozone is also produced artificially in some photocopiers and laser printers by the high voltage (approx. 6 kV) electrical discharge employed in the electrostatic process. This ozone quickly decomposes into oxygen, given that its half-life in a typical office is less than five minutes (amount of time needed to reduce the concentration by 50%).

Ozone is regarded as an air pollutant and a concentration below 0.2 mg/m³ (0.1 ppm) has been set as an acceptable level for the workplace in most of the European countries. Below this level, ozone should pose no health problems, even with prolonged exposure (i.e. the normal working week). Ozone has a detectable odour at very low concentrations and can irritate the eyes, nose and throat at 0.2 mg/m³ (0.1 ppm). At 2 or 4 mg/m³ (1 to 2 ppm), ozone may cause headaches, eye irritations, acute chest pains and extreme fatigue.

Any Canon product that produces ozone, is equipped with special filters to reduce ozone emissions to a level well below the acceptable standards. The filters are machine-specific and should be changed periodically (depends on the model).



In a case where a faint smell of ozone is detectable in a room with multiple installations, an environmental assessment may be necessary, the result of which may require improvements to the ventilation system to keep the working conditions comfortable. Recent technology such as "direct charging" and "catalytic filters", alleviates most of the concern in this area for many Canon users.

Catalytic filters: a higher grade than the conventional "charcoal filters" are used in many mid to high volume products. Whilst this type still requires routine maintenance, it does provide the security of a limitless service life. Direct charging does not require "air space" in the charging process. This means that significantly lower voltages can be used (1-2 kV) and far lower levels of ozone are produced in fact; actual amounts are negligible.

Dust

Small dust emissions cannot be avoided during the copying or printing process. They are caused by the paper transport and by the smallest toner particles, which cannot be filtered.

Many countries provide standards for permissible levels in the workplace. Generally, the MAC (Maximum Allowed Concentration) value is approximately 6 mg/m³. Tests of our products by an independent institute showed maximum emissions between 0.001 and 0.05 mg/m³.

Acoustic noise

Acoustic noise levels can be a concern with some office equipment, especially in multiple installations; however, the noise output for our products is minimised by design and use of the latest noise reducing technology. This ranges from the quieter running of a hall IC stepper motor to the use of noise absorbent materials lining the outer covers.

2.4 Electromagnetic interference suppression

In addition to ensuring safety for users and technicians, Canon also takes great care to prevent any radio interference being generated by our products and to avoid functional abnormalities caused by external interference fields.

During normal operation, all electrical and electronic equipment with motors and digital circuits can potentially generate radio interference. This interference can affect equipment nearby, to cause snow and ghosting on TVs or clicking and hiss on radios. In the worst case, it could even cause another device to malfunction.

To ensure total integrity and suppress interference to the bare minimum, we test and evaluate our products repeatedly in our own anechoic rooms, shielded enclosures, and open field test sites. Our efforts in this area are well attested by our products. They fully comply with the legal requirements in the country of sale, including the requirements of CE marking for countries within the European Community. Not forsaking this fact, we continue in our endeavours to develop technology which will further safeguard our products and reduce to ever lower levels the generation of electromagnetic radiation, whilst keeping performance as high as possible.



It should be noted, however, that equipment performance is dependent on proper installation and usage.



3.1 Photoconductive drum

- OPC drum
- Amorphous silicon drum

3.2 Toner

- Single-component toner
- Dual-component toner
- Safety
- Disposal
- Spills

3.3 Toner cartridges

3.4 Bubble-Jet ink cartridges/bottles

3.5 Silicone oil

3.6 Print media

3. Supplies

As a general policy and in keeping with the whole ethos of hazard reduction and risk control, Canon very carefully selects the component substances used in our supply consumables. In this way we can be sure to reduce any potential to cause harm, both to humankind and the environment.

Chemicals used in the image-making process, such as organic compounds, amorphous silicon, and toner, are all low hazard. Inks used in the bubble-jet printing process pose no health risks when used and handled in accordance with our recommendations.

The chemicals described in this section are summarised in the Material Safety Data Sheet (MSDS) which can be obtained by contacting your local service provider or your national Canon agent.

3.1 Photoconductive drum

Canon uses the following two types of drum in photocopiers and laser printers; these are central to the electrophotographic process.

OPC drum

The OPC drum is an aluminium cylinder coated with thin layers of organic photoconductive compounds.

All coating materials have been found negative in the Ames test, a screening test for carcinogenicity.

OPC drums should be recycled or disposed of as painted aluminium scrap, according to local regulations.

Amorphous silicon drum

This drum is an aluminium cylinder coated with a thin layer of photoconductive amorphous silicon.

Again, all coating materials contain no toxic substances and can be recycled or disposed of as aluminium scrap, according to local regulations.

3.2 Toner

Toner is used to form the image on paper. It consists of resin and colouring agent(s). Two basic types of toner are used in our products such as copiers, laser printers, and laser facsimiles.

Single-component toner

This type consists of mainly iron oxide (or ferrite powder) and resin. Each particle is encapsulated in a thermo-plastic resin. It is used mainly for black images, although it has been used to create dark colours such as sepia for specialist applications in our single colour products.

The whole single-component toner is laid onto the paper in its powdered state, then pressure and heat is applied to bond it in.

Dual-component toner

This type uses a mixture of an iron (or ferrite) powder carrier and a solid pigmented thermo-plastic resin toner powder. Collectively, this mixture of two components is known as a "starter", the quantities of each component being in precise ratio before any consumption by the printing process takes place.

Only the pigmented toner powder is laid onto the paper for subsequent processing, whilst the carrier component stays in the product for re-use as it is topped up with fresh toner.

This type is used widely for a full range of colours in a variety of products.



Safety

Toner resin is mostly thermoplastic resin such as styrene acrylate copolymer.

The compounds are used for stability even during the heat treatment imposed by the product in the fixing stage of the printing process. All types of toner have been assured negative in the Ames test, a screening test for carcinogenicity.

In order to fully assure low health risks, many countries provide standards for permissible chemical exposure levels in the workplace. For European Community countries the Control of Substances Hazardous to Health (CoSHH) regulations require manufacturers and employers to assess any health risks to staff using chemical compounds. As Canon toner powders are not identified as toxic or carcinogenic or listed as hazardous under the CoSHH regulations, any risk assessment is based upon any hazards caused by "dust". As such, the CoSHH regulations stipulate an Occupational Exposure Limit (O.E.L) as follows:

- 10 mg/m³ 8 hour Time Weighted Average (TWA) Long Term (LT) for total inhalable dust.
- 5 mg/m³ 8 hour TWA LT for respirable dust.

In Canon product tests, however, it was found that dust concentrations are much lower.

For example, in a two day independent assessment carried out in the U.K., two users of high volume photocopiers at a time when service work was also being conducted in the same location, were found to be exposed to an average measured value of 0.09 mg/m³ over the long term period of 8 hours.

Based on these findings there is little need for concern about health risks from toner dust in its normal application.

When feeding toner into the machine or discarding waste toner, however, it is still recommended that you proceed gently to prevent accidental excessive release of toner into the air.

Disposal

Used toner should be discarded in its container as plastic scrap according to local regulations. Like other organic powders, accidental release of toner could cause dust explosions if ignited. For this reason, do not allow an ignition source such as static electricity near a cloud of toner dust.



Spills

Be careful when filling or discarding toner. If spillage occurs, it should be cleaned up by damp wiping or using a *suitable vacuum cleaner. Care must be taken to avoid inhaling the dust.

A small amount of inhaled toner poses no problem (as discussed earlier in this document), but if someone inhales a large amount, he/she should be moved to a clean air location and follow a doctor's instruction. If toner gets on the skin, wash it

off with soap and water. If it enters the eyes, bathe the eyes repeatedly with clean water. If irritation continues, a doctor should be consulted. Please refer to our Material Safety Data Sheet for further information.

*A suitable vacuum cleaner has been designed to handle electrically conductive particles of 5 micron in size, with the ability to prevent or dissipate generation of static charges.

For more information please consult your local service provider, or your national Canon agent.

3.3 Toner cartridges

Our comprehensive range of family copiers (FC), personal copiers (PC), laser printers (LBP) and laser fax products use consumer replaceable drum cartridges. These comprise a photoconductive drum, a toner supply and an electrostatic charge unit in one container. They are made up of metals (mainly aluminium and iron) and plastics (general-purpose plastics and toner). For the safety characteristics of toner and drums see previous sections.



Canon provides a very successful recycling program for used cartridges. Used cartridges are collected or can be returned to dealers or the national Canon agent. In some countries we provide pre-paid postage labels. This recycling program involves effective recovery of the raw materials, thereby contributing to the environmentally conscious use of world resources.

3.4 Bubble-Jet ink cartridges/bottles

Canon created its high-quality printing ink with customer safety in mind. It consists of water, organic solvents, colouring agents and a few additives. It is safe and harmless in normal operation, because we choose the safest ingredients possible.

The organic solvents are the same as those used in felt-tip pens and paints. Some pose a minor risk to health if ingested, inhaled in great amounts, or introduced to the eyes or skin. Among the available solvents, Canon selected the ones with the lowest hazard. Even so, a safe work method should be adopted in handling these products to avoid undue exposure by inhalation, ingestion, or contact. Keep them away from children.

If there is a potentially harmful component in the ink, it is identified on the label along with a description of the hazard it poses and the necessary safety precautions.

If the ink comes in contact with the skin, wash it off with soap and water. If it gets into the eyes, bathe with plenty of water and consult an ophthalmic specialist.

The ink used is both solvent and waterproof. Take special care not to get ink on clothes, as it is permanent by design and can only be expected to fade over a period of time with prolonged exposure to light.

Used ink cartridges should be disposed according to local regulations.

3.5 Silicone oil

Silicone oil is used in a variety of products, to prevent toner particles from sticking to the parts of the product responsible for bonding them to the paper in the final stage of the process. A very small amount of silicone oil (.001 c.c. to .01 c.c.) is used for each A4 print.

Various types of silicone oil are used, the main difference relates to the viscosity of the oil.

A Material Safety Data Sheet is available for further information. Please refer to the correct sheet according to the product on which the oil will be used.

Used silicone oil should be discarded in the same way as other used oils, according to local regulations.

3.6 Print media

Canon developed a broad range of print media for their products, varying from high-grade quality paper to standard and recycled paper. In addition, a wide selection of transparencies for copiers and printers is available.

Recycled and ecological paper satisfies environmental demands. Recycled paper is manufactured from waste paper, reducing unwanted pollution and waste dumping in landfills. In terms of paper quality, current research has greatly improved the brightness levels of recycled and ecologically sound produced paper.

The Canon Paper Test Laboratory in Giessen, Germany, has developed extensive testing and quality assurance procedures, to meet the high standards in the current print media market. The laboratory plays a crucial role in the choice of suppliers to the Canon media. Only print media with the best technical specifications, compatible with current office equipment requirements, are selected.

Optimum media properties improve output quality, reduce machine wear-and-tear, and avoid jamming of the media. All of which means a higher machine uptime and productivity for the user.





4. Installation environment

- Choose a climatic location out of direct sunlight for the installation, with adequate space for operators and any visiting service personnel.
 - Care should be taken to ensure the location (or use of the product in that location) does not block or impede any gangways, especially emergency evacuation routes.
 - Keep temperature and humidity levels constant.
 - Do not install near windows.
 - Do not install near heaters, humidifiers, etc.
- Recommended environment:
- Temperature: 20-25 °C
 - Relative Humidity: 40-70%
- Keep the environment well ventilated; 4 to 5 air changes per hour is usually comfortable for operators and this may be a requirement for some products.
 - Avoid dusty locations; this may impair your product's performance.
 - Do not block or cover the machine's ventilation grilles; this can cause the product to overheat.
 - Do not place heavy objects or liquid containers on the machine.
 - Plug the product into the wall outlet correctly.
 - Make sure that the product's electrical rating is compatible with the supply outlet.
 - Avoid sharing outlets with incompatible equipment.



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