LGA QualiTest GmbH
Ecological Product Testing

Certified according to DIN EN ISO 9001/14001

TÜVRheinland®
LGA

Test report

QUOP 5781520-2

Client:

IMEX CO., LTD.
1630-8, Mitsu-takatsu
Okayama-shi
Okayama-ken, 709-2124
Japan

Date of commission: December 01, 2008

Samples received: December 04, 2008 (MGI-Toner)

Nature of commission: Material examination of a toner sample
MGI Toner (Monochrome)

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1 Nature of commission

LGA QualiTest GmbH was commissioned to carry out material tests of a black toner sample according to the requirements of the LGA certificate "Tested for contaminants", product group – reprocessed toner modules. The tested parameters are volatile organic compounds in total (TVOC), Cobalt, Nickel and tin-organic compounds.

2 Description of the sample

The sample (toner powder) was packed in a glass bottle and delivered on December 04, 2008.

Sample name	MGI Toner (Monochrome)

3 Examination methods

3.1 Benzene, Styrene, TVOC (total volatile organic compounds) and volatile CMR compounds (carcinogenic, mutagenic, reproduction-toxic)

The samples were analyzed by thermoextraction and thermodesorption GC/MS.
Volatile CMR compounds are classified as carcinogenic, mutagenic or reproduction-toxic pursuant to category 1 and 2 according to

- TRGS 905 German Technical rules for Hazardous Substances
- Classified according to Annex I of the EC Directive 67/548/EEC as carcinogenic, mutagenic or reproduction-toxic

3.2 Heavy metals

Cobalt, Nickel
Digestion with microwave after that determination with inductively coupled plasma spectrometry (ICP).

3.3 Tin-organic compounds

Extraction with methanol (value A)
Extraction of the samples with methanol, derivatisation with sodium tetraethyl borate.
The quantification is carried out using capillary gas chromatography (GC).
Extraction with artificial sweat solution (value B)
Extraction of the sample with artificial sweat solution, derivatisation with sodium tetraethyl borate.
The quantification is carried out using capillary gas chromatography (GC).

Tin-organic compounds: n-butyl tin, di-n-butyl tin, tri-n-butyl tin, tetra-n-butyl tin, n-octyl tin, di-n-octyl tin and tri-cyclohexyl tin.

4 Results of the examination

The limit values as evaluated are in accordance with the certification criteria of the LGA certificate "Tested for contaminants" for reprocessed toner modules (toner powder).

Values that are exceeding the limiting values are printed in bold letters.

No.	Parameter	Unit	Limiting value		Material examination	
					MGI Toner (Monochrome)	
1.	**Volatile organic compounds:**					
1.1	**TVOC**	mg/kg	< 300 [1)]		75	
1.2	**Benzene**	mg/kg	< 0.35		< 0.3	
1.3	**Styrene**	mg/kg	< 40 [1)]		18	
1.4	**volatile CMR substances (Cat. 1+2)**	mg/kg	< 1		each < 1	
2.	**Heavy metals:**					
2.1	**Cobalt**	mg/kg	< 25		19	
2.2	**Nickel**	mg/kg	< 70		28	
3.	**Tin-organic compounds:**		A [2)]	B [2)]	A	B
3.1	**Total of tin-organic compounds**	mg/kg	< 5	< 0.5	each < 0.005	Not necessary
3.2	**Sum of dibutyltin (DBT) and tributyltin (TBT)**	mg/kg	< 0.5	< 0.05	< 0.005	Not necessary
4	**Azo dyes (only for color toner, mixed sample)**	mg/kg	< 30		Not necessary	

1) Exceeding the limits of both TVOC and styrene value is permissible if the requirements (target values) of the emission test are fulfilled.

2) Value A is valid when extracted using methanol. If this value is exceeded, value B is valid (extraction using artificial sweat solution, DIN EN ISO 105 E04).

5 Evaluation

The product "MGI toner (Monochrome)" fulfills the material requirements of the LGA certificate "Tested for contaminants" for the compounds TVOC, benzene, styrene and volatile CMR substances (Cat. 1+2), heavy metals: Cobalt, Nickel and tin-organic compounds.

Note:
Products must pass the complete material examination [(VOC; heavy metals: Cobalt, Nickel; azo dyes (only for color toner); tin-organic compounds: method A or method A and B)] and the emission test. Also a surveillance contract has to be signed before the certificate "LGA tested for contaminants" can be awarded.

Nuremberg, January 20, 2009

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Ökologische Produktprüfung

Dr. Christian Schelle
Head of the Competence Centre

Expert:

Rudolf Wildermann
Dipl.-Ing.

Thermoextraction Compounds	CAS #	Toner MGI (Monochrome) Amount	Units	LGA Limit value mg/kg
Benzene	71-43-2	< 0.3	mg/kg	**< 0.35**
Ethylbenzene	100-41-4	3.1	mg/kg	
Xylenes	1330-20-7	4.4	mg/kg	
iso-Propylbenzene	98-82-8	0.6	mg/kg	
n-Propylbenzene	103-65-1	0.3	mg/kg	
Styrene	100-42-5	18	mg/kg	**< 40**
n-Hexane	110-54-3	0.5	mg/kg	
n-Butanol	71-36-3	5.5	mg/kg	
Phenol	108-95-2	0.7	mg/kg	
2,6-Di-tert-butyl-p-cresol	128-37-0	2.6	mg/kg	
n-Nonanal	124-19-6	0.3	mg/kg	
n-Decanal	112-31-2	0.4	mg/kg	
Butanone	78-93-3	0.4	mg/kg	
4-Methyl-2-pentanone	108-10-1	14	mg/kg	
Trimethylsilanol	1066-40-6	3.0	mg/kg	
2-Phenylpropene	98-83-9	0.8	mg/kg	
E-1-Phenylpropene	873-66-5	2.4	mg/kg	
Benzaldehyde	100-52-7	12	mg/kg	
Acetophenone	98-86-2	4.1	mg/kg	
Methylmyristate (SVOC)	124-10-7	1.8	mg/kg	
an aromatic compound (SVOC)	--	103	mg/kg	
an aromatic compound (SVOC)	--	20	mg/kg	
not identified compounds (VOC)	--	2.0	mg/kg	
not identified compounds (SVOC)	--	43	mg/kg	
TVOC (the sum of all detected substances, having retention times between n-hexane and n-hexadecane) LGA-tested for contaminants	--	**75**	**mg/kg**	**< 300**
TVOC (the sum of all detected compounds)	--	243	mg/kg	--

VVOC = very volatile organic compounds

SVOC = semi volatile organic compounds