

HJ

Sector Standard for Environmental Protection of the People's Republic of China

HJ/T 413-2007

Technical requirement for environmental labeling products Remanufactured toner cartridge

Issued on December 21, 2007

Putting into effect as of April 1, 2008

Issued by State Environmental Protection Administration

Foreword

This standard is developed for the purpose of implementing the Law of the People's Republic of China on Environmental Protection, minimizing the adverse impacts of the production and use of remanufactured toner cartridge on the environment and human health and promoting the application of environmental protection products.

This standard, based on the German Blue Angel Standard of Reprocessed Toner Modules (RAL-UZ 55 Reprocessed Toner Modules), presents requirements for the limits of toxic and hazardous substances, environmental design, recycling and reuse of remanufactured toner cartridge as well as open information about it.

This standard is a guiding standard and applicable to the certification of environmental labeling products in China.

This standard is put forward by the Department of Science, Technology and Standards of the State Environmental Protection Administration.

Major organizations in charge of the development of this standard: Environment and Development Center of SEPA, Zhuhai Tianwei Feima Printing Consumables Co., Ltd., Guangdong Printing Consumables Engineering Technology Research & Development Center , Zhuhai Simeiya Toner Co., Ltd., Zhuhai Nasida Enterprise Management Co., Ltd., Xinweijun (Zhuhai) Printing Equipment Co., Ltd., and Shanghai ORINTON Electronics Co., Ltd..

This standard was approved by the State Environmental Protection Administration on December 21, 2007.

This standard shall be put into effect as of April 1, 2008.

This standard shall be interpreted by the State Environmental Protection Administration.

Technical Requirement for Environmental Labeling Products

Remanufactured Toner Cartridge

1. Application Scope

This standard specifies the terminology & definition, basic requirements, technical contents and determination method for environmental labeling product —— remanufactured toner cartridge.

This standard is applicable to the remanufactured toner cartridges for mono-color and color laser printers, copying machines and multi-functional machines.

2. Standard Quotation Documents

This standard quotes the provisions of the following documents. The effective version of all quotation documents without specific date is applicable to the current standard.

GB/T 1844 Symbols of Plastics and Resins

GB/T 5748-1985 Method for Airborne Dust Measurement in Work Place

GB/T 13963 Copying Machines Vocabulary

GB/T 14670-1993 Air Quality—— Determination of Styrene ——Gas Chromatography

GB/T 16288 Marking for Plastic Packing Products Recycling

GB/T 16483 General Rules to Drafting Safety Data Sheet for Dangerous Chemicals

GB/T 18883-2002 Indoor Air Quality Standard

SJ/T 11363 Limit of Toxic and Hazardous Substances in Electronic and Information Product

HJ/T 302-2006 Technical Requirements for Environment Labeling Products —— Printer, Fax Machine and Multi-function Machine

ISO/IEC 19752-2004 Determination Method for the Page Output of the Toner Cartridge of Mono-color Black & White Electrostatic Image Printer and Multi-function Machines with Printing Unit

3. Terminology and Definitions

The following terminologies are applicable to this standard.

3.1 Remanufactured Toner Cartridge

It refers to the original toner cartridge after cleaning, repair or changing damaged components as well as reassembly and filling of carbon powder, which can replace the original toner cartridge for use.

The other terminologies and definitions of this standard adopt relevant requirements of GB/T 13963.

4. Basic Requirements

4.1 The quality of the products shall comply with the requirements of national standard for

relevant products.

4.2 The discharge of pollutants from the enterprises shall comply with the requirements of national or local standards for the discharge of pollutants.

5. Technical Contents

5.1 Requirements for Remanufactured Toner Cartridge

5.1.1 Reuse

Before refilling, the mass of recycled components except those which directly affect printing quality including photosensitive drum should be over 75% of that of the original components.

5.1.2 Requirements for newly added components

- a) The newly added components shall meet the requirements of SJ/T 11363 and shall not use plastics containing PVC;
- b) The plastic components with weight more than 25 g or surface area more than 200 mm² shall be marked according to the requirements of GB/T 16288;
- c) Solvents containing CFCs, HCFCs, 1,1,1-trichloroethane or CCl₄ shall not be used during the production process.

5.1.3 Reliability

- a) The remanufactured toner cartridge shall have good seal to prevent any powder leakage during the operation and storage;
- b) The newly added components shall be provided with Material Safety Data Sheet (MSDS) that meets the requirements of GB/T 16483.

5.1.4 Mark

- a) Remove the original label of the toner cartridge;
- b) There shall be new mark on the remanufactured toner cartridge and external package which is evidently different from the original mark with clear word of “recycled”.

5.1.5 Recycle and Treatment

- a) Relevant enterprises shall set up recycling system for post-use remanufactured toner cartridge. The manufacturer shall recycle the used toner cartridge for re-processing and circular utilization;
- b) For the components not meeting use requirements due to technical reasons, the manufacturer is permitted to use substitute meeting relevant standard and treat the material from the original toner cartridge;
- c) Recycling method and venue shall be explained in the instruction manual;
- d) Manufacture shall recycle and reuse the residual toner or put it into a sealed container for incineration.

5.1.6 Package

- a) The packaging materials shall meet the following requirements:
 - i. Not using PVC;
 - ii. Total concentration of heavy metals such as Pb, Cr, Hg and Cr⁶⁺ shall not be more than 100 ppm.

- b) Packaging materials shall be recyclable materials;
- c) The production process of packaging materials shall not use CFCs, HCFCs, 1,1,1-trichloroethane and CCL₄ solvent;
- d) Packaging materials shall be marked in accordance with GB/T 16288.

5.2 Requirement for Toner

- 5.2.1 Toner shall not use the ingredient containing Pb, Hg, Cd, Ni and Cr⁶⁺.
- 5.2.2 Toner shall not contain the azo dye that decomposes into carcinogenic aromatic amines in Annex A.
- 5.2.3 Toner shall not contain the ingredients of hazardous substances in Annex B.
- 5.2.4 AMES test result of toner pollutants is negative.

5.3 The hazardous chemical substances occurred during operation of remanufactured toner cartridge shall not be bigger than the figures in Table 1.

Table 1 Limits of Hazardous Chemical Substances

Volatile Substances	Mono color (mg/h)	Color (mg/h)
TVOC	10	18
Benzene	0.05	0.05
Styrene	1.0	1.8
Dust	4.0	4.0

5.4 Open Information and Operation and Maintenance Instruction Manual

- a) Product information or package shall be clearly printed with the message that remanufactured toner cartridge is recyclable;
- b) Product information shall provide users with clear and appropriate suggestions on the treatment of remanufactured toner cartridge;
- c) Product information shall point out that remanufactured toner cartridge should not be forcefully opened. In case of leakage of toner due to inappropriate operation, measures shall be taken to avoid inhale of and skin exposure to toner. It shall also include the emergency response measures for skin exposure if any;
- d) Product information shall emphasize that the storage of remanufactured toner cartridge should be away from children.

6. Determination Method

- 6.1 For the technical requirements of 5.1, 5.2 and 5.4, the applicant shall present relevant certificate and statement and fill out Annex D and Annex E, which are subject to site inspection.
- 6.2 The determination method for TVOC in 5.3 shall be conducted according to Annex C.
- 6.3 The determination conditions for benzene in 5.3 shall comply with Annex D of HJ/T 302-2006 with testing method complying with the once specified in GB/T 18883-2002.
- 6.4 The determination conditions for styrene in 5.3 shall comply with Annex D of HJ/T 302-2006 and the testing method shall comply with GB/T 14670-1993.
- 6.5 The determination conditions for dust in 5.3 shall comply with Annex C of HJ/T 302-2006 and testing method shall comply with GB/T 5748-1985.

Annex A

(Standard Annex)

Azo Dye That Decomposes into Carcinogenic Aromatic Amines

Chinese name	English name	CAS code
4-氨基联苯	4-Aminodiphenyl	92-67-1
联苯胺	Benzidine	92-87-5
4-氯邻甲苯胺	4-Chloro-o-toluidine	95-69-2
2-萘胺	2-Naphthylamine	91-59-8
邻氨基偶氮甲苯	o-Amino-azotoluene	97-56-3
2-氨基-4-硝基甲苯	2-Amino-4-nitrotoluene	99-55-8
4-氯苯胺	p-chloroaniline	106-47-8
2,4-二氨基苯甲醚	2,4-Diaminoanisole	615-05-4
4,4'-二氨基二苯甲烷	4,4'-Diaminodiphenylmethane	101-77-9
3,3'-二氯联苯胺	3,3'-Dichlorobenzidine	91-94-1
3,3'-二甲氧基联苯胺	3,3'-Dimethoxybenzidine	119-90-4
3,3'-二甲基联苯胺	3,3'-Dimethylbenzidine	119-93-7
4,4'-二氨基-3,3'-二甲基二苯甲烷	3,3'-Dimethyl-4,4'-diaminodiphenylmethane	838-88-0
2-甲氧基-5-甲基苯胺	p-Cresidine	120-71-8
4,4'-二氨基-3,3'-二氯二苯甲烷	4,4'-methylene bis-(2-chloroaniline)	101-14-4
4,4'-二氨基联苯醚	4,4'-Oxydianiline	101-80-4
4,4'-二氨基二苯硫醚	4,4'-Thiodianiline	139-65-1
邻甲苯胺(2-甲基苯胺)	o-Toluidine	95-53-4
2,4-二氨基甲苯	2,4-Diaminotoluene	95-80-7
2,4,5-三甲基苯胺	2,4,5-Trimethylaniline	137-17-7
甲氧基苯胺	Anisidine	90-04-0

Annex B

(Standard Annex)

Hazardous Substance

This kind of ingredients are classified according to Annex 1 of Council Directive 67/548/EEC (on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances) and based on *Gefahrstoffverordnung* (Regulations on Hazardous Substances).

- Based on Carc.Cat.1, Carc.Cat.2 or Carc.Cat.3 of 67/548/EEC Directives on carcinogenic substances;
- Based on Mut.Cat.1, Mut.Cat.2 or Mut.Cat.3 of 67/548/EEC Directives on substances inducing mutation of organisms;
- Based on Repr.Cat.1, Repr.Cat.2, Repr. Cat.3 of 67/548/EEC Directives on reproduction toxic substances, or classified according to TRGS 905 and putting label in line with the following R Phrases in Annex 6 of 67/548/EEC Directives:

R26 (Deadly poisonous for inhalation)

R27 (Deadly poisonous for skin exposure)

R40 (Relatively evident carcinogenic effect)

R42 (Causing allergy after inhalation)

R45 (Carcinogenic)

R46 (May cause genetic diseases)

R49 (May cause cancer by inhalation)

R60 (Reproduction damage)

R61 (May damage foetus)

R62 (Have the risk of damaging fertility)

R63 (Have the risk of damaging foetus)

R64 (Have the risk of damaging breast-feed baby)

R68 (May cause irreversible danger)

or classify them into carcinogenic substance, organism mutation substance and regenerated toxic substance according to the provisions of TRGS 905 (Revised version).

Manufacturer or importer shall classify the substance according to Section 5 “Decree on Hazardous Substances” of Annex VI of 67/548/EEC.

It should not include the product with R43 Phrase label (allergy by skin exposure).

In principle, substances with “toxic” or “deadly poisonous” labels shall not be used.

Annex C

(Standard Annex)

Method for the Determination of TVOC Ingredients

C.1 Application Scope

This method is applicable to the determination of TVOC concentration of remanufactured toner cartridge under operation status.

C.2 Method

Select appropriate absorbent (Tenax TA), use adsorption tube to collect certain volume of air sample, the volatile organic compounds in the air flow retain in the adsorption tube. After sampling, heat the adsorption tube, carry out adsorption stripping of the volatile organic compounds. The test sample enters capillary gas chromatograph with inert carrying gas. Identify the nature of each ingredient by the retention time and the amount by peak area.

C.3 Instruments and Equipment

C.3.1 Gas chromatograph: The test uses a gas chromatograph equipped with hydrogen flame ionization detector.

C.3.2 Thermal desorption analyzing device.

C.3.3 Air sampler.

C.3.4 Test supporting materials:

- a) TENAX adsorption tube;
- b) GB/T 6872 Test on the Consumption Amount of Developer of Xerographic Printer;
- c) A4 copy paper (70~80 g/m²).

C.4 Testing Conditions

C.4.1 Test box: 5 m³ or 50 m³ environmental protection test box.

C.4.2 Environmental conditions:

- a) Temperature: (25±2)°C;
- b) Humidity: no more than 50%.

C.5 Testing Procedures

C.5.1 Preparation of Standard Sample

- a) Prepare VOC into standard solution with required concentration;
- b) With the standard solution of required concentrations, draw the standard curve using liquid external standard method;
- c) Activate Tenax TA sampling tube for scaling.

C.5.2 Pre-test Preparation

- a) Put the subject product into an appropriate position in the center of the environmental protection test box;
- b) Adjust internal temperature of the box to (25±2)°C with relative humidity ≤50%;

- c) Place the air sampler on a tripod. The suction mouth of the sampling tube should face the subject product. Adjust its height and position of measurement so that the suction inlet is 1.2 m above the ground and 0.3 meter to the subject product. Then fix well the sampler.

C.5.3 Background Sampling

- a) Use soap film flowmeter to calibrate the flow of the air sampler before and after sampling and record the flow value with error less than 5%;
- b) The subject product is in “off” status. Connect Tenax TA sampling tube with the sampling inlet of the sampler to sample for 120 min at the flow rate of 0.2 L/min.

C.5.4 Operation Sampling

- a) Power on the subject product for continuous operation. It shall be ensured that the copying amount shall reach 80% of the rated copying amount;
- b) Use soap film flowmeter to calibrate the flow of the air sampler before and after sampling and record the flow value with error less than 5%;
- c) Connect Tenax TA sampling tube with the sampling inlet of the sampler to sample for 120 min at the flow rate of 0.2 L/min;
- d) After the completion of the first measurement, turn off the power of subject product. Open the door of the test box, start the ventilation device in the box for 1 h ventilation. Repeat the above procedures and carry out the second operation sampling.

C.5.5 Thermal Desorption

- a) Connect Tenax TA sampling tube with thermal desorptor for 1 min~3 min thermal desorption.
- b) As soon as thermal desorption is finished, the sample is injected into gas chromatograph for analysis.

C.5.6 Chromatographic Analysis

C.5.6.1 Use liquid external standard method to draw the standard curve

- a) Take 1 µl~5 µl liquid with 100 µg and 10 µg standard solution and inject it into the adsorption tube. At the same time, inert gas at rate of 100 ml/min passes through the tube for 5 min. Then take down the adsorption tube and seal it up;
- b) Employ thermal desorption gas chromatograph method to analyze the standard series of the adsorption tube and draw the standard curve.

C.5.6.2 Sample Analysis

- a) Carry out thermal desorption and gas chromatograph analysis respectively of the background sample and operation sample;
- b) Identify the substance based on retention time and the amount of the substance by peak area in line with chromatographic curve.

C.5.7 TVOC Calculation Formula

C.5.7.1 Calculation of the concentration of background sample

$$SER_B = C_B \times n_B \times V \qquad C_B = \frac{M_{voc_b}}{V_p}$$

Among them,

C_B —— the concentration of VOC of background sample ($\mu\text{g}/\text{m}^3$);

SER_B —— the volatile rate of VOC of background sample ($\mu\text{g}/\text{h}$);

M_{voc_B} —— the mass of VOC of background sample (g);

n_B —— hourly air exchange rate of background sampling;

V —— the volume of the test box (m^3);

V_P —— the volume of background sample (m^3).

C.5.7.2 Calculation of the concentration of operation sample

$$SER_{DN} = \frac{\frac{M_{\text{voc}_{DN}}}{V_P} \times n_{DN}^2 \times V \times t_G - SER_B \times n_{DN} \times t_G}{n_{DN} \times t_D - e^{-n_{DN}(t_G - t_D)} + e^{-n_{DN} \times t_G}}$$

Among them,

SER_{DN} ——the volatile rate of VOC of operation sample ($\mu\text{g}/\text{h}$);

SER_B ——the volatile rate of VOC of background sample ($\mu\text{g}/\text{h}$);

$M_{\text{voc}_{DN}}$ ——the mass of VOC of operation sample (g);

n_{DN} ——air exchange rate of operation sampling;

t_D —— operation sampling time (h);

t_G —— all sampling time (h);

V ——the volume of the test box (m^3);

V_P ——the volume of operation sample (m^3).

C.5.7.3 Take the value with maximum difference between two operation test values and two background test value as the determination result.

Annex D

(Standard Annex)

Enterprise's Statement Sheet

Sheet A

Requirement	Yes	No
General requirement for remanufactured toner cartridge		
Remanufacture		
Before toner filling, is the mass of recycled components except those which directly affect printing quality including photosensitive drum over 75% of that of the original components?		
Requirement for newly added components of remanufactured toner cartridge		
Not using plastic products containing PVC		
Do these components meet the requirements of SJ/T 11363 regarding the limits of toxic and hazardous substances in electronic and information products?		
Apart from the components with weight less than 25 g or surface area less than 200 mm ² , are all plastic components marked according to the requirements of GB/T 16288 and consistent with GB/T 1844?		
Are there any CFCs, HCFCs, 1,1,1-trichloroethane and CCL ₄ solvents used during the production process?		
Reliability		
Remanufactured toner cartridge shall be sealed up well to prevent any leakage during operation and storage		
Does the manufacturer provide the MSDS sheet of new and substitute elements meeting GB/T 16483?		
Mark		
Remove the original label		
There shall be new mark on the remanufactured toner cartridge and external package which is evidently different from the original mark with clear word of "recycled". They should be marked with the name or trademark of the manufacturer		
Recycling and treatment		
Do relevant enterprises set up recycling system for post-use remanufactured toner cartridge? Do they recycle the used toner cartridge for re-processing and circular utilization?		
For the components not meeting use requirements due to technical reasons, do the manufacturers use substitutes meeting relevant standard and treat the material from the original toner cartridge?		
Does the instruction manual explain the recycling method and recycling venue?		
Do relevant enterprises recycle residual toner or put it into an airtight container for incineration?		
Packaging		
Do relevant enterprises employ PVC-free plastic products for product packaging?		

Do packing materials comply with SJ/T 11363-2006?		
Do relevant enterprises employ recyclable packing materials?		
Are there any regulations on not employing CFCs, HCFCs, 1,1,1-trichloroethane and CCL ₄ solvents used during the production process?		
Are the packaging materials marked in accordance with GB/T 16288?.		
Open Information, Operation and Maintenance Instruction Manual on Toner Cartridge		
Product information or package shall be clearly printed with the message that remanufactured toner cartridge is recyclable		
Product information shall provide users with clear and appropriate suggestions on the treatment of remanufactured toner cartridge		
Product information shall point out that remanufactured toner cartridge should not be forcefully opened. In case of leakage of toner due to inappropriate operation, measures shall be taken to avoid inhalation of and skin exposure to toner. It shall also include the emergency response measures for skin exposure if any		
Product information shall emphasize that the storage of remanufactured toner cartridge should be away from children		

Sheet B

Requirement for Toner Cartridge	Yes	No
Heavy metals: Pb, Hg, Cd, Ni and Cr ⁶⁺		
If their concentration meet the requirement of SJ/T 11363-2006		
Azo dye		
Does toner contain the azo dye that can decompose into carcinogenic aromatic amines listed in Annex A?		
Other Hazardous Substances		
If toner contain R Phrases in Annex 3 and Annex 4 of 67/548/EEC Directives: R26 (Deadly poisonous after inhalation) R27 (Deadly poisonous for skin exposure) R40 (Relatively evident carcinogenic effect) R42 (Causing allergy after inhalation) R45 (Carcinogenic) R46 (May cause genetic diseases) R49 (May cause cancer by inhalation) R60 (Reproduction damage) R61 (May damage foetus) R62 (Have the risk of damaging fertility) R63 (Have the risk of damaging foetus) R64 (Have the risk of damaging breast-feed baby) R68 (May cause irreversible danger)		

(Standard Annex)

Product Type: _____

[illegible]