



ROHS 2.0 Test Equipment (EDX-4)

Brochure

Global Office of Lisun Electronics Inc.

<http://www.Lisungroup.com>

Lisun Group (Hong Kong) Limited

Add: Room 803, Chevalier House, 45-51 Chatham Road South, Tsim Sha Tsui, KL, HK

Tel: 00852-68852050 Fax: 00852-30785638

Email: SalesHK@Lisungroup.com

Lisun Electronics (Shanghai) Co., Ltd

Add: 113-114, No. 1 Building, Nanxiang Zhidi Industry Park, No. 1101, Huyi Road, Jiading District, Shanghai, 201802, China

Tel: +86(21)5108 3341 Fax: +86(21)5108 3342

Email: SalesSH@Lisungroup.com

Lisun Electronics Inc. (USA)

Add: 445 S. Figueroa Street, Los Angeles, CA 90071, U.S.A.

Email: Sales@Lisungroup.com

Lisun China Factory

Add: NO. 37, Xiangyuan Road, Hangzhou City, Zhejiang Province, China

Tel: +86-189-1799-6096

Email: Engineering@Lisungroup.com

Leader in Lighting & Electrical Test Instruments

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The EDX-4 ROHS 2.0 test equipment meets the requirements of IEC62321-8. The four kinds of o-benzene controlled by Rohs2.0 are plasticizers and are hardly volatile materials. They need high temperature (200°C-450°C) to evaporate. The current IEC standard is PY/TD-GC-MS (thermal cracking/ Thermal desorption-gas chromatography-mass spectrometry detector), and this equipment we use EDX-4 micro-cracking desorption technology (thermal cracking/thermal desorption-gas chromatography)

**IEC 62321-8**

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Determination of certain substances in electrotechnical products –
Part 8: Phthalates in polymers by gas chromatography-mass spectrometry
(GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal
desorption accessory (Py/TD-GC-MS)

Détermination de certaines substances dans les produits électrotechniques –
Partie 8: Analyse des phtalates dans les polymères par chromatographie en
phase gazeuse-spectrométrie de masse (GC-MS), chromatographie en phase
gazeuse-spectrométrie de masse par pyrolyse/thermodésorption (Py/TD-GC-MS)

IEC-approved PY/TD-GC-MS is a thermal cracking + thermal desorption + gas chromatography + mass spectrometry detector, where the thermal cracking temperature is high, up to 1200 degrees, many large molecular substances are cracked into small molecular substances, which will Interference and false positives to the results, so need to use MS mass spectrometers to qualify.

For the EDX-4 o-benzene rapid detection system, we only need to quantify the corresponding o-benzenes, so our heating range is set in the range of 200°C-450°C, so that all four o-benzenes are volatilized and enter GC (gas chromatograph) for quantification without affecting the results of other macromolecular substances, so EDX-4 does not need a mass spectrometer.

Therefore, EDX-4 test equipment is more reasonable and scientific to set a more accurate temperature range, and GC quantification is more suitable than GCMS.

1. Equipment List

Product name	Specifications	Number	Remarks
Gas chromatograph	With FID + capillary sampling system + split/special custom inlet (With dual EPC control)	1 SET	
Workstation	Chromatography workstation (with anti-control function)	1 SET	
Chromatographic column	Phthalates column	1 SET	
LISUN EDX-4 thermal desorption desorber	Cracking desorption temperature 200 ° C ~650 ° C	1 SET	Thermal cracking + thermal desorption
Nitrogen and hydrogen air source	General configuration	1 SET	
Electronic balance	1/10000 of Setolis	1 SET	
Nitrogen cylinder	99.999% purity nitrogen with gas cabinet	1 SET	With pressure reducing valve

Computer printer	HP Business Desktop printer HP inkjet printer	1 SET	
Standards	4 o-benzene standard samples (mixed standard) 3 bottles 500ppm 3 bottles 1000ppm 4 vials (Teflon bottle cap)	1 SET	
Consumables (a year's)	10 injection quartz tubes 20 injection quartz sleeves 1 injection needle 1 pack of injection septum	1 SET	

Remarks: The quotation includes all instruments. The customer only needs to prepare a desk, air conditioner, and five three-plug power supplies.

2. Analysis condition

- Micro-pyrolysis program temperature rise 200 ° C -450 ° C
- Microthermal cracking time 2 min
- Injection method: split injection
- Liquid injection volume: 1 ul
- Solid injection volume: 5mg or less
- Inlet temperature: 250 °C
- FID detector temperature: 300 °C
- Temperature programmed to 50 °C (for 1 min), to 20 °C per minute to 450 °C (for 4 min)
- The method does not require pre-treatment, the consumable is 2.5cm long quartz tube, quartz cotton, pretreatment column, the solid sample is placed in the middle part of the quartz tube, the two ends are fixed with quartz cotton, and then the prepared sample tube is placed in the heating chamber Just fine.

Component name and retention time

Name	Abbreviation	Retention time	Time window
Diisobutyl Phthalate	DIBP	8.524	0.05
Dibutyl Phthalate	DBP	9.041	0.05
Butyl Benzyl Phthalate	BBP	10.941	0.05
Diocetyl Phthalate	DEHP	11.949	0.05

3. Results and analysis

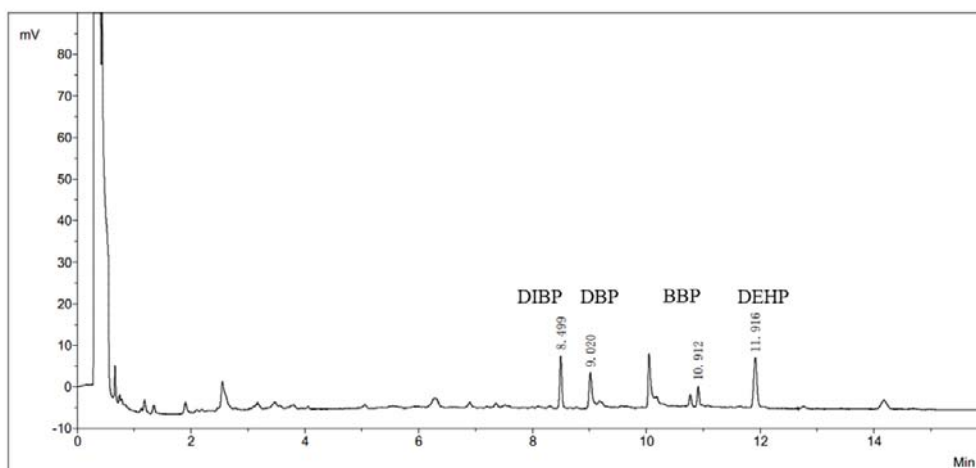
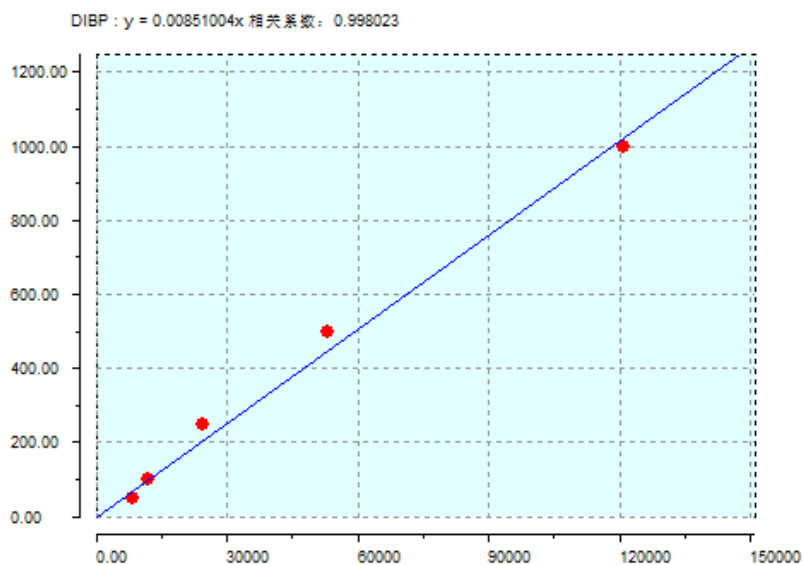


图1. 四种邻苯二甲酸酯标准品出峰谱图

Standard curve and linear range (detection limit)

The DIBP standard solutions were prepared at concentrations of 50 ppm, 100 ppm, 250 ppm, 500 ppm, and 1000 ppm. The concentration was plotted on the abscissa and the peak area of the component was plotted on the ordinate. The standard curve was drawn. The standard curve and the linear correlation coefficient are shown below.



The table below compares the peak height and peak area offive different concentration

Concentration(ppm)	Peak height (pA)	Area (A)
50	2038.7	8472.5
100	2829.6	12607.7
250	5720.6	24674.0
500	12090.8	53037.4
1000	24747.2	120759.3

3 times signal to noise ratio calculation of the minimum detection limit of each component is 25ppm

Repeatability (Precision experiment)

The repeatability was measured at the concentration of the minimum detection limit, and the results are as shown below.

RSD%		
DIBP	Peak height	Area
1	944.8	3484.2
2	1007.3	3638.8
3	903.2	3167.9
4	1205.6	4227.6
RSD%=5.24		

Analysis: The rapid detection method for ortho-benzene in Rohs2.0 has a minimum detection limit of 25 ppm (the lowest detection limit of Shimadzu PY+GCMS is 50ppm), the linear correlation coefficient is greater than 0.998, and RSD%=8.24, which is fully satisfied. Enterprise material screening requirements.