

Inventory Management of an Economic Entity – Selected Aspects

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Abstract: Inventory management plays an important role in the enterprise. Every entrepreneur regardless of the size of the company is in contact with the materials. The materials are part of the inventory or tangible current assets. The components of current assets change their natural form in a relatively short time. While running a business the components of current assets are in constant motion, passing through the successive phases of activity and adopting different forms [1]. Inventories of materials are an important part of the assets of the entity. Therefore, there is a need to develop appropriate organizational and technical conditions that would enable comprehensive protection of stocks of materials and proper expenditure. Current analysis and evaluation of the effectiveness of inventory management is one of the most important elements of business management. Maintaining inventories above the amount necessary to the smooth running of business causes the freezing of funds and thereby increases the operating costs of the plant. On the other hand, too low inventory level can cause downtime and contribute to a loss. Efficient management of inventory related to costs and supply has a significant impact on the economic performance of each company. The purpose of this article is to present an outline of theoretical issues relating to inventory management, i.e.: processes carried out in the warehouse, tangible current assets, documentation, material accountancy and valuation of tangible current assets.

Keywords: inventory management, control, tangible current assets

I. Processes At The Warehouse

Warehouse is a functional-organizational unit, designed for storage of inventory, occupying a separate space, equipped with appropriate technical means, managed and operated by a team of people [2]. Processes at the warehouse are the set of activities generally called the storage [3]. These activities are related to the manipulation of inventory (tangible) and temporary storage. In contrast, inventory management refers to finding and practicing methods of maintaining inventory, raw materials, semi-finished or finished products in the amount adequate to provide the maximum level of customer service at minimum cost [4].

Storage process is divided into four basic phases [5]:

- Receiving,
- Storage,
- Completing,
- Releasing.

Receiving material goods by the warehouse is an operation that begins upon delivery from the outside from the supplier or from the inside from another cell of the company. Existing internal transport and handling equipment is necessary to conduct an unloading procedure. The identification of the obtained materials is followed by quantitative and qualitative control.

Quantity control is based on a general inspection of the external object of delivery and compliance of the various ranges of quantities declared with the amount received. Verification consists in weighing or counting individual packages and determining if they are not affected [6]. Quality control depends on the legal requirements and procedures. This is usually a visual inspection. It is verified whether the materials and their protection (e.g. film) do not have any signs of damage (e.g. dents, tears). After completion of the inspection the material is transferred to the storage and formally adopted at the state of a warehouse [7].

Storage is the location of the material goods in a designated storage space under the conditions provided for specific groups of stocks.

Completing involves taking the existing stocks of such materials and in such quantities that result from the ongoing order. The phase of completion is the most difficult part of the process at the warehouse. Typically, the warehouse staff dealing with completing works under time pressure. Most of the complaints related to the issuance of materials from the warehouse is due to the mistakes made while completing.

Releasing goods are physical activities associated with the release of the goods from a warehouse to a fixed recipient with the confirmation of both, the issuer and the recipient. Release of goods is an operation that completes the process of storage. Essential tasks performed while releasing goods are [8]:

- Packaging and forming transport units in a release zone. This applies to load units that have arisen in the process of completion and have not been packed and formed in the phase of completion,
- Release control is checking the prepared goods with the release documents. The completeness of prepared transport units is verified,
- Loading follows a positive result of the inspection. Loading units are grouped in batches of releases according to directions, routes, buyers.

II. Tangible Current Assets

Tangible current assets, as defined by the Act of 29 September 1994, as amended on Accounting (article 3 paragraph 1 item 18, lit. a and point 19) are intended for sale or use within 12 months from the balance sheet date or within the normal operating cycle appropriate for the activity, if it lasts longer than 12 months. They are materials purchased to be used for individual needs, finished products processed or produced by the entity (goods, services) that are suitable for sale or in the course of production, or semi-finished products and goods purchased for resale without further processing [9].

Materials are part of the inventory, i.e. tangible current assets. In accordance with the Accounting Act materials are assets acquired or produced by the entity, intended for use as raw materials for the manufacturing of products (i.e. goods, works and services) or for general economic purposes, including advertising or representation.

Materials are characterized by the fact that they wear during a production cycle and transmit their value as a whole to a manufactured product. Due to the short period of use, within 12 months, or within the normal operating cycle expected for the industry, they are classified as tangible current assets [10].

The materials are mainly used in basic operational activity, and thus in the production and while providing services (directly in the processes of production and manufacturing), although their use is also associated with the necessity of maintenance of machinery and equipment, repairs, heating of the premises, maintenance of cleanliness, sales of products (packaging), as well as the ongoing work of the administrative and office character [11].

No matter the designation, materials are characterized by single-use and transferring their value to the products or to the financial result [12].

Due to the intended use, materials are divided into [13]:

- a) *Basic materials* – materials directly used in the manufacturing process of products.
They are a component of manufactured product called resource. They can also be ordered and semi-finished products, manufactured by another company, that are an integral part of the manufactured product. These are also the basic packages, without which a particular product could not be sold, e.g.: cans, jars, cartons,
- b) *Auxiliary materials* – materials, which are used for purposes of administration, sale or general manufacturing processes. These include, for example, oils and lubricants for machinery and equipment maintenance, working and protective clothing, office supplies,
- c) *fuel* – for example, fuel oil, coal used for heating,
- d) *spare parts of machinery and equipment* – materials used during repair and maintenance,
- e) *Waste* - defective materials or materials formed by cutting the basic materials. Usually they are not suitable for use.

Standardization of supply of materials is associated on one hand with the need to hold stocks that allow maintaining the liquidity of production, on the other hand with the desire to have only the necessary quantities, so as not to freeze the funds nor lead to a situation where excessive stocks could for example be broken or damaged. It is, therefore, necessary to continuously monitor and analyse the condition of materials [14].

Due to the desirability of maintaining, the inventories are divided into [15]:

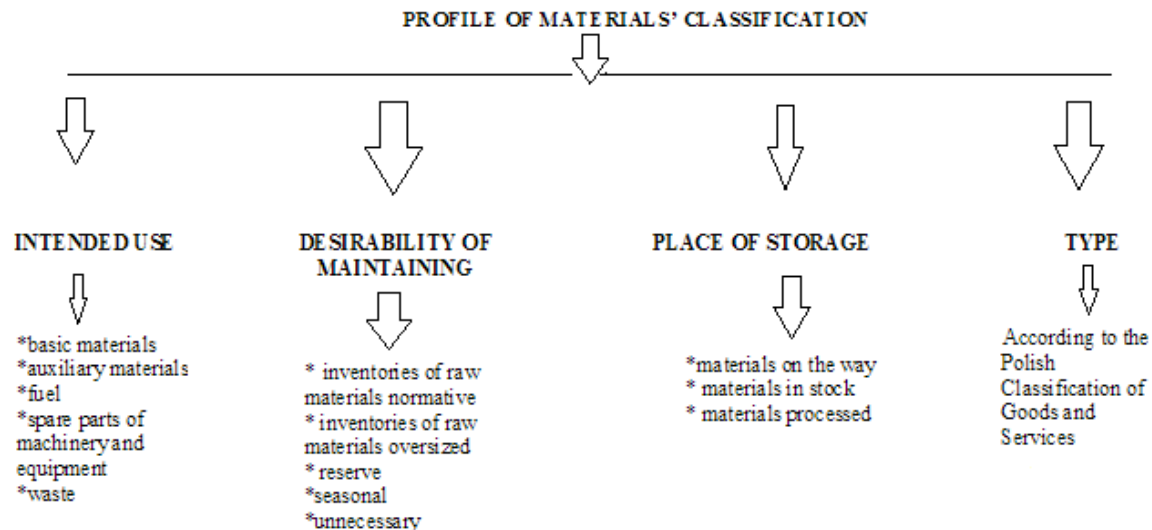
- a) *Normative inventory of materials* – means such an amount, which will ensure the proper functioning of the processes carried out by the unit. The best solution for the control of inventories is the use of the purchase method defined as ‘just in time’. Purchase of materials is made then right before their release.
- b) *Oversized supply of materials* – may include inventory reserve, purchased in the event of unforeseeable circumstances (e.g. natural disasters or other acts), seasonal inventories associated with their production cycle (e.g. crops), as well as redundant supplies. Redundant stocks may consist of nutritious materials whose number far exceeds the needs of the unit (excessive shopping or change or restriction of activities) and defective materials, i.e. those that have lost their properties as a result of various events and factors (were broken, expired, damaged).

Due to the place of storage, the materials can be divided into [16]:

- a) *materials in stock* are divided into: own - materials received from suppliers, tested both quantitatively and qualitatively, delivered to the person responsible for them and stored in the warehouse, external - materials, the adoption of which the recipient refused or materials held in escrow or under a pledge),

- b) *materials processed*, i.e. conveyed to processing in order to adapt them to the needs of production,
- c) *Materials on the way*, i.e. the materials that have been shipped and invoiced but not received by the recipient, or are already received, but have not yet been entered into stock.

Scheme1. Classification of materials



Source: A. Kuzior, *Ewidencyjne ujęcie zakupu i zużycia materiałów*, [in:] *Rachunkowość Finansowa z uwzględnieniem MSSF*, praca zbior. pod red. Z. Messnera, PWN, Warszawa 2007, p. 314.

Polish classification of products and services [17] in conjunction with the classification of economic activities divides materials according to their type, depending on the kind of activity, as a result of which it arose. PCGS gives each material the digital code helpful in the identification of materials.

Finished products are produced by the entity in its production plant, products not subject to further processing, responding to specific technical, commercial and quality standards, accepted during quality control process, intended for sale to external customers or in their own retail outlets [18].

Products in the course are products started, incomplete in terms of technology, that are still in the course of production, requiring further treatment.

Semi-finished products have already undergone particular, technologically closed production phases, primarily intended for assembly or processing in the later stages of the production of the finished product in a manufacturing plant, as the components of this product.

Goods are tangible current assets produced by other entities, purchased for resale in an unaltered form. Goods can also be companies' own products when stores are located in the factory and are sold by the producer in their own retail outlets. Goods also include current assets outside the entity, but being its property, stored in foreign magazines, for example, by written request by the contractor or transmitted by the entity for further processing. Goods are also products which are the subject of buying, for example, agricultural products, forestry products, raw materials, as well as products acquired and held for real estate trading (land, buildings, structures), and the rights to properties acquired for resale, which are not fixed assets. The classification of the asset to the goods depends mainly on how to use it in the enterprise. The same property may be treated as goods by one entity, and as a material (raw material) or a finished product by another entity.

III. Valuation of tangible current assets

According to the Act of 29 September 1994 on Accounting, materials at the time of purchasing are included in the accounts according to the cost of purchase or production costs - if they are manufactured in-house (art. 28, paragraph 11, item 1). Materials at the purchase date may be put in the accounts, including the differences between those prices and the actual prices of their purchase (included in account 34-2 "Deviations from the standard prices of materials" [19].

At the balance sheet day the materials are valued:

- a) according to purchase price (art. 28, paragraph 1, item 6 of the Act)

The *purchase price* is the price including the amount due to the seller with no deductible tax on goods and services and excise duty, plus costs directly attributable to the purchase, including the costs of transportation,

loading, unloading, storage, marketing, and reduced by discounts, deductions, and other similar reductions. The purchase costs can be directly included in the purchase price if it is possible to assign these costs to a particular delivery.

In other cases - the purchase costs are settled in time proportionally between release and stock of a given asset [20].

b) If it does not distort the assets and the entity's financial results - according to the purchase price (Article 34, paragraph 1, item 1 of the above mentioned Law).

The purchase price is the amount due to the seller, without deductible VAT and in the case of import increased by regulatory liabilities and reduced by lower prices (discounts, deductions) [21].

c) Products at production cost.

Production costs include costs directly related to particular product, and a reasonable proportion of the costs indirectly related to the production of the product. Production cost is used for valuation of tangible assets in the form of finished and semi-finished products intended for sale or for own business.

The purchase price and the production cost cannot be higher than the net price of a particular material, goods or product. This is the upper limit of the pricing. If the purchase price is expressed in foreign currency, they are calculated for gold, using the average NBP exchange rate on the business day preceding the date of the invoice.

In cases where the calculation of production cost is impossible or unprofitable, the cost is replaced by the net sales price of the products, so the sale price excluding VAT, reduced by profit, selling expenses and general and administrative expenses.

There are two exceptions from this principle:

- the first exception occurs when products are valued at the net sale price, for the case when the cost of production on the balance sheet date is higher than *the net selling price of the product, and therefore it includes the loss*,
- the second exception occurs when pricing is at net sales price, for the case when determination of the cost of production is:
 - objectively possible; this applies, for example, to so-called by-products appearing in a production process together with the main products (e.g. at the slaughter of animals), by-products are valued at net sales price;
 - Practically intentional (profitable) as the amount of work related to it would be higher than the achieved benefits; the unit does not have the account with the cost of production (eg. production cycle is short, the product range is very wide).

In accordance with the provisions of the Accounting Act materials are included in the books according to their actual purchase price. This means that the cost of the purchase increases the value of the materials. The Act also allows the possibility of valuation of materials based on the market price, if it does not distort the balance of assets and financial results. It is assumed that this condition is fulfilled if the purchase costs incurred by the entity are insignificant in relation to the stock of materials and if stock of materials and related costs of buying persist at a similar level. In such a situation, the cost of purchase are treated as expenses in the period in which they were incurred [22].

Prices, which are used to register materials' inwards and outwards are called fixed prices. In the register of materials there are:

- variable register prices, i.e. real prices,
- Constant register prices, i.e. the prices that do not change over a longer period of time (usually adopted by the entity for use in the fiscal year).

Constant register prices can be set at the level of sales prices of goods or products. In such a case at the moment of acceptance of delivery, there appear the differences between the value of the materials or goods resulting from the invoice in the purchase prices or from the calculation of production costs of products and their value determined through multiplying the accepted quantities of materials, goods or products by constant register prices. Deviations from the fixed prices then appear [23].

All materials' inwards and outwards should be calculated at real purchase prices, ie. according to the invoice prices, plus the costs associated with the purchase. The cost of purchase of each batch of the same material can be different, depending on the supplier's premises, and the purchase price may differ depending on the source of purchase and the price offered. The same material from different supply may have a different price. The following solutions may be applied to calculate the release of materials [24]:

- a) *the earliest price, i.e. FIFO* (first in - first out), involving the valuation on the basis of release evidence according to the price of the first delivery, which is still in the warehouse, and after its exhaustion - on the basis of the prices of the next delivery,

- b) *the latest price, i.e. LIFO* (last in - first out) at which the release evidence is calculated at the prices of the last supplies in stock, and if they are exhausted - at the price of earlier supplies,
- c) *The average price*, based on determining the average price after each delivery, calculated as the ratio of the value of the previous state, plus the latest materials' inward, by an amount corresponding to those values.

Tangible current assets registered at the constant register prices are adjusted in the books by deviations from the fixed prices to the level of their real prices [25].

Deviations, their nature and inclusion in the register can be characterized by the following statements:

- they represent the difference between the real price and the fixed price of a particular batch of materials,
- they are determined to bring the register value from the account *Materials* to the actual value of the stock (usually the purchase price); fixed register price is applied only to the current recognition of acceptance and release of materials, it cannot be the category on which the balance valuation is based,
- to register deviations, a corrective account *Deviations from standard prices of materials* is used; the account was created as a result of the vertical division of *Materials* account,
- by establishing and registering *Deviations*, their nature is defined; it depends on the relationship of the purchase price and the register price:
 - a) if the register price is lower than the real price, the deviations are debit - they increase the value of the materials covered by fixed register prices on *Materials* account - they are recognized on the debit side of the account of deviations; in this case the value of the purchase price is determined according to the following equation:

$$\text{Purchase price} = \text{fixed register price} + \text{deviation}$$

if the register price is higher than the real price, the deviations are credit - they reduce the value of the materials covered by fixed register prices on *Materials* account - they are recognized on the credit side of the account of deviations; purchase price in this case can be described as follows:

$$\text{Purchase price} = \text{fixed register price} - \text{deviations}$$

- b) because deviations correct the value of materials, and these may in part be consumed, and partly be treated as a closing stock, so at the end of the month there should be proportional settlement of deviations between the value of the materials used and the rest in stock; fixed register price is used for the current valuation of the release of materials, it cannot be, however, a parameter for measuring the consumption of materials; settlement of deviations allows to determine the real amount of costs incurred due to the consumption of materials.

In the case of fixed register prices the valuation of the release of materials proceeds through two stages.

In *the first stage* on a regular basis throughout the month, all the release documents are settled, according to fixed register prices. Application of the fixed register price is a consequence of the adoption of such a system of pricing while accounting the accepted materials. It is necessary to maintain the same principles of pricing operations that expand and reduce the status of the *Materials* account. In such a system, the value of materials is recognized also in part on the account that corrects *Deviations from the standard register prices of materials*.

The second stage of pricing the release of materials is to measure the deviations for consumption and stock. It can be said that deviations always "follow" the materials. If there is no release of materials, the deviations appear in full on the corrective account associated with *Materials* account. If the materials are released, an appropriate part of deviations shall be transferred to the place where the value of the materials consumed by fixed register prices appears. Regardless of the nature of the deviations, the division between supply and consumption must be proportional. In order to determine the deviations attributable to used materials we need to determine the rate of deviation margin, and deviation margin attributable to the materials used. *The rate of deviation margin* is the relation of the value of deviations to the value of materials (we consider the states before the releases). The rate is expressed as a percentage and answers what percentage of the value of the materials are deviations. Calculation of the rate allows the analysis of valuable relationships of deviations and materials. The higher the rate, the greater the difference between the actual value and register value of the materials. A considerable growth of the rate may be a signal informing about the need for change in fixed register price.

Determining the rate shortens the procedure for determining deviations referring to particular directions of the release of materials, eliminates the need for determining at least some proportion of deviations for each of the partial use of materials. To determine the deviation margin, a predetermined rate and the value of materials which may be revised by the deviations is used.

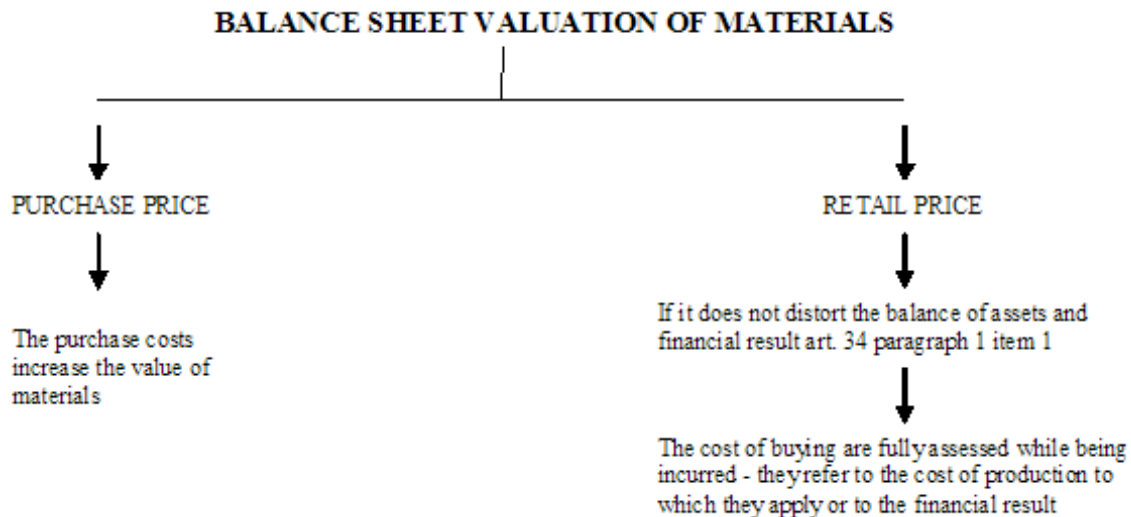
Settlement of deviations can also be seen in terms of balance sheet valuation of inventories of materials and measurement of financial results through proper determination of costs of materials.

IV. Valuation of Materials

Valuation of tangible current assets is to determine the quantity and value of inventory on the specified day. Material valuation is made on the balance sheet day at sales price, purchase price or production costs not higher than the prices of their net sales.

Balance sheet valuation of materials is based on the purchase price or, if certain conditions are met, the price of sales. Possible variants of materials valuation is shown in the following diagram.

Scheme2. Variants of the balance sheet valuation of materials



Source: A. Kuzior, *Ewidencyjne ujęcie zakupu i zużycia materiałów*, [w] *Rachunkowość finansowa z uwzględnieniem MSSF*, praca zbior. pod redakcją Z. Messnera, PWN, Warszawa 2007, p. 316.

In the financial statements materials may not be recognized at the higher value than the net sale price [26] obtainable at the balance sheet day, or the selling price of the asset, without tax on goods and services and excise duty, reduced by discounts, rebates and other similar reductions and costs associated to bringing the asset to be sold and selling, and extended by a specific subsidy [27].

At the valuation of goods, materials and packaging on the balance sheet day, the reduction of use value or commercial value [28], including impairment, is taken into account [29]. This means that the goods, packaging and materials that have lost their value, in consequence of damage, due to permanent loss of commercial value or purchases made in excessive amounts, or due to exceeded expiry date, should be evaluated to estimate the size of the depreciation and to replenish stocks to the realizable value (price). Evaluation of the usefulness of inventories should follow a regular basis, although it is not stated in the Act, and the effects of a reduction in value should be charged to other operating expenses, when noticed [30].

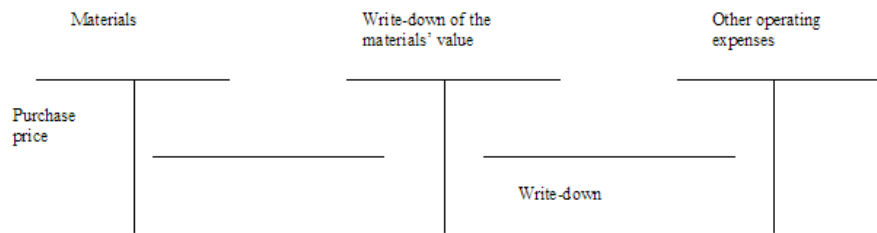
Differences arising from the valuation shall refer to the account *other operating expenses*.

Materials are valued in the financial statements at a purchase cost or net realizable value, depending on which amount is lower. Net realizable value is a specific category for a particular business unit. The general principle of the balance sheet valuation of materials does not allow a situation in which materials would be disclosed in the value that exceeds the economic benefits expected in connection with the use or sale of materials [31].

Tangible current assets may permanently lose the ability to sell or use them in business as a result of e.g. expiry of shelf life or use, damage, etc. Then an individual can make their liquidation.

In a situation where the component of the stocks is not suitable for business use, ie. it does not meet the criteria set out in Art. 3 point 1 item 12 of the Accounting Act (in the future it will not be economically profitable), it should be derecognised from the balance sheet records and liquidated. The costs and income associated with the liquidation of assets, account for the remaining operating costs or possibly other operating income. These are events not directly related to operating activities (art. 3 point 1, item 32 of the Accounting Act). However, if liquidation is made because of a random event (e.g. fire, rainstorm), the effects associated with it will be classified as extraordinary losses or extraordinary gains.

Scheme3. Write-down scheme



Source: T. Żyznowski, *Wzorcowy plan kont SPZOZ*, Wyd. PCE, Warszawa 2002, p. 173.

If the reason of the impairment losses has become obsolete (it turns out that the materials will be used), the impairment adjustment shall be made to the account other operating income. Reducing impairment loss cannot cause materials to exceed the value of the original purchase price. Inventories of goods, materials that irreversibly have lost the ability to be disposed or used as a result of expiration, must be derecognised from the balance sheet records and classified as other operating expenses.

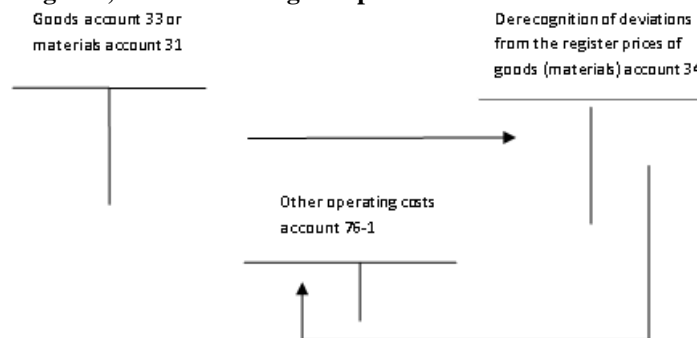
1. When an entity recognizes the goods (materials) at the purchase price or sales price:

Scheme4. Recognition of goods, materials at purchase price or sales price



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013
 When an entity recognizes the goods (materials) at register prices

Scheme5. Recognition of goods, materials at register prices

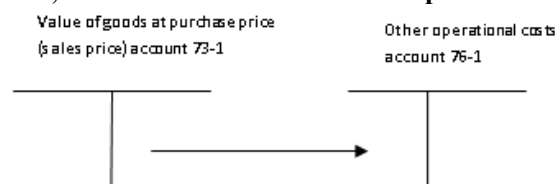


Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

When the entity writes-off goods (materials) to the costs at the time of purchase (art. 17, par. 2 point 4 of the Accounting Act)

a) Reclassification of liquidated goods directly charged to the cost of a year.

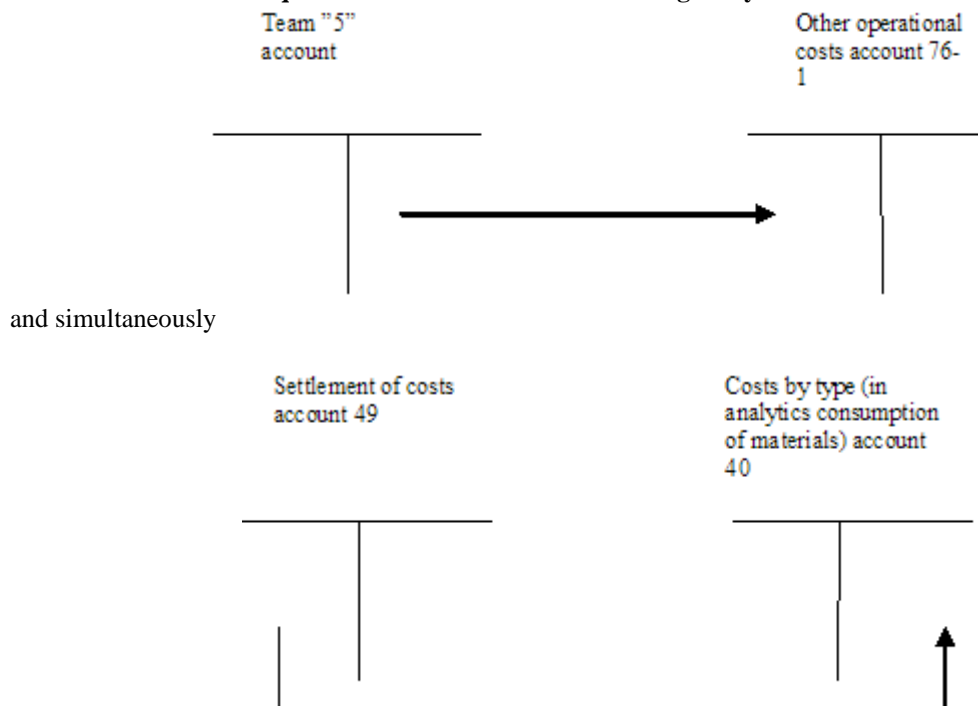
Scheme6. Write-down of goods, materials in costs at the time of purchase



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

a) The reclassification of liquidated materials posted directly to the cost of a given year (after purchase) in the case of full register of cost of the operational activity.

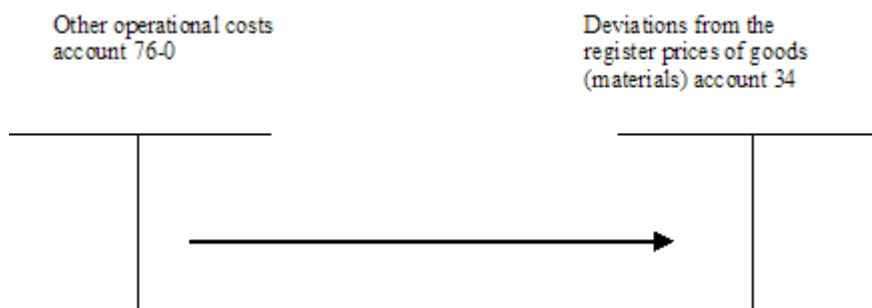
Scheme7. Transfer of liquidated materials in the costs of a given year



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

If liquidated stocks were previously covered by the write-downs (in connection with the loss of value), while making the decision on liquidation, the previous write-down should be derecognized, according to:

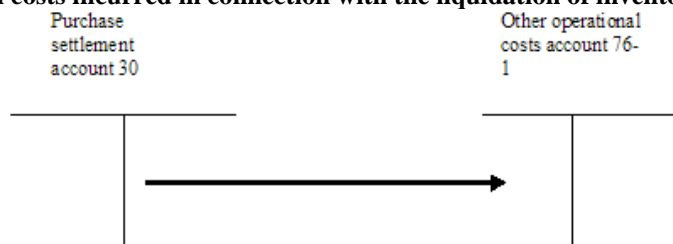
Scheme8. Derecognition of a previous write-down



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

Additional costs incurred in connection with the liquidation of inventories, e.g. due to their disposal, charge other operating costs of the entity. They are accounted e.g. on the basis of invoices from contractors

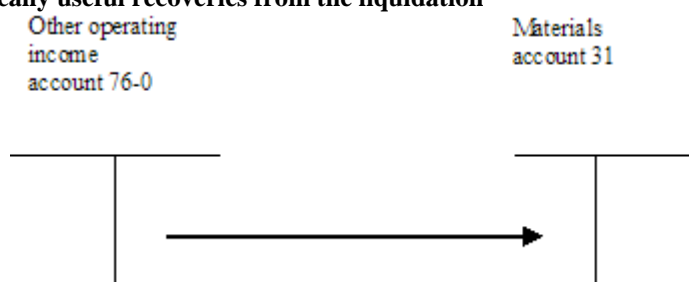
Scheme9. Additional costs incurred in connection with the liquidation of inventories



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

Any recoveries from liquidation, which may be economically useful, entered to the inventory, should be included in the balance sheet as shown below (Scheme 10):

Scheme10. Economically useful recoveries from the liquidation



Source: *Likwidacja zapasów w księgach rachunkowych*, Gazeta Prawna nr 44 from 03.06.2013

Liquidation of inventory is documented by a decision of the head of the unit and the protocol of liquidation. The decision is the basis for writing off the inventory from the balance sheet, and the protocol documenting the physical liquidation shall be made on the date of liquidation. Documents should meet the data for accounting evidence, in particular, they should include the data identifying the destroyed inventory (including the type, quantity, unit price and value), and the causes and circumstances of the liquidation.

Documenting losses in stocks is one of the conditions for them to be classified as tax expenses. Possible inclusion of such losses in tax expenses depends on whether the loss is not due to negligence of the taxpayer. If liquidation does not occur due to the fault of the taxpayer, the expenditure incurred on their purchase or production can be classified as deductible expenses at the time of their physical liquidation, if they are properly documented.

V. Conclusion

One of the most important questions of tangible current assets of the entity are the inventories of materials, which should result in economic benefits.

The processes of the inventory are associated with receiving, storing, completing and issuing materials in appropriately prepared place. These processes begin upon delivery and receipt of materials by the employee responsible for the entrusted property.

All operations associated with materials management should be properly documented. For this purpose the warehouse documents that illustrate the fact of economic operations in accordance with the actual course are needed. Records of materials is designed to protect property, control of the implementation of supply, consumption of materials and changes in inventories.

Management of materials inventory involves interaction of two important and at the same time opposing tendencies. The first is to ensure high availability of materials. The second is to strive for a low freezing of capital in inventories of materials. In fact, there is almost never a situation in which the level of stocks would reach zero. Enterprises forecasting the occurrence of difficulties in the supply, maintain a certain level of inventory, which provides them with continuous operation. These additional reserves are called margin of safety.

The stocks should be adjusted to the expected sales. Maintaining stocks in the company incurs certain costs, but also carries certain benefits. Thus, in practice, the elimination of inventory seems neither possible nor preferred.

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