



HLMTS

计 量 检 测



鹤山利奥计量检测服务有限公司  
Heshan Leo Metrology and Testing Services Co.Ltd.





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# 前言 Preface

随着全球经济一体化的日益深化和发展，各国的贸易壁垒逐渐地被削弱或打破。随之而来的是人们对环保、安全及健康的追求也越来越高，而发达国家不停地更新技术标准和相关的法规，提高产品的技术门槛，给制造商、进口商和零售商增加了负担。同时，保护人类的健康和环境，实现可持续发展，是各国必须追求的共同目标，也是必然的趋势。利奥计量检测服务有限公司(LEO-MTS)正是在这种理念的基础上来帮助客户满足品质、安全和环境方面的标准要求。

利奥计量检测服务有限公司(LEO-MTS)的检测、检验、校准和咨询的一体化服务在消费品领域独树一帜，设立了全方位产品安全管理系统和测试实验室，为产品进行专业及严谨的测试，推动客户达致卓越，实现可持续发展，帮助您、您的供应商和客户，降低或消除违反技术性法规的风险。

我们愿意成为各界客户产品品质和安全的忠诚守护者，以世界先进设备和技术为保障，竭诚以我们的专业知识成就各界合作伙伴的卓越事业！

Trade barriers of each country are gradually weakened under global economic integration. Therefore, people have a higher standard for environment protection, safety and health. Developed countries have set higher technical standards and more strict regulations for products, which has increased burdens for manufacturers, importers and retailers. Striving toward a sustainable world is undoubtedly a common goal for most countries. LEO-MTS is an excellent option to help customers satisfy standard requirements on quality, safety and environment.

LEO-MTS provides excellent, integrated testing, inspection, calibration and consulting services. Our comprehensive Products Safety Management System and testing laboratory were established to carry out professional and rigorous tests on products and to help reduce or eliminate risks that violate technical provisions.

Leo's advanced equipment and professional knowledge help guarantee our customers' products are of the highest quality and safe for the consumer.



## LEO-MTS愿景

我的专业，您的卓越

## LEO-MTS使命

提供卓越服务，增加客户价值  
关注稳健业绩，营造安全环境  
珍视企业贡献，以客户为焦点  
激发职工潜能，鼓励集思广益

## LEO-MTS品质方针

资料准确，服务及时，机制高效

## LEO-MTS 服务宗旨

公司是具有完全独立合法的第三方公正地位的专门从事检测、校准的技术服务机构，服务技术来源为执行国际、国家行业检定规程、技术规范以及从欧美市场吸取先进检测技术及服务管理资讯。我们愿用良好的信誉、精湛的技术、诚挚的服务和科学高效的工作，为广大客户提供满意的测量、校准和检测服务，向全社会提供公正、可靠和信得过的公证性资料。

## LEO-MTS Vision

My Profession Your Excellence

## LEO-MTS Mission

Provide excellent service and add value for our customers  
Strive for steady performance and create a safe environment  
Contribute to society and focus on our customers needs.  
Encourage Creativity and Cherish Collective Wisdom

## LEO-MTS Quality Policy

Accurate data, Timely service, Efficient system

## LEO-MTS Service Objective

LEO-MTS is a professional and independent third-party technical service organization which provides services in industrial calibration, products and materials testing, inspecting and technical consulting. With advanced technology and service management information from Europe and America, we execute inspection and testing according to both global and national testing standards. We are proud to provide excellent service to all our customers with convenient calibration, testing and consulting services along with issuing informative data available to the public.



# 公司简介 Company Profile

鹤山利奥计量检测服务有限公司(LEO-MTS)成立于2009年，位于中国广东省鹤山市古劳镇玄坛庙工业区，屹立于美丽的西江河畔，面积3,000平方米，是专业的工业校准，消费品安全和可靠性评估，轻工业原材料检测、货物核对和技术咨询服务的独立第三方公证机构，帮助众多行业和企业提供一站式的全面品质解决方案。

LEO-MTS在工业仪表校准、消费品检测、轻工业原材料可靠性及环境卫生四大领域，提供有害物质检测，玩具及相关产品安全性检测，环境安全检测，轻工产品可靠性与失效分析，材料可靠性与失效分析，材料成份分析，纺织品、鞋类、皮革检测及包装材料检测，验货与审核服务，计量校准及仪器维修，技术咨询等多项综合检测与验证业务。

LEO-MTS是中国合格评定认可委员会(CNAS)认可的实验室，具备出具第三方检测报告的资质。除了通过中国的认可以外，LEO-MTS还通过了美国消费品安全委员会(CPSC)授权，成为其认可的实验室，检测报告具有国际公信力。

作为综合性、专业性和国际性的检测验证机构，LEO-MTS凭借先进的技术和卓越的服务理念，为广大企业解决了众多品质难题，赢得了客户和社会的信赖。

Established in 2009 and located in the Xuantan Temple Industrial Zone, Gulao town, Heshan, Guangdong, China, Heshan LEO-MTS stands along the riverside of Xi River, covering an area of 3,000m<sup>2</sup>.

LEO-MTS offers various comprehensive authentication services such as hazardous substance testing, safety testing on toys and related products, environmental safety testing, light industry product liability analysis, material liability analysis, material components analysis, fabrics, shoes, leather and packaging material tests, inspection and verification services, metrology and calibration and instrument maintenance and technical consultation.

LEO-MTS is a China National Accreditation Service for Conformity Assessment (CNAS) approved lab and is qualified to issue third-party testing reports. In addition, LEO-MTS has been authorized by the Consumer Product Safety Commission as an accredited lab which enables LEOMTS to offer global validated testing report.

As a comprehensive, professional and international testing and verification organization, LEO-MTS has gained the trust of its customers by its outstanding performance in solving quality problems with advanced technology and excellent service concept.



US Consumer Product Safety Commission  
Heshan Leo Metrology And Testing Services Co. Ltd  
CPSC Identification Number for this Laboratory: 1331

# LEO-MTS优势

## Strengths of LEO-MTS

- \* 集先进科研技术为一体，努力创新科学技术
- \* 提供专业卓越服务，不断满足和配合客户的需求
- \* 定期参加国际国内多种能力验证活动，保证测试和校准结果公证准确、数据真实可靠
- \* 熟悉纸品、玩具、纺织、包装和食品接触材料等行业的物料特性，对产品的安全性和可靠性有着良好的界定方法并进行准确无误的评定
- \* 能在生产前即产品设计阶段，进行检测服务和技术改进提案
- \* 与厂方紧密结合，应特殊情况可灵活处理急单配合订单货期

技术和服是LEO-MTS立足于市场的基石，选择LEO-MTS，就意味着您选择了一个具有丰富运作经验、真诚可靠的品质合作伙伴！

LEO-MTS是独立公正的第三方专业技术服务机构，我们提供：

专业的检测、检验、校准技术支持；公正独立的检验报告；便捷高效的服务保障；以客户为中心的忠诚服务理念；为客户提供一体化完全解决方案。

- \* Integrate advanced scientific research and technology.
- \* Strive for innovation in science and technology.
- \* Provide professional and excellent service to satisfy and meet the needs of customers' requirements continually.
- \* Regularly participate in a variety of international and domestic proficiency testing activities, ensure that testing and calibration results are impartial and accurate and that data is true and reliable.
- \* Knowledge of material properties of the paper products, toys, textiles, packaging and food contact materials industries and have a good definition and accurate assessment on the safety and reliability of products.
- \* Provide testing services and technical improvement proposals during the pre-production period or product design stage.
- \* Work closely with our factory and help with special circumstances related to urgent orders and delivery.

Technology and service are the foundation of LEO-MTS. Choosing LEO-MTS means choosing a reliable, sincere and quality partner with rich operating experience.

As an independent and impartial third-party professional technical service organization, LEO-MTS offers:

Professional technical support for testing, inspection and calibration;

independent and impartial inspection reports;

a convenient and effective service guarantee;

a loyal service concept with customer focus and an integrated total solution for the customer.

# LEO-MTS核心业务

## LEO-MTS Core Business







# 玩具及儿童产品安全检测

## Safety Testing of Toys and Children's Products

安全的玩具配合适当的监督能够使儿童玩耍时更添乐趣。正当主要的玩具入口国家通过出台不同的玩具安全标准及法规，以确保玩具安全之时，制造商及零售商亦同样需要面对产品制造时可能发生的错误及其所带来的健康危害。

LEO-MTS玩具安全检验范围基本涵盖了所有应用最广泛的国内外标准的要求，可以按美国、加拿大、澳大利亚、欧盟、中国等国家标准和国际知名的大玩具公司的企业标准进行检验，对玩具类产品进行严格、准确的风险评估和测试。出具的报告符合各进口国的法规要求，可作为各国通关和结汇的有效文件，被全世界61个国家和地区认可和接受。

Child's play can be more fun with safe toys and proper supervision. While toy safety is mandated by major importing countries through toy standards and regulations, manufacturers and retailers alike are liable for possible manufacturing defects and related health hazards.

LEO-MTS toys safety testing covers almost all requirements of national and international standards. Tests can be conducted according to the standards of America, Canada, Australia, the European Union, China and famous toy manufactures' standards, which guarantees strict and accurate analysis of a product's risk. MTS reports are all in line with the regulations of each import country, and it can be used as the valid document for declaration and settlement. Test reports are accepted and certified by more than 61 countries around the world.

物理及机械测试	Physical and Mechanical Properties
<p>美国</p> <p>美国玩具安全标准ASTM F963</p> <p>美国消费品安全委员会 CPSC 16 CFR 1500</p> <p>欧洲</p> <p>欧盟玩具安全标准EN71 第一部分</p> <p>加拿大</p> <p>加拿大玩具条例 SOR/2011-17</p> <p>涉及玩具机械物理、阻燃和电池要求部分</p> <p>国际标准</p> <p>国际标准ISO 8124 第一部分</p> <p>中国</p> <p>国家玩具安全技术规范GGB 6675-附录A</p> <p>澳大利亚/新西兰</p> <p>玩具安全标准AS/NZS ISO8124 第一部分</p> <p>年龄阶段评定</p>	<p>USA</p> <p>Standard Consumer Safety Specification for Toy Safety, ASTM F963</p> <p>Consumer Product Safety Commission: CPSC 16CFR1500</p> <p>Europe</p> <p>Safety of Toys – EN71 Part 1</p> <p>Canada</p> <p>Canada Consumer Product Safety Act Toys Regulations SOR/2011-17</p> <p>International Standard</p> <p>Safety of Toys -ISO 8124 Part 1</p> <p>China</p> <p>National Safety Technical Code for Toys: GB 6675-Annex A</p> <p>Australian/New Zealand Standard</p> <p>Safety of Toys Part 1: Safety aspects related to mechanical and physical properties</p> <p>Age grading assessment</p>

## 易燃性测试(固体材料/玩具产品)

### 美国

美国玩具安全标准ASTM F963

美国联邦法规16CFR1500.44

### 欧洲

欧盟玩具安全标准EN71第二部分

### 加拿大

加拿大玩具条例

SOR/2011-17条款21

### 国际标准

国际标准ISO 8124第二部分

### 中国

国家玩具安全技术规范GB 6675-附录B

### 澳大利亚/新西兰

玩具安全标准AS/NZS ISO8124第二部分

## Flammability (Solid Material/Toys)

### USA

Standard Consumer Safety Specification for Toy Safety, ASTM F963

Consumer Product Safety Commission: CPSC 16CFR1500.44

### Europe

Safety of Toys – EN71 Part 2

### Canada

Canada Consumer Product Safety Act Toys Regulations SOR/2011-17 Article 21

### International Standard

Safety of Toys -ISO 8124 Part 2

### China

National Safety Technical Code for Toys: GB 6675-Annex B

### Australian/New Zealand

Safety of toys Part 2

## 易燃性测试(纺织原料/绒毛织物/绒毛材料)

### 美国

美国玩具安全标准ASTM F963

### 欧洲

欧盟玩具安全标准EN71第二部分

### 加拿大

加拿大玩具条例

SOR/2011-17条款32-34

### 国际标准

国际标准ISO 8124第二部分

### 中国

国家玩具安全技术规范GB 6675-附录B

### 澳大利亚/新西兰

玩具安全标准AS/NZS ISO8124第二部分

## Flammability (Textile)

### USA

Standard Consumer Safety Specification for Toy Safety, ASTM F963

### Europe

Safety of Toys – EN71 Part 2

### Canada

Canada Consumer Product Safety Act Toys Regulations SOR/2011-17 Article 32-34

### International Standard

Safety of Toys - ISO 8124 Part 2

### China

National Safety Technical Code for Toys: GB 6675-Annex B

### Australian/New Zealand

Safety of toys Part 2

## 毒性元素分析

### 美国

美国玩具安全标准ASTM F963(含: 总铅含量测试)

美国消费品安全委员会CPSC 16CFR1303

美消费品改进 2008 法案第101节 H.R.4040

### 欧洲

欧盟玩具安全标准EN71第三部分

### 加拿大

加拿大(玩具)-条例

SOR/2011-17条款23

### 国际标准

国际标准ISO 8124第三部分

### 中国

国家玩具安全技术规范GB 6675-附录C

### 澳大利亚/新西兰

玩具安全标准AS/NZS ISO8124第三部分

## Migration of Certain Elements

### USA

Standard Consumer Safety Specification for Toy Safety, ASTM F963 (Include: Total Lead Content)

Consumer Product Safety Commission: CPSC 16CFR1303

U.S. CPSC Consumer Product Improvement Act of 2008, H.R.4040 Section 101

### Europe

Safety of Toys – EN71 Part 3

### Canada

Canada Consumer Product Safety Act Toys Regulations (SOR/2011-17) Section 23

### International Standard

Safety of Toys -ISO 8124 Part 3

### China

National Safety Technical Code for Toys: GB 6675-Annex C

### Australian/New Zealand

Safety of toys Part 3

# 有害物质检测

## Hazardous Substance Testing

### 邻苯二甲酸盐检测

### Phthalates Testing

邻苯二甲酸盐是一类使用广泛的增塑剂，也是工业常用的软化剂，用于增强可塑性，在塑胶和油漆中普遍存在。

欧盟早在2005/84/EC指令中已对用于玩具或儿童护理品的塑性材料及可放入口中的玩具及儿童护理品中的邻苯二甲酸盐作了明确限制，现已收编至REACH附录XVII限制列表中；美国在CPSIA2008中也明确提出了相关要求：供12岁以下儿童使用的玩具或3岁以下儿童使用的护理产品DEHP、DBP、BBP含量小于或等于0.1%；3岁以下儿童使用的护理产品或能放入口中供12岁以下儿童使用的玩具中DINP、DIDP、DNOP含量小于或等于0.1%；加拿大也在2010年提出邻苯二甲酸盐禁令：禁止6种邻苯二甲酸盐在乙烯基材料的儿童玩具和儿童护理用品中使用。

Phthalates are a plasticizer which are widely used as a softener to enhance plasticity. They are applied in plastic and paint.

Europe has already made a clear restriction in directive 2005/84/EC on phthalates included in toys or childcare products which can be put into a child's mouth. The corresponding restriction requirements were replaced by the Annex XVII of REACH. The US also administered effective relevant requirements in CPSIA2008: DEHP, DBP, BBP contents in toys for children under 12 or childcare products for children under 3 include no more than 0.1% of phthalates. Canada put forward its own phthalate ban in 2010 including 6 kinds of phthalates often used in vinyl toys and childcare products.



## 被限制使用的邻苯二甲酸盐： Phthalates with limitations of application

序号 No	CAS号 CAS NO	缩写 Initials	物质名称 Substance	指令/法规 Regulation
1	84-74-2	Dibutyl Phthalate (DBP)	邻苯二甲酸二丁酯	REACH附录XVII条目51要求玩具或儿童护理品的塑性材料DBP+BBP+DEHP ≤0.1%； 条目52要求可放入口中的玩具或儿童护理品的塑性材料DINP+DIDP+DNOP ≤0.1%
2	85-68-7	Benzylbutyl Phthalate (BBP)	邻苯二甲酸基丁酯	
3	117-81-7	Bis-(2-Ethylhexyl) Phthalate (DEHP)	邻苯二甲酸辛酯	Article 51, Annex XVII requires the plasticized material of toys or child care products: the content of DBP+BBP+DEHP should be ≤0.1%； Article 52 requires that the plasticized material of the toy that can be put into a child's mouth or child care product: the content of DINP+DIDP+DNOP should be ≤0.1%  美国消费品安全改进法案2008 U.S. Consumer Product Safety Improvement Act of 2008
4	68515-48-0	Diisononyl Phthalate (DINP)	邻苯二甲酸二异壬酯	
5	117-84-0	Di-n-octyl Phthalate (DNOP)	邻苯二甲酸二正辛酯	
6	26761-40-0	Diisodecyl Phthalate (DIDP)	邻苯二甲酸二异癸酯	
7	84-69-5	Diisobutyl Phthalate (DIBP)	邻苯二甲酸异丁酯	要求：Requires：  1. 儿童玩具或儿童护理品DEHP, BBP, DBP 含量 < 0.1% 1. Toys for children or child care products: the content of DEHP, BBP or DBP should be < 0.1%
8	84-75-3	Di-n-Hexyl Phthalate (DHP/DnHP)	邻苯二甲酸二己酯	2. 可放入儿童口中的玩具或儿童护理品DINP, DNOP Or DIDP 含量 < 0.1% 2. Toys that can be put into a child's mouth or child care products: the content of DINP, DNOP or DIDP should be < 0.1%
9	84-66-2	Diethyl phthalate (DEP)	邻苯二甲酸二乙酯	
10	84-76-4	Dinonyl phthalate (DNP)	邻苯二甲酸二壬酯	加拿大消费品安全法案—邻苯二甲酸盐法规 (SOR/2010-298) Phthalates Regulations of Canada Consumer Product Safety Act (SOR/2010-298 )
11	131-18-0	Dipentyl phthalate (DPP)	邻苯二甲酸二戊酯	
12	27554-26-3	Di-isoctyl phthalate (DIOP)	邻苯二甲酸二异辛酯	要求：Requires：  1. 乙烯基玩具和儿童护理品DEHP, BBP, DBP < 0.1% 1. Vinyl toys and child care products: the content of DEHP, BBP or DBP should be < 0.1%
13	131-11-3	Dimethyl phthalate (DMP)	邻苯二甲酸二甲酯	2. 可放入4岁以下儿童口中的乙烯基玩具和儿童护理品DINP, DNOP, DIDP <0.1% 2. Vnyl toys that can be put into a child's mouth (under 4 years old) and child care products: the content of DINP, DNOP or DIDP should be <0.1%
14	84-61-7	Dicyclohexyl phthalate (DCHP)	邻苯二甲酸二环己酯	
15	131-16-8	Dipropyl phthalate (DPRP)	邻苯二甲酸二丙酯	

# 包装材料检测

## Packaging Materials Testing

包装及包装物料涉及各个行业，出口产品的所有包装必须符合相关重金属的含量要求，LEO-MTS能为广大客户提供相应的包装及包装材料的重金属含量检测。

### 欧盟包装废弃物指令(94/62/EC)

指令94/62/EC即《关于包装和包装废弃物的1994年12月20日欧洲议会和理事会指令》，2004年2月11日欧盟颁布了对94/62/EC的修正案2004/12/EC，其中规定整体回收率60%，再循环率55%，另外规定具体的再循环率：玻璃60%、纸和纸板60%、金属50%、塑胶25%、木材15%，重金属浓度指标未改变。

Package and packaging materials are involved in every industry. All packages for export products should fulfill requirements related to heavy metal content. LEO-MTS provides customers with relevant heavy metal content testing on package and packaging materials.

### EU Directive on Packaging and Packaging Waste (94/62/EC)

Directive 94/62/EC refers to “European Parliament and Council Directive 94/62/EC of 20th December 1994 on Packaging and Packaging Waste.” On February 11, 2004, the European Union issued 2004/12/EC as an amendment to 94/62/EC. It specified that the overall recovery rate should be 60% with the recycling rate of 55%, including specific recycling rates for glass at 60%, paper and paperboard at 60%, metal at 50%, plastic at 25% and wood at 15%. The standard of heavy metal concentrations remained unchanged.

包装物定义	Definition of Package
是指由任何性质的任何材料制成的用于容纳、保护、搬运、交付和提供商品的所有产品。包括从原材料到加工成商品，从生产者到用户或消费者。	Refers to all products made of any material that hold, protect, carry, deliver and provide commodities, whether raw materials provided to manufacturers or finished goods for the end user.
有害重金属限量要求	Limitation of Harmful Heavy Metals
有害重金属物质铅、镉、汞及六价铬四种物质含量总和不得超过100mg/kg(0.01%重量百分比)。	Total content of the four harmful heavy metals, lead, cadmium, mercury and hexavalent chromium shall not exceed 100 mg/kg (0.01% weight percentage).

## 美国包装环保测试

CONEG即美国东北州首长联合会（8个州）于1989年成立，为减少包装及包装材料中的重金属含量而制定了地方性法规。随着TPCH在1992年成立，CONEG也改名为TPCH，而TPCH测试方法和要求与CONEG是一样的，保持不变。

The Toxics in Packaging Clearinghouse (TPCH)在1992年设立，最初于1989年由CONEG资源节省委员会起草的包装毒性法规，旨在推进减少在美国各州出售或分销的产品包装和包装成分中四种重金属（汞、铅、镉和六价铬）的含量。因此，TPCH限制了整个包装的供应链，包括包装和包装零部件的生产商、供应商和使用包装的产品生产商或分销商。

TPCH已经被美国19个州所接受，而美国国会也准备立法支持。该法规限定包装中Pb、Cd、Hg、Cr<sup>6+</sup>四种重金属的总和要小于100mg/kg。

## CONEG and TPCH

In 1989 CONEG, the Conference of Northeastern Governors, recommended changes in local laws and regulations aimed at reducing the heavy metal content in packaging materials. In 1992 the Toxics in Packaging Clearinghouse (TPCH) was formed to promote the Model Toxics in Packaging Legislation originally drafted by the Source Reduction Council of CONEG in 1989. The law specifically reduces the content of four heavy metals (Hg, Pb, Cd and Cr<sup>6+</sup>) contained in packaging materials of products sold or distributed in the United States. TPCH imposes restriction on the entire packaging supply chain, including manufacturers and suppliers of packaging components, and also product manufacturers and distributors who use packaging.

TPCH has been accepted by 19 U.S. states with, undoubtedly, more to follow. The regulation limits the total of the four heavy metals (Hg, Pb, Cd and Cr<sup>6+</sup>) contained in packaging to a total of no more than 100mg/kg.



# DMF检测

## DMF Inspection

富马酸二甲酯(Dimethylfumarate, 简称DMF)具有很强的广谱杀菌效果, 能抑制30多种常见的细菌、酵母菌及霉菌, 被广泛用于皮革、鞋类、纺织品、竹木制品等的杀菌及防霉处理。如果超量使用富马酸二甲酯(DMF), 可能引起消费者皮肤过敏、皮疹或灼伤疼痛。

对DMF的禁令最初是在2009年3月17日欧盟发布的2009/251/EC中, 该决议是依据通用产品安全指令(2001/95/EC, GPSD)的第13条: 委员会在意识到特定产品造成严重危险, 在同成员国商议之后, 可批准紧急措施, 该措施一般不超过一年, 在相同程式下, 还可延长不超过一年的时间。

2009年3月20日《欧盟公报》发布: 于2009年5月1日起全面禁用富马酸二甲酯, 并要求成员国确保没有含富马酸二甲酯的产品在市场上投放或销售。此决议要求: 测定产品或产品部件中富马酸二甲酯的含量的最大限量为0.1mg/kg。

此决议的有效期限已被延长至2013年3月15日直到其在REACH中正式生效。目前欧盟化学品管理署(EACH)已出台草案将富马酸二甲酯(DMF)纳入REACH法规附录17限制性物质列表中。

Dimethylfumarate (hereinafter referred to as DMF) is used to kill bacteria since it can restrain bacterium, saccharomycetes, and saccharomycetes of more than 30 kinds. It is commonly used for mildew prevention and the sterilization treatment of leather, footwear, textile, bamboo and wood items, etc. The overuse of DMF may cause consumers to experience skin irritation, rash or burning pain.

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The first interdict for DMF was declared in resolution 2009/251/EC which was announced on March 17, 2009, and was conducted according to the thirteenth article of General Product Safety Directive: If there is any product which may lead to serious risk, the committee can approve emergency measures toward the product after coming to a consensus with other committee members. Generally, the emergency measure shall not be in force for more than one year, however, it may be prolonged for another year if necessary. On March 20, 2009 the Official Journal of the European Union declared the resolution take effect as of May 1, 2009. According to the Official Journal of the European Union, DMF use is prohibited in all products. All member countries are not permitted to sell DMF products in the marketplace. This prohibition requires that the DMF content in all tested products or product components should be under 0.1mg/kg.

This Decision shall apply until the Commission Regulation amends Annex XVII of Regulation (EC) No 1907/2006 concerning DMF or March 15, 2013. Recently, Commission Regulation (EU) has issued draft regulations to ban the use of DMF in consumer products and is planning to add DMF into the table of Annex XVII of Regulation (EC) No 1907/2006.

测试项目Test Items	限量Limit	测试仪器Instrument
富马酸二甲酯 (DMF)	0.1mg/kg	GC-MS

# 甲醛测试

## Formaldehyde Testing

甲醛（化学分子式HCHO，分子量：30.03）是一种无色的、有强烈刺激性气味的气体。甲醛已经被世界卫生组织确定为致癌和致畸性物质，是公认的变态反应源，也是潜在的强致突变物之一。研究表明甲醛具有强烈的致癌和促癌作用，长期接触低剂量甲醛的危害有：引起慢性呼吸道疾病，鼻咽癌、结肠癌、脑瘤、月经紊乱和细胞核的基因突变，DNA单链内交连和DNA与蛋白质交连及抑制DNA损伤的修复、妊娠综合症、新生儿染色体异常、白血病，引起青少年记忆力和智力下降。各国对甲醛的限制要求如下：

Formaldehyde ( Chemical formula: HCHO, formula weight:30.03) is a colorless gas proven to be a carcinogenic teratogenesis matter by the World Health Organization. According to related studies, formaldehyde possesses a strong carcinogenic ability, and long time contact with low weight formaldehyde may lead to: chronic respiratory diseases, nasopharyngeal carcinoma, colon cancer, brain tumors, menstrual disorders, nucleus genetic mutations, DNA damage, chromosome abnormality and leukemia. Requirements for the use of formaldehyde in products are listed below:

标准要求 Standards	适用范围 Application Scope	限量要求 Limitation	测试方法 Test Method
EN 71-9有机化合物要求  EN 71-9:Organic chemical compounds Requirement	3岁以下儿童玩具  Toys for children under 3 years of age	可接触纺织品 30ppm 可接触纸张 30ppm 可接触树脂粘合木 80ppm  30ppm Accessible textiles 30ppm Accessible paper 80ppm Accessible resin-bonded wood	纺织品: ISO 14184-1/ GB/T 2912-1  纸张: EN 645+ EN 1541  树脂粘合木: EN 717-3  Textiles: ISO 14184-1/ GB/T 2912-1  Paper: EN 645+ EN 1541  Resin-bonded Wood: EN 717-3
日本玩具安全标准第三部分, 2002  ST 2002 Toy Safety Standard part 3	玩具中的纺织品  Textiles used for toys	婴幼儿纺织品玩具(2岁以下) 16mg/kg 直接与人体接触的纺织品玩具 75mg/kg  Textiles used for toys intended for infant (under 2 years old) 16mg/kg  Textiles used for toys that come in contact with the human body 75mg/kg	
GB 18401-2010 国家纺织品基本安全技术规范  GB 18401-2010 National Textile Basic Safety Technical Specifications	A类: 3岁以下婴幼儿用品 B类: 直接接触皮肤的产品 C类: 非直接接触皮肤的产品  Class A: Infant products for < 3 year olds Class B: Products with direct contact to skin Class C: Products with indirect contact to skin	A类: 20mg/kg B类: 75mg/kg C类: 300mg/kg  Class A: 20mg/kg Class B: 75mg/kg Class C: 300mg/kg	



## 苯系物及有机可挥发物检测

# Analysis of the Homologous Series of Benzene & VOC

苯系物通常包括苯、甲苯、乙苯、二甲苯等。苯为无色透明油状液体，具有强烈芳香的气味，易挥发为蒸气，易燃有毒。甲苯、二甲苯属于苯的同系物，都是煤焦油分馏或石油的裂解产物。目前，苯系化合物已经被世界卫生组织确定为强烈致癌物质。

苯及苯系物的来源：

建筑材料的有机溶剂，如油漆的添加剂和稀释剂、防水材料添加剂。  
装饰材料、人造板家具、粘合剂的溶液。

The BTEX typically includes benzene, toluene, ethylbenzene, xylene, etc. Benzene is a light yellow colored oily liquid with a strong aromatic odor and volatile vapors that is flammable and toxic. Toluene and xylene are homologues of benzene, and both are the pyrolysis products of coal tar fractionation or cracking of oil. Recently, Benzene compounds were identified as a strong carcinogen by the World Health Organization.

The Source of Benzene and its Homologues:

Organic solvents of building materials, such as paint additives and diluents, waterproof materials additives;  
Solutions and adhesives used on decorative materials, plywood furniture.

**LEO-MTS 可根据以下标准进行苯系物检测：**

**LEO-MTS can test below BTEX based on the following methods:**

项目名称	Item Name	方法 Method
苯系物	Benzene, Toluene, Ethyl benzene, Xylene	GB 18583- 2008, Annex B & Annex C GB 24613-2009
有机可挥发气体	VOC: Volatile Organic Compounds	GB 24613-2009



# 材料检测分析及产品可靠性

## Materials Testing Analysis & Products Reliability



随着行业的发展，消费者的鉴别水准也在不断提升，对产品的可靠性要求也越来越高。为了帮助轻工行业或相关制造业尽可能地挖掘由设计、制造或机构部件所引发的潜在性问题，在产品投产前或后寻找解决问题点，为产品品质和可靠性做出必要的保证。

Product reliability requirements are increasing due to the growth of the printing industry and rising concerns of consumers. It is necessary for light industry and related industries to determine and alleviate potential risks caused designation, manufacturing and components before production in order to guarantee their quality and reliability.

## 原材料检测

### Raw Materials Testing

对印刷通讯业中原材料的要求至关重要的一环，LEO-MTS开发了全球专业化的实验室，满足印刷通讯行业的印刷品的特性品质，从而可以为行业制订相应的研发标准，树立行业的先驱者和标杆作用。

Control of raw materials is the most important part of the printing process. LEO-MTS, therefore, aims to satisfy the special needs required by the printing industry by establishing the high level R&D standards.

## 纸张

### Paper

纸张的品质直接影响整个纸制品的品质，纸张的用途不一样，其性能和品质要求也是不一样的。高档的产品，必须对纸张有很高的要求，适应性能必须要更加良好。LEO-MTS能全面分析纸张的本身特性，结合使用者的实际需要，开发了专业化的纸张检测实验室，满足印刷通讯行业印刷品的品质检测需求，从而知晓纸张的适用性能和对相关标准的符合性。

The quality of paper has a direct influence on the distinctive characteristics of finished products. The properties and requirements of paper vary according to usage. For example, paper used in high-end products is, appropriately, of a higher quality. With the development of a professional paper testing lab, Leo-MTS can comprehensively analyze the characteristics of paper. Our lab tests the applicability and conformity of a specified paper in order to ensure it will fulfill a customer's needs for their printed product.

	测试类别	Test Type	测试标准 Standard
结构性能 Structural Performance	定量	Grammage	GB/T 451.2, ISO 536, TAPPI T410
	厚度	Thickness	GB/T 451.3, ISO 534, TAPPI T411
	水份含量	Moisture	GB/T 462, ISO 287, TAPPI T412
光学性能 Optical Performance	白度	Whiteness	TAPPI T562
	亮度	Brightness	GB/T 7974, QB/T 2804, ISO 2470, TAPPI T452
	颜色	Color	GB/T 7975, GB/T 21245, ISO 5631
	色度值	Tint	TAPPI T562
	不透明度	Opacity	GB/T 1543, ISO 2471, TAPPI T425
	尘埃度	Defect Size	GB/T 1541, TAPPI T564
	光泽度	Gloss	ASTM D523
表面性能 Surface Performance	粗糙度	Roughness	GB/T 22363, TAPPI T555
	磨擦系数	Coefficients of Friction	ISO 9416, ISO 15359, TAPPI T549
	表面强度	Wax Pick	GB/T 22837, TAPPI T459
吸收性能 Sorption Performance	吸油性	Print Penetration	IGT W24
	吸水量	Water Absorbency	GB/T 1540, TAPPI T441
化学性能 Chemical Performance	pH度	pH	GB/T 1545, ISO 6588-1
	碱度	Alkalinity	TAPPI T553
	灰分	Ash	GB/T 742, ISO 1762, ISO 2144, TAPPI T413
力学性能 Mechanical Performance	耐折度	Folding Endurance	TAPPI T511
	Z方向强度	Z-Direction Tensile	TAPPI T541
	粘合强度	Internal Bond Strength	TAPPI T569
	短距压缩	Short Span Compressive Strength	GB/T 2679.10, ISO 9895, TAPPI T826
	挺度	Stiffness	GB/T 22364, ISO 2493, TAPPI T489
	撕裂度	Internal Tearing Resistance	GB/T 455, ISO 1974, TAPPI T414
	耐破度	Bursting	GB/T 454, GB/T 1539, ISO 2758 ISO 2759, TAPPI T403, TAPPI T807, TAPPI T810
	边压强度	Edgewise Compressive	TAPPI T811, GB/T 6546, GB/T 2679.17
	拉伸特性	Tensile Properties	GB/T 12914, ISO 1924-2, TAPPI T494
	伸缩性	Dimensional Instability	GB/T 459
印刷性能 Printing Performance	拉毛阻力	Picking	GB/T 22365, ISO 3783, IGT W31
	胶印试验	Offset Printing	IGT W32
	墨斑	Mottle	IGT W57
	掉毛	Linting	IGT W44

## 瓦楞纸和纸板

### Corrugated paper and paper board

瓦楞纸板是一个多层的黏合体，它最少由一层波浪形芯纸夹层及一层纸板构成。它有很高的机械强度，能抵受搬运过程中的碰撞和跌落。

瓦楞纸板经过模切、压痕、钉箱或粘箱制成瓦楞纸箱。瓦楞纸箱是一种应用最广的包装制品，用量一直是各种包装制品之首。瓦楞纸箱以其特点和环保优势被广泛应用于商品的外包装，在商品的运输、保存和销售中起到了重要的保护作用。在使用过程中，要求纸箱必须达到一定的牢固度和耐用性。当前，激烈的市场竞争，使各纸箱生产企业在生产工艺和管理上不断的进行改进以获得最大利润，这就使得纸箱用户在使用纸箱的过程中遇到了或多或少的品质问题，如纸箱堆码后垮塌、破裂等造成了许多不必要的损失。为避免出现这样的情况，生产出合格的纸箱产品，必须对瓦楞纸箱进行检测，使瓦楞纸箱的生产过程得到有效的控制，确保使用的瓦楞纸箱合格。

Corrugated paper board consists of a multi-layered bonding body of materials. It includes a minimum layer of wavy core paper and a layer of cardboard. It has high mechanical strength and is able to withstand impacts and falls.

With its characteristics and environmental advantages, corrugated boxes are widely used in the packaging of goods and play an important role in the protection, transportation and sales of goods. During their use, cartons must maintain certain firmness and durability standards to be effective. Cartons of lesser quality can rupture or cause stacked cartons to collapse, which creates unnecessary losses. In order to avoid such situations and produce quality carton products, testing of the corrugated board is necessary to ensure effective control and quality in the production process of corrugated boxes.

项目名称	Item Name	方法 Method
破裂强度	Bursting Strength	GB/T 6545-1998, ISO 2759:2001, TAPPI T810- 2011
边压强度	Edgewise Crush Resistance	GB/T 6546-1998, ISO 3037:1994, TAPPI T811-2007
平压强度	Flat Crush	TAPPI T 825 om-03
环压强度	Ring Crush	TAPPI T 822 om-07
粘合强度	Pin Adhesion	TAPPI T 821 om-06
抗压强度	Compression Strength	GB/T 4857.4-2008

## 油墨和涂料 Ink and Paint

油墨是印刷资讯传媒中的一种重要色体材料，它的性能直接影响到印刷中的转移过程和印刷后的图文资讯再现品质。印刷科学的发展和承印材料的开发与应用、新型印刷版材和新印刷工艺的出现，为油墨的更新与发展带来了挑战和机遇，控制油墨的各项参数，是印刷复制高品质图文资讯产品的重要保证。LEO-MTS能全面分析油墨的特性，从而知晓油墨的流变性能、干燥机理、黏附机理、成色机理和印刷适性能等，开发了专业化的油墨检测实验室，满足印刷通讯行业的印刷品的品质检测需求，从而知晓油墨的适应性能和对相关标准的符合性。

Ink is an important coloring material in the printing communication industry. Its performance has a direct impact on the quality of graphic presentation during the process of transmission. With the development of printing science, development and application of printing materials, the presence of new printing plates and printing techniques, the renewal and development of ink faces a great challenge as well as opportunities. Control of ink's parameters guarantees high quality graphic products. LEO-MTS is able to analyze properties of ink thoroughly to check rheological properties, drying mechanism, adhesion mechanisms, coloring process and mechanism and printing applicability of the ink. A professional ink testing lab has been established in order to test the applicability and conformity of the inks.



项目名称	Item Name	方法 Method
颜色	Color	ISO 12647-2
密度	Density	ISO 12647-2
光泽度	Gloss	ASTM D523
pH	pH	ASTM E70, GB/T 1717
细度	Grindage	ASTM D1316
挥发物含量	Volatile Content	ASTM D2369 ASTM D5403
粘度	Viscosity	ASTM D4212
乳化率	Emulsification	ASTM D4942
耐磨度	Rub Resistance	ASTM D5264
干燥时间	Drying Time	ASTM D5895
耐化学试剂试验	Chemical Reagent Resistance	ASTM D6688, GB/T 18724, ISO 2836
固体含量	Nonvolatile Content	ASTM D2832, GB/T 1725, ISO 3251
附着力	Adhesion	GB/T 9286, ISO 2409, GB/T 7707, ASTM F2252
粘性	Tack	GB/T 18723, ISO 12634
耐光色牢度	Light Fastness	ASTM D3424

## 粘合剂 Adhesive

胶粘剂能将两种或两种以上同质或异质的制件（或材料）连接在一起，固化后具有足够强度的有机或无机的、天然或合成的一类物质，统称为胶粘剂或粘接剂、粘合剂，习惯上简称为胶或胶水。粘合剂在轻工行业有广泛的应用，如覆膜、装订、粘合等加工工艺中，粘胶剂的稳定性直接影响到加工的效果，LEO-MTS拥有全套设备，对胶水的品质进行全面检测。

Adhesive can connect two or more kinds of homogeneous or heterogeneous parts (or materials) together. It is an organic or inorganic, natural or synthetic substance with sufficient strengths after curing; it is collectively regarded as adhesive or bonding agents, adhesives, and is commonly known as glue. Adhesive is widely used in light industry for such things as coating, binding, cohesives, etc. The stability of adhesive has a direct influence upon the effect of finishing. LEO-MTS has equipment for thoroughly testing the quality of adhesives.

项目名称	Item Name	方法 Method
单位用量	Weight Per Unit Area	ASTM D899
颜色	Color	ASTM D1544, GB/T 9281.1 , ISO 4630.1
气味	Odor	ASTM D4339
比重	Density	ASTM D1475
pH	pH	ASTM E70, GB/T 14518
固体含量	Nonvolatile Content	ASTM D1489, GB/T 2793
粘度	Viscosity	ASTM D2196, ASTM D4212 , GB/T 2794
耐化学试剂试验	Chemical Reagent Resistance	ASTM D6688, GB/T 18724 , ISO 2836

## 电化铝烫印箔 Aluminum Foil Stamping

烫印箔实际由两个主要的薄层组成，即聚酯薄膜片基和转印层。在烫印时，烫印层凭借热量和压力的作用被压印承印件的全部或部分表面上。当烫印完毕后，聚酯薄膜连同没有被转印的部分一起被拉走。

Hot stamping foil is composed of two main thin layers, the polyester film substrate and the transfer layer. In the stamping process, heat and pressure are applied to imprint the foil on all or part of the surface of the printing area. When the stamping is complete, the polyester film together with the transfer material which has not been used will be removed.

项目名称	Item Name	方法 Method
色差	Color Difference	ASTM D2244或GB/T 7921
剥离	Peel Adhesion	ASTM D3330或GB/T 2792
耐光色牢度	Light Fastness	ASTM D3424
耐磨度	Rub Resistance	ASTM D5264

## 塑胶类检测

### Plastic

用聚氯乙烯、聚乙烯、聚丙烯、聚苯乙烯以及其他树脂制成的薄膜,用于包装,以及用作覆膜层。塑胶包装及塑胶包装产品在市场上所占的份额越来越大,特别是复合塑胶软包装,已经广泛地应用于各个行业或领域,这些产品都给人们生活带来了极大的便利。对其各个特性的检测更有利于生产。

Plastic includes a variety of films made of polyvinyl chloride, polyethylene, polypropylene, polystyrene and other resins that are used for packaging and laminating material. There has been an increased demand for packaging and plastic packaging products in various industries or areas.

项目名称	Item Name	方法 Method
厚度	Thickness	GB/T 6672,ISO 4593
透光率	Luminosity	ASTM D1003或GB/T 2410
雾度	Haze	ASTM D1003或GB/T 2410
湿润张力	Wetting Tension	ASTM D2578或GB/T 14216
慢速刺破	Puncture	ASTM D5748
拉伸特性	Tensile Properties	ASTM D882或GB/T 1040或ISO 527
摩擦系数	Coefficients of Friction	ASTM D1894或GB/T 10006
撕裂度	Tear	ASTM D1922或GB/T 16578.2
热收缩率	Thermal Shrinkage	ASTM D2732
热合强度	Welding Strength	QB/T 2358或ASTM F1921

## 胶纸

### Adhesive Tapes

透明胶纸是在BOPP原膜的基础上,经过高压电晕使一面表面粗糙,涂上胶水后经过分条分成小卷,就是我们日常使用的胶带。

Transparent gummed paper, commonly called tape, is small rolls cut from the original BOPP film, which is coated with adhesive after corona by high-voltage.

项目名称	Item Name	方法 Method
剥离	Peel Adhesion	ASTM D3330或GB/T 2792
老化试验	Accelerated Aging	ASTM D3611或GB/T 17875

# 气候环境试验

## Climate and Environmental Testing

LEO-MTS环境可靠性实验室拥有一批专业的国际先进试验设备和环境室，性能稳定、功能齐全。包括下面的项目：

LEO-MTS owns and operates advanced professional testing equipment and environmental testing rooms with comprehensive functions and stable properties. Testing parameters are as follows:

测试项目	Item Name	测试范围 Test Scope
恒温恒湿房检验	Constant Temperature and Humidity	A. 20°C ±3 20% ±5 B. 20°C ±3 35% ±5 C. 23°C ±3 50% ±5 D. 26°C ±3 75% ±5
环境测试	Environmental Testing	温度: 10~60°C 湿度: 环境湿度0~95% Temperature: 10~60°C Humidity: Environment Humidity 0~95%
低温 (冷冻与解冻)	Low Temperature(Freeze & Thaw)	0~25°C
高温	High Temperature	环境温度~200°C Environment Temperature~200°C
耐晒	Fade Resistance Testing	按时间来计算 By time
脱色(布料/绳)	Bleed Testing (Cloth/Cord)	
金属灰暗测试 (项链类)	Metal Tarnish Testing (Necklace)	
翻粘	Blocking Tendency	





# 环境安全检测

## Environmental Safety Testing



环境污染不仅影响人们的工作和生活，而且直接威胁人们的身体健康。随着生活水准的提高，人们对环境品质的要求也越来越高。LEO-MTS凭借专业技术人员的丰富经验和先进的测试设备，为您提供可靠的、一站式的环境检测服务，其中包括废水检测（生活废水、工业废水）、噪声检测（厂界噪声、职业噪声）等。

Along with the improvement of living standards, there are rising concerns for environmental protection. With experienced professional technicians and advanced testing equipment, LEO-MTS provides reliable and one-stop environment analysis services including sewage testing (sanitary sewage, industrial sewage), noise analysis (factory noise and occupational noise), etc.

## 污水检测

### Sewage testing

随着社会的发展，环境问题越来越突出，水污染问题也时有发生，如广西龙江镉污染事件。LEO-MTS在污水检测方面通过CNAS认可，检测报告科学、公正。

With social development, environmental issues are increasingly prominent. Water pollution is a problem. For example, the LongJiang River located in Guangxi was polluted by cadmium. LEO-MTS has been accredited by CNAS for sewage testing in order to help combat this issue.

污水检测项目包括 Testing parameters are as follows:

项目名称	Item Name	方法 Method
重金属	Heavy Metal (Pb, Cd, Zn, Cu, Ni, Cr, As, Ag, Hg)	DB44/26-2001, US EPA 3005A-1992, U.S. EPA 6010C-2000
六价铬	Cr <sup>6+</sup>	DB44/26-2001, GB 7467-1987
pH	pH	DB44/26-2001, GB 6920-1986
色度	Colority	DB44/26-2001, GB 11903-1989
悬浮物	Suspended Substance	DB44/26-2001, GB 11901-1989
生化需氧量(BOD <sub>5</sub> )	Biochemical Oxygen	DB44/26-2001, HJ 505-2009
化学需氧量(COD)	Chemical Oxygen	DB44/26-2001, GB 11914-1989
石油类、动植物油	Petroleum Oil, Animal and Vegetable Oils	DB44/26-2001, GB/T 16488-1996
挥发酚	Volatile Phenolic	DB44/26-2001, HJ 503-2009
硫化物	Sulfide	DB44/26-2001, GB/T 16489-1996
氨氮	Ammonia Nitrogen	DB44/26-2001, HJ 535-2009
氟化物	Fluoride	DB44/26-2001, GB 7484-1987
磷酸盐	Total Phosphorus	DB44/26-2001, GB 11893-1989
苯胺类	Aniline Compounds	DB44/26-2001, GB 11889-1989
阴离子表面活性剂	Anionic Surfactants	DB44/26-2001, GB 7494-1987

## 包装运输测试

### Packaging Shipping Testing

为了尽可能降低运输流通过程对产品造成的损坏，保障产品的安全，方便储运装卸，加速交接点验，通常我们将以运输储运为主要目的的包装称之为运输包装。因此而进行的测试项目，称之为运输包装测试。

主要目的是

- 克服物流过程中的各种危险因素；
- 防止物品从容器中脱出，集合产品；
- 适应搬运和存储系统，充分利用空间；
- 对标签（唛头）、条码等正确地标示以利于交接。



LEO-MTS拥有运输振动台、压力等设备，能对不同运输包装的安全性能进行评估。

To reduce product damage in logistics and for easy loading and unloading, special packaging methods are used for transportation. This type of packaging is referred to as “transportation packaging” and requires special testing in order to achieve the following:

- Eliminate all risky factors in logistics;
- Prevent products from coming off containers;
- Ensure packages are suitable for logistics and storage;
- Assure mark codes and labels are correct for efficient delivery.

LEO-MTS has shaking tests and pressure testing equipment available for different transportation packaging tests.

## ISTA 国际运输安全测试

### ISTA (International Safe Transit Association) Testing

ISTA即国际安全运输协会，是一个国际性的非牟利组织，其前身是NSTA-美国国家安全运输协会，目前在全世界的会员已有数百家知名的货运公司和实验室。它一直致力于协助会员开发有效的包装、方法、后勤系统等，以提高产品的运输包装安全性能，从而防止或减少产品在运输和搬运过程中遇到的损失。该组织已经发布了一系列的标准以及测试程序和测试项目等文件，作为对运输包装的安全性能进行评估的统一依据。LEO-MTS获得了ISTA的认证，可以提供重量低于150lb(68 kg)的运输包装产品测试和质量评估服务，并可以签发ISTA认可的正式包装运输测试报告。

ISTA (International Safe Transit Association), a non-profit organization previously known as NSTA-National Safe Transit Association, has hundreds of members throughout the world, including famous freight companies and laboratories. It is committed to helping members develop more efficient packaging methods, logistics systems, etc, to improve the performance of transport packaging and prevent or reduce damages to products during handling and transportation. This organization has already published a series of documents including

standards, testing procedures and projects that are the basis for evaluating the safe performance of products' transport packaging. LEO-MTS, certified by ISTA, can provide transport packaging tests of Packaged-Products 150 lb (68 kg) or less and quality evaluation services, sign and issue formal and certified ISTA reports.

### ISTA 运输测试为您提供如下的切实利益：

- 减少产品的损坏和流失，以保证产品价值；
- 节省分销成本；
- 减少和消除索赔争议；
- 缩短包装开发的时间，增强市场投放信心；
- 提高客户满意度和产品的市场占有率。

### ISTA - International Transit Safe Test

#### ISTA Test procedures will provide tangible including:

- (1) Protection of products and profits with reduced damage and product loss
- (2) Economically balanced distribution costs
- (3) Reduce and eliminate controversial claims
- (4) Shortened packaged development time and confidence in product launch
- (5) Improve customer satisfaction and market share of products

测试项目	Test Category	方法 Method
定频振动，冲击(跌落)	Vibration (fixed displacement), Shock(drop)	ISTA 1A
压力，振动(定频振动)，冲击(跌落)	Compression, Vibration (fixed displacement), Shock(drop)	ISTA 1C
环境，压力，振动(定频振动)，冲击(跌落),振动(定频振动)	Atmospheric Conditioning, Compression, Vibration (fixed displacement), Shock(drop), Vibration (fixed displacement)	ISTA 2A
定频振动，旋转棱跌落，跌落，旋转面跌落，危险物冲击	Vibration (fixed displacement), Rotational Edge Drop, Drop, Full rotational Flat Drop, Hazard Impact	ISTA 2D
定频振动，转动棱跌落，跌落，旋转面跌落，桥式冲击	Vibration (fixed displacement), Rotational Edge Drop, Drop, Full Rotational Flat Drop, Bridge Impact	ISTA 2E



## 文具测试

### Writing and marking instruments

书写工具中笔帽和端盖是有危害的,如果一个儿童吸入一个笔帽或一个端盖,可能遗留在喉咙处及堵塞在气管处。

如果按照下面要求设计可以减少可能导致窒息的风险:

笔帽有通气口或太大不能进入导气管:

端盖是一个安全的附件,通风,平整或从书写工具的末端仅有个最小量的突起,或是太大不能进入导气管。

If a child inhales a pen cap or an end closure, it may become lodged below the larynx and block the trachea. The risk of asphyxiation can be reduced if:

- 1) the pen cap is ventilated or is too large to enter the airway; or
- 2) the end closure is securely attached, ventilated, flush with or protrudes only a minimal amount from the end of the writing instrument or is too large to enter the airway.

BS 7272是已公认的及被广泛采用的英国国家安全标准规范要求之一,以减少由于笔帽导致的窒息风险(BS 7272-1)以及来自书写工具和标记工具的端盖(BS 7272-2)的风险,因为在正常或可预见的情况下14岁及以内的儿童很有可能使用这些书写工具。(BS 7272-1)的内容技术上等同于ISO 11540。

BS 7272 is one of the well-recognized and widely adopted national safety standard specifying requirements to reduce the risk of asphyxiation from caps(BS 7272-1) and from end enclosures(BS 7272-2) of writing and marking instruments likely to be used by children up to the age of 14 years. Part 1 of BS 7272 is technically related to ISO 11540.

Current Applicable National/International Safety Standards for writing and marking instruments.



## 现行适用的有关书写和标记工具的国内/国际安全标准

项目名称	Item Name	方法 Method
书写和标记工具笔帽的测试	Writing and Marking Instruments – Part 1: Specification for caps to reduce the risk of asphyxiation	BS 7272-1:2008
书写和标记工具端盖的测试	Writing and Marking Instruments – Part 2: Specification for end closures to reduce the risk of asphyxiation	BS 7272-2:2008
14岁及以下儿童使用的书写和标记工具用笔帽的安全要求	Caps for writing and marking instruments intended for use by children up to 14 years of age	ISO 11540:1993
学生用品安全通用要求	Request in common use of security for student's articles	GB 21027-2007
进出口笔类产品笔帽和端盖安全要求及测试方法	Safety requirements and tests for caps and end closures of writing and marking instruments for import and export	GB 24110-2009

## 主要检测设备

### The Main Testing Equipment

#### 常用检测设备

#### Commonly Used testing equipments

鹤山利奥计量检测服务有限公司拥有先进检测设备：

Advanced Testing Equipment in LEO-MTS:

恒温、恒湿检测实验室	Constant Temperature and Humidity Testing Laboratories
气质联用仪	Gas Chromatography – Mass Spectrometer
电感耦合等离子体发射光谱仪	Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)
气相色谱仪	Gas Chromatography
原子吸收光谱仪	Atomic Absorption Spectrometer
X射线荧光光谱仪	X-Ray Fluorescence Spectrometer
傅氏转换红外光谱仪	Fourier Transform Infrared Spectrometer
IGT测试仪	IGT Tester
分光密度计	Spectrodensitometer
纸箱整箱抗压机	Carton Compression Machine
边压强度测试仪	Side Compression Strength Tester
马弗炉	Muffle Furnace
光源箱	Viewing Light Box
油墨耐磨测试仪	Rub Tester
洁白度测试仪	Brightimeter Micro S-5



# 计量检定/校准

## Metrological Verification /Calibration

LEO-MTS建立了综合校准室、电学校准室、压力校准室和理化校准室，目前通过中国合格评定国家认可委 (CNAS) 认可的计量校准项目共24项，以及经质监局考核合格的建标12项，项目包括了长度、力学、电磁和化学四个类别。

LEO-MTS计量科有资质和能力承接体系的咨询和培训工作，并利用自身资源进行各种测试服务。

LEO-MTS established comprehensive, electricity, pressure, physicochemical testing labs. Total 24 types include Length, Mechanic, Electromagnetic and Chemical services have been authorized by China National Accreditation Service for Conformity Assessment. Total 12 types standards of measurement have been passed by JiangMen Supervision Testing Institute of Quality & Metrology. LEO-MTS lab is qualified to offer consulting and training and testing service with their resources in Metrology Division.

### 综合校准室

#### Comprehensive Testing Lab

综合校准室配备了光栅式指示表检定仪、测温仪表检定仪、标准砝码、扭矩扳子检定仪、量块等标准设备，可开展指示表、温控仪、电子天平、电子秤、扭矩扳子、卡尺、千分尺等项目的校准。

The comprehensive testing lab equipment includes a raster-indicator instrument, thermometer, weight, electronic measuring wrench, a gauge block instrument and so on. We can offer calibration services for equipment such as indicators, temperature controllers, electronic balances, electronic scales, electronic measuring wrenches, calipers, micrometers, etc.

### 电学校准室

#### Electricity Testing Lab

电学校准室配备了多功能校准仪、耐压测试仪、标准电阻箱等标准设备，可开展电流、电压、电阻等專案的校准。

The electricity testing lab equipment includes a multi-calibration meter, pressure instrument and resistance box so that we can offer current, voltage and resistance calibration services.

### 压力校准室

#### Pressure Testing Lab

压力校准室配备了压力校准装置，可开展一般压力表、真空表和氧气表等项目的校准(强检仪器除外)。

The pressure testing lab equipment includes pressure related devices so that we can offer calibration services for pressure gages, vacuum gauges and oxygen forms (except mandatory calibration item).

### 理化校准室

#### Physicochemical Testing Lab

理化校准室配备了精密电子天平、恒温恒湿箱等装置，可开展对玻璃量器的校准。

The physicochemical testing lab equipment includes an electronic scale and a constant temperature and humidity box so that we can offer calibration services for glass containers.

# 校准认可能力范围

## Scope of Calibration Competence

测量仪器名称	Instrument	规范代号名称	Title, Code of Calibration Method	测量范围 Range	扩展不确定度(校准和测量能力, k=2) Uncertainty (CMC, k=2)
数显卡尺	Digital Display Caliper	JJG30-2002通用卡尺检定规程	JJG30-2002 V. R. of Current Calipers	(0~200)mm, (200~300)mm	$U=0.01\text{mm}$ , $U=0.02\text{mm}$
带表卡尺	Dial Caliper	JJG30-2002通用卡尺检定规程	JJG30-2002 V. R. of Current Calipers	(0~200)mm, (200~300)mm	$U=0.01\text{mm}$ , $U=0.02\text{mm}$
游标卡尺	Vernier Caliper	JJG30-2002通用卡尺检定规程	JJG30-2002 V. R. of Current Calipers	(0~200)mm, (200~300)mm	$U=0.01\text{mm}$ , $U=0.02\text{mm}$
高度卡尺	Height Gauge	JJG31-2011高度卡尺检定规程	JJG31-2011 V. R. of Current Calipers	(0~200)mm, (200~300)mm	$U=0.01\text{mm}$ , $U=0.02\text{mm}$
千分尺	Micrometer	JJG21-2008千分尺检定规程	JJG21-2008 V. R. of Micrometer	Digital display outside micrometer (0~25)mm Outside micrometer (0~25)mm	$U=0.67\text{m}$ , $U=1.4\text{m}$
带表千分尺	Dial Micro- meters	JJG427-2004带表千尺检定规程	JJG427-2004 V. R. of Micrometers with Gauge	(0~25)mm	$U=1.0\text{m}$
深度千分尺	Depth Micrometer	JJG24-2003深度千尺检定规程	JJG24-2003 V. R. of Depth Micrometers	(0~25)mm	$U=1.2\text{m}$
百分表	Dial Test Indicator with Scale Division of 0.01mm	JJG34-2008指示表(指针式、数显式)检定规程	JJG34-2008 V. R. of Dial Gauges (diat and digital)	Digital:(0~10)mm, Dial:(0~3)mm Dial:(0~5)mm, Dial:(0~10)mm	$U=6.7\text{m}$ , $U=4.5\text{m}$ $U=5.3\text{m}$ , $U=6.7\text{m}$
千分表	Dial Test Indicator with Scale Division of 0.001mm	JJG34-2008指示表(指针式、数显式)检定规程	JJG34-2008 V. R. of Dial Gauges (diat and digital)	Dial:(0~1)mm, Digital:(0~1)mm Digital:(0~3)mm, Digital:(0~5)mm	$U=1.5\text{m}$ , $U=1\text{m}$ $U=1.5\text{m}$ , $U=2.3\text{m}$
杠杆百分表	Dial Test Indicator with Scale Division of 0.01mm	JJG35-2006杠杆表检定规程	JJG35-2006 V. R. of Dial Test Indicator	(0~1)mm	$U=4\text{m}$
杠杆千分表	Dial Test Indicator with Scale Division of 0.001mm	JJG35-2006杠杆表检定规程	JJG35-2006 V. R. of Dial Test Indicator	(0~0.2)mm	$U=1.5\text{m}$
深度百分表	Depth Dial Test Indicator with Scale Division of 0.01mm	JJG 830-2007深度指示表检定规程	JJG 830-2007 Verification Regulation of Depth Dial Gauge	(0~5)mm	$U=6.7\text{m}$
电子秤	Electronic Scale	JJG539-1997数字指示称检定规程	JJG539-1997 V. R. of Digital Indicating Weighing Instruments	(1.5~100) kg	$U=0.76\text{g}$ ~19g
弹簧秤	Spring Dial Scale	JJG13-1997模拟指示称检定规程	JJG13-1997 V. R. of Analogue Indication Weighing Instruments	200g~20 kg	$U=0.3\text{g}$ ~10g
度盘秤	Dial Scale	JJG13-1997模拟指示称检定规程	JJG13-1997 V. R. of Analogue indication Weighing Instruments	200g~10 kg	$U=0.3\text{g}$ ~40g
移动式杠杆秤	Mobile Lever Scale	JJG14-1997非自行指示称检定规程	JJG14-1997 V. R. of Non-self-indication Weighing Instruments	100g ~100 kg	$U=0.25\text{g}$ ~30g
机械天平	Mechanical Balance	JJG98-2006机械天平检定规程	JJG98-2006 V. R. of Mechanical Balance	0.1mg ~2 kg	$U=0.05\text{mg}$ ~0.16g
电子天平	Electronic Balance	JJG1036-2008电子天平检定规程	JJG1036-2008 V. R. of Electronic Balance	0.1mg ~2 kg	$U=0.05\text{mg}$ ~0.16g
弹簧管式一般压力表及真空表及真空表	Bourdon Tube Pressure Gauge, Pressure Vacuum and Vacuum Gauge for General Use	JJG52-1999弹簧管式一般压力表、压力真空表和真空表检定规程	JJG52-1999 V. R. of Bourdon Tube Pressure Gauge, Pressure Vacuum Gauge and Vacuum Gauge for General Use	(-0.1~0) MPa (1~+25) MPa	$U_{\text{rel}}=0.50\%$ $U_{\text{rel}}=0.53\%$
扭矩扳子	Torque wrench	JJG707-2003扭矩扳子检定规程	JJG707-2003 V. R. of Torque Wrenches	(20-100) N. m	$U_{\text{rel}}=1.8\%$
电流表、电压表	Ampere- meter, Voltmeter	JJG 124-2005电流表、电压表、功率表及电阻表检定规程	JJG 124-2005 V.R.of Amperemeters, Voltmeters, Wattmeters and Ohmmeters	100uA~500uA, 500uA~2mA, 2mA~5mA, 5mA~20mA, 20mA~50mA, 50mA~200mA, 200mA~500mA, 500mA~2A 2A~5A, 5A~20A	$U_{\text{rel}}=0.16\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.30\%$ $U_{\text{rel}}=0.37\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.35\%$ $U_{\text{rel}}=0.41\%$ $U_{\text{rel}}=0.45\%$
				$U_{\text{rel}}=0.13\%$ $U_{\text{rel}}=0.19\%$ $U_{\text{rel}}=0.22\%$ $U_{\text{rel}}=0.20\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.31\%$ $U_{\text{rel}}=0.22\%$ $U_{\text{rel}}=0.34\%$ $U_{\text{rel}}=0.35\%$ $U_{\text{rel}}=0.47\%$	
直流数字电压表	DC Digital Voltmeter	JJG315-1983直流数字电压表试行检定规程	JJG315-1983 V.R.of DC Digital Voltmeter	200mV~1V, 1V~2V, 2V~5V, 5V~10V, 10V~20V, 20V~50V, 50V~100V, 100V~200V, 200V~500V, 500V~1000V	$U_{\text{rel}}=0.16\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.30\%$ $U_{\text{rel}}=0.37\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.35\%$ $U_{\text{rel}}=0.41\%$ $U_{\text{rel}}=0.45\%$
数字多用表	Digital Multimeter	JJG315-1983直流数字电压表试行检定规程	JJG315-1983 V.R.of DC Digital Voltmeter	200mV~1V, 1V~2V, 2V~5V, 5V~10V, 10V~20V, 20V~50V, 50V~100V, 100V~200V, 200V~500V, 500V~1000V	$U_{\text{rel}}=0.13\%$ $U_{\text{rel}}=0.19\%$ $U_{\text{rel}}=0.22\%$ $U_{\text{rel}}=0.20\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.31\%$ $U_{\text{rel}}=0.22\%$ $U_{\text{rel}}=0.34\%$ $U_{\text{rel}}=0.35\%$ $U_{\text{rel}}=0.47\%$
		JJG598-1989直流数字电流表试行检定规程	JJG598-1989 V.R.of DC Digital Amperemeter	100uA~500uA, 500uA~2mA, 2mA~5mA, 5mA~20mA, 20mA~50mA, 50mA~200mA 200mA~500mA, 500mA~2A 2A~5A, 5A~20A	$U_{\text{rel}}=0.16\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.21\%$ $U_{\text{rel}}=0.30\%$ $U_{\text{rel}}=0.37\%$ $U_{\text{rel}}=0.25\%$ $U_{\text{rel}}=0.35\%$ $U_{\text{rel}}=0.41\%$ $U_{\text{rel}}=0.45\%$
温控仪	Thermo- meter Temperature Indication Controller	JJG617-1996数字温度调节仪检定规程	JJG617-1996 Digital Temperature Indicators and Controllers	(0-1300) °C	$U=1.6\text{ }^{\circ}\text{C}$



## 计量室测试服务

测试名称 Testing	测试项目	Item Name
光源测试 Light testing	光照度	Illumination
	色温	Color Temperature
	色差	Chromaticity Tolerance
	显色指数	Color Rendering Index
	同色异谱	Metamerism
拉力测试 Pull testing	拉力机	Pull Machine
	压力机 (如: 纸箱抗压机)	Press Machine (press carton)
办公 (生产)场所环境 Public Environment Testing	噪音	Noise
	照明	Light
	震动	Vibration

## 常用校准设备

### Commonly Used Calibration Equipment

鹤山利奥计量检测服务有限公司拥有先进校准设备:

LEO-MTS possesses many pieces of advanced calibrating equipment:

光栅式指示表检定仪	Raster - Indicator Instrument	量块	Gauge Block Instrument
多功能校准仪	Multi-Calibration Meter	测温仪表检定仪	Temperature Controller
砝码	Weight	精密压力表	Precision Pressure Gauge

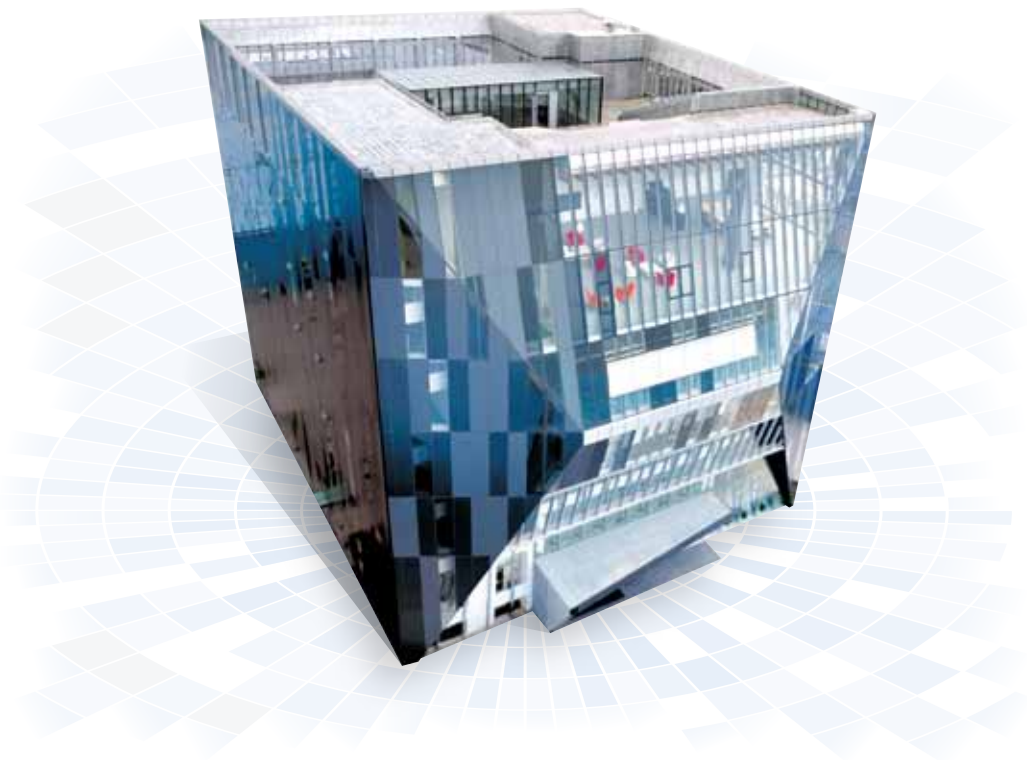
## 体系认证咨询业务

### Management System Consultation and Training Services

ISO 10012 测量管理体系咨询	ISO 10012 Measurement Management System
代理ISO 10012测量管理体系内审员培训/发证	ISO 10012 Measurement Management System Internal Auditor Training And Certifying
ISO 17025 实验室认可咨询	Consultation Approved By ISO 17025 Lab
代理ISO 17025实验室认可内审员培训/发证	ISO 17025 Measurement Management System Internal Auditor Training And Certifying
欧美玩具安全标准	EU And US Toy Safety Standards
新资讯咨询服务	New Information Consulting Services

学员结业后能胜任工厂、企业的仪器管理和检测工作。计量培训类可满足ISO 9001等ISO标准, 持证上岗的要求。

After training, students are able to manage equipment and handle the testing work in factories and enterprises. Metrology training can well equip the trainees for handling jobs related to ISO operation including ISO9001.



**HLMTS**  
计 量 检 测

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