

E.A. Krasilnikova

# **COMMERCIAL EQUIPMENT IN RETAIL**

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Retail equipment of retail stores remains the most important element of marketing, sales management. The planning of the placement of commercial equipment is carried out taking into account the assortment, marketing policy of the trading company. This tutorial defines the role and importance of equipping stores with commercial equipment. This tutorial provides classifications of commercial equipment: uncooled commercial equipment and refrigerated commercial equipment. It also analyzes the features of the management of a trading enterprise as a property complex. The textbook is intended for students, undergraduates studying in the following areas: "Trading", "Commerce", "Retail Management" and other areas. This manual is of great interest for store managers.

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## INTRODUCTION

Development of electronic commerce today remains the most relevant development trend in trade. In 2022, the share of e-commerce turnover in the Russian Federation was fixed at the level of 9.5% of the total retail trade turnover. Of course, all strategies of retail chains are currently being built taking into account this fact. However, the most important component of the organization of retail trade remains the management of stationary retail facilities, stores. Offline trading today is represented by supermarkets, supermarkets, discounters, etc. Systematization of the technological process with the use of computer technology begins with the delivery, acceptance, packaging, packaging, labeling, storage and ends with the calculation with customers using cash registers, including using payment cards. Automation and mechanization of the trade process today has not only the goal of increasing the efficiency of the trade organization, but also improving the speed and quality of customer service.

The introduction of modern commercial equipment allows to increase the productivity of workers. At the same time, the observance of the principle of occupational safety remains the top priority of managers. Control over this is entrusted to state regulatory agencies.

Modern video surveillance systems and customized use of webcams allows not only, for example, to track the number of buyers, but also to collect data on the sex and age of visitors, as well as to memorize faces and analyze the frequency of visits to

the store by one or another buyer. Another example of the use of video surveillance is software, which allows using a video camera to track the queue length and automatically give a signal to the staff to open another cash desk if the queue exceeds the norm. Sensors are used in retail to create a new customer experience. For example, a “smart” price tag with a sensor allows you to display at the shelf the information about exactly the product that the buyer took from the shelf. This serves the convenience of the buyer, and as a result, increases the conversion.

In order to form future specialists in terms of the technical equipment of trade organizations with knowledge and skills in a textbook, a substantive theoretical-practical material is presented.

The study manual reveals the features of the trade organization as an object of technical equipment, the classification of commercial equipment, the appointment of each of the types and other material of theoretical and practical nature. At the end of each chapter are posted topics for reports and essays. The objectives of the development of this textbook are the expansion of the presentation on the basics of mechanization and automation of the process of product distribution; formation of the presentation, practical skills and abilities in the field of selection, installation and rational operation of all types of trade- technological equipment.

The objectives of the study of the textbook are the development of skills and abilities to ensure the rational use of all types of transport, trade and technological equipment.

## **Chapter 1. TRADE ORGANIZATION AS AN OBJECT OF TECHNICAL INSTALLATION**

### **1.1. Characteristic of trade as a type of economic activity**

Trade is a sector of the economy intended for the sale of products manufactured in other industries. Separation of trade in a separate sector of the economy is associated with the social division of labor and the historical allocation of commercial capital as part of industrial.

The subjects of trade are trade organizations, individual entrepreneurs, the state and consumers.

The objects of trade are goods, as well as works and services related to the sale of goods.

Trade is divided into the following types:

- wholesale;
- retail;
- catering (trade and production activities).

Wholesale trade is a type of trading activity carried out for the purpose of resale of goods or their other use in business activities and other purposes not related to personal, family, household use.

Retail trade is a type of trading activity associated with the purchase and sale of goods intended for personal, family, home consumption and other similar uses that are not related to business activities.

The important role of trading is as follows:

- 1) provides a link between production and consumption.

2) satisfies the needs of people and reduces the time to purchase goods;

3) trade is a mirror of the economy. It reflects all the changes in the economic sphere;

4) trade is an essential condition for production;

5) trade is involved in solving the social task of bringing together the level of well-being of various groups of the population.

The main tasks of trade:

1) supplying the population with goods and reducing the time spent by buyers for the purchase of goods, improving the service culture;

2) the improvement of the economic relations of trade with industry;

3) improvement of trade and technological processes;

4) further development of market relations in trade;

5) social protection of interests of various layers of consumers;

6) an increase in the purchase of high-quality goods corresponding to the demand of the population;

7) the creation of trade enterprises with different price levels (shops for the rich and the poor);

The main functions of the trade:

1. study consumer demand;

2. organization of procurement of goods from suppliers;

3. quality control of goods;

4. the formation of the trading range;

5. storage and preparation of goods for sale;

6. placement and display of goods on the trading floor;

7. Sale of goods – the main function of retailers;

8. provision of services;

The above features are common to the industry. In order to study in depth the issue of technical equipment of a trade enterprise with equipment, we will consider the functions of retail. They consist of:

- 1) in the study of the demand for goods and their market supply, maintaining a balance between supply and demand;
- 2) in the formation of the trading range, meeting the needs of the population in the goods;
- 3) in organizing the distribution of goods, bringing the goods to customers by organizing their spatial movement and supplying them to points of sale;
- 4) in the impact on production in order to expand the range and increase the volume of goods;
- 5) in the formation of inventories and maintaining them at the required level;
- 6) in the advertising and information work of retail trade enterprises;
- 7) in the implementation of trade and technological operations with the goods – such as storage, production refinement (packaging, packaging, etc.);
- 8) in the formation of demand and sales promotion for goods sold;
- 9) in choosing the most effective methods of selling goods (offering goods and assisting customers in their selection, performing settlement transactions);
- 10) in maintaining a balance between supply and demand;
- 11) to improve the technology of trade and improve customer service.

In a modern market situation characterized by high competition, a trade organization must have high-tech, high-

performance, often innovative, equipment to perform all of the above and other specific functions.

## **1.2. Trade company as a property complex**

The main organizational and economic component of trade is a trade organization.

We will give definitions of such concepts as “trade organization,” “trade enterprise,” “trade object” according to GOST R51303–2013 “Trade. Terms and Definitions”. Let us pay attention to the distinction between the concepts “organization” and “enterprise”.

Trade organization – an organization of various organizational and legal forms, carrying out trading activities, including the necessary funds and employees with the distribution of responsibilities, powers and relationships.

Trade enterprise is a property complex located in a shopping facility and outside a shopping facility used by trade organizations and individual entrepreneurs to sell goods and / or provide trade services.

A commercial object is a building or part of a building, a structure or a part of a building, a structure or a part of a structure specially equipped with equipment designed and used for laying out, displaying goods, serving customers and conducting cash settlements with buyers when selling goods.

Distinguish, stationary shopping facility is a shopping facility, which is a building or part of a building, a building or part of a building, firmly connected with the foundation of such a building, building with the ground and connected (technologically connected) to the networks of engineering and technical support.

Non-stationary trade object is a trade object representing a temporary structure or temporary structure that is not firmly connected with the land plot, regardless of the presence or absence of connection (technical connection) to the networks of engineering and technical support, including a mobile structure.

The main task of the trade enterprise is economic activity aimed at meeting the needs of the population served and making a profit.

It is very important to determine the type and type of trade company, since its legal status, forms of ownership, size, and aspects of the management of owners influence the equipment complex of the organization of trade and technological equipment.

As to the aspects of managing the owners of an organization, it can be divided into enterprises owned by one owner, partnership enterprises, corporations owned by many owners. On the one hand, unity of command in relation to the owner of a trade organization has a positive effect on the choice of trade and technological equipment. This is manifested in the reduction of time for the procedure of selection, selection and coordination of models. At the same time, the partnership of owners allows to achieve the optimal ratio for all criteria for the selection of equipment.

Of course, technical equipment is influenced by the trading and operational process, which in the store consists of such sequential operations:

- acceptance of goods,
- storage,
- preparation for sale,
- display,
- show,

- sale,
- calculation, etc.

To perform these operations, all the premises of the store are equipped with certain sets of furniture, respectively, for the sales area and utility rooms. It is very important to choose the type of furniture for each store, to determine its quantity, since rational organization of the sales process, increase in labor productivity of trade workers, the fullest use of the store's floor space, the size of the working stock of goods in the sales hall, quality of customer service, depend on it as well as the interior of the trading floor. When choosing furniture to equip the store, they take into account the way customers serve, the particularities of sales and storage of specific groups of goods, the volume of their sales, the frequency of stock replenishment.

If we consider various types of retail trade organizations, then it is necessary to study the specifics of their trading activities.

So, retail trade organization:

- 1) purchases goods from the manufacturer or an intermediary and offers them for sale to the consumer in an unchanged form or after the usual retail processing (preparation for sale);
- 2) forms a range of products and a list of services to meet the needs of customers;
- 3) show samples on open trade stands in order to receive orders for goods;
- 4) distributes goods ordered by catalog, samples, samples or on the basis of other offers (mail-order trade);
- 5) organizes trade with home delivery;
- 6) organizes peddling trade;
- 7) organizes street trading.

For each of these trade and technological processes are characterized by their own features of technical equipment, due to the nature of the sale of goods. For example, organizing street vending requires countertops with a special, street cover, made in the anti-vandal version. Also, such equipment is equipped with autonomous cooling systems.

For hacking, you need lightweight, compact, mobile equipment with autonomous power supply.

Equipment for car dealerships and grocery stores will a priori be different in terms of technical characteristics, design, and design.

The level of technical equipment of the enterprise determines the production efficiency of the main production, determines the possibility of the rhythm of its production with the specified consumer properties. Today, trade organizations have their own production, such as: cooking (salads, meatballs, steaks, meatballs, etc.), bakery (loaves, baguettes, puffs, cakes, etc.), confectionery (cakes, pastries), meat (minced meat, goulash, zrazy, etc.) products. That is why the pressing issue for trade company is to equip them not only with trade, but also with technological equipment.

### **1.3. Management of trade enterprise as a property complex**

In general, management is a process of purposefully influencing a system to transform it into a new state or to maintain it in an existing state. Management is a purposeful process that is carried out continuously in time and space, requiring in-depth analysis, development and setting of new goals. Each control system has a control object and a control subject.

The subject of management is a control unit, element or set of elements of a control system acting on another or other elements. The control subject directs to the control object impulses of influence, which contain information, directly or indirectly, on how the control object should function in the future.

The subject of management of a trade enterprise as a property complex is a group of officials (managers, specialists) of the relevant structural units responsible for the formation, operation and improvement of the organization's technical equipment.

The control object is a controlled link, element or set of elements of the control system that perceives control actions. It receives management teams and operates in accordance with the content of these teams.

The subject of management of a trade enterprise as a property complex is directly the complex of assets of the organization, the units responsible for their operation and technical condition.

In the process of implementing management interaction within the framework of managing the property complex of a trade company, a managerial relationship arises between the subject and the object, the essence of which is the interest of the subject of management in the effective functioning of the organization's asset complex, that the subject generates management teams related to the optimal process of formation and operation such a complex. The object of management, motivated by the subject, behaves accordingly management teams.

Direct and feedback is carried out between the subject and the control object. Direct communication is realized through control actions and their accompanying information, and feedback through control over the result of system operation.

Relations of management exist between the subject and object of management as a result of the implementation of management communication and management interaction. It is these relationships that become the basic ability to directly manage, since they set the opportunity to develop management teams (subject) and the willingness of these teams to perform (object).

To implement the effective management of a trade enterprise as a property complex, it is necessary to formulate management principles:

1) the unity of direction, goals of activity.

The speed of development of scientific and technological progress, the emergence of improved equipment (for example, online cash registers, refrigerators with low power consumption), elements of modification of existing equipment (modules of fiscal memory to cash registers), as well as high market competition requires quick effective actions from management entities. Therefore, the object of management must understand and share the goals of the organization. At the same time, the management of the trade organization should strive for the mandatory consistency and one-direction of individual and group goals with the goals of the division and organization;

2) authority and responsibility.

Powers – limited right to use the resources of the organization and direct the efforts of some of its employees to perform certain tasks. Responsibility – the obligation to perform existing tasks and be responsible for their satisfactory resolution;

3) leadership.

Each manager must clearly understand the organizational goals and rationally evaluate his contribution in order to give

clear orders to his subordinates who are aimed at realizing the goals of the company. The principle of “leadership” has replaced the principle of “unity of command” and assumes that a subordinate can receive orders not only from one leader, which requires a high level of qualification and responsibility from both the subordinate and the manager. The principle of “leadership” emphasizes that the management of a trade organization is not the task of one individual, but the work of a collective, group;

4) the division of labor.

Specialization is the basis of the division of labor, which involves the execution of work, larger in size and better in quality, with the same effort. This is achieved by reducing the number of goals to which attention and effort should be directed;

5) coordination of personal, group and organizational interests.

Forming organizational goals, the organization takes into account the interests of various groups, including its staff. Thus, to ensure the unity of the objectives of the trade organization, it is necessary to seek and consistency of the interests of the person (group) and the company;

6) command system.

The command system is a series of interest groups that are able to ensure the manageability of a firm, achieving efficiency and effectiveness. One of the key teams is the senior executive team;

7) centralization / decentralization.

The degree of centralization will vary depending on the specific conditions. Therefore, the question arises about the correct proportion between centralization and decentralization. This is the problem of determining the measure that will provide the best possible results;

8) stability of the workplace for staff.

High staff turnover reduces organization effectiveness. Including in this connection the level of technical equipment of a trade organization plays a huge role in its activities;

9) remuneration, staff motivation.

To ensure loyalty and support of employees, they should receive fair remuneration for their work;

10) initiative.

An initiative means developing a plan and ensuring its successful implementation. It gives the organization strength and energy;

11) justice.

The fairness of the subject of management in relation to the object is a highly motivating tool for high-performance activity that does not require material costs;

12) discipline.

Discipline involves the construction of a clear organizational structure of management in the enterprise, as well as compliance with the functioning of vertical and horizontal communications;

13) organizational culture.

Organizational culture – the artifacts of the company, traditions, rules of conduct that ensure the unity of the staff, the implementation of the strategy and the achievement of goals.

A modern trade organization is an organization capable of quickly responding to dynamic changes, continuously improving technologies and the uncertainty of the external environment. The modern approach to managing an organization consists in a balanced combination of human values, organizational change and continuous adaptation to changes in the external environment.

To build an effective management system, it is necessary to distinguish classical management functions:

- planning;
- forecasting;
- organization;
- motivation;
- control.

Identifying the features of a shop will improve the efficiency of its management system as a property complex.

These features include the fact that:

a) the main function of the enterprise is the sale of food and non-food products. Specificity is also manifested in the fact that food products can be perishable, the implementation period of which does not exceed 72 hours. In connection with this, the object of control is the process of selling goods;

b) the object of management also becomes the process of promotion of goods at the point of sale. High competition in trade encourages manufacturers and intermediaries to form whole complexes of product promotion at all stages of product distribution. The key element is the trade object as the final stage of the movement of goods to the consumer. In this regard, the organization of presentations, tastings in the trading floors of the shops involves the installation of specialized equipment;

c) a large number of trade organizations sells a wide and / or deep range of goods, which complicates both the management process as a whole and the process of selecting and installing the corresponding commercial equipment;

d) government regulation of trade determines the need to install certain equipment to comply with the principles of legal operation (for example, test scales, online cash registers, etc.);

e) interaction with the media, both in order to promote a trade organization (online store, promotion on social networks, etc.), and ease of access to the general consumer's Internet environment (for example, in the form of posting photo and video files more often all with negative information about the store) encourages business management to form a system for managing such relationships;

f) different scales of trade organizations (small, medium, large network) predetermine various approaches to the organization of the management process;

g) the interaction of the retailer with the end user imposes additional requirements on the organization of the process of relations with suppliers and manufacturers of goods, product quality control, and return of goods for various reasons.

The study of such features of a trade organization will make it possible to build a clear management system for both the enterprise as a whole and its assets, the non-current part of which is represented by trade and technological equipment.

#### **1.4. Intention and purposes of technical installation of trade organizations**

First you need to define the technical equipment of the enterprise. We give the following definitions of this concept from different points of view.

Technical equipment of a trade enterprise is a complex of regulatory and technical measures governing the design and technological preparation of the trade and production process, as well as the system of equipment placement of a trade organization. The equipment is equipped with a sales area, warehouse, utility and administrative premises of the enterprise.

These events provide full readiness of the enterprise for its activities. Refrigeration equipment is used at shop in the sales area (refrigerated showcases, racks, bonnets, chests, etc.), in warehouses (cold rooms). The main criterion for selection is the temperature maintained by the refrigerating chamber or refrigeration unit, overall dimensions, therefore, the capacity of the refrigerator as well as installation method.

In relation to the trade organization, the technical equipment of the enterprise is part of the trade and technological process.

Technical equipment of trade organizations is the process of completing a shop with trade and technical equipment in order to ensure its functioning.

In the process of technical equipment of trade organizations in a market economy, the following factors should be considered:

- design features of a trade building, warehouse (number of floors, placement of supporting columns, floor level, dimensions of premises, etc.);
- method of selling goods and their range;
- types and technical characteristics of trading and process equipment;
- the possibility of comprehensive mechanization of loading and unloading;
- economic efficiency of the use of commercial equipment;
- the possibility of improving the working conditions of workers.

After a thorough study of all parameters, the manager should draw up a plan for the technical equipment of trade organizations, taking into account:

- security with design and estimate documentation;
- planned equipment efficiency, labor costs in monetary units;
- terms of delivery by suppliers of equipment and cash registers corresponding to the reference models of models entered in the State Register, etc.

The main tasks of technical equipment of trade organizations are:

- 1) Ensuring the functioning of a trade enterprise;
- 2) Optimization of trade and technological processes;
- 3) Ensuring the effective use of material, financial, labor resources of a trade company;
- 4) Improving the efficiency of trade company, etc.

### **1.5. Control questions, topics of reports and essays on chapter 1**

#### Test questions for Chapter 1:

1. The concept of trade as a type of economic activity.
2. Types of trade.
3. The concept of trade organization.
4. Forms of trade as a basis for the concept of technical equipment of organizations.
5. The objectives of trade as a type of economic activity.
6. The main functions of trade.
7. Functions of retail trade at the macro and micro level.
8. The concept of trade company.
9. The concept of a shopping facility.
10. Criteria for the distinction between stationary and non-stationary trading facilities.
11. The main operations of the trading process.

12. The concept of technical equipment of a trade company.
13. Features of technical equipment of trade organizations, depending on their type and type.
14. Criteria for evaluating trade buildings as an object of technical equipment.
15. Stages of preparation for the design of trade organizations in the framework of their technical equipment with commercial equipment.
16. Analysis of the location of the trade organization as an object of technical equipment.
17. Consumer and logistics flows and their accounting in the process of technical equipment of a trade organization.
18. Organization and technical equipment of the parking space of the trade organization.
19. Mechanization and automation of technological processes of trade organizations.

#### Essays' topics for Chapter 1.

1. Expand the features of equipping organizations with trade and technological equipment depending on their type and type.
2. Justify the requirements for trade and technological equipment, which imposes a modern retailer.
3. How, in your opinion, the choice of trading and technological equipment affects the management of the trading process?
4. Expand the features of the stages of selection of trade and technological equipment, depending on its type and type.
5. Innovations in the equipment of trade and technological equipment.

### Reports' topics for Chapter 1:

1. The role of technical equipment of trade organizations in improving the efficiency of trade and marketing activities.
2. Modern technical equipment of trade organizations in Russia and prospects for its development.
3. Aims and objectives of technical equipment of trade organizations in the modern economy.
4. The impact of the level of technical equipment of trade organizations on labor productivity.

## **Chapter 2. CLASSIFICATION OF COMMERCIAL EQUIPMENT**

### **2.1. Factors affecting the choice of commercial equipment**

Commercial equipment is the calling card of any store, kiosk, pavilion, exhibition hall and in general any outlet. The main purpose of retail's furniture is to help make the sale of goods. The type of such furniture should correspond to the whole concept of the complex, shop, cafe, pharmacy, restaurant and so on. The choice of such equipment, today, is large enough. Numerous companies and enterprises offer a wide range of shelving, countertops, display cases, tables, chairs, modular furniture and other equipment.

The choice of commercial equipment is very important and difficult process. Model, overall dimensions, components are of great importance in the preparation of the specification of trade and technological equipment for the purposes of acquisition by a trading enterprise. In addition to these, it is necessary to take into account other factors that must be considered when choosing equipment, namely:

- Customer service method;
- Features of sales of goods;
- Storage features;
- Volume of sales;
- Frequency of stock replenishment;
- Assortment of goods;
- Convenience to customers, visibility, availability;

- Convenience of staff;
- Customer Service Culture;
- Compliance with the overall design of the shop floor and retail network;
- Reliability, durability
- and other factors.

It is important to determine the principles for the selection of types of retail or wholesale company and its configuration.

1. Compliance of the equipment with the product profile and the size of the shop's sales area;

2. Equipping stores with commercial equipment should be based on the methods used to sell goods.

The definition of a rational composition of commercial equipment and the nature of its placement have a significant impact on the efficiency of the use of shop space.

## **2.2. Classification of commercial equipment**

Furniture for trade enterprises are classified:

1. at the place of use:

- for trading floors (for sale of goods),
- outbuildings (for acceptance, storage and preparation for sale);

2. at the purpose:

- for the display and sale of goods (wall and island slides, countertops),
- for display (showcase),
- for transportation and sale (containers),
- for storage (racks and floor stands),
- for preparation of goods (packing tables),
- for settlements with customers (cash booths, cashier

- controllers, cashiers),
- to create amenities for customers (tables for packing and storing goods in bags, devices for storing customers' bags);
- 3. at the installation method:
  - wall (installed along the walls of the trading hall, along its perimeter),
  - island (installed in the center of the hall),
  - mounted (mounted on the walls of the trading floor),
  - built-in (mounted in the recess of the walls);
- 4. at the product profile:
  - specialized equipment (for the sale of a specific type of goods: bread, vegetables, live fish, etc.) and
  - universal (for the sale of any kinds of goods);
- 5. at the selling method:
  - for self-service stores or
  - for stores that use the traditional method of sale;
- 6. at the constructions:
  - not folding and
  - collapsible.

An important condition for the effective operation of stores and small retail network is equipping them with equipment. The range of goods, the preservation of their quality, the convenience of the staff, and, consequently, the customer service culture depend on his choice.

Each small retail enterprise must have the appropriate inventory and equipment, and trading in perishable products – cooling facilities.

Furniture plays an important role in the rational organization of the trading process. It is used when performing various

operations related to the receipt, storage and sale of goods, and must meet operational, technical, ergonomic, economic, aesthetic, sanitary and hygienic requirements.

**The operational and technical requirements** provide, along with the convenience of furniture for buyers and sellers, to provide a visual display of goods and sufficient capacity. Trading furniture must be durable and sustainable, to ensure the reliability of fittings and components.

**Ergonomic requirements** are taken into account when designing furniture, based on anthropological data (average height and proportions of the human body). The height, width and length of the equipment should minimize the fatigability of sales staff when filling it with goods and serving customers.

**Economic requirements** imply simplicity of designs, making economical production and convenient operation. Furniture should be made of inexpensive building and finishing materials using modern production technologies. An important condition for reducing the cost and increasing the profitability of retail's furniture is the organization of its mass industrial production, simple technological process, the ability to replace individual parts and components in the repair process.

**Aesthetic requirements** are imposed on the shape, proportions, color and design features of retail's furniture. Equipment should be barely noticeable; in form, proportions, color and design features in harmony with the overall design of the shop.

**Sanitary and hygienic requirements** stipulate that the design of retail's furniture, as well as the materials used for the manufacture of this furniture, should not impede its cleaning during operation and cleaning of premises. In this regard, the

furniture should have a benign finish, with a smooth surface, without excessive recesses, gaps and projections.

In tents and kiosks selling food, the countertops should be covered with linoleum, oilcloth, plastic or other waterproof material. Plastic coated surfaces are wiped with a wet swab. It is impossible to wash furniture with abundantly moistened swabs, since the liquid flowing in the target between the parts leads to swelling of wooden parts and rusting of metal parts. Removing dirt from the painted surfaces of furniture is recommended only by dry cleaning.

Unification bringing to uniformity of forms, designs and sizes of parts from which the assembly of retail's furniture is made.

Furniture made of standardized parts can be easily mounted both as separate sections and as a solid front, which leads to cost savings due to the reduction in the number of racks and other elements.

Standardization of retail's furniture provides for the establishment of regulatory requirements for the size, materials, manufacturing quality, rules for acceptance, labeling, packaging, transportation and storage of retail's furniture.

Cash registers: types, device, technical characteristics and operating rules. Cash terminals and their role in trade organizations

Payment transactions with customers play an important role in the trade process of the store. From their proper organization depends on the cost of time buyers to purchase goods.

Settlements with customers can be carried out by receiving money directly by the seller, cashier or cashier controller and at the same time taking into account the amount received by means of a cash register. Cash registers provide visibility,

simplicity and correctness of the calculation, control over the maintenance of cash transactions, the accuracy of accounting of cash receipts. At the same time, the process of settlements with customers is significantly accelerated.

The design of modern cash registers allows you to keep track of the cumulative result of money received from customers, print a check with various data, print a check number, a paid amount, a cipher code, and a countertop number on the control tape. At the same time on their indicators indicates the amount spent, the cipher and the number of the countertop. Information obtained in control cash registers can be output to magnetic or perforated tape with subsequent processing of data on electronic computers in order to study demand, determine the volume of sales of goods, etc.

Cash registers consist of the following basic mechanisms: installation, indicator, counting, check-printing, transmission, driving, blocking and closing,

The installation mechanism, made in the form of a set of keys, is used for a set of monetary amounts carried out through a cash register, installation of a cipher and a countertop, on which the amount should be reflected, and the inclusion of the drive.

The indicator mechanism is necessary for information of the cashier and the buyer about the dialed amount, the installed cipher of the check and the number of the section countertop on which the operation was performed. The counting mechanism consists of a set of summing, control and operational countertops.

With the help of the check printing mechanism, a check with the corresponding details is obtained. It also serves to print a control tape.

The transmission mechanism transmits data collected on the installation mechanism to the summing countertops, the printing device, the data indicator.

### **2.3. Control questions, topics of reports and essays on chapter 2**

#### Test questions for Chapter 2:

1. Factors affecting the choice of commercial equipment
2. The method of customer service as a factor in the choice of commercial equipment.
3. Signs of classification of commercial equipment.
4. Types of commercial equipment.
5. Types of non-mechanical equipment.
6. The configuration of the sales area as a factor in the selection of commercial equipment.
7. Consumer flows as a factor in the placement of commercial equipment.
8. Organization and installation of the parking space of the trade organization.
9. Mechanization and automation of technological processes of trade organizations.

#### Essays' topics for Chapter 2:

1. Expand the features of equipping organizations with trade and technological equipment depending on their type and type.
2. Justify the requirements for trade and technological equipment, which imposes a modern retailer.
3. How, in your opinion, the choice of trading and technological equipment affects the management of the trading process?

4. Expand the features of the stages of selection of trade and technological equipment, depending on its type and type.
5. Innovations in the equipment of trade and technological equipment.

Reports' topics for Chapter 2:

1. The role of technical equipment of trade organizations in improving the efficiency of trade and marketing activities.
2. Modern technical equipment of trade organizations in Russia and prospects for its development.

## **Chapter 3. UNCOOLED COMMERCIAL EQUIPMENT**

Trading and technological process in the store consists of successive operations: acceptance, storage, preparation of goods for sale, display, display, sale, payment for goods sold. To perform these operations, the premises of the stores are equipped with non-mechanical trading equipment (retail's furniture).

For rational organization of the sales process, it is necessary to choose the right type of furniture and determine its quantity. Properly selected furniture allows you to:

- make maximum use of the shop's retail and warehouse space;
- to expand the range of products;
- reduce product losses;
- introduce progressive forms of sale;
- to improve the interior of the sales area;
- to increase the labor productivity of trade workers and, consequently, to improve service buyers.

When choosing furniture to equip the store, they take into account the way customers are served, the specifics of the sale and storage of individual product groups, the volume of their sales, the frequency of stock replenishment.

### **3.1. Technical requirements for retail's furniture**

The size and design of retail's furniture should be closely linked to the parameters of the premises of the stores, which is largely due to its typification, unification and standardiza-

tion, which are part of the technical requirements for retail's furniture.

By typing, they understand the system of measures aimed at eliminating excessive diversity and selecting the most advanced types of retail's furniture that meet modern requirements.

Unification – bringing to uniformity of forms, designs and sizes of parts from which the assembly of retail's furniture is made.

Furniture made of standardized parts can be easily mounted both as separate sections and as a solid front, which leads to cost savings due to the reduction in the number of racks and other elements. To assess the level of unification of retail's furniture can be used the formula:

$$K = Q_1 / Q_2$$

where  $Q_1$  – the number of standardized elements included in the product;

$Q_2$  – the total number of elements included in the product.

Standardization of retail's furniture provides for the establishment of regulatory requirements for the size, materials, manufacturing quality, rules for acceptance, labeling, packaging, transportation and storage of retail's furniture.

Typification, unification and standardization allow selecting the most rational types of furniture and, on the basis of broad interchangeability of parts, speed up the production and introduction of high-quality furniture and low cost into the sales network.

**Operational requirements** provide for the creation of maximum facilities for both buyers and sellers. Namely: the possibility of convenient display and visual demonstration of goods, the presence of sufficient capacity for laying the working stock of goods, the possibility of prompt replenishment of

this stock, ensuring the safety of goods, the design compliance with the optimal use of the floor space.

To increase the number of goods sold and improve customer service, it is necessary to provide free access to the product, to show it correctly, which means that retail's furniture should have a maximum display area.

**Ergonomic requirements** stipulate that the size of retail's furniture should be designed taking into account the height and proportion of the person's figure, and ensure minimum fatigue of the staff, as well as good visibility of goods and free access to them for buyers. Thus, the height of the trade slides is set in accordance with the height of a person (200–220 cm.), And the depth of the shelf – in accordance with the length of the arm (60–80 cm.). The most optimal height of placement of goods from 80cm. up to 180cm. The upper shelves are located at a height of no more than 200 cm., And the bottom – no less than 25 cm. from the floor level. The width of the top shelf should be no more than 30 cm., And the bottom one no more than 60 cm. The upper zone of the slides is recommended for installation of lighting and advertising facilities.

**Economic requirements.** Furniture should be inexpensive and economical to operate. As materials for the manufacture of furniture should be used wood substitutes, plastics and metal. The profitability of furniture operation depends on the simplicity and convenience of its design, reliability, durability, convenience for trade workers and customers, equipment capacity. It is calculated that the exhibition area of furniture should be at least two and a half times the installation, i.e. at the minimum sales area of furniture should be provided with a maximum display of goods.

**Aesthetic requirements** determine the shape, proportion and color of furniture in accordance with the purpose and decoration of the hall. The furniture should be open, unobtrusive, have a color that would highlight the goods. Sources of lighting should pay attention to the goods to the buyer, but not have a blinding effect. The shape, color and proportions of the furniture should be in harmony with the general interior of the store's trading floor.

Sanitary and hygienic requirements. The furniture should be of such a design that it can be easily cleaned of dirt. The surface of the furniture should be smooth, without projections, grooves, sharp corners and crevices. For the manufacture of furniture it is necessary to use materials that do not interact with the goods, and from which dust and dirt are easily removed using ordinary detergents.

### **3.2. Types of retail's furniture for the organization of the goods' sale**

The main types of furniture for organizing the sale of goods in the sales area are slides, countertops, display cases, containers, and cash booths.

1. Slides are designed for displaying the display, sale and storage of a working stock of goods. They can be near-wall, island, in-court and end faces.

Wall slides have shelves on one side. On the upper brackets of these slides are lamps.

Shelves of island slides hang on both sides.

The in-room slides are similar in construction to island islands, but are installed along windows. On the side facing the window display, lay out the goods so that it can be viewed from the street. Trade hills are the same in height and are installed in the end of the line of island slides.

In some slides, instead of the bottom shelf, podskaphniki were designed to store the working stock of goods.

In grocery stores use:

Specialized slides for selling a specific range of products.

a) Slides for vegetables and fruits are equipped with baskets, which are mounted on shelves or hung directly on brackets. The tilted mirrors located in the upper part allow buyers to see the goods well.

b) Slides for bakery products have inclined shelves for laying out bread and a case for storing a working stock of goods. The shelves on the front side are equipped with high sides (so that the bread does not fall), and the podskapnik is a small shelf for buyers' bags. Bread spread from the back room.

c) Wall slides with shelves-cassettes are used for the sale of confectionery.

In non-food stores, slides are used for the sale of certain types of goods, which use various special devices-cassettes, bars, baskets, etc.

a) Slides for the sale of small goods – pens, small haberdashery, bijouterie, etc. – are equipped with cassettes.

b) Slides for products hung on hangers – children's clothes, men's shirts, knitwear – are provided with inclined brackets fixed on the back wall or horizontal bars with price holders.

c) Headgear is demonstrated on wire brackets with a ring at the end, which are inserted into the rear perforated shield. Such slides are equipped with rotating mirrors.

g) Slides for selling shoes equip brackets with a length of 600 mm., fixed in the rear wall. Mirrors are installed in the lower part of the slide.

e) Samples of fabrics are hung on retractable brackets fitted with price holders, and fabrics in rolls are laid out on shelves.

e) For the display and sale of the finished dress using hung. Hung up come in a variety of designs: round and rectangular; single and two-tier; mobile and stationary; with a mirror in the end part and without it.

In addition to the main types of furniture, fitting stores are installed in stores selling finished dresses. They are equipped with mirrors and hangers for clothing buyers.

For fitting shoes on the trading floor set up stools.

2. Countertops used in the traditional method of customer service. They come with a shop window and without a shop window.

Display shelf display case has a built-in glass top for display and display of goods. From the outside, the countertop is equipped with a narrow shelf for buyers' bags, and from the seller's side – drawers or shelves for storing goods and inventory.

3. Storefronts are designed to display products inside the store. They consist of glass walls and glass shelves. Storefronts distinguish between wall and island. Island showcases have glass walls on four sides.

4. Cash cabins are designed for installation of a cash register and settlement with customers. They are equipped with a drawer, a shelf for storing cash tapes and a bracket with a lamp for local lighting. Some cabins are equipped with an electromechanical conveyor for the promotion of purchases.

Equipment for storage of goods in warehouses:

For stacking and storage of goods used shelving and pallets.

1) Shelving by appointment are divided into universal and special, according to the design – collapsible and non-collapsible.

a) Universal shelving is used to store various goods in containers or on pallets. There are:

- Shelving racks – represent several rows of horizontal shelves, mounted on vertical racks;
- cellular shelving – horizontal shelves are divided by vertical partitions. They are used for storing small-piece goods in boxes or packs, as well as for placing goods by grades, types and other characteristics;
- box racks are used for storing small-piece goods (radio components, photo goods, etc.). The cells in them are boxes.

b) Special racks are designed for storage of certain goods (for example, sewing) or goods with non-standard sizes (for example pipes). They are divided into:

- rack racks – consist of a horizontal frame with racks fixed on it;
- mechanical – it hung up, intended for storage of products on hangers.

The choice of one or another type of rack is influenced by the assortment of stored goods, the dimensions of the container beds, and the lifting and handling equipment used.

The number of racks can be determined by the formula:

$$Q_{st} = Q_t / V_{st},$$

where  $Q_{st}$  – the number of racks;

$Q_m$  – the volume of goods to be stored in racks,  $m^3$

$V_{st}$  – rack capacity,  $m^3$

The capacity of the rack can be defined as the product of the number of cells ( $K_{ya}$ ) in the rack by the actual capacity of one cell ( $V_{ya}$ ):  $V_{st} = K_{ya} V_{ya}$

2) Pallets are used for storage of goods, their movement and transportation. Goods placed on a pallet are transported using lifting and transport equipment. According to the device pallets are divided into flat, rack and box:

a) flat – consist of supporting posts and solid or grating for laying goods. Between the supports left openings for entering the fork grab carts or electric;

b) rack – have four racks, which are fixed by horizontal partitions. This allows multi-stacking cargo (cardboard boxes, small items);

c) box pallets – have removable or non-removable drawers with or without a lid. They put the goods in boxes, bundles, easily damaged goods.

3) Lari and bins are used for storing groceries. There are rectangular, round or conical shape, have a boot device on top, and a dump hatch at the bottom.

### **3.3. Classification of retail's furniture**

Furniture for shop is classified according to the following features: (handout).

#### At the place of use:

- equipment for trading floors;
- for outbuildings and warehouses.

#### By installation method:

- wall;
- island;
- wall;
- built.

#### By product profile:

- specialized;

- universal.

To destination:

- for storage of goods;
- to prepare goods for sale;
- for acceptance of goods for quality;
- to display products;
- for display and sale of goods;
- for transportation and sale.

By production material:

- metal;
- wooden;
- combined.

By design:

- non-separable;
- team.

### **3.4. Tare-equipment**

Container equipment is containers of various designs, designed simultaneously for transportation, storage and sale of goods in self-service stores. Packing equipment used for the organization of advanced technology product distribution from suppliers in the distribution network. At the warehouse of the supplier, it is loaded with packaged goods, transported to a store on a specialized vehicle, unloaded using material handling equipment and delivered to the self-service sales area. Thus, the packaging equipment will allow you to create production and trade complexes: the wholesale base – the store's trading floor; the manufacturer is a shop floor, etc. Goods are loaded into packaging equipment at factories, factories or wholesale enterprises and delivered directly to the sales area.

The advantages of using packaging equipment:

- eliminating unnecessary links in the path of movement of goods from suppliers to the sales area;
- manual relocation of goods is eliminated and the number of workers involved in the movement of goods is reduced;
- the time for loading and unloading cars is reduced by 5 times;
- the cost of delivering 1 ton of cargo is reduced by 40–45%;
- reduced product losses
- 25% more efficient use of retail space
- labor of workers of trade is facilitated and necessary conveniences for buyers are created.

Design features of packaging equipment: depending on the design of the base supports, there are 3 types of containers: in the form of racks (TOC), in the form of wheels (CURRENT), and in the form of a combination of racks and wheels (TOC). The design of the container equipment can be folding, collapsible, folding and collapsible. The main parts of it are: the base, walls, cover, doors and devices for display of goods. Container shelving for piece goods is a new type of packaging equipment. It consists of a platform (bottom), frame racks, detachable and one-piece shelves, an upper guard panel, wheels. Detachable shelves of the container rack are divided into parts; compiled in pairs, they provide a good display of goods. The container is mobile, but if necessary it can be fixed, becoming stationary.

The use of packaging equipment is a progressive method of delivering goods to commercial enterprises, but it also has a number of difficulties:

- passages in individual stores are too narrow to move containers;

- reception rooms are not adapted for direct unloading of packaging equipment (there are no ramps);
- it is necessary to use specialized vehicles equipped with a van with a built-in cabin lift.

### **3.5. Principles of optimal selection of retail's furniture**

When choosing the optimal set of furniture should be based on the following principles:

1. Compliance of the furniture with the product profile and the size of the shop's sales area;
2. Compliance with the method of selling goods;
3. The use of furniture, ensuring the effective use of the area of the sales area;
4. Accounting of storage features, sales volume and frequency of replenishment of stocks of goods.

The main indicator when choosing furniture is its demonstration area, i.e. area of furniture, designed specifically for display and display of goods. The higher this figure, the more effective the trade and economic process. Demonstration area should be 75–82% of the retail space of the store.

A very important indicator is the ratio of the demonstration area to the installation. Installation is called the area occupied by the base of the furniture. Rational use of retail space is achieved if the installation area is at least 30% of the area of the sales area.

The trading mechanical equipment includes:

1. Machines for cutting products, types, principle of operation.
2. Machines for grinding products, especially work.
3. Hand cutting tools. Rules of operation and safety.
4. Inventory for acceptance of goods.

5. Inventory to prepare for the sale and sale of food products.
6. Advertising and exhibition inventory.

### **3.6. Control questions, topics of essays on chapter 3**

#### Test questions for chapter 3:

1. Classification and types of warehouse non-mechanical equipment.
2. Storage equipment for bulk and bulk cargo.
3. The choice of non-mechanical storage equipment and the calculation of the need for it.
4. Market analysis of non-mechanical equipment.
5. What are the requirements for non-mechanical commercial equipment.
6. What criteria are imposed on suppliers of non-mechanical equipment.

#### Essays' topics for Chapter 3:

1. Typing and standardization of commercial furniture.
2. Furniture for receiving, storing and presenting goods
3. Furniture for trading floors and shops.
4. Furniture for warehouse and technological premises.
5. Furniture for market and street trading.

## Chapter 4. COOLED COMMERCIAL EQUIPMENT

Trade refrigeration equipment is used for short-term storage, demonstration and sale of pre-cooled and frozen perishable products at low positive or negative temperatures.

### 4.1. Types of refrigerate commercial equipment

Trade refrigeration equipment includes:

- refrigerated display cases;
- display countertops;
- refrigerated shelf display cases,
- low-temperature lari,
- cold rooms and
- special refrigeration equipment – ice makers, soft ice cream freezers, juke box cooling machines, beverages, sales of frozen juices in machines.

### 4.2. Characteristics of modern refrigerated display cases, countertops, shelf display case

Modern refrigerated display cases are a necessary element of any store, cafe, bar. Domestic and foreign firms supply the market with various refrigeration equipment, differing from each other in shape, size, exterior finish. Often, samples of different companies are similar in appearance, but have different prices, from acceptable to very high.

At the same time, structurally refrigerated display cases and display countertops are mostly of the same type. Refrigeration

equipment is available with or without an integrated refrigeration unit designed for centralized cooling. Front glass is not glare-free, with one bend, which ensures product visibility.

For self-service stores, the design of the showcase has been modified. Access to the product has both the buyer and the seller. A distinctive feature of the display case is the front glass, which provides the buyer with free access to the product. Showcase easily loaded by the seller.

The temperature in the display case (from +2 to – 3) is maintained by thermostats located in the upper and lower part of the display case.

Electric defrosting of frost is used both at the top and at the bottom of the shelf display case. The duration of thawing is controlled by a special timer. This process is triggered by a sensor located at the top of the display case.

Refrigeration equipment of most companies meets the level of European quality. Basically it is technically of the same type, but the French, German, Finnish equipment has a higher level of performance and reliability.

**Medium- and low-temperature countertops** for selling refrigerated and frozen products are available with individual refrigeration units and with a centralized cooling system.

Constructive design of shop windows for stores is determined by the characteristics of product distribution and the availability of free space in the sales area. If the sales area is limited, refrigerated display cases of the EURO-SCANDIA type are used.

When selling goods from containers, refrigerated showcases are used (medium temperature refrigerated showcase with centralized cooling for two containers).

The modern market of commercial refrigeration equipment is saturated with a variety of refrigerated shelf display cases made by manufacturers in Finland, Italy, Poland and other countries, which differ from each other in overall dimensions, design and technical characteristics.

#### **4.3. Characteristics of modern cold-rooms, low-temperature lari and special refrigeration equipment**

***Modern cold-rooms*** produce in two versions – panel and block. Prefabricated cameras are designed for short-term storage of perishable goods.

Refrigerators of the panel type have standardized prefabricated elements with flood insulation. They are easy to install and transport. Assembly elements are equipped with built-in joints, which simplifies and facilitates installation.

Refrigerators are equipped with refrigerators in the traditional version and in the form of monoblocks.

In the traditional version of the installation diagram of the refrigeration machine, the refrigeration unit is located next to the chamber or mounted on one of its surfaces, the evaporator or air cooler is located inside the refrigeration chamber.

Prefabricated block-type chambers consist of prefabricated blocks (wall-mounted, U-shaped with a door and a fully assembled chiller). Such cameras are convenient for installation, but less convenient for transportation.

***Special refrigeration equipment*** includes ice makers for making cubed or flaked ice, soft ice cream freezers, refrigerated shelf display cases for cooling and freezing food, juice cooling machines and ice cream sales.

A distinctive feature of ice machines is basically the shape of the surface of the evaporator. With a flat surface of the evaporator, ice cubes are obtained, with cylindrical ice, for example in the LP-50 ice maker, in the form of cylinders. This ice is used in cafes and restaurants to cool drinks.

Scaled ice is prepared by freezing it on the cylindrical surface of the drum with the subsequent cutting of ice from the drum with a special mill. Scaly ice is used to cool minced meat, fish, and store delicatessen products in ice. Soft ice cream freezers are designed for cooking frozen to a temperature not lower than  $-5^{\circ}\text{C}$  ice cream mixture. The device of most freezers is of the same type. A liquid mixture enters the working cylinder from the loading tank, which is frozen on the inner surface of the cylindrical evaporator. The frozen mixture, into which air is “driven in” with a scraper-mixer, is cut off from the surface of the evaporator and batch-released to the consumer. The quality of the finished product depends on the composition of the mixture and the effort to remove the frozen mixture from the surface of the evaporator.

The structure of refrigerated shelf display cases for cooling products differs from shelf display cases for storing products by the presence in the shelf display case of directional, adjustable air flow. The cooling capacity of the chiller takes into account the heat released to cool products. Products are loaded from mobile trolleys by pushing functional containers onto the shelves of the shelf display case.

More technological loading and cooling products in the refrigerator directly on the rack.

Refrigeration equipment installed at catering establishments is determined by the type of enterprise.

The purpose of the enterprise determines the structure and composition of the functional groups of the warehouse production premises, as well as the sales area with refrigeration equipment in the complex of technological equipment used for selling products. The group of industrial premises using refrigeration equipment includes the following shops: meat, fish, vegetable, offal, refrigeration, green processing, culinary, confectionery, shop for making dumplings and dumplings, making soft ice cream.

The main refrigeration equipment of the production workshops are refrigerated shelf display cases, prefabricated cold rooms and sectional tables with refrigerated containers.

In hot shops and hot compartments of the culinary workshop, cooled containers are used for storing fats and frying, sour cream, cottage cheese, milk, eggs and other products for cooking and culinary products (daily or semi-daily stock).

In addition to the listed refrigeration equipment, specialized refrigeration equipment is used to cool and freeze raw materials and finished products, to cool juices, and to prepare chilled beverages.

Soft ice cream freezers and ice makers can be installed in the sales area near the finished product distribution line.

The warehouse houses refrigerated chambers for storing meat, fish, dairy products, eggs, fats and gourmet products, fruits and berries, greens, beer and beverages, meat, fish and vegetable convenience foods, cream confectionery, ready-made culinary products, food waste.

Refrigerators at catering establishments do not have significant structural differences from the chambers used in trade.

Placing products in the traditional chambers – on the shelves, in boxes and containers.

The refrigeration unit is the main part of the monoblock chiller or is performed as a split system. Air cooling – mainly by means of air coolers.

Refrigerating units of the stationary refrigerating unit are installed in a separate specialized room. Refrigeration units, which provide cold for a single refrigeration chamber, are placed next to the refrigeration chamber.

The use of refrigeration equipment in the production shops is determined by the adopted scheme of technological operations for the preparation of products. In the implementation of in-line production using functional tanks and mobile racks, refrigerated shelf display cases are used for cooling, storing and, if necessary, freezing products.

The type of refrigeration equipment in the sales area largely depends on the structure of the enterprise.

In modern technical design of product distribution lines, refrigeration equipment is built into the line, whose configuration and completeness are determined by the type of enterprise and the purpose of the line.

In case of linear or island arrangement of mobile equipment, for example, of French production, it can be used as isothermal and refrigeration equipment with machine cooling.

Refrigerated isothermal display cases ensure the safety of products lying on crushed ice. Such display cases are intended mainly for the storage of vegetables and salads.

Changes in the presentation of products due to shrinkage are less pronounced when stored in closed refrigeration equipment.

In cafes and bars, windows are installed that have a modern design, small overall dimensions, and a large overview of the

choice of products. The air in the display case is cooled by air coolers. At the request of the customer, the display cases are supplied with individual or stand-alone refrigeration unit.

Placing the air cooler in commercial refrigeration equipment provides a solution to a number of problems.

Firstly, products are effectively cooled in the entire volume of refrigeration equipment, even in an open-type showcase.

Secondly, which is especially important primarily for refrigeration equipment of the “shelf display case type”, there is a rapid cooling of air that enters when opening the doors.

Thirdly, the air cooler is compact, conveniently placed in the volume of commercial refrigeration equipment.

Thus, from the point of view of the intensification of air cooling in commercial refrigeration equipment, the use of air coolers is most effective. However, if they are installed in the equipment, intensive drying of the product is possible. Therefore, when storing non-insulated (unpacked) products with an open surface, they resort to a natural cooling system for air in commercial refrigeration equipment.

During the operation of refrigeration units installed in the commercial refrigeration equipment, the heat generated by the condensers is released directly into the sales area. Therefore, especially in the summer, the store needs air conditioning or powerful supply and exhaust ventilation.

In small and medium-sized trading enterprises, decentralized air conditioning is mainly used.

There are the following designs of monoblock air conditioners.

Monoblock air conditioners (made in a single package) are divided into window and mobile.

Window air conditioners are installed in the openings of windows or walls. Characteristic features – full factory readiness, low cost, some inconveniences associated with predetermined conditions of placement.

Mobile air conditioners – designed to cool or heat small rooms and can be moved by the consumer from one room to another. Such air conditioners can be used in mobile trade and in small temporary pavilions.

Split air conditioners – consist of two or more separate units: one outdoor and one or more indoor. According to the performance of the indoor unit, they are divided into floor, wall, ceiling, duct and cassette. Distinctive features of split systems, work only on recycling; the need for specialized installation; flexibility in choosing the installation location; wider power range for air cooling and heating.

#### **4.4. Service and maintenance of uncooled commercial equipment**

Maintenance includes the maintenance of preventive maintenance of refrigeration equipment, technical inspection and maintenance, as well as the elimination of sudden equipment failures that are not predictable.

Scheduled preventive maintenance of commercial refrigeration equipment includes the following:

- technical care for existing equipment during operation, i.e. monitoring the condition of the equipment, compliance with the rules of technical operation (sanitization, thawing of a snow coat from the surfaces of evaporators);
- technical inspection of equipment – a set of measures aimed at maintaining the equipment in a state of

- constant technical readiness (monitoring the technical condition, eliminating minor faults, checking and adjusting the mode of operation);
- medium or major repairs, during which the equipment is completely disassembled in the specialized conditions of repair plants.

Technical maintenance of the equipment at the trade enterprise organizes.

Specialist (chief engineer, equipment engineer, chief mechanic), appointed by order of the head of the company.

Technical inspection, current, average and capital repairs of the equipment are carried out by experts.

Information on the technical condition of the refrigeration equipment and on the repairs carried out, as well as regulations related to the observance of the rules of operation of refrigeration equipment and safety, the mechanic servicing equipment writes in the maintenance log of refrigeration units.

The maintenance log of refrigeration units is kept by the head of the enterprise, the chief engineer or the chief mechanic of the enterprise.

Daily technical maintenance of commercial refrigeration equipment is provided by store personnel or catering enterprises.

During the operation of refrigeration equipment, the thickness of the snow coat on the surface should not exceed 3–4 mm. At the specified thickness of the snow coat, the defrosting system of the evaporator of refrigeration equipment is activated. Do not use products that may cause scratches on the surface of the evaporator or damage to the evaporator with possible subsequent leakage of refrigerant from the chiller.

At least once a week it is recommended to rinse the internal surfaces of refrigeration equipment with soft degreasing agents with subsequent removal of condensed moisture.

Cleaning of the refrigeration unit from dust and dirt is carried out only by the rules of safety in the operation of refrigeration equipment.

The cooling unit must be turned off and always de-energized!

For normal operation of refrigeration equipment, the following requirements should be met:

1. Equipment to load products only after it reaches the technologically set temperature;
2. The temperature of products placed in refrigeration equipment must not be higher than the air temperature in the cooled volume;
3. Products must be placed in the refrigerator compartment, taking into account the movement of air;
4. It is not recommended to store products that have a pronounced smell.

During the operation of refrigeration equipment it is prohibited:

- operate refrigeration equipment that does not have a protective grounding or grounding;
- open the protective covers of the automation devices;
- dismantle fences from refrigeration units;
- to inspect and repair refrigeration equipment to persons who do not have the appropriate permits and relevant qualifications.

#### **4.5. Control questions, topics of essays on chapter 4**

##### Test questions for Chapter 4:

1. Classification of commercial refrigeration equipment.
2. Rules of operation of commercial refrigeration equipment and safety.
3. Give the main characteristics of the commercial refrigeration equipment, which must be installed in the sales area of the store for selling frozen vegetables and fruits.
4. What are the limitations (technical) during the operation of refrigeration equipment?
5. Expand the question of safety regulations in the operation of commercial refrigeration equipment.

##### Essays' topics for Chapter 4:

1. Scheduled preventive maintenance of commercial refrigeration equipment.
2. Changes in the presentation of products due to shrinkage.

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