LGA QualiTest GmbH
Ecological Product Testing

Certified according to DIN EN ISO 9001/14001

TÜVRheinland®
LGA

Test report

QUOP 5781292-3

Client:	IMEX CO., LTD. 1630-8, Mitsu-takatsu Okayama-shi Okayama-ken, 709-2124 **Japan**
Date of commission:	July 17, 2008
Samples received:	July 14, 2008
Nature of commission:	Material examination of a toner sample **TMC Cyan Toner**

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1 Nature of commission

LGA QualiTest GmbH was commissioned to carry out material tests of a color 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 (TVOC), Cobalt, Nickel, Tin-organic compounds and Azo dyes.

2 Description of the sample

The samples (toner powder) were packed in glass bottles and delivered on July 14, 2008.

No.	Sample name
3	TMC Cyan Toner

3 Examination methods

3.1 Benzene, Styrene, TVOC (total volatile organic compounds) and volatile CMT compounds (carcinogenic, mutagenic, teratogenic)

The samples were analyzed by thermoextraction and thermodesorption GC/MS.
Volatile CMT compounds are classified as carcinogenic, mutagenic or toxic to reproduction 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 toxic for reproduction

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.

3.4 Azo dyes

Test method: § 64 LFGB B 82.02-4 and § 64 LFGB B 82.02-2
The materials will be tested for the following amines mentioned in the directive 2001/61/EC: 4-Aminodiphenyl, Benzidin, 4-Chlor-o-toluidin, 2-Naphthylamin, o-Aminoazotoluol *), 2-Amino-4-nitrotoluol **), p-Chloranilin, 2,4-Diaminoanisol, 4,4'-Diaminodiphenylmethan, 3,3'-Dichlor-benzidin, 3,3'-Dimethylbenzidin, 3,3'-Dimethyl-4,4'-diaminodiphenylmethan, p-Kresidin, 4,4'-Methylen-bis-(2-chloranilin), 4,4'-Oxydianilin, 4,4'-Thiodianilin, o-Toluidin, 2,4-Toluylendiamin, 2,4,5-Trimethylanilin, 3,3'-Dimethoxybenzidin, o-Anisidin (2-Methoxyanilin), 4-Amino-azobenzol
*) Determination as o-toluidin
**) Determination as 2,4-Toluylendiamin

4 Results of the examination

The limit values 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	
					TMC Cyan Toner	
1.	**Volatile organic compounds:**					
1.1	TVOC	mg/kg	< 300 [1)]		156	
1.2	Benzene	mg/kg	< 0.35		< 0.3	
1.3	Styrene	mg/kg	< 40 [1)]		< 0.3	
1.4	volatile CMT-substances (Cat. 1+2)	mg/kg	< 1		each < 1	
2.	**Heavy metals:**					
2.1	Cobalt	mg/kg	< 25		< 1.0	
2.2	Nickel	mg/kg	< 70		< 5.0	
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	< 0.01	Not necessary
4	Azo dyes (only for color toner, mixed sample)	mg/kg	< 30		< 5	

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

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 "TMC Cyan Toner" sample complies with the requirements of the LGA certificate "Tested for contaminants".

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, August 15, 2008

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Ökologische Produktprüfung

Expert:

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Dipl.-Ing.

Thermoextraktion		Toner TMC Cyan		LGA Limit value
Compounds	**CAS #**	**Amount**	**Units**	**mg/kg**
Benzene	**71-43-2**	**< 0.3**	**mg/kg**	**< 0.35**
Toluene	108-88-3	0.5	mg/kg	
Styrene	**100-42-5**	**< 0.3**	**mg/kg**	**< 40**
n-Hexane	110-54-3	1.0	mg/kg	
n-Pentadecane	629-62-9	0.8	mg/kg	
iso-Propanol (VVOC)	67-63-0	0.5	mg/kg	
Phenol	108-95-2	0.8	mg/kg	
2-Butoxyethanol	111-76-2	3.2	mg/kg	
2-Phenoxyethanol	122-99-6	2.3	mg/kg	
n-Nonanal	124-19-6	0.7	mg/kg	
n-Decanal	112-31-2	0.9	mg/kg	
Acetone (VVOC)	67-64-1	2.5	mg/kg	
Trimethylsilanol	1066-40-6	3.0	mg/kg	
Acroleine	107-02-8	0.8	mg/kg	
Acetic acid	64-19-7	5.7	mg/kg	
Propionic acid	79-09-4	1.9	mg/kg	
Ethylen glycol	107-21-1	52	mg/kg	
Ethyldioxolane	2568-96-9	12	mg/kg	
Propylen glycol	57-55-6	6.3	mg/kg	
Diethylen glycol	111-46-6	5.9	mg/kg	
Acetophenone	98-86-2	0.6	mg/kg	
Benzoic acid	65-85-0	0.9	mg/kg	
2-Phenoxypropanol	4169-04-4	3.0	mg/kg	
a Ditertbutylphenol (SVOC)	--	9.0	mg/kg	
not identified compounds	--	54	mg/kg	
not identified compounds (SVOC)	--	88	mg/kg	
TVOC (the sum of all detected substances, having retention time between n-hexane and n-hexadecane) LGA-tested for contaminants	**--**	**156**	**mg/kg**	**< 300**
TVOC (the sum of all detected substances)	--	256	mg/kg	--

VVOC = very volatile organic compounds
SVOC = semi volatile organic compounds