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.

玩具安全检测／轻工检测／校准与测量体系

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前言

随全球经济一体化的日益深化和发展，人们对环保、安全及健康的追求也越来越高，而各个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，是各国追求的共同目标，也是必然的趋势。鹤山利奥计量检测服务有限公司(LEO-MTS)正是在这理想的定位上来帮助客户满足质量、安全和环境方面的标准要求。

鹤山利奥计量检测服务有限公司(LEO-MTS)的检测、检验、校准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！

Preface

Under global economic integration, people have a higher standard for environmental protection, safety and health.

All 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, inspections, and calibration 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

我们致力成为被全球认可的检验和校准高品质服务提供商！

LEO-MTS 使命

秉承行业基准，捍御产品安全；
校测科学严谨，降低客户风险；
铸就专业品牌，践行诚信公正；
服务臻于致善，超越顾客期望。

LEO-MTS 质量方针

数据准确，服务及时，机制高效

LEO-MTS 服务宗旨

LEO-MTS是具有完全独立合法的第三方公正地位的技术服务机构，专业从事符合国际/国家行业标准的校准、检测和技术服务工作。我们致力于以良好的信誉、精湛的技术和卓越的工作品质，为广大客户提供优质、满意的服务，向社会提供公正、可靠的公证性数据。

LEO-MTS Vision

To be a globally-recognized laboratory, offering high-quality service in testing and calibration.

LEO-MTS Mission

Guarantee the product quality by sticking to the industry benchmark.
Reduce the business risk for the client via rigor and technical expertise.
Build the professional brand by adhering to honesty and impartiality.
Go beyond the customer's expectation by providing excellent service.

LEO-MTS Quality Policy

Accurate data, Timely service, Efficient system

LEO-MTS Service Objective

LEO-MTS is a legally established third-party organization, specializing in technical service in both national and international scope, including industry-specific calibration, products and materials testing, as well as technical consultation. LEO-MTS promises all our clients the credible data and excellent service based on our sound reputation, advanced technology and good workflow management.

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公司简介

鹤山利奥计量检测服务有限公司(LEO-MTS)成立于2009年，位於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、货物检验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质量解决方案。

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，材料成分分析，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等多项综合检测与检验业务。

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

2017年，根据《中华人民共和国计量法》第22条，《中华人民共和国认证认可条例》第16条，《检验检测机构资质认定办法》163号令和RB/T 214-2017及要求等，实验室申请并获得了实验室资质认定(CMA)，在能力范围内对社会出具公证证明作用的数据和结果。

作为综合性、专业性和国际性的检测与检验机构，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质量难题，赢得了客户和社会的信赖。

Company Profile

Established in 2009 and located in 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^2.

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.

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 LEO-MTS to offer globally validated testing reports.

In 2017, LEO-MTS applied for the laboratory qualification accreditation (CMA) , according to Article 22 of the Metrology Law of the people's Republic of China, Article 16 of the regulations of the people's Republic of China on certification and accreditation, order No. 163 of the measures for the qualification of inspection and testing institutions and RB / T 214-2017 and other requirements, LEO-MTS obtained the qualification and can issue notarial certification for the test data and results within the scope of ability.

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.

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L3791)

Heshan Leo Metrology and Testing Services Co., Ltd.

(Legal Entity: Heshan Leo Metrology and Testing Services Co., Ltd.)

Building 51, No.1, Xuantanmiao Industrial Area, Gulao, Heshan, Guangdong, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date：2020-03-25

Expiry Date：2024-01-15

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA).
The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml.

中国合格评定国家认可委员会

实验室认可证书

（注册号：CNAS L3791）

兹证明：

鹤山利奥计量检测服务有限公司

（法人：鹤山利奥计量检测服务有限公司）

广东省鹤山市古劳镇玄坛庙工业区 1 号 51 座，529738

符合 ISO/IEC 17025：2017《检测和校准实验室能力的通用要求》（CNAS-CL01《检测和校准实验室能力认可准则》）的要求，具备承担本证书附件所列服务能力，予以认可。

获认可的能力范围见标有相同认可注册号的证书附件，证书附件是本证书组成部分。

生效日期：2020-03-25

截止日期：2024-01-15

中国合格评定国家认可委员会授权人

中国合格评定国家认可委员会（CNAS）经国家认证认可监督管理委员会（CNCA）授权，负责实施合格评定国家认可制度。CNAS是国际实验室认可合作组织（ILAC）和亚太认可合作组织（APAC）的互认协议成员。
本证书的有效性可登陆www.cnas.org.cn获认可的机构名录查询。

检验检测机构

资质认定证书

证书编号：2017192839Z

名称：鹤山利奥计量检测服务有限公司

地址：广东省鹤山市古劳镇玄坛庙工业区1号51座

经审查，你机构已具备国家有关法律、行政法规规定的基本条件和能力，现予批准，可以向社会出具具有证明作用的数据和结果，特发此证。资质认定包括检验检测机构计量认证。

检验检测能力及授权签字人见证书附表。

许可使用标志

CMA

2017192839Z

注：需要延续证书有效期的，应当在有效期届满3个月前提出申请，不再另行通知。

发证日期：二〇一七年六月三十日

有效期至：二〇二三年六月二十九日

发证机关 广东省质量技术监督局

本证书由国家认证认可监督管理委员会监制，在中华人民共和国境内有效。

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LEO-MTS优势

提供卓越专业服务，满足和配合顾客需求，并不断改进服务！
帮助企业在产前、产中和产後提供质量服务和技术改进方案！
不同类型产品，制订和实施质量方案，确保完成品质量要求！
紧密结合厂方需求，应特殊情况可灵活处理和配合订单货期！
熟识轻工行业原材料及辅料的特性，确保产质量安全和可靠！
集先进科研技术为一体，实现科学技术微创新、创新和变革！
参加国内外多项能力验证，保证数据结论公证准确、真实可靠！
技术和服务是LEO-MTS立足于市场的基石，选择LEO-MTS，就意味您选择了一个具有丰富运作经验、真诚可靠的质量合作伙伴！

LEO-MTS独立公证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；
公证独立的检验报告和数据；
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。

Strengths of LEO-MTS

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 in impartial and accurate, data that is true and reliable.
Prove ourselves familiar with the material properties of paper products, toys, textiles, packaging and food contact materials industries, have a good definition and accurate assessment on the safety and reliability of products.
Provide testing services and technical improvement proposals in pre-production period or product design stage.
Closely integrate with the factory, flexibly deal with special circumstances to allow for fulfillment of urgent order deliveries.

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

玩具及儿童产品安全检测

安全的玩具配合适当的监督能够使儿童玩耍时更添乐趣。正当主要的玩具人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、中国等国家的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105个经济体认可和接受。

LEO-MTS Core Business

Safety Testing of Toys and Children's Products

Child's play can be more fun with safe toys and proper supervision. Toy safety is now well mandated by major importing countries through toy standards and regulations. Still, manufacturers and retailers alike are liable to 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's tandards, 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 our reports can be used as the valid document for declaration and settlement. Test reports are accepted and certified by more than over 105 economies.

基本玩具安全标准

测试项目	欧盟	美国	加拿大	澳大利亚/新西兰	中国	国际
物理和机械性能	EN71-1	ASTM F963, 16 CFR 1500	SOR/2011-17	AS/NZS ISO8124-1	GB6675.2	ISO8124-1
易燃性测试（固体材料/玩具产品）	EN71-2	ASTM F963, 16 CFR 1500.44	SOR/2011-17	AS/NZS ISO8124-2	GB6675.3	ISO8124-2
易燃性测试（纺织品）	EN71-2	ASTM F963, 16 CFR 1610	SOR/2011-17	AS/NZS ISO8124-2	GB6675.3	ISO8124-2
毒性元素（重金属）分析	EN71-3	ASTM F963, 16 CFR 1303, CPSIA	SOR/2011-17, SOR/2018-83	AS/NZS ISO8124-3	GB6675.4	ISO8124-3
邻苯二甲酸盐	REACH附录17条款51和52	CPSIA and 16 CFR 1307	SOR/2016-188	消费者保护第11号公告	GB6675.1	ISO8124-6

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Basic Toy Safety Standards

Test Items	Europe	USA	Canada	Australia / New Zealand	China	International
Mechanical and physical properties	EN71-1	ASTM F963, 16 CFR 1500	Canada Consumer Product Safety Act Toys Regulations SOR/2011-17	AS/NZS ISO8124-1	GB6675.2	ISO8124-1
Flammability (Solid Material /Toys)	EN71-2	ASTM F963, 16 CFR 1500.44		AS/NZS ISO8124-2	GB6675.3	ISO8124-2
Flammability (Textile)	EN71-2	ASTM F963, 16 CFR 1610		AS/NZS ISO8124-2	GB6675.3	ISO8124-2
Toxic Element (Heavy metal)	EN71-3	ASTM F963, 16 CFR 1303, CPSIA	SOR/2011-17, SOR/2018-83	AS/NZS ISO8124-3	GB6675.4	ISO8124-3
Phthalates	Entries 51 and 52 of Annex XVII of REACH	CPSIA and 16 CFR 1307	SOR/2016-188	Consumer Protection Notice No. 11 of 2011	GB6675.1	ISO8124-6

玩具总重金属要求

（单位：mg/kg)

	美国		欧盟			加拿大	
	CPSIA; ASTM F963		REACH			SOR/2011-17; SOR/2018-83	
材料	涂层	基材	塑料	珠宝	涂层	涂层	基材
总铅(Pb)	90	100	500	500	500	90	90
总汞(Hg)	–	–	–	–	–	10	–
总镉(Cd)	–	–	100	100	1000	–	–

Total Heavy metal requirement of Toy

(Unit: mg/kg)

	USA		Europe			Canada	
	CPSIA; ASTM F963		REACH			SOR/2011-17; SOR/2010-83	
Materials	Coatings	Substrates	Plastic	Jewelry	Coatings	Coatings	Substrates
Lead (Pb)	90	100	500	500	500	90	500
Mercury (Hg)	–	–	–	–	–	10	–
Cadmium (Cd)	–	–	100	100	1000	–	–

玩具可迁移重金属要求

（单位：mg/kg）

	美国		欧盟			加拿大	其他	
	ASTM F963		EN71-3			SOR/2011-17	AS/NZS ISO8124-3; ISO8124-3; GB6675.4	
材料	涂层/基材	造型粘土	I类	II类	III类	涂层	除造型粘土和指画颜料外材料	造型粘土
砷 (As)	25	25	3.8	0.9	47	1000	25	25
钡 (Ba)	1000	250	1500	375	18750	1000	1000	250
镉 (Cd)	75	75	1.3	0.3	17	1000	75	50
三价铬 (Cr III)	60	25	37.5	9.4	460	–	60	25
六价铬 (Cr VI)			0.02	0.005	0.053	–		
汞 (Hg)	60	25	7.5	1.9	94	10 (T)	60	25
铅 (Pb)	90	90	2.0	0.5	23	90 (T)	90	90
锑 (Sb)	60	60	45	11.3	560	1000	60	60
硒 (Se)	500	500	37.5	9.4	460	1000	500	500
铝 (Al)	–	–	2250	560	28130	–	–	–
硼 (B)	–	–	1200	300	15000	–	–	–
钴 (Co)	–	–	10.5	2.6	130	–	–	–
铜 (Cu)	–	–	622.5	156	7700	–	–	–
锰 (Mn)	–	–	1200	300	15000	–	–	–
镍 (Ni)	–	–	75	18.8	930	–	–	–
锡 (Sn)	–	–	15000	3750	180000	–	–	–
有机锡 (Organic tin)	–	–	0.9	0.2	12	–	–	–
锶 (Sr)	–	–	4500	1125	56000	–	–	–
锌 (Zn)	–	–	3750	938	46000	–	–	–

注：
（1）I类材料 ： 干的，易碎的，粉末状或柔软玩具材料（如：粉笔、蜡笔、造型粘土等 ）
II类材料 ： 液体或粘性的玩具材料（如：泡泡水、指画颜料等 ）
III类材料 ： 可刮取的玩具材料（如：表面涂层、纺织品、聚合物、皮革、纸张等）
（2）加拿大的溶出测试方法与其他标准不同。

Soluble Migrated Heavy Metal Requirement of Toy

(Unit: mg/kg)

	USA		Europe			Canada	Other	
	ASTM F963		EN71-3			SOR/2011-17	AS/NZS ISO8124-3; ISO8124-3; GB6675.4	
Materials	Coatings/ Substrates	Modeling clay	Category I	Category II	Category III	Surface Coatings	Materials except modeling clay and finger paint	Modeling clay
Arsenic (As)	25	25	3.8	0.9	47	1000	25	25
Barium (Ba)	1000	250	1500	375	18750	1000	1000	250
Cadmium (Cd)	75	75	1.3	0.3	17	1000	75	75
Chromium III (Cr III)	60	25	37.5	9.4	460	—	60	25
Chromium VI (Cr VI)			0.02	0.005	0.053	—		
Mercury (Hg)	60	60	7.5	1.9	94	10 (T)	60	60
Lead (Pb)	90	90	2.0	0.5	23	90 (T)	90	90
Antimony (Sb)	60	60	45	11.3	560	1000	60	60
Selenium (Se)	500	500	37.5	9.4	460	1000	500	500
Aluminum (Al)	—	—	2250	560	28130	—	—	—
Boron (B)	—	—	1200	300	15000	—	—	—
Cobalt (Co)	—	—	10.5	2.6	130	—	—	—
Copper (Cu)	—	—	622.5	156	7700	—	—	—
Manganese (Mn)	—	—	1200	300	15000	—	—	—
Nickel (Ni)	—	—	75	18.8	930	—	—	—
Tin (Sn)	—	—	15000	3750	180000	—	—	—
Organic tin	—	—	0.9	0.2	12	—	—	—
Strontium (Sr)	—	—	4500	1125	56000	—	—	—
Zinc (Zn)	—	—	3750	938	46000	—	—	—

Note:
(1) Category I: Dry, brittle, powder like or pliable toy material (such as: chalk, crayons, modeling clays, etc.)
Category II: Liquid or sticky toy material (such as: bubble solution, finger paints, etc.)
Category III: Scraped-off toy material (such as: surface coatings, textiles, polymers, leather, paper, etc.)
(2) Canada soluble test method is different from other standards.

儿童珠宝测试

儿童珠宝种类繁多，包括发饰、项链、耳环、手镯、手链、戒指等等，随着人们生活水准的提高，其需求量也日益增加。儿童还处在生长发育时期，有些质量不好的首饰材料会对儿童的皮肤产生有害作用，出现过敏现象等。欧盟、美国、加拿大等多个国家或地区都已经制定专门的儿童珠宝首饰法规/标准，限制某些金属元素的含量。

（一）美国

- 消费品安全改进法案CPSIA铅含量测试
- ASTM F2923儿童珠宝首饰
- 加利福尼亚州珠宝法案AB2901

（二）欧盟

- 欧盟Reach附录17条目23镉含量测试
- 欧盟Reach附录17条目63铅含量测试
- 欧盟Reach附录17条目27镍释放量测试

（三）加拿大

- 加拿大儿童珠宝法规SOR/2018-82

Children's Jewelry Test

There are various kinds of children's jewelry, including hair ornaments, necklaces, earrings bracelets, rings, etc... With the improvement of people's living standards, the demand is also increasing. Because children are still in the period of growth and development, some poor -quality jewelry materials have harmful effects on children's skin; such as allergic reactions. EU, US, Canada and other countries and regions have developed specific children's jewelry regulations and standards to limit the levels of certain heavy metals.

(1) USA

- Consumer Product Safety Improvement Act 2008 (CPSIA) Total Lead
- ASTM F2923 Standard Specification for Consumer Product Safety for Children's Jewelry
- California Bill AB2901 Jewelry

(2) Europe

- Total Cadmium test of Entry 23 of REACH Annex XVII
- Total Lead test of Entry 63 of REACH Annex XVII
- Nickel release test of Entry 27 of REACH Annex XVII

(3) Canada

- SOR/2018-82 Children's Jewellery Regulations

HLMTS
计 量 检 测

邻苯二甲酸盐检测

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，在塑料和油漆中普遍存在。

世界各国对邻苯二甲酸盐的要求也越来越严格。美国在2017年10月修订了之前的邻苯二甲酸盐的限制要求；欧盟在2018年12月，也修订了REACH附录XVII中邻苯二甲酸盐的限制；加拿大在2016年对邻苯二甲酸盐禁令进行修订：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。中国在2014年将邻苯的限制加入到玩具标准GB6675中。

Phthalates Testing

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

The requirements for phthalates are becoming more and more strict all over the world. The US revised the previous restrictions on phthalates in October 2017; In December 2018, Europe also revised the restrictions on phthalates in Reach annex XVII; Canada revised the phthalate ban in 2016: Six phthalates are prohibited from being used in children's toys and children's care products made of vinyl materials. China added the restriction of phthalates to the toy standard GB6675 in 2014.

邻苯二甲酸盐法规汇总

邻苯二甲酸盐	CAS号	REACH (%)			GB6675 (%)		Canada (%)		CPSIA (%)	
邻苯二甲酸二丁酯 (DBP)	84-74-2	0.1	0.1	玩具、儿童护理品和物品中的塑化材料	0.1	可触及的玩具材料和部件中塑化材料	0.1	玩具或儿童护理品中的乙烯基材料	0.1	儿童玩具或儿童护理品中的塑化材料
邻苯二甲酸苯基丁酯 (BBP)	85-68-7	0.1					0.1		0.1	
邻苯二甲酸辛酯 (DEHP)	117-81-7	0.1					0.1		0.1	
邻苯二甲酸异丁酯 (DIBP)	84-69-5	0.1			–		–		0.1	
邻苯二甲酸二异壬酯 (DINP)	28553-1-2-0 68515-48-0	0.1		可放入口中的玩具、儿童护理品的塑化材料	0.1	可放入口中的玩具材料和部件中塑化材料	0.1	可放入4岁以下儿童口中的玩具或儿童护理品中的乙烯基材料	0.1	
邻苯二甲酸二异癸酯 (DIDP)	26761-40-0 68515-49-1						0.1		–	
邻苯二甲酸二正辛酯 (DNOP)	117-84-0						0.1		–	
邻苯二甲酸二戊酯 (DPENP)	131-18-0	–		–	–	–	–	–	0.1	
邻苯二甲酸二己酯 (DHEXP)	84-75-3	–		–	–	–	–	–	0.1	
邻苯二甲酸二环己酯 (DCHP)	84-61-7	–		–	–	–	–	–	0.1	

The Summary of Phthalates Regulations

Phthalates	CAS No.	REACH (%)		GB6675 (%)		Canada (%)		CPSIA (%)	
dibutyl phthalate (DBP)	84-74-2	0.1	Plasticized material in toys and childcare articles and article	0.1	Plasticized material in toys	0.1	The vinyl in a toy or child care article	0.1	any plasticized component part of a children's toy or child care article
benzyl butyl phthalate (BBP)	85-68-7	0.1				0.1		0.1	
di(2-ethylhexyl) phthalate (DEHP)	117-81-7	0.1				0.1		0.1	
diisobutyl phthalate (DIBP)	84-69-5	0.1		–		–		0.1	
diisononyl phthalate (DINP)	28553-12-0 68515-48-0	0.1	Plasticized material in toys and childcare articles which can be placed in the mouth by children	0.1	Plasticized material in toys which can be placed in the mouth by children	0.1	The vinyl in any part of a toy or child care article that can, in a reasonably foreseeable manner, be placed in the mouth of a child under four years	0.1	
diisodecyl phthalate (DIDP)	26761-40-0 68515-49-1					0.1		–	
di-n-octyl phthalate (DNOP)	117-84-0					0.1		–	
di-n-pentyl, phthalate (DPENP)	131-18-0	–	–	–	–	–	–	0.1	
di-n-hexyl phthalate (DHEXP)	84-75-3	–	–	–	–	–	–	0.1	
dicyclohexly phthalate (DCHP)	84-61-7	–	–	–	–	–	–	0.1	

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
1	84-74-2	Dibutyl Phthalate (DBP)	邻苯二甲酸二丁酯
2	85-68-7	Benzylbutyl Phthalate (BBP)	邻苯二甲酸苯基丁酯
3	117-81-7	Bis-(2-Ethylhexyl) Phthalate (DEHP)	邻苯二甲酸辛酯
4	28553-12-0 & 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	68515-49-1& 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
8	84-75-3	Di-n-Hexyl Phthalate (DHP/DnHP)	邻苯二甲酸二己酯
9	84-66-2	Diethyl phthalate (DEP)	邻苯二甲酸二乙酯
10	131-18-0	Dipentyl phthalate (DPP)	邻苯二甲酸二戊酯
11	84-61-7	Dicyclohexyl phthalate (DCHP)	邻苯二甲酸二环己酯
12	84777-06-0	1,2-benzenedicarboxylic acid dipentylester, branched and linear (PiPP)	1,2-苯二酸-二(支链与直链)戊基酯
13	71888-89-6	1,2-benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	邻苯二甲酸二C6-8支链烷基酯，富C7
14	68515-42-4	1,2-benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	邻苯二甲酸二(C7-11支链与直链)烷基酯
15	117-82-8	Bis(2-meth oxyethyl) phthalate (DMEP)	邻苯二甲酸二甲氧乙酯
16	776297-69-9	n-Pentyl-isopentyl phthalate (nPiPP)	邻苯二甲酸正戊基异戊基酯
17	605-50-5	Phthalic acid, bis-iso-pentyl-ester (DIPP)	邻苯二甲酸二异戊酯
18	68515-51-5;68648-93-1	1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate (DIAP)	邻苯二甲酸二（C6-C10）烷基酯：（癸基，己基，辛基）酯与1，2-邻苯二甲酸的复合物且邻苯二甲酸二己酯含量≥0.3%

欧美包装材料检测

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%、塑料25%、木材15%，重金属浓度指标未改变。

包装物定义

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。

有害重金属限量要求

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)。

Packaging Materials Testing in USA & EU

Packaging and packaging materials are widely used in every industry. All packaging for export products should fulfill requirements related to heavy metal content. LEO-MTS provides customers with relevant heavy metal content testing on packaging 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. The amendment specifies that the overall recovery rate (of packaging and packaging waste ?) 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 remains unchanged.

Definition of Packaging

Packaging refers to all products, regardless of its composition, to hold, protect, carry, deliver and provide commodities from raw materials provided to manufacturers to finished goods for the end user.

Limit of Hazardous Heavy Metal Content

Total content of the four hazardous heavy metals, that is, lead, cadmium, mercury and hexavalent chromium should not exceed 100 mg/kg (0.01% weight percentage).

美国包装环保测试

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。该法规限定包装中铅、镉、汞及六价铬四种重金属的总和要小于100mg/kg。

2021年2月，美国TPCH宣布此组织2021新包装毒性物质法案(TPCH-2021)。更新后的内容包括增加全氟烷基和多氟烷基物质(PFAS)和邻苯二甲酸酯的管控，以及制订新的流程和标准来识别和规范在包装中的高度关注化学物质。

TPCH

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 demands the reduction of the content of four heavy metals (Hg, Pb, Cd and Cr6+) 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 (Mercury (Hg), Lead (Pb), Cadmium (Cd) and Hexavalent Chromium (Cr6+)) contained in packaging to a total of no more than 100mg/kg.

In February 2021, the Toxics in Packaging Clearinghouse (TPCH-2021) announced the organization's 2021 update to their Model Toxics in Packaging Legislation. The update includes the addition of the class of perfluoroalkyl and polyfluoroalkyl substances (PFAS) and ortho-phthalates as regulated chemicals, as well as new processes and criteria for identifying and regulating additional chemicals of high concern in packaging.

法规	要求
欧盟94/62/EC	铅+镉+汞+六价铬≦100 mg/kg
美国TPCH	铅+镉+汞+六价铬≦100 mg/kg
TPCH-2021	铅+镉+汞+六价铬≦100 mg/kg； 全氟烷基和多氟烷基物质(PFAS) 不得检出； 所有邻苯二甲酸酯物质含量之和不得超过100 ppm

Regulations	Requirement
EU Directive 94/62/EC	Total (Pb+Cd+Hg+Cr^{6+})≦100 mg/kg
USA TPCH	Total (Pb+Cd+Hg+Cr^{6+})≦100 mg/kg
TPCH-2021	Total (Pb+Cd+Hg+Cr^{6+})≦100 mg/kg; no detectable PFAS; The sum of the concentration levels of phthalates shall not exceed 100 parts per million by weight (0.01%)

甲醛测试

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，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：

标准要求	适用范围	限量要求
EN 71-9有机化合物要求	3岁以下儿童玩具	可接触纺织品 30mg/kg 可接触纸张 30mg/kg 可接触树脂粘合木 80mg/kg
欧盟玩具安全指令2009/48/EC附件C	－3岁以下儿童玩具 －功能人口玩具	1.5 mg/L（迁移限量）聚合物玩具 0.1 mL/m^3(释放限量）树脂粘合木玩具材料 30 mg/kg（浓度限量）纺织品玩具材料 30 mg/kg（浓度限量）皮革玩具材料 30 mg/kg（浓度限量）纸玩具材料 10 mg/kg（浓度限量）水基玩具材料
GB 18401-2010 国家纺织品基本安全技术规范	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	A类：20mg/kg B类：75mg/kg C类：300mg/kg

Formaldehyde Testing

Formaldehyde (Chemical formula: HCHO, formula weight: 30.03) is colorless gas proved to be of carcinogenicity and teratogenesis by the World Health Organization. Longtime contact with a small amount of formaldehyde may lead to: chronic respiratory diseases, nasopharyngeal carcinoma, colon cancer, brain tumors, menstrual disorders, nucleus genetic mutations, DNA damage, chromosome abnormality and leukemia. Restrictions for the use of formaldehyde in products are listed below:

Standards	Application Scope	Limitation
EN 71-9:Organic chemical compounds Requirement	Toys for children under 3 years of age	30 mg/kg Accessible textiles 30 mg/kg Accessible paper 80 mg/kg Accessible resin-bonded wood
Directive 2009/48/EC Appendix C	- toys intended for children under 36 months - other toys intended to be placed in the mouth	1.5 mg/L (migration limit) in polymeric toy material 0.1 mL/m^3 (emission limit) in resin-bonded wood toy material 30 mg/kg (content limit) in textile toy material 30 mg/kg (content limit) in leather toy material 30 mg/kg (content limit) in paper toy material 10 mg/kg (content limit) in water-based toy material
GB 18401-2010 National Textile Basic Safety Technical Specifications	Class A: Infant products for < 3 year olds Class B: Products with direct contact to skin Class C: Products with indirect contact to skin	Class A: 20mg/kg Class B: 75mg/kg Class C: 300mg/kg

DMF检测

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，被广泛用於皮革、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。

2012年5月16日，欧盟已将富马酸二甲酯(DMF)纳入REACH法规附录17限制性物质列表条目61中进行管控。

DMF Testing

Dimethylfumarate (hereinafter referred to as DMF) is used to kill bacteria since it can restrain bacterium, 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.

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.

May 16, 2012, COMMISSION REGULATION (EU) has issued regulations to ban the using of DMF in consumer products and add DMF into the table of Annex XVII to Regulation (EC) No 1907/2006.

测试项目 Test Items	限制法规 Regulation	限量 Limit
富马酸二甲脂 (DMF)	Entry 61 of REACH Annex VXII	0.1mg/kg

多环芳烃

多环芳烃(PAHs)指分子中含有两个或两个以上苯环的碳氢化合物，有些还含有氮、硫和环戊烷，包括萘、蒽、菲、芘等150余种化合物。英文全称polycyclic aromatic hydrocarbon,简称PAHs。常见的多环芳烃具有致癌作用的为四到六种的稠环化合物。

多环芳烃对人体的主要危害部位是呼吸道和皮肤。人们长期处於多环芳烃污染的环境中，可引起急性或慢性伤害。

德国 15 PAHs

材料中PAHs污染的主要原因是由于使用了在橡胶和柔性塑胶中使用了PAHs污染的软化油；在橡胶和塑胶中使用PAHs污染的煤烟作为黑色颜料；到目前为止，PAHs污染被证实不仅仅存在于橡胶中，也存在于其它各种塑胶当中，例如：ABS，PP，各种清漆或涂层和各种天然材料当中。

2019年，德国产品安全委员会(AfPS)修订了德国自愿性GS认证中多环芳烃(PAHs)的限制要求并发布了新版本“AfPS GS 2019:01 PAK”。 此修订于2020年7月1日正式生效，并取代旧标准“AfPS GS 2014:01 PAK”。

Polycyclic Aromatic Hydrocarbon (PAHs)

The hydrocarbon containing two or more than two benzene rings in their molecules is called polycyclic aromatic hydrocarbon (PAHs).There is a total of 150 kinds, including Naphthalene, Anthracene Phenanthrene, Pyrene, and some PAHs contain Nitrogen, Sulphur and Cyclopentane. The 4 to 6 kinds fused ring compound in PAHs have carcinogenic effects.

Prolonged exposure to PAHs will cause acute or chronic damages to human body, especially to the pneogaster and skins.

German 15 PAHs Certification

The reasons for the PAH contamination in materials are the application of PAH -contaminated softening oil in rubber and flexible plastics and the usage of PAH-contaminated bitumite as black pigment in plastic and rubber. So far, the PAH contamination is verified not only in rubber, but also in different kinds of plastics, such as ABS, PP, varnish or coating and various natural materials.

In 2019, the German Product Safety Commission (AfPS) revised the restrictions on polycyclic aromatic hydrocarbons (PAHs) in Germany's voluntary GS certification and published a new standard “AfPS GS 2019:01 PAK”. The new standard came into effect on July 1, 2020 and replaced the old standard “AfPS GS 2014:01 PAK”.

	第1类（毫克每千克）	第2类(毫克每千克)		第3类(毫克每千克)	
	意图放入口中的材料，或在预期使用过程中与皮肤长期接触(超过30秒)的材料： –2009/48/EC定义的玩具； 或 –供3岁以下儿童使用的产品	不属於第1类，意图或可预见与皮肤长期接触(超过30秒)或短期重复接触的材料		不属於第1和2类，意图或可预见与皮肤短期接触(不超过30秒)的材料	
	-	a.儿童使用	b.其他消费品	a.儿童使用	b.其他消费品
苯并(a)芘	<0.2	<0.2	<0.5	<0.5	<1
苯并(e)芘	<0.2	<0.2	<0.5	<0.5	<1
苯并(a)蒽	<0.2	<0.2	<0.5	<0.5	<1
苯并(b)荧蒽	<0.2	<0.2	<0.5	<0.5	<1
苯并(j)荧蒽	<0.2	<0.2	<0.5	<0.5	<1
苯并(k)荧蒽	<0.2	<0.2	<0.5	<0.5	<1
䓛	<0.2	<0.2	<0.5	<0.5	<1
二苯并(a,h)蒽	<0.2	<0.2	<0.5	<0.5	<1
苯并(g,h,i)北	<0.2	<0.2	<0.5	<0.5	<1
茚并(1,2,3-cd)芘	<0.2	<0.2	<0.5	<0.5	<1
菲，芘，蒽，荧蒽	<1 总和	<5 总和	<10 总和	<20 总和	<50 总和
萘	<1	<2		<10	
15种总和	<1	<5	<10	<20	<50

Parameter	Category 1 (mg/kg)	Category 2 (mg/kg)		Category 3 (mg/kg)	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use - in toys according to Directive 2009/48/EC or - for the use by children up to 3 years of age	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact with skin during the intended or foreseeable use		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use	
	–	a. Use by children	b. Other Consumer Product	a. Use by children	b. Other Consumer Product
Benzo[a]pyren	<0.2	<0.2	<0.5	<0.5	<1
Benzo[e]pyren	<0.2	<0.2	<0.5	<0.5	<1
Benzo[a]anthracen	<0.2	<0.2	<0.5	<0.5	<1
Benzo[b]fluoranthen	<0.2	<0.2	<0.5	<0.5	<1
Benzo[j]fluoranthen	<0.2	<0.2	<0.5	<0.5	<1
Benzo[k]fluoranthen	<0.2	<0.2	<0.5	<0.5	<1
Chrysen	<0.2	<0.2	<0.5	<0.5	<1
Dibenzo[a,h]anthracen	<0.2	<0.2	<0.5	<0.5	<1
Benzo[ghi]perylen	<0.2	<0.2	<0.5	<0.5	<1
Indeno[1,2,3-cd]pyren	<0.2	<0.2	<0.5	<0.5	<1
Phenanthren, Pyrene, Anthracen, Fluoranthen	<1 Sum	<5 Sum	<10 Sum	<20 Sum	<50 Sum
Naphthalin	<1	<2		<10	
Sum 15 PAHs	<1	<5	<10	<20	<50

欧盟 8 PAHs

欧盟化学品管理法规REACH附录17要求，从2010年1月1日起，填充油(extender oils)如含有指定PAHs物质，不可置于市场及用于生产轮胎或轮胎部件。2013年12月6日，欧盟委员会发布并修订REACH附录17条目50关于多环芳烃(PAHs)的限制要求。此法规已于2015年12月27日生效。

在正常或合理的可预见的使用条件下，产品中如含有直接并且长期接触人体皮肤或口腔的橡胶或塑胶部件，则其中列表中任一多环芳烃的含量限值为1mg/kg(0.0001%)。限制的产品范围：运动器材如自行车、高尔夫球杆、球拍,日常用具、手推车、步行支架,家用工具,服装、鞋类、手套、运动服装,表带、腕带、面具、头巾。

玩具，包括活动玩具和儿童护理品，如果含有超出多环芳烃(PAHs)限量要求橡胶或塑胶部件，不得投放市场。在正常或合理的可预见的使用条件下，产品中如含有长期直接接触或短期重复接触皮肤或口腔的橡胶或塑料部件，则其中列表中任一多环芳烃的含量限值为0.5毫克/千克(0.00005%)。

EU REACH 8 Polycyclic Aromatic Hydrocarbons (PAHS)

From January 1, 2010, Annex XVII of REACH stated that exterder oils should not be placed in the market or used in the production of tyres or parts of tyres if they contain named PAHs substances. On Dec. 6th, 2013, EU amended the limit of PAHs in entry 50 of Annex XVII to REACH. The amendment took effect on Dec. 27th, 2015.

The entry 50 of Annex XVII to REACH states that articles shall not be placed on the market for supply to the general public, if any of their rubber or plastic components that come into direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity, under normal or reasonably foreseeable conditions of use, contain more than 1 mg/kg (0,0001 % by weight of this component) of any of the listed PAHs. Such articles include amongst others:

— sport equipment such as bicycles, golf clubs, racquets
— household utensils, trolleys, walking frames
— tools for domestic use
— clothing, footwear, gloves and sportswear
— watch-straps, wrist-bands, masks, head-bands

Toys, including activity toys, and childcare articles, shall not be placed on the market, if any of their rubber or plastic components that come into direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity, under normal or reasonably foreseeable conditions of use, contain more than 0,5 mg/kg (0,00005 % by weight of this component) of any of the listed PAHs.

No.	多环芳烃名称	CAS No.	轮胎或轮胎部件填充油（mg/kg）	长期接触人体皮肤或口腔的橡胶或塑料部件（mg/kg）	玩具（包括活动玩具），儿童护理品，其橡胶或塑料配件长期与人体皮肤和口腔接触（mg/kg）
1	苯并芘（BaP）	50-32-8	1	1	0.5
2	苯并芘（BeP）	192-97-2		1	0.5
3	苯并蒽（BaA）	56-55-3		1	0.5
4	䓛 (CHR)	218-01-9		1	0.5
5	苯并荧蒽（BbFA）	205-99-2		1	0.5
6	苯并芘（BjFA）	205-82-3		1	0.5
7	苯并芘（BkFA）	207-08-99		1	0.5
8	二苯并蒽（DBAhA）	53-70-3		1	0.5
	总含量		10		

No.	PAHs	CAS No.	n extender oils or used in tyres or parts of tyres (mg/kg)	rubber or plastic components that come into direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity (mg/kg)	Toys, including activity toys, and childcare articles, shall not be placed on the market, if any of their rubber or plastic components that come into direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity (mg/kg)
1	Benzo[a]pyren (BaP)	50-32-8	1	1	0.5
2	Benzo[e]pyren (BeP)	192-97-2		1	0.5
3	Benzo[a]anthracen (BaA)	56-55-3		1	0.5
4	Chrysen (CHR)	218-01-9		1	0.5
5	Benzo[b] fluoranthene (BbFA)	205-99-2		1	0.5
6	Benzo[j]fluoranthene (BjFA)	205-82-3		1	0.5
7	Benzo[k] fluoranthene (BkFA)	207-08-99		1	0.5
8	Dibenzo[a,h] anthracene (DBAhA)	53-70-3		1	0.5
	Sum		10		

RoHS

现代人类对于电子电器的依赖程度比较高，电子电气产品也经历了一个飞速发展期。伴随著人们对电子电气的大量需求，其废弃物的数量也急速增加，这些废弃的电子电气件已成为困扰全球环境的大问题。鉴于此，越来越多的国家或地区出台了相关法规限制电子电器中使用有害物质，以减少因废弃的电子电气件对环境和人类的危害。

欧盟早在2003年便通过了RoHS指令（2002/95/EC），全称《在电子电气设备中限制使用某些有害物质的指令》，在2011年7月1日发布RoHS修订指令2011/65/EU（RoHS2.0）取代旧有指令。随后，中国在2006年颁布了中国版RoHS，全称为《电子信息产品污染控制管理办法》，其后在2016年1月21日正式公布《电器电子产品有害物质限制管理办法》取代原有的版本。以及美国部份州、日本、韩国也推出了自己的RoHS版本。

为帮助客户轻松应对不同国家的RoHS要求，保证产品顺利入口，LEO-MTS推出一站式服务。

Hazardous substances Testing in electrical and electronic equipment RoHS

As human beings rely on electronic appliances more highly, electronic and electrical products experienced a rapid development period. With the great demand for electronic and electrical equipment, the amount of waste is also increasing rapidly. The waste created by this electrical equipment has become a big problem for the global environment. In view of this, more and more countries and regions have issued relevant laws and regulations to limit the use of hazardous substances in electronic appliances, in order to reduce the harm of waste electronic and electrical components to the environment and human beings.

In early 2003, the European Union published “Directive 2002 /95/EC of the restriction of the use of certain hazardous substances in electrical and electronic equipment” (RoHS Directive). On July 1, 2011, the EU issued the new directive 2011/65/EU (RoHS 2.0) to replace the old directive. Subsequently, China issued the Chinese version of RoHS in 2006, the full name of which is “the management measures for pollution control of electronic information products”. Later, on January 21, 2016, China officially released “the management measures for the restriction of harmful substances in electrical and electronic products” to replace the original version. Some states in the United States, Japan and South Korea have also launched their own version of RoHS.

In order to help customers easily solve the problems in meeting the RoHS requirements of different countries and ensure the smooth entry of products, LEO-MTS launched one-stop service testing.

RoHS 限制物质	限量	RoHS Restricted Substances	Limit
铅 (Pb)	0.1% (1000mg/kg)	Lead(Pb)	0.1% (1000mg/kg)
镉 (Cd)	0.01% (100mg/kg)	Cadmium(Cd)	0.01% (100mg/kg)
汞 (Hg)	0.1% (1000mg/kg)	Mercury(Hg)	0.1% (1000mg/kg)
六价铬(CrVI)	0.1% (1000mg/kg)	HexavalentChromium(CrVI)	0.1% (1000mg/kg)
多溴联苯(PBBs)	0.1% (1000mg/kg)	Polybrominatedbiphenyls(PBBs)	0.1% (1000mg/kg)
多溴联苯醚(PBDEs)	0.1% (1000mg/kg)	Polybrominateddiphenylethers(PBDEs)	0.1% (1000mg/kg)
邻苯二甲酸二丁酯DBP	0.1%	Dibutyl Phthalate (DBP)	0.1%
邻苯二甲酸苯基丁酯BBP	0.1%	Benzyl Butyl Phthalate (BBP)	0.1%
邻苯二甲酸二(2-乙基)己DEHP	0.1%	Di-2-ethylhexyl phthalate (DEHP)	0.1%
邻苯二甲酸二异丁酯DIBP	0.1%	Diisobutyl phthalate (DIBP)	0.1%

耐唾液/汗液测试

日常物品在使用过程中预期或可预见的与嘴接触或与皮肤接触，可能会导致物品中的着色剂迁移到嘴巴或皮肤上。为测定物品中的着色剂是否能迁移，采用人工唾液/汗液来评估颜色迁移程度。

Saliva / sweat resistance test

Expected or foreseeable contact with the mouth or skin during the use of daily articles may cause the migration of the colorant in the articles to the mouth or skin. In order to determine whether the colorant in the article can migrate, artificial saliva / sweat is used to evaluate the degree of color migration.

测试项目 Test Items	测试方法 Method
日常物品耐唾液色牢度的测定 Determination of the colourfastness of articles for common use – Part 1: test with artificial saliva	DIN 53160-1
日常物品耐汗液色牢度的测定 Determination of the colourfastness of articles for common use – Part 2: test with artificial sweat	DIN 53160-2

HLMTS
计 量 检 测

LEO-MTS核心业务

材料检测分析及产品可靠性

随行业的发展，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。

纸张

纸张的品质直接影响整个纸制品的质量，纸张的用途不一样，其性能和质量要求也是不一样的。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，从而知晓此纸张的适用性能和对相关标准的符合性。

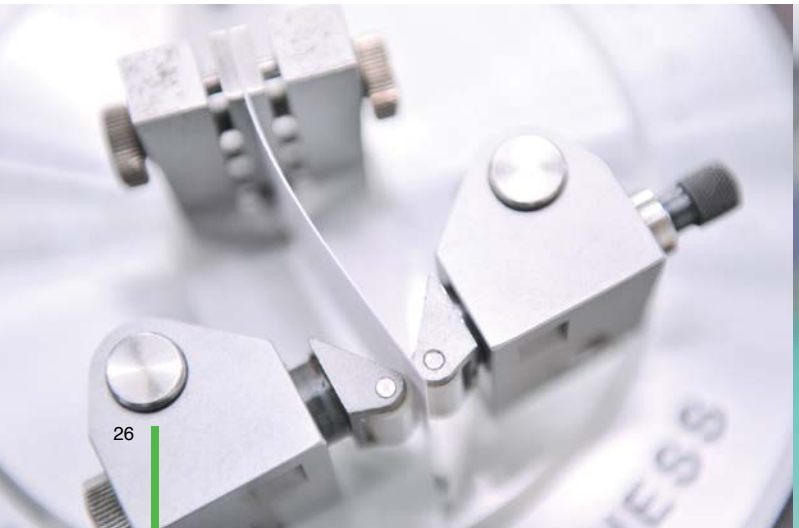
LEO-MTS Core Business

Materials Testing Analysis & Products Reliability

Product reliability requirements are increasing due to the growth of the printing industry and rising concerns of consumers. It is necessary for printing 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.

Paper

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			中国标准 National Standard	美国标准 US Standard	国际标准 International Standard
结构性能 Structural Performance	定量	Grammage	GB/T 451.2	TAPPI T410	ISO 536
	厚度	Thickness	GB/T 451.3	TAPPI T411	ISO 534
	水分含量	Moisture	GB/T 462	TAPPI T412	ISO 287
光学性能 Optical Performance	白度	Whiteness	GB/T 22879 GB/T 22880	TAPPI T562	ISO 11475 ISO 11476
	亮度	Brightness	GB/T 7974 QB/T 2804	TAPPI T452	ISO 2470-1 ISO 2470-2
	颜色	Color	GB/T 7975 GB/T 21245	TAPPI T527	ISO 5631-1
	色度值	Tint		TAPPI T562	
	不透明度	Opacity	GB/T 1543	TAPPI T425	ISO 2471
	尘埃度	Defect Size	GB/T 1541	TAPPI T564	
	光泽度	Gloss	GB/T 8941	ASTM D523	ISO 8254-1 ISO 8254-3
表面性能 Surface Performance	粗糙度	Roughness	GB/T 22363	TAPPI T555	ISO 8791-4
	磨擦系数	Coefficients of Friction	GB/T 22895	TAPPI T549	ISO 15359
	表面强度	Surface Strength	GB/T 22837	TAPPI T459	
吸收性能 Sorption Performance	吸油性	Print Penetrateon	CY/T 104.3 GB/T 12911		IGT W24
	吸水量	Water Absorbency	GB/T 1540	TAPPI T441	ISO 535
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 GB/T 22877	TAPPI T413	ISO 1762 ISO 2144
力学性能 Mechanical Performance	耐折度	Folding Endurance	GB/T 457	TAPPI T511	ISO 5626
	Z方向强度	Z-Direction Tensile	GB/T 31110	TAPPI T541	ISO 15754
	粘合强度	Internal Bond Strength	GB/T 26203 GB/T 31122	TAPPI T569	
	短距压缩	Short Span Compressive Strength	GB/T 2679.10	TAPPI T826	ISO 9895
	挺度	Stiffness	GB/T 22364	TAPPI T489	ISO 2493
	撕裂度	Internal Tearing Resistance	GB/T 455	TAPPI T414	ISO 1974
	耐破度	Bursting	GB/T 454 GB/T 1539	TAPPI T403 TAPPI T807 TAPPI T810	ISO 2759 ISO 2758
	边压强度	Edgewise Compressive	GB/T 2679.17	TAPPI T811	ISO 3037
	拉伸特性	Tensile Properties	GB/T 12914	TAPPI T494	ISO 1924-2
	伸缩性	Dimensional Instability	GB/T 459		
印刷性能 Printing Performance	拉毛阻力	Picking	GB/T 22365 QB/T 2896		ISO 3783 IGT W31
	胶印试验	Offset Printing			IGT W32
	墨斑	Mottle	CY/T 104.4		IGT W57
	掉毛	Linting	QB/T 2897		IGT W44

瓦楞纸和纸板

瓦楞纸板是一个多层的粘合体，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质量问题，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，确保使用瓦楞纸箱的合格。

Corrugated paper and paper board

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

Corrugated boxes are made from corrugated board after die cutting, creasing, nailing, and sticking. With its characteristics and environmental advantages, Corrugated box is widely used in the packaging of goods, and it has played an important protective role in the transportation and sale of goods. During use, the cartons must maintain a certain firmness and durability. Due to fierce market competition, carton manufacturing enterprises continue to improve their production technology and management to achieve maximum profits, which could cause the carton user to encounter more quality problems in the process of using cardboard boxes , such as carton stacking collapse, and rupture. In order to avoid such situations and produce qualified carton products, quality detection on the corrugated box is necessary to ensure effective control and quality in the production process.

项目名称	Item Name	中国标准 National Standard	美国标准 US Standard	国际标准 International Standard
破裂强度	Bursting strength	GB/T 6545	TAPPI T810	ISO 2759
边压强度	Edgewise crush resistance	GB/T 6546	TAPPI T811	ISO 3037
平压强度	Flat crush	GB/T 22874	TAPPI T 825	ISO 3035
环压强度	Ring crush	GB/T 2679.8	TAPPI T 822	ISO 12192
粘合强度	Pin Adhesion	GB/T 6544	TAPPI T 821	
抗压强度	Compression Strength	GB/T 4857.4		ISO 12048

油墨和涂料

油墨是印刷信息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信息再现质量。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，是印刷复制高质量图文信息产品的重要保证。LEOMTS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、粘附机理、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质量检测需求，从而知晓油墨的适应性能和对相关标准的符合性。

Ink and Paint

Ink is an important coloring material in the printing communication industry. Its performance has a direct impact on the quality of graphic presentation With the development of printing science, development and application of printing materials, and 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	中国标准 National Standard	美国标准 US Standard	国际标准 International Standard
颜色	Color	GB/T 14624.1 GB/T 13219.1		ISO 12647-2
密度	Density	GB/T 14624.1		ISO 12647-2
光泽度	Gloss	GB/T 8941	ASTM D523	ISO 8254-1 ISO 8254-3
酸碱度	pH	GB/T 1717	ASTM E70	ISO 787
细度	Grindage	GB/T 1724 GB/T 13217.3	ASTM D1316	ISO 1524
挥发物含量	Volatile Content	GB/T 1725	ASTM D2369 ASTM D5403	ISO 3251
粘度	Viscosity	GB/T 13217.4	ASTM D4212	
乳化率	Emulsification		ASTM D4942	
耐磨度	Rub Resistance		ASTM D5264	
干燥时间	Drying Time	GB/T 14624.4	ASTM D5895	
耐化学试剂试验	Chemical Reagent Resistance	GB/T 18724	ASTM D6688	ISO 2836
固体含量	Nonvolatile Content	GB/T 1725	ASTM D2832	ISO 3251
附著力	Adhesion	GB/T 9286 GB/T 7707	ASTM F2252	ISO 2409
粘性	Tack	GB/T 18723		ISO 12634
耐光色牢度	Light Fastness	GB/T 22771	ASTM D3424	

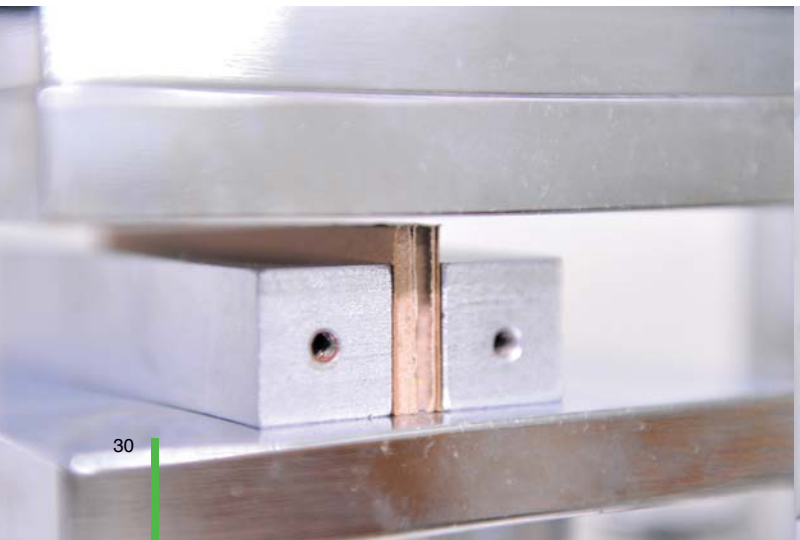
粘合剂

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，对胶水的质量进行全面检测。

Adhesive

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, which is collectively regarded as adhesive or bonding agents, adhesives, and 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	中国标准 National Standard	美国标准 US Standard	国际标准 International Standard
单位用量	Weight Per Unit Area		ASTM D899	
颜色	Color	GB/T 9281.1	ASTM D1544	ISO 4630.1
气味	Odor		ASTM D4339	
比重	Density		ASTM D1475	
酸碱度	pH	GB/T 14518	ASTM E70	
固体含量	Nonvolatile Content	GB/T 2793	ASTM D1489	
粘度	Viscosity	GB/T 2794	ASTM D2196 ASTM D4212	



电化铝烫印箔

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。

Aluminum Foil Stamping

Hot stamping foil is actually composed by two main thin layers, the polyester film substrate and the transfer layer. In the process of stamping, with heat and pressure the stamping layer is imprinted on all or part of the surface of the printing parts. When the stamping is completed, the polyester film with the transfer parts which have not been used will be taken off.

项目名称	Item Name	中国标准 National Standard	美国标准 US Standard
色差	Color Difference	GB/T 7921	ASTM D2244
剥离	Peel Adhesion	GB/T 2792	ASTM D3330
耐光色牢度	Light Fastness	GB/T 22771	ASTM D3424
耐磨度	Rub Resistance		ASTM D5264

胶纸

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。

Gummed Paper

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	中国标准 National Standard	美国标准 US Standard
剥离	Peel Adhesion	GB/T 2792	ASTM D3330
老化试验	Accelerated Aging	GB/T 17875	ASTM D3611
持粘性	Holding power	GB/T 4851	
初粘性	Tack	GB/T 4852	

塑胶类检测

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。塑料包装及塑料包装产品在市场上所占的份额越来越大，特别是复合塑料软包装，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

Films which are made of polyvinyl chloride, polyethylene, polypropylene, polystyrene and other resins are used for packaging and laminating layer. With the Increasing Market share of plastic packaging and plastic packaging products, in particular composite plastic flexible packaging has been widely used in various industries or areas.

项目名称	Item Name	中国标准 National Standard	美国标准 US Standard	国际标准 International Standard
厚度	Thickness	GB/T 6672	ASTM D5947	ISO 4593
透光率	Luminous	GB/T 2410	ASTM D1003	
雾度	Haze	GB/T 2410	ASTM D1003	ISO 13468-1
湿润张力	Wetting Tension	GB/T 14216	ASTM D2578	ISO 8296
慢速刺破	Puncture		ASTM D5748	
拉伸特性	Tensile Properties	GB/T 1040	ASTM D882	ISO 527
摩擦系数	Coefficients of Friction	GB/T 10006-88	ASTM D1894	ISO 8295
撕裂度	Tear	GB/T 16578.2	ASTM D1922	ISO 6383-2
热收缩率	Thermal Shrinkage		ASTM D2732-14	
热合强度	Welding Strength	QB/T 2358	ASTM F1921 ASTM F88	

木制品水分含量测试

水分会影响许多产品的加工工艺、使用寿命、可用性及产品品质。例如药品、塑料和食品。因此监控水分含量信息至关重要。大部份产品都具有最佳生产工艺所适合的水分含量，从而获得高质量产品。此外，水分含量对价格也有一定的影响。相关法规对于某些产品的最大允许水分含量有严格的规定（例如国家食品法规中有关规定）。

Test of Moisture Content in Woodware

Moisture Content influences the processing technicque, life, usage and quality of a product, such as plastics and food; therefore, it is critical to control the moisture content during production for the best quality and price of a product. Actually, stringent regulations of the maximum moisture content in different products have been established, for example the requirements in the national food regulations.

本实验室建立了干燥过程测试法，用传统烘箱法采用空气对流方式对样品进行加热，并需要较长时间干燥时间，测试样品中的水分含量。

Considering its significance, our laboratory develops the oven-drying method to detect moisture content in woodware under the air convection theory. This heating process takes a long time and is slow.

项目名称	Item Name	美国标准 US Standard
木材水分含量	Moisture Content	ASTM D4442 Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials

耐气候环境试验

Climate and Environment Experiments

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 environment testing rooms with comprehensive functions and stable properties. Testing parameters are as follows:

项目名称	Item Name	测试范围 Test Scope
恒温恒湿房检验	Constant Temperature and Humidity	A.(20±3)℃ (20±5)% B.(20±3)℃ (35±5)% C.(23±3)℃ (50±5)% D.(26±3)℃ (75±5)%
环境测试	Environmental Testing	温度：10~60℃ 湿度：环境湿度0~95% Temperature: 10~60℃ Humidity:Environment Humidity 0~95%
低温（冷冻与解冻）	Low Temperature(Freeze & Thaw)	-18℃~25℃ -30℃~25℃
高温	High Temperature	环境温度~200℃ Environment Temperature~200℃
脱色(布料/绳)	Bleed Testing(Cloth/Cord)	
金属灰暗（项链类）	Metal Tarnish Testing(Necklace)	
翻粘	Blocking Tendency	

光照老化－氙灯老化仪测试

氙灯老化测试是用氙灯来模拟全光谱太阳光的破坏效果，材料暴露在阳光下所产生的变化。通过材料试样的暴露在氙弧灯的光照及热辐射进行老化试验，从而评价材料的耐光、耐候性能。氙灯可产生与日光光谱曲线非常接近的稳定能量分布，能为包括红外线在内的整个光谱提供能量。对于照射有色物质，氙灯还能产生和日光一致的加热效应，从而大大提高了试验结果的准确性。

Xenon Arc Lamp Artificial Aging – Accelerated Testing

The Xenon-arc lamp artificial aging-accelerated test is to simulate the natural destructive effect from sunlight of a full spectral region on the specimens through the Xenon-arc lamp with controlling irradiance, In this simulated environment the quality of the specimens in respect of its colorfastness to light and its resistance to weather can be revealed. The Xenon-arc lamp can emit ideal light in stable energy distribution, which is very close to the solar spectrum encompassing all ranges of radiation including visible, infrared radiation, etc. as for comparing to sunlight, which greatly improves the accuracy of the test result. Accurate and reliable test data analysis helps enterprises to reduce product development time and production cost.

项目名称	Item Name	测试标准 Test Criteria
印刷品	Printing Product	ASTM D3424印刷品氙灯老化测试 ASTM D3424 Standard Practice for Evaluating the Relative Lightfastness and Weatherability of Printed Matter
涂料	Paints	ISO 11341色漆和清漆　人工风化及人工辐射照　滤子化的氙弧辐射照 ISO 11341 Paints and varnishes – Artificial weathering and exposure to artificial radiation – Exposure to filtered Xenon-arc radiation
		GB/T 1865 色漆和清漆　人工气候老化和人工辐射暴露　滤过的氙弧辐射 GB/T 1865 Paints and varnishes – Artificial weathering and exposure to artificial radiation – Exposure to filtered Xenon-arc radiation.

包装运输测试

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（麦头）、条形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，能对多个运输包装的要求项目进行检验总和测试。

ISTA国际运输安全测试

ISTA(International Safe Transit Association)，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式和测试项目等文件，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(68kg)的运输包装产品测试和品质评估服务，并可以签发ISTA认可的正式包装运输测试报告。

Package Shipping Testing

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 Testing

ISTA (International Safe Transit Association), a non-profit organization, whose Predecessor is NSTA-National Safe Transit Association has hundreds of members over the world, including famous freight companies and laboratories. It has been committed to help our members develop more efficient packaging, methods, logistics system, etc, to improve the safe performance of products’ transport packaging and prevent or reduce the damages of products in handling and transportation. This organization has already published a series of documents, such as standards, testing Procedures and testing projects as the uniform basis for evaluating the safe performance of products’ transport packaging. LEO-MTS, certified by ISTA, can provide transport packaging test of Packaged-Products 150 lb (68 kg) or less and quality evaluation service, sign and issue formal and certified ISTA reports.

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ISTA运输测试为您提供如下的切实利益

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

ISTA - International transit safe test

ISTA procedures will provide tangible benefits of:
(1) Protection of products and profits with reduced damage and product loss
(2) Economically balanced distribution costs.
(3) Reduce and eliminate the 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 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 drop, bridge impact.	ISTA 2E

文具测试

书写工具中笔帽和端盖的危害，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：

1) 笔帽有通气口或太大不能进入导气管。

2) 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。

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窒息(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。

Writing and marking instruments

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

1) the pen cap is ventilated or 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 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 enclosure(BS 7272-2) for writing and marking instruments, which in normal or foreseeable circumstances are likely to be used by children up to the age of 14 years. Part 1 of BS 7272 technically related to ISO 11540.

现行适用的有关书写和标记工具的国内/国际安全标准
Current Applicable National/International Safety Standards for Caps of Writing and Marking Instruments

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
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
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
学生用品安全通用要求	Request in common use of security for student's articles	GB 21027

印刷产品检测

轻工印刷类的精装书、平装书及图书期刊类产品的外观、表面整饰、印刷质量及规范，达到标准要求是非常重要的，否则会影响读者的阅读和欣赏。为此，我们能帮助客户提供以下完整的成品的规格及标准检测服务。

Inspection of printed paper products

When printing hardcover or paperback books, it is very important for the appearance, surface finishing, printing quality and specifications to meet the standard requirements. Therefore, we can help customers provide the following complete finished product specifications and standard testing services.

项目名称	Item Name	方法
精装书	精装书籍要求	GB/T 30325
平装书	平装书籍要求	GB/T 30326
图书期刊	纸质印刷产品印制质量检验规范　第3部分	GB/T 34053.3
平版装潢印刷品	平版装潢印刷品	GB/T 7705
平版印刷品	平版印刷品质量要求及检验方法	CY/T 5-1999

Inspection items	Item Name	Method
Hard-cover binding	General requirement of hard-cover binding	GB/T 30325
Soft-cover binding	General requirements of soft – cover binding	GB/T 30326
Books and periodicals	Specifications of quality inspection for printed paper products-part 3: Books and periodicals	GB/T 34053.3
Offset lithographic prints	Offset lithographic prints for decorating	GB/T 7705
Offset lithographic prints	Quality requirements and inspection methods of offset lithographic prints	CY/T 5-1999

主要检测设备

常用检测设备

LEO-MTS拥有先进检测设备：
恒温、恒湿检测实验室
气质联用仪
电感耦合等离子体发射光谱仪
气相色谱仪
原子吸收光谱仪
X射线荧光光谱仪
傅氏转换红外光谱议
IGT测试仪
分光密度计
纸箱整箱抗压机
边压强度测试仪
马弗炉
光源箱
油墨耐磨测试仪
白度测试仪
液相色谱电感耦合等离子体质谱仪

The Main Testing Equipment

Commonly Used testing equipments

Advanced Testing Equipment in LEO-MTS:
Constant Temperature and Humidity Testing Laboratories
Gas Chromatography – Mass Spectrometer
Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)
Gas Chromatography
Atomic Absorption Spectrometer
X-Ray Fluorescence Spectrometer
Fourier Transform Infrared Spectrometer
IGT Tester
Spectrodensitometer
Carton Compression Machine
Side Compression Strength Tester
Muffle Furnace
Viewing Light Box
Rub Tester
Brightimeter Micro S-5
Liquiel Chromatograpky Incluceively Coupled Plasaia Mass Spectromtter (LC-ICP-MS)

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LEO-MTS核心业务

计量检定/校准

为了确保测量设备数值的准确性，让企业所使用的每一台仪器都处于合格状态，MTS计量科建立了综合校准室、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，项目包括了长度、力学、电磁和化学四个类别。

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。

综合校准室

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。

电学校准室

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、电阻等项目的校准。

LEO-MTS Core Business

Metrological Verification /Calibration

LEO-MTS offers calibration services for ensuring the accuracy of test data and to make sure every device and piece of equipment your company operates is qualified. We established comprehensive, electricity, pressure, and physicochemical testing labs. Total 24 types include Length, Mechanic, Electromagnetic and Chemical services have been authorized by China National Accreditation Service for Conformity Assessment.

LEO-MTS lab is qualified to offer consulting, training and testing services with their resources in Metrology Division.

Comprehensive Testing Lab:

Comprehensive testing lab possesses raster-indicator instrument, thermometer, weight, electronic measuring wrench, gauge block instrument and so on. We can offer calibrations such as indicator, temperature controller, electronic balance, electronic scale, electronic measuring wrench, caliper, micrometer etc.

Electricity Testing Lab:

Electricity testing lab possesses multi-calibration meter, pressure instrument, and resistance box tests so that we can offer calibrations current, voltage, resistance calibration services.

校准与测量体系
METROLOGICAL VERIFICATION AND CALIBRATION SERVICE

压力校准室

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。

Pressure Testing Lab:

Pressure testing lab possesses pressure related devices so that we can offer calibration services for pressure gauges, vacuum gauges and oxygen forms.

理化校准室

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。

Physicochemical Testing Lab:

Physicochemical testing lab possesses electronic scale, constant temperature and humidity box so that we can offer calibration for glass containers.

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校准认可能力范围
SCOPE OF ACCREDITED CALIBRATION

序号 NO.	测量仪器名称 Instrument	被测量 Measurand	校准规范 Calibration Method	测量范围 Range	扩展不确定度（k＝2） Expanded Uncertainty (k=2)	说明 Limitation
1	数显卡尺 Digital Display Caliper	长度 Length	通用卡尺检定规程 JJG30 V. R. of Current Calipers JJG 30	(0~200) mm , (200~300) mm	U=0.01mm , U=0.02mm	
2	带表卡尺 Dial Caliper	长度 Length	通用卡尺检定规程 JJG30 V. R. of Current Calipers JJG 30	(0~200) mm , (200~300) mm	U=0.01mm , U=0.02mm	
3	游标卡尺 Vernier Caliper	长度 Length	通用卡尺检定规程 JJG30 V. R. of Current Calipers JJG 30	(0~200) mm , (200~300) mm	U=0.01mm , U=0.02mm	
4	高度卡尺 Height Gauge	长度 Length	高度卡尺检定规程 JJG31 V. R. of Height Caliper JJG 31	(0~200) mm , (200~300) mm	U=0.01mm, U=0.02mm	
5	千分尺 Micrometer	长度 Length	千分尺检定规程 JJG21 V. R. of Micrometer JJG 21	数显外径千分尺:(0~25)mm , Digital display outside micrometer:(0~25) mm 外径千分尺:(0~25)mm Outside micrometer:(0~25) mm	U=0.7um, U=1.3um	
6	百分表 Dial Gauges(Resolution is 0.01mm)	长度 Length	指示表（指针式、数显 式）检定规程 JJG 34 V. R. of Dial Gauges(dial and digital) JJG 34	(0~10) mm, 指针式:(0~1)mm	U=4um, U=1.5um	
7	千分表 Dial gauges(Resolution is 0.001mm)	长度 Length	指示表（指针式、数显 式）检定规程 JJG 34 V. R. of Dial Gauges (dial and digital) JJG 34	数显式:(0~1)mm, 数显式:(1~3) mm, 数显式:(3~5)mm	U=1.0um, U=1.5um, U=2.3um	
8	杠杆表 Dial Test Indicator	长度 Length	指杠杆表检定规程 JJG 35 V. R. of Dial Test Indicator JJG 35	杠杆百分表:(0~1)mm , 杠杆千分表:(0~0.2)mm	U= 4μm , U= 0.7μm	
9	电子称 Electronic Scale	品质 Mass	数字指示秤检定规程 JJG 539 V. R. of Digital Indicating Weighing Instruments JJG 539	2g~100 kg	U=0.76g~19g	
10	电子天平 Electronic Balance	品质 Mass	电子天平检定规程 JJG 1036 V. R. of Electronic Balance JJG 1036	1mg~2 kg	U=0.5mg~0.6g	只校III级及以下 Accredited Only for:III level and below

序号 NO.	测量仪器名称 Instrument	被测量 Measurand	校准规范 Calibration Method	测量范围 Range	扩展不确定度（k＝2） Expanded Uncertainty (k=2)	说明 Limitation
11	弹性元件式一般压力表及真空表 Elastic Element Pressure Gauges and Vacuum Gauges for General Use	压力 Pressure	弹性元件式一般压力表、压力真空表和真空表检定规程 JJG 52 V. R. of Elastic Element Pressure Gauges, Pressure- Vacuum Gauges and Vacuum Gauges for General Use JJG 52	(-0.1~25) MPa	U=1.0%FS	只校1.6 级及以下 Accredited Only for:1.6 level and below
12	扭矩扳子 Torque wrench	扭矩 Torque	扭矩扳子检定规程JJG 707 V. R. of Torque Wrenches JJG 707	(10~100)N.m	U_{rel}=2%	
13	电流表 Ampere meter	直流电流 DC Current	电流表、电压表、功率表及电阻表检定规程 JJF 124 V.R.of Amperemeters, Voltmeters, Wattmeters and Ohmmeters JJG 124	100uA~500uA , 500uA~2mA, 2mA~5mA , 5mA~20mA, 20mA~50mA , 50mA~200mA, 200mA~500mA , 500mA~2A 2A~5A , 5A~20A, 200mV~1V, 1V~2V, 2V~5V, 5V~10V, 10V~20V, 20V~50V, 50V~100V, 100V~200V, 200V~500V, 500V~1000V,	U_{rel}=0.19% , U_{rel}=0.23% U_{rel}=0.22% , U_{rel}=0.22% U_{rel}=0.35% , U_{rel}=0.37% U_{rel}=0.32% , U_{rel}=0.41% U_{rel}=0.45% , U_{rel}=0.48% U_{rel}=0.16% , U_{rel}=0.22% U_{rel}=0.25% , U_{rel}=0.28% U_{rel}=0.31% , U_{rel}=0.30% U_{rel}=0.26% , U_{rel}=0.38% U_{rel}=0.42% , U_{rel}=0.52%	
		直流电流 DC Current				
14	直流数字电压表 DC Digital Voltmeter	直流电流 DC Current	数位多用表校准规范 JJF 1587 Calibration Specification for Multimeters JJF 1587	200mV~1V , 1V~2V , 2V~5V , 5V~10V 10V~20V, 20V~50V, 50V~100V, 100V~200V, 200V~500V, 500V~1000V, 100uA~500uA , 500uA~2mA, 2mA~5mA , 5mA~20mA, 20mA~50mA , 50mA~200m	U_{rel}=0.13% , U_{rel}=0.19% U_{rel}=0.20% , U_{rel}=0.25% U_{rel}=0.31% , U_{rel}=0.22% U_{rel}=0.34% , U_{rel}=0.35% U_{rel}=0.47% , U_{rel}=0.19% U_{rel}=0.23% , U_{rel}=0.22% U_{rel}=0.22% , U_{rel}=0.35% U_{rel}=0.37% ,	
15	数字多用表 Digital Multimete	直流电流 DC Current	数位多用表校准规范 JJF 1587 Calibration Specification for Multimeters JJF 1587	200mA~500mA , 500mA~2A 2A~5A , 5A~20A, 200mV~1V, 1V~2V, 2V~5V, 5V~10V, 10V~20V, 20V~50V, 50V~100V, 100V~200V, 200V~500V, 500V~1000V,	U_{rel}=0.32% , U_{rel}=0.41% U_{rel}=0.45% , U_{rel}=0.48% U_{rel}=0.16% , U_{rel}=0.22% U_{rel}=0.25% , U_{rel}=0.28% U_{rel}=0.31% , U_{rel}=0.30% U_{rel}=0.26% , U_{rel}=0.38% U_{rel}=0.42% , U_{rel}=0.52%	
16	温控仪 Thermo- meter Temperature IndicationControll er	温度 Temperature	数位温度调节仪检定规程JJG 617 Digital Temperature Indicators and Controllers JJG 617	(0-1300)℃	U=1.6℃	

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体 系 认 证 咨 询 业 务

ISO 10012测量管理体系
代理ISO 10012测量管理体系内审员培训/发证
ISO 17025实验室认可
代理ISO 17025实验室认可内审员培训/发证
欧美玩具安全标准
新信息咨询服务
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为客户的产品规格提供专业的技术顾问服务
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。

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