

全国高职高专印刷与包装类专业教学指导委员会规划统编教材

Practical English for Packaging Technology

包装专业英语

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出版说明

本系列教材是由《全国高职高专印刷与包装类专业教学指导委员会规划统编教材》编审委员会根据“电脑图文处理与制版专业”“印刷工艺与技术类专业”“印刷机械工程与技术类专业”和“包装技术及包装装潢类专业”四个专业的培养方向、教学计划和课程设置而组织全国有关院校编写的。

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本系列教材特色：

一、遵照高职教育的定位，一是高等教育，二是职业教育。教材内容除了必备的专业知识体系和知识结构外，还突出职业岗位的技能要求。针对目前高职教材沿袭本科教材体系，不能适合高职教育特点的问题，从教材的体系设置，课时的安排，内容的编排上，充分体现教材的实用性、技术性和实践性。

二、突出高职教育的特点，教学针对就业岗位的需要，重在强化学生的实践性能力培养，采取多种形式强化实践教学，将高职专业教学与有关岗位的国家职业标准相结合，实现与企业岗位要求零距离。

三、突出现代化多媒体教学，主教材要配合相关课件、模拟操作、资料扩展等电子版教学材料。

四、以教育部示范院校和骨干院校为主，联合多家院校编写，整合资源，优势互补，具有示范性和普适性。

我们将在各教材后附有意见反馈表，希望各院校任课教师能认真填写，提出意见和建议，以使我们的教材不断完善。

《全国高职高专印刷与包装类专业教学指导委员会规划统编教材》编审委员会
2005 年 5 月

编写说明

本书旨在巩固包装技术专业学生的基础英语水平、拓宽知识面,提高学生对国外包装技术资料的阅读能力。全书共分为四大部分:第一部分是包装介绍;第二部分为包装基础,是本书的重点,它结合包装产品的生命周期,内容包括包装选材、包装容器、包装制作、包装过程、包装设计、产品流通直至包装废弃物的处理,选材广泛,且考虑到包装专业知识体系的由浅入深。正文后配有相应的阅读材料;第三部分为补充材料,考虑到高职高专的教育特色,并针对学生个性化发展的需要,适当增加了实用性内容——如考虑到学生就业的需要,增加了个人简历及与包装行业有关的招聘启事等内容。另外考虑到学生进一步深造的需要,增加了一些国外知名包装企业、院校以及专业刊物的介绍;第四部分是词汇表。为了让读者更好地阅读本书,本书在重点章节特别设立了学习目的、学习要求、学习重点和练习题目,并且为了教师情景化教学的需要,特别在每篇课文后增加了与课文内容有关的讨论题目。

本书由王冬梅主编,马爽副主编、刘志刚参编。其中王冬梅负责编写第二部分的第二章、第三章、第四章、第五章和第四部分;马爽负责编写第一部分、第二部分的第一章、第六章和第三部分;刘志刚负责编写第二部分的第七章,并参与编写第二部分第三章。值得特别说明的是本书的多处内容是三位编者共同编写的结果。全书由王冬梅统稿,由上海大学金国斌教授主审。

本书可作为高职高专类包装技术专业教材,也可作为包装工程专业本科参考教材和相关专业在职技术人员提高专业外语水平的学习参考书。

本书是编者结合自己的教学实践编写的,在编写过程中广泛听取了深圳职业技术学院、上海理工大学和江南大学包装工程专业师生的宝贵意见,并得到了有关专家、学者的大力支持和帮助,在此深表感谢!尤其感谢陕西科技大学陈满儒教授在编写过程中给予的大力支持和帮助。

由于编者的知识水平有限,书中的错误在所难免,敬请读者批评指正。

主编 王冬梅

Part 1 Packaging Conception

Text

Introduction to Packaging

Objective : To learn about the foundational contents of packaging , including the definition , functions and development in recent years.

Requirement : To seize how to define packaging , and understand how a package runs its different functions.

● What is packaging

Packaging is best described as a *coordinated* system of preparing goods for *transport* , *distribution* , storage , *retailing* and use of goods. Also , packaging may be defined in terms of its protective role as in ‘ packaging is a means of achieving safe delivery of products in *sound* condition to the final user at a minimum cost ’ or it can be defined in business terms as ‘ a *techno-economic* function for *optimizing* the costs of delivering goods *whilst* maximizing sales and profits ’.

● Functions of packaging

Packaging is a complex , *dynamic* , scientific , artistic and *controversial* business function , which in its most fundamental form contains , protects/preserves , transports and informs/sells. The main functions of packaging are :

Containment – packages can hold the contents and keep them secure until they are used.

Protection – the protection function of the package has two aspects. First is the protection of the product from all hazards from the time it is packaged until the consumer of the product uses it in its entirety. The second aspect of protection *coequal with* protection of the product – is protection of the environment surrounding the item in the package. This is true not only for people who may come in contact with the packaged product , but for storage and transportation facilities as well.

Communication – packages can identify the contents and assist in selling the product. Shipping containers should also inform the carrier about the *destination* and any special hand-

ling or storage instructions. Some packages inform the user about method of opening and/or using the contents.

Machinability – packages have good performance on production lines for high speed filling and closing , without too many stoppages.

Convenience – throughout the production , storage and distribution system , including easy opening , and dispensing .

Marketing – to be **aesthetically** pleasing , including a functional size and shape , brand image and style of presentation.

● Packaging in the late 20th century

There have been **substantial** developments in both materials and packaging systems over the last ten years , which have been instrumental in both reducing packaging costs and the development of novel and minimally processed foods.

Fast-food **outlets** made their appearance in the 1950s and created a demand for new kinds of packaging. The consumer met **disposable single-service** packaging for the first time , while the fast-food outlets demanded the bulk delivery of ready-to-cook food portions in their own special type of packaging. Fast-food outlets boomed and later joined by increasing levels of public health care and a rapidly growing trend toward eating out rather than at home. Today this market is large enough to form its own sector , sometimes called the HRI (hospital , restaurant and institution) market.

The 1950s also saw the growth of convenience and prepared food packages , such as cake mixes , TV dinners , boil-in-bag foods , and gravy preparations. A rapidly growing technology added **petroleum-derived** plastics to the package designer 's selection of packaging materials.

The 1970s and early 1980s brought numerous changes , many of them legislated. Child-resistance closures were **mandated** for some products. **Tamper-evident** closures were brought in for others. Labeling laws required listing of ingredients , and in Canada , language equality laws were tightened. Standards for the acceptance of new packaging materials were raised. **Consumerism** and a concern for the environment started to be important factors for those who watched for future trends.

The last decades of the 20th century witnessed rapid change. The population aged , and many social habits changed. Families became smaller. **Single-person** households became common. The domestic housewife became a relic of the past as both partners in a marriage sought professional careers or higher income levels. For the modern urban dweller , “convenient” and “fast” became the **operative** words. Marketers have recognized a whole subclass of people who know only how to boil water or turn on the microwave. If it isn't ready in five minutes , they don't want it. If it takes more than one dish , their interest **wanders**.

Words and Expressions

coordinate *v.* 协调, 整理

transport *v.* 传送, 运输 *n.* 传送器, 运输, 运输机

distribution *n.* 分配, 分发, 销售, 分布状态, 发送, 发行

retailing *n.* 零售

sound *adj.* 可靠的, 合理的, 有效的
adv. 彻底地, 充分地

techno-economic *adj.* 科技经济的

optimize *v.* 使最优化

whilst *conj.* 时时, 同时

dynamic *adj.* 动力的, 动力学的, 动态的

controversial *adj.* 引起争论的, 有争议的

containment *n.* 盛装, 包容

protection *n.* 保护

coequal with 同等的

communication *n.* 交流, 传达, 交通

destination *n.* 目的地

machinability *n.* 机械加工性, 可切削性

convenience *n.* 便利, 方便, 有益, 有用

marketing *n.* 销售, 营销

aesthetically *adv.* 审美地, 美学上

substantial *adj.* 充实的, 充足的, 实质的, 真实的

outlet *n.* 出现, 出口, 出路

disposable *adj.* 可处理的, 可任意使用的

single-service *adj.* 个别的, 单一的, 单纯的, 一次性使用的

petroleum-derived *adj.* 从石油中提取的

mandated *adj.* 统治的, 管理的

tamper-evident *adj.* 防破坏的, 显窃启的

consumerism *n.* 以顾客为中心, 用户至上

single-person *adj.* 单人的

operative *adj.* 有效的, 现实的, 手术的

wander *v.* 漫步, 徘徊, 迷路, 迷失方向

Exercise

• Translate the following into Chinese

1. The protection function of the package has two aspects. First is the protection of the product from all hazards during its whole distribution process. The second aspect of protection is protection of the environment surrounding the item in the package.
2. For the modern urban dweller, "convenient" and "fast" became the important words. Marketers have recognized a whole subclass of people who know only how to boil water or turn on the microwave. If it isn't ready in five minutes, they will be impatient.

• Discussion

Please take a package and enumerate its functions, and discuss how the package runs its different functions

Reading Material

What Is Packaging

Packaging is the enclosure of products , items , or other packages in **pouches** , bags , boxes , cups , **trays** , cans , tubes , bottles , or other container forms to perform one or more of the following basic functions :

- Containment
- Protection
- Communication
- **Utility**

Packages function in the physical environment , subject to moisture , temperature extremes , mechanical shocks and vibration. No matter what environmental conditions are encountered , the package is expected to protect the product , keeping it in the condition intended for use until the product is **delivered** to the ultimate consumer.

Packages must also satisfy an **array** of **regulatory** requirements. In the United States , the Federal Government has the primary regulatory **responsibility** and **authority**. Regulations cover label contents , package weight , health claims , materials used for packages , and similar topics. State and local governments have more limited authority.

The industry of packaging involves several other industrial groups , including manufacturers of paper , plastic , metal , glass , wood , adhesives , and machinery , companies that form packages from the materials , and companies that fill packages with products and transport them to market.

The **overall** economic impact of packaging is difficult to describe , but it has been **reliably** estimated that about \$100 billion worth of materials are used for packaging each year in the United States. This does not take into account the employment , the construction of factories , the manufacture and sale of packaging equipment , the transportation of products to market , and other factors. Worldwide , materials worth about \$ 450 billion are used.

Virtually everything that is intended for market is packaged , including **pharmaceuticals** , **cosmetics** , food and **beverages** , **electronic** devices , **hardware** , scientific instruments , clothing , and many other products. Even automobiles , aircraft , and other complex **mechanisms** are **assembled** from many components that were packaged for transport to the assembly site.

Words and Expressions

tray *n.* 浅盘 , 碟

pouch *n.* 小袋 , 烟草袋 , 钱袋 , 扁平袋

utility *n.* 效用 ; 有用 , 实用

deliver *v.* 递送 , 陈述 , 释放 , 交付

array <i>n.</i> 一串, 陈列	pharmaceutical <i>adj.</i> 医药的, 制药的 <i>n.</i> 药品
regulatory <i>adj.</i> 规章的; 制订规章的, 受 规章限制的	cosmetic <i>n.</i> 化妆品
responsibility <i>n.</i> 责任, 职责	beverage <i>n.</i> 饮料
authority <i>n.</i> 权力, 职权, 权威	electronic <i>adj.</i> 电子的, 电子仪器的
overall <i>adj.</i> 全部的, 全面的	hardware <i>n.</i> 五金器具, (电脑的) 硬件, (电子仪器的) 部件
reliably <i>adv.</i> 可靠地, 可信赖地, 确实地	mechanism <i>n.</i> 机械装置, 机构, 机制
	assemble <i>v.</i> 装配, 组合

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1. Walter Soroka. Fundamentals of packaging technology-new 3rd edition ,2002
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Part 2 Packaging Fundamental Technology

Chapter 1 Packaging Materials

Text 1

Paper

Objective : To learn about the definition of paper and its advantages compared with other materials , and know about some types of paper in common use.

Requirement : To seize how to define paper and the using fields of different types of papers.

Main points : Characteristics and using fields of kraft paper , fine paper and greaseproof paper.

● Paper and its advantages

Paper is defined as a *matted* or *felted* sheet usually composed of plant fiber. Paper has been commercially made from such fiber sources as rags (linen) , *bagasse* (sugar cane) , cotton and straw. Modern paper is made almost exclusively from *cellulose fiber* derived from wood.

Paper has a number of advantages as a packaging material :

- It is produced in many grades and *converted* to many different forms , especially boxes or cartons.
- It is *recyclable* and *biodegradable* .
- It is easily combined with other materials to make *coated* or *laminated* packs.
- It can be produced with different degrees of opacity.

● Types of papers

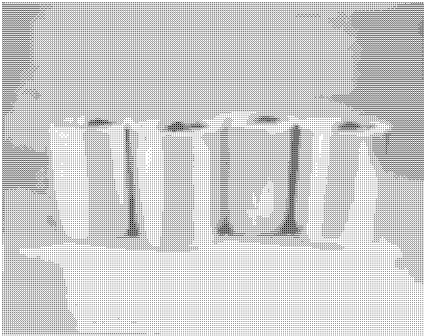
● Kraft paper

Kraft paper is a strong paper which is used for 25 – 50kg multi-wall sacks for pow-

ders , flour , sugar , fruits and vegetables. It can be bleached white , printed or used unbleached (brown). It is usually used in several layers or '*plies*' , to give the required strength.

● Fine paper

Fine paper is made from **woodchips** and **sawmills residues** , which is a by-product of the forest product industry. These materials are pulped and pressed into sheets to make fine paper.



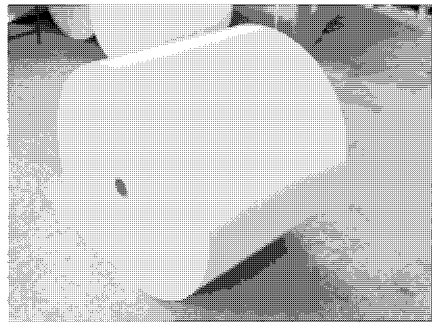
Fine paper is used as writing paper , photo-copier paper and printer paper. Fine paper is good to use for these purposes because it has longer fibers and is brighter than other paper grades.

● Vegetable parchment

Vegetable parchment is produced from **sulphite pulp** which is passed through a bath of concentrated **sulphuric acid** to swell and partly dissolve the cellulose fibres , to make them plasticised. This closes the pores and fills voids in the fibre network to make the surface more intact than kraft paper , and thus makes the paper resistant to grease and oils and gives greater wet strength properties. It is used to pack butter , cheese and fresh fish or meat.

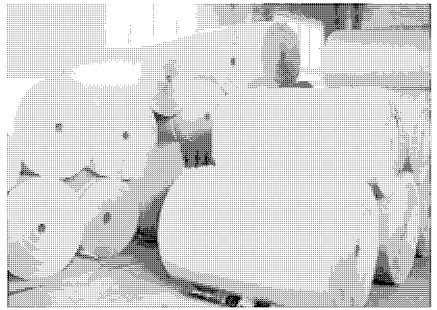
● Greaseproof paper

Greaseproof paper is made from **sulphite pulp** in which the fibres are more thoroughly beaten to produce a closer structure. It is resistant to oils and fats , and although this property is lost when the paper becomes wet , it is widely used for wrapping fish , meat and dairy products.



● Glassine

Glassine is similar to greaseproof paper , but is given additional **calendering** to increase the density and produce a close-knit structure and a high **gloss** finish. It is more resistant to water when dry but loses the resistance once it becomes wet.



● Coated papers

Many papers are treated with **wax** by coating , dry waxing (in which wax penetrates the paper while hot) or wax sizing (in which the wax is added during the preparation of the pulp). Wax provides a moisture barrier and allows the paper to be heat sealed. However , a simple wax coating is easily damaged by **folding** or by **abrasive** foods , but this is overcome by laminating the wax between layers of paper and/or polyethylene. Waxed papers are used for bread wrappers and inner liners for **cereal** cartons.

Words and Expressions

matted *adj.* 缠结的, 纠缠的, 弄乱的

felted *adj.* 粘结起来的, 用毡覆盖的

bagasse *n.* 甘蔗渣

cellulose fiber *n.* 纤维素

convert *v.* 使转变, 转换..., 加工, 使...
改变信仰

recyclable *adj.* 可循环的

biodegradable *adj.* 可生物降解的

coated *adj.* 涂布的, 涂层的

laminated *adj.* 层压的, 薄板状的, 薄膜
状的

kraft paper 牛皮纸

ply *n.* 层板, 厚度, 褶

fine paper 铜版纸

woodchip *n.* 碎木片

sawmill *n.* 锯木厂, 锯木机

residue *n.* 滤渣, 残留物

vegetable parchment 植物羊皮纸

sulphate pulp 硫酸盐制纸浆, 化学纸浆

sulphuric acid 硫酸

greaseproof paper 防油纸

sulphite 亚硫酸盐

glassine *n.* 薄玻璃纸

calendering 辗(压)光, 压制(延)

gloss *n.* 光泽的表面, 光彩的表面

v. 使有光彩, 掩饰, 上光于

coated paper 涂布纸

wax *n.* 蜡 *v.* 涂蜡, 上蜡于

fold *v.* 折叠, 包, 合拢, 抱住

abrasive *n.* 研磨剂 *adj.* 研磨的

cereal *n.* 谷类食品, 谷类

Exercise

● Translate the following into Chinese

1. Fine paper is used as writing paper , photocopier paper and printer paper. Fine paper is good to use for these purposes because it has longer fibers and is brighter than other paper grades.
2. The thickness of some plastic films that is needed to give the required degree of protection is less than that which can be handled on filling and forming machines. Therefore coating an expensive barrier film onto a thicker , cheaper paper substrate gives the desired strength and handling properties.

• Discussion

Please take a paper package to discuss the packaging materials and their functions.

Reading Material 1

Paper Raw Material and Components

The raw material of paper is obtained primarily from wood , flax , straw and cotton waste , etc. The three main components are cellulose fibre , ***lignin*** and ***carbohydrates*** . Cellulose is structural tissue that forms the chief part of paper and many textile fibres. Lignin is the adhesive material which binds the cellulose fibres together in the wood. Carbohydrates are made up of sugars , fatty acids , etc. Lignin and carbohydrates are non-fibrous materials and have no value as pulp making substances.

To improve paper performance , there are many additives in paper , including :

- Fillers (' loading agents ') , such as china clay , to increase the opacity and brightness of paper and improve surface smoothness and printability

- ***Binders*** , including ***starches*** , vegetable ***gums*** , and synthetic ***resins*** to improve the ***tensile strength*** , ***tear*** and ***burst strength***

- Resin or wax ***emulsions*** are used as sizing agents to reduce penetration by water or printing inks

- ***Pigments***

Other chemicals to assist in the manufacturing process (e. g. ***anti-foaming agents***).

Words and Expressions

lignin *n.* 木素

carbohydrate *n.* 碳水化合物

binder *n.* 连接料

starch *n.* 淀粉

gum *n.* 胶料

resin *n.* 树脂

tensile strength *n.* 拉伸强度

tear *n.* 撕裂

burst strength *n.* 耐破度

emulsion *n.* 乳剂

pigment *n.* 色素 , 颜料

anti-foaming agent 防起泡剂

Text 2

Paperboard

Objective : To learn about the definition of paperboard and the relationship between paper and paperboard.

Requirement : To understand the differences between paper and paperboard , familiar with some types of paperboard and their using fields.

Main points : Structure , characteristics and using fields of corrugated cardboard.

“Paper ” and “Paperboard ” are nonspecific terms that can be related to either material **caliper** (thickness) or **grammage** (weight). The International Standards Organization (ISO) states that material weighing more than 250 grams per square meter (51 pounds per 1 000 square feet) shall be known as paperboard. U. S. practice calls paper that is more than 300 micrometers (0.012in.) thick paperboard.

● Fibreboard

Fibreboard (more than 0.11mm thick) is either solid or corrugated. The solid type has an outer kraft layer and an inner bleached board. It is able to resist **compression** and to a lesser extent impact. Small fibreboard **cylinders** are made using single ply board , either with or without a foil layer and LDPE inner layer.

● Corrugated cardboard

Corrugated cardboard (Fig 2. 1. 2. 1) has a corrugated (wavy) inside layer , sandwiched between layers of **linerboard** . It is used to make containers for shipping products to factories , warehouses , retail stores , offices and homes. It is good to use corrugated cardboard for transporting these products because it is light , strong and easily custom-sized for all products. (Source : Resource integration systems)

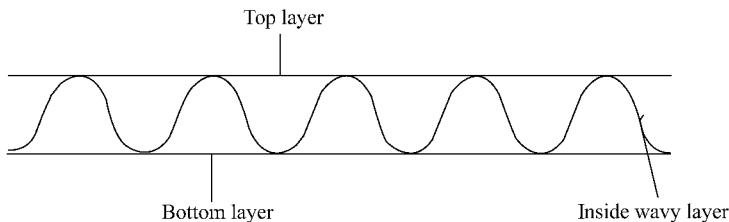


Fig 2. 1. 2. 1 Sketch map of corrugated cardboard

The “**flute** ” describes the structure of the wave shaped cardboard material that makes up a board 's corrugation. Flutes come in several sizes , known as flute profiles. The standard

profiles range (Table 2. 1. 2. 1) from A-flute (the largest) to F-flute and below (microflutes).

Table 2.1.2.1 Fluting ranges for corrugated board

Flute configuration	No. flutes/m	Flute height/mm	Minimum flat crush/(N/m ²)
A(coarse)	104 – 125	4.5 – 4.7	140
B(fine)	150 – 184	2.1 – 2.9	180
C(medium)	120 – 145	3.5 – 3.7	165
E(very fine)	275 – 310	1.15 – 1.65	485

● A-flute

A-flute , the original flute , is the highest flute size , and therefore , when combined with an inner and outer facing , is the thickest. A-flute makes the most of corrugated 's *cushioning* and *stacking* properties for *fragile* and *delicate* items.

● B-flute

B-flute , the second flute size adopted by the corrugated industry , has lower arch heights than A and more flutes per foot. This means that the medium contacts and supports the liners at a greater number of points , providing a stiff , flat surface for high quality printing and die cutting and with excellent crush resistant properties.

● C-flute

C-flute came along next to split the difference between A and B flutes. C-flute is thinner than A-flute , thicker than B , and offers good cushioning , stacking and printing properties. C-flute is by far the most widely used flute size. An estimated 80% of today 's corrugated containers are made of C-flute board.

● E-flute

E-flute has the greatest number of flutes , which gives it the greatest crush resistance and the flattest surface for high quality printing applications. The thin board profile of E-flute (It is one-fourth the thickness of C-flute) reduces box size and saves storage space. Because of its thin *profile* and excellent cushioning properties , E-flute can often *substitute for* conventional folding cartons or solid fiber containers.

Today , F-flute , a new flute , is the newest growth segment in the corrugated industry. The idea behind the new flute , originally developed in Europe , is to make packages with lower fibre content. With F-flute , converters can reduce the total amount of fibre in the packaging , thereby creating a more rigid box with less solid waste going into *landfills* .

Generally , larger flutes provide greater strength and cushioning , while smaller flutes have better **printability** and **foldability**. Flute profiles can be mixed and matched within the same piece of combined board , to **manipulate** printability , compression strengths , cushioning strengths and the total thickness of the board. For instance , CE double wall gets its durability from its C-flute layer , while the E-flute gives it a smoother printing surface.

● Types of corrugated materials

● Single face sheet

A corrugated medium with a linerboard facing adhered to one side. It can be manufactured in sheets or rolls. Single face is principally used as a wrapping material , and occasionally for interior packing or padding.

● Single wall corrugated

A corrugated medium with a linerboard facing adhered to both sides. It is also referred to as “double face”. This popular and **versatile** 3-ply construction is converted into a wide variety of containers and packaging components.

● Double wall corrugated

Two corrugated mediums with a linerboard facing adhered between them and to both sides. This 5-ply construction is most applicable for packing heavy items where high rigidity and protection is required.

● Triple wall corrugated

Three corrugated mediums and four linerboard facings. This 7-ply construction is used where large container sizes are involved , such as pallet packs. It made up of two layers of C-flute and one layer of B-flute , so it is very strong , crush resistant and excellent for storage and transit.

● Boxboard

Boxboard is a multi-layer rigid paper material that is used to make boxes of various colors , shapes and sizes , including cereal , shoe and candy boxes. Boxboard usually has from six to eight layers. The upper layer is often made from a **deinked pulp** or other high quality recovered paper. Inner layers are made with a lower-quality paper stock (e. g. , old newsprint and mixed papers with some old corrugated containers added for strength).

● Other paperboards

White board is suitable for contact with food and is often coated with PE , PVC or wax