

Concept Paper on Inventory Valuation



**Valuation Standards Board
and
ICAI Registered Valuers Organisation
The Institute of Chartered Accountants of India
(Setup by an Act of Parliament)
New Delhi**

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Message

It is truly said that the right to practice a profession carries a duty to protect the society and is not a privilege for the benefit of the professional. A professional often serves the society, while he is usually paid by his client, and it is extremely important that the society's interests are kept above his own. Similarly, in the valuation profession the strength and efficiency of a valuation process and in turn its outcome will remain undiluted only if the Registered Valuers observe high standards of professional ethics.

At ICAI Registered Valuers Organisation (ICAI RVO), it is our continuous endeavour to develop and issue various publications and papers so that the discipline of valuation is continuously enriched, and the Registered Valuers gain global presence. In pursuit of the above objective, ICAI RVO and the Valuation Standards Board (VSB) of ICAI have undertaken this joint initiative and are bringing out this Concept Paper on Inventory Valuation to outline considerations for estimating the fair value of inventory.

I am happy and appreciative of this initiative undertaken by the Valuation Standards Board (VSB) of ICAI under the Chairmanship of CA. Anil S. Bhandari, Vice Chairman CA. M P Vijay Kumar and I also thank my colleagues on the Board of ICAI RVO Shri Pawan Singh Tomar, Shri Ashok Haldia, Prof. Anil Saini, CA. Nihar N. Jambusaria & CA. Prafulla P. Chhajed for their efforts and support.

I also appreciate the efforts of Shri. Rakesh Sehgal, Managing Director ICAI RVO and CA. Sarika Singhal, Officiating CEO ICAI RVO and Secretary, Valuation Standards Board and Ms. S. Rita, Deputy Secretary ICAI for their significant contribution in finalisation of this Concept Paper.

I am confident that this Concept Paper will help Registered Valuers in developing a better understanding of the subject and drive greater efficacy in valuation activities undertaken by them.

Date: 30th January, 2022

Place: New Delhi

Rajeev Kher

Chairperson and Independent Director, ICAI RVO

Message

Valuation is a multi-disciplinary profession which includes knowledge of other fields like law, economics, statistics, finance, accounting, engineering etc. As a valuation professional, one needs to continuously build up his competency to meet the requirements of this ever-changing field of practice.

In India, IND AS 2 “Inventories” and AS-2 “Valuation of Inventories” prescribes the accounting treatment for inventories which provides that the inventories shall be measured at cost or net realisable value, whichever is lower. However, it is also important to understand that there is a very thin line of difference between the book value of inventory and the fair value of inventory, and particularly between the fair value and net realisable value.

At this juncture, I accolade the efforts of Valuation Standards Board of ICAI and ICAI Registered Valuers Organisation for taking the collective efforts in bringing out this Concept Paper on Inventory Valuation which will help the readers in understanding this difference and also guide them about the key approaches and methods used in ascertaining the fair value of inventories.

I extend my appreciation to the members of the Board of ICAI RVO and the Valuation Standards Board of ICAI and especially to CA. Anil S. Bhandari, Chairman, Valuation Standards Board and CA. M. P. Vijay Kumar, Vice-Chairman, Valuation Standards Board for bringing out this Concept Paper for the benefit of members and other stakeholders.

I am sure that the members and other stakeholders will find this Concept Paper extremely useful in understanding the nuances of inventory valuation while discharging their professional duties.

CA. Nihar N. Jambusaria
President, ICAI
Director ICAI RVO

Date: 30th January, 2022

Place: New Delhi

Message

Valuation of an asset is an estimate of its worth, arrived at after factoring in multiple parameters, externalities, and assumptions. Valuation though backed by research and analysis involves significant amount of judgment, hence a Valuer needs to test reasonableness of assumptions, as mere estimations without substantiation do not facilitate independent evaluation of fair value.

Book value of inventory is far from the Fair Value of inventory and for valuing an inventory at Fair Value it is extremely critical to understand the economics of the value chain right from procurement to sale. The Concept Paper on inventory valuation will help valuers in understanding different approaches and methods that are available for inventory valuation and also the rationale and appropriateness for the adoption of a particular valuation methodology over others.

I compliment the efforts of all the members of the Board of ICAI RVO under the Chairmanship of Shri Rajiv Kher, and the members on the Board of Valuation Standards Board (VSB) of ICAI under the Chairmanship of CA. Anil S. Bhandari and Vice Chairman CA. M P Vijay Kumar, for jointly bringing out this Concept Paper for the benefit of members and other stakeholders.

I am confident that this publication would be extremely helpful for the members and other stakeholders in developing their skills and competencies.

Date: 30th January, 2022

Place: New Delhi

CA. (Dr.) Debashis Mitra

Vice-President, ICAI

Message

The need for valuation services has been increasing rapidly over the years, so also the influence of valuation professionals in the making of the society and the economy. In the current day world, valuation of underlying assets and businesses forms an integral part of many market-based transactions such as mergers, acquisitions, take over, liquidation, issue of securities etc.

Inventories are generally the second largest component on the asset side of a balance sheet and largest component under the current assets, hence its valuation for financial reporting is critical. Inventory Valuation is not only required for financial reporting and accounting but Fair Value of Inventory is also needed in course of mergers, demerger, liquidation, insolvency, transfer pricing, litigation and fund raising to name a few.

To foster professional excellence amongst the valuation professionals, the Valuation Standards Board (VSB) of ICAI together with ICAI Registered Valuers Organisation is bringing out this Concept Paper on Inventory Valuation. The Concept Paper provides guidance on how to estimate the Fair Value of Inventory and also explains the thin line of difference between the Book Value and Fair Value of Inventory.

We extend our appreciation to the members of the Board of ICAI RVO and the Valuation Standards Board in supporting and contributing towards bringing out this Concept Paper for the benefit of members and other stakeholders.

We commend the efforts of CA. Parag Kulkarni and CA. T. V. Balasubramanian who helped in finalizing of the Draft Concept paper. We commend the efforts of Shri Rakesh Sehgal, Managing Director, ICAI RVO; CA. Sarika Singhal, Officiating CEO, ICAI RVO and Secretary VSB, ICAI for their contribution in finalisation of this Concept Paper and also their team members viz. Ms. Seema Jangid, Assistant Secretary ICAI and CA. Pragya Agrawal, Assistant Project Officer ICAI for their technical and administrative support.

We are confident that the Registered Valuers (RVs) and the Valuation Professionals will find this Concept Paper extremely useful in developing their skills and competencies.

CA. Anil S. Bhandari
Chairman,
Valuation Standards Board

CA. M. P. Vijay Kumar
Vice-Chairman,
Valuation Standards Board

Date: 30th January, 2022

Place : New Delhi

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1. Introduction

Inventory valuation is a valuation activity undertaken to determine the value of inventory or closing stock as on the valuation date. Inventory is an asset for an organization and includes finished products, work in progress goods and raw materials.

The Ministry of Corporate Affairs has notified IND AS 2 “Inventories” and AS-2 “Valuation of Inventories” which prescribes the accounting treatment for Inventories in India. Both these Standards provides that the inventories shall be measured at the lower of cost and net realisable value. IND AS 2 deals with the determination of cost and its subsequent recognition as an expense, including any write-down to net realisable value. It also provides guidance on the cost formulas that are used to assign costs to inventories.

It is worth noting here that there is a thin line of difference between the book value of inventory and fair value of inventory. Book value based on historical costs ignores the value created as the inventory moves up the value chain, hence it is generally lower than the fair value of Inventory.

Ind AS 113 – Fair Value Measurement, defines fair value and sets out the framework for measuring fair value. However same does not specify guidelines particularly specific to Inventory.

The Institute of Chartered Accountants of India has also issued ICAI Valuation Standards 2018 comprising of 8 standards on various aspects of valuation, but none of them specifically provides guidance relating to the valuation of Inventory.

Considering the above factors, this concept paper has been developed to discuss technicalities involved in the valuation of Inventory. The purpose of this concept paper is to outline the process for estimating the fair value of Inventory and to bring more uniformity in this area of valuation practice.

Physical verification of Inventory and/or determining the physical availability of the inventory is not considered within the scope of this concept paper.

2. Definition of Inventory

IND AS-2 on "Inventory" defines Inventory as: - *"Inventories are assets:*

- (a) held for sale in the ordinary course of business;*
- (b) in the process of production for such sale; or*
- (c) in the form of materials or supplies to be consumed in the production process or in the rendering of services."*

It can well be said that Inventory basically includes:-

- a. Finished goods that are purchased or produced completely and awaiting sale.
- b. Work-in-progress – Materials that are introduced into the productions process but yet to be completed into a finished good.
- c. Raw materials, components, stores and spares (all together as Raw Materials) - Goods that are yet to be introduced into the production process are the raw materials.

It is important to note here that Inventory excludes all goods or assets that are subjected to depreciation and is to be treated as Property, Plant or Equipment. Hence, any spare parts / Asset which can be used only in connection with an item of fixed asset and whose use is expected to be irregular and which is to be treated as property/plant/equipment shall not be treated as inventory; For eg: A vehicle will be treated as inventory for a manufacturer of vehicles but will be a fixed asset for an entity wherein it is part of its fleet.

Inventories include items as described in paragraphs above and classified as inventories in the normal course of business, even if the business has since then been discontinued or has been afflicted by insolvency or bankruptcy process.

This concept paper applies to all inventory other than following as the numerous and varied aspects of these specific assets were not considered or envisaged in the preparation of this paper.

- a. Real estate assets
- b. Intangible assets, even if these are held in the normal course for sale
- c. Biological assets (i.e., living animals or plants) that are either related to agricultural activity or part of agricultural produce at the time of harvest
- d. Financial instruments
- e. Art works and antiques

3. Importance & Need for Inventory Valuation

Inventories are generally the second largest component on the asset side of a balance sheet and the largest component under the current assets. Hence its valuation, as per the reporting requirements, is extremely critical as it impacts the financial reporting and all the critical ratios of an entity. Correct Inventory valuation is also important as the reported inventory amount directly impacts the cost of goods sold and hence profitability of the entity.

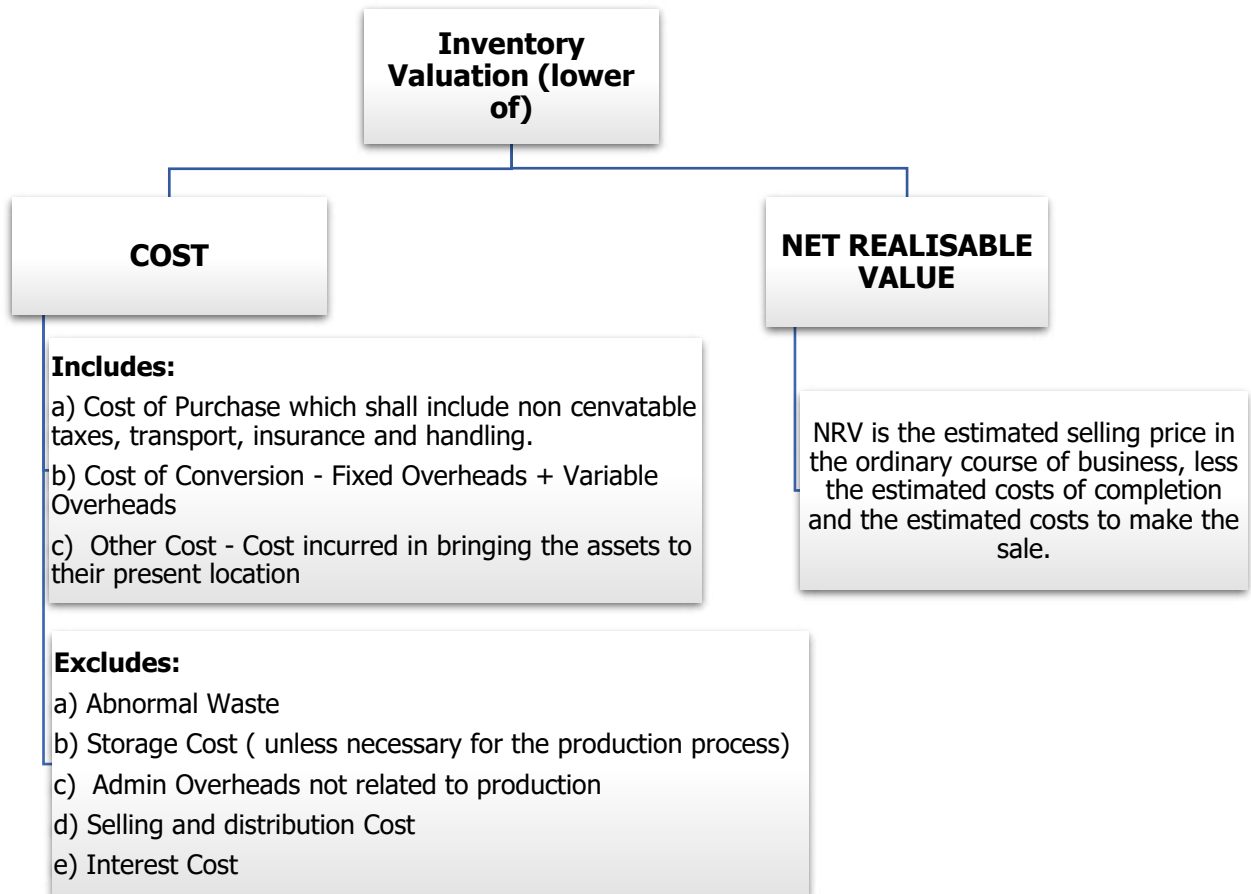
Inventory Valuation is required by an entity on account of following: -

- a. For financial reporting purposes; valuations of inventory are often required in course of accounting under IND AS or Accounting Standards
- b. In course of mergers, demergers or business acquisitions; valuation of inventory is often needed at fair value to determine the transaction value.
- c. Valuers may be asked to value inventory for insolvency resolution/liquidation.
- d. For tax reporting purposes inventory valuations are needed for transfer pricing analyses, ad valorem taxation analyses.
- e. Inventory may be the subject of litigation, requiring valuation analysis in certain circumstances.
- f. Entities intending to raise fund may ask Valuers to value inventory that is being used as collateral.

4. Key aspects of Inventory Valuation as per IND AS

Ind AS 2 prescribes that the inventories shall be measured at the lower of cost and net realisable value.

Valuation of Inventory as per Ind AS 2 can be summarised in a chart as hereunder: -



a) Cost of inventories

Cost of inventories comprises of costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

i) Costs of purchase

The costs of purchase of inventories comprise of purchase price, import duties and other taxes (other than those subsequently recoverable by the entity from the taxing authorities), and transport, handling and other costs directly attributable to the acquisition of finished goods,

materials and services. Trade discounts, rebates and other similar items are deducted in determining the costs of purchase.

ii) Costs of conversion

The costs of conversion of inventories include costs directly related to the units of production, such as direct labour. They also include a systematic allocation of fixed and variable production overheads that are incurred in converting materials into finished goods. Fixed production overheads are those indirect costs of production that remain relatively constant regardless of the volume of production, such as depreciation and maintenance of factory buildings and equipment, the cost of factory management and administration etc. Variable production overheads are those indirect costs of production that vary directly, or nearly directly, with the volume of production, such as indirect materials and indirect labour.

The allocation of fixed production overheads to the costs of conversion is based on the normal capacity of the production facilities. Normal capacity is the production expected to be achieved on an average over a number of periods or seasons under normal circumstances, taking into account the loss of capacity resulting from planned maintenance. The actual level of production may be used if it approximates normal capacity. The amount of fixed overhead allocated to each unit of production is not increased as a consequence of low production or idle plant. Unallocated overheads are recognised as an expense in the period in which they are incurred. In periods of abnormally high production, the amount of fixed overhead allocated to each unit of production is revised based on such higher production, on a conservative approach to valuation.

iii) Other costs

Other costs are included in the cost of inventories only to the extent that they are incurred in bringing the inventories to their present location and condition. For example, it may be appropriate to include non-production overheads or the costs of designing products for specific customers in the cost of inventories.

Cost Formulae

An entity shall ascertain the costs of inventories by applying proper techniques and cost formulae. The costs of inventories of items that are not ordinarily interchangeable, and goods and services produced and segregated for specific projects shall be assigned by using specific identification of their individual costs. The cost of inventories, other than above, shall be assigned by using the first-in, first-out (FIFO) or weighted average cost formula. An entity shall use the same cost formula for all inventories having a similar nature and use to the entity.

b) Net Realisable Value

As mentioned earlier, net realisable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and the estimated costs necessary to make the sale. Estimation of net realisable value is an important point in valuing inventories. If the net realisable value is lower than cost, then inventories are shown at net realisable value. The practice of writing inventories down below cost to net realisable value is consistent with the view that assets should not be carried in excess of amounts expected to be realised from their sale or use. Estimates of net realisable value are based on the most reliable evidence available at the time the estimates are made, of the amount the inventories are expected to realise.

5. Differences between Ind AS 2 (Inventories) and AS 2 (Valuation of Inventories)

- i) Ind AS 2 deals with the subsequent recognition of cost/carrying amount of inventories as an expense, whereas the AS 2 does not provide the same
- ii) Ind AS 2 provides explanation with regard to inventories of service providers whereas the AS 2 does not contain such an explanation
- iii) AS 2 explains that inventories do not include machinery spares which can be used only in connection with an item of fixed asset and whose use is expected to be irregular; such machinery spares are accounted for in accordance with Accounting Standard (AS) 10, Accounting for Fixed Assets. Ind AS 2 does not contain specific explanation in respect of such spares as this aspect is covered under Ind AS 16.
- iv) Ind AS 2 does not apply to measurement of inventories held by commodity broker-traders, who measure their inventories at fair value less costs to sell. However, this aspect is not there in the existing AS 2.
- v) Ind AS 2 defines fair value and provides an explanation in respect of distinction between 'net realisable value' and 'fair value'. The AS 2 does not contain the definition of fair value and such explanation.
- vi) Ind AS 2 provides detailed guidance in case of subsequent assessment of net realisable value. It also deals with the reversal of the write-down of inventories to net realisable value to the extent of the amount of original write-down, and the recognition and disclosure thereof in the financial statements. AS 2 does not deal with such reversal.
- vii) Ind AS 2 excludes from its scope only the measurement of inventories held by producers of agricultural and forest products, agricultural produce after harvest, and minerals and mineral products though it provides guidance on measurement of such inventories. However, AS 2 excludes from its scope such types of inventories.
- viii) AS 2 specifically provides that the formula used in determining the cost of an item of inventory should reflect the fairest possible approximation to the cost incurred in bringing the items of inventory to their present location and condition whereas Ind AS 2 does not specifically state so and requires the use of consistent cost formulae for all inventories having a similar nature and use to the entity. Ind AS 2 also explains this aspect
- ix) Ind AS 2 requires more disclosures as compared to the AS 2

6. Differences between Ind AS 2 and US GAAP – ASU 2015-11

ITEM	IND AS	US GAAP
Inventory Costing	The cost of inventories, other than that which is not ordinarily inter changeable, shall be assigned by using the first-in first-out formula (FIFO) or weighted average cost formula. LIFO is not permitted.	The cost of inventories can be assigned by using the first in-first out (FIFO), last in-first out (LIFO) or weighted average cost formula.
Inventory Measurement	Inventory is measured at the lower of cost and net realisable value. Net realisable value is estimated selling price less cost of completion of sale.	Inventory that is measured using method other than LIFO or the retail inventory method is measured at lower of cost and net realisable value. Inventory that is measured using LIFO or the retail inventory method is measured at lower of cost or market value. Market Value is defined as current replacement cost subject to an upper limit of net realisable value and a lower limit of net realisable value less a normal profit margin.
Reversal of Inventory write-downs	Reversals of Inventory write downs are permitted for subsequent recoveries.	Reversals of write-downs are prohibited.

7. Techniques used to Ascertain Inventory Cost for Financial Reporting and Accounting

Inventory items are generally fast-moving assets, i.e., constantly moving in the supply chain cycle and are being sold and restocked continuously and thus the cost keep changing. Hence selecting a cost flow formula is critical in determining the Cost of Inventory for financial reporting. Cost flow formula can be first in-first out; weighted average; last in-first out and specific identification.

- i) **First in First Out (FIFO)** - It assumes that the items of inventory that were purchased or produced first are sold first, and consequently the items remaining in inventory at the end of the period are those most recently purchased or produced. Hence under this method, the inventory is being valued close to the current replacement cost. During periods of inflation, amongst all the approaches FIFO will result in the lowest estimate of cost of goods sold and the highest net income.
- ii) **Last in First Out (LIFO)** - It assumes that the items of inventory that were purchased or produced last are sold first, and consequently the items remaining in inventory at the end of the period are the oldest inventory. The cost of inventory under LIFO is hence based upon the cost of material bought earliest. During periods of inflation, use of LIFO will result in the highest estimate of cost of goods sold and thus the lowest net income.
- iii) **Under the Weighted Average Cost (WAC)**, the cost of each item is determined from the weighted average of the cost of similar items at the beginning of a period and the cost of similar items purchased or produced during the period. The average may be calculated on a periodic basis (such periodicity itself to be also determined by each entity), or as each additional shipment is received, depending upon the circumstances of the entity. The averaging technique method makes valuation of inventories convenient during times of volatile price change.
- iv) **The specific identification method** of inventory costing attaches the actual cost to an identifiable unit of product. Under the specific identification method, the entity must identify each unit in inventory, unless it is unique, with a unique identification tag or serial number. This method is particularly used by entities dealing or manufacturing high valued large inventory items such as airplanes.

As discussed above, under INDAS 2 the costs of inventories of items that are not ordinarily interchangeable and goods and services produced and segregated for specific projects shall be assigned by using specific identification of their individual costs. The cost of inventories, other than above, shall be assigned by using the first-in, first-out (FIFO) or weighted average cost formula. An entity shall use the same cost formula for all inventories having a similar nature and use to the entity. The company is expected to be consistent in its application of the selected cost flow assumption.

8. Differences between Fair Value and Book Value in Inventory Valuation.

Book Value of Inventory is far from the fair value of Inventory. As discussed above the book value is either valued at cost or net realisable value, while fair value of inventory reflects the price at which an orderly transaction to sell the same inventory in the principal (or most advantageous) market for that inventory would take place between market participants at the measurement date. Hence the fair value of the inventory will be the amount that will be received by the concerned entity through sale of the inventory in its existing condition to a market participant at the measurement date and hence includes the expected return/profit as well.

For valuing an inventory at fair value, it is extremely critical to understand the economics of the value chain. An entity undertakes any activity with the sole objective to earn profits and the final selling price includes all the related profits that it expects to earn for value created by undertaking the entire production and sale process. All expenses are incurred by any entity with a single objective of earning profits and hence value is added at every single stage right from procurement to sale.

Book value based on historical costs completely ignores the value created as the inventory moves up the value chain. Profits earned and value added in the production process, which generally reflects the return on the inputs utilised, are not considered in case inventory has been valued at cost and hence it is generally lower than the fair value of Inventory.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale. Hence book value based on net realisable value considers the value to be generated in the complete value creation process including the margins that will be generated post valuation date through the activity that are pending to be undertaken on the inventory before it can be sold. Hence net realisable value is generally higher than the fair value of inventory.

Further, the profit margins generated at different level of the process chain varies depending upon the value added by that process and is not prorated based on the cost incurred at different processes. Determining and allocating profit margins over different processes is

extremely important and critical in the process of Inventory valuation. Hence understanding the economics of value chain for the entire process is crucial before starting Inventory Valuation.

Example:

For a wholesaler, most of the margin is earned from sale and marketing process, hence its profit margin on its basic inventory will be low, while for a manufacturer most of the value is created at production stage and hence the profit margin allocated to the WIP or finished good shall be high.

Second major difference between the net realisable value and the fair value is that while net realisable value is an entity-specific measurement while fair value is market-based measurement. Hence Net realisable value for inventories may not be equal to fair value less costs to sell.

Example:

An entity holds inventories of 10000 units and it could sell the same in the market @ Rs.10/- each after selling expenses. The entity has an order in hand to sell the inventories @ Rs. 11/- In this situation, fair value is Rs 10/- each, but net realisable value is Rs. 11/- each.

9. Approaches and methods in inventory valuation and selection of correct approach

The three valuation approaches described in ICAI Valuation Standard 103-“Valuation Approaches and Methods” are Market Approach, Income Approach and Cost Approach. In addition to the methods prescribed in ICAI Valuation Standard 103 the following two additional methods can be used for inventory valuation i.e., the Top-Down Method or the Bottom-Up Method. Both these methods have elements of all three approaches i.e., cost, market and income approaches.

i) The Top-Down Method

The Top-Down method begins with estimating the selling price and deducting remaining costs and estimated profit on such further activities which are allocable to future actions to be taken post valuation date. This method attempts to bifurcate the efforts, and related value, that were completed before the valuation date versus those efforts that are to be completed after the valuation date. Hence this method is quite similar to estimating the Net Realisable value with an additional step of excluding the estimated post valuation profits.

ii) The Bottom-Up Method

The Bottom-Up Method begins with the book value of inventory and adjusts same for returns on manufacturing assets and processes. It can be used to cross check the valuation results from Top-Down Method. The Bottom-Up Method can also be considered for such valuations when the valuer is not able to obtain sufficient and appropriate data to use the Top-Down Method.

As per ICAI Valuation Standards, a valuer shall select that valuation technique which maximises the use of relevant observable inputs and minimises the use of unobservable inputs. Therefore, the Top-Down Method shall be the preferred method for valuation of work-in-progress and finished goods as they are close to sales and hence subjective assumptions will be lesser as Top-down approach begins with sale price.

Similarly, for raw materials inventory bottom-up method shall be the preferred approach, where book value or current cost is used. If there are observable market information, such information should be used to estimate the fair value of raw materials. *Further, the basic underlying principle of these two approaches is that the fair value of inventory fundamentally shall be the same under both these methods.*

Valuer has to consider the purpose of inventory valuation before selecting appropriate valuation approaches and methods. The choice of valuation methodology should be determined based on various factors including the premise of value, valuation bases, availability of reliable information etc.

Fair value measurement standards under other frameworks, such as Ind AS 113, gives priority to market-based inputs for valuation, but Market Approach will have a very limited direct application for valuation of inventory since products are different from each other and there seldom will exist an exact same comparable product for a subject.

10. Market Approach and Comparable Transaction Method

As defined in ICAI Valuation Standard 101 – Definitions, Market approach is a valuation approach that uses prices and other relevant information generated by market transactions involving identical or comparable (i.e., similar) assets, liabilities or a group of assets and liabilities, such as a business.

The Market Approach for valuation can be considered for

- a. inventory of commoditised products, or
- b. inventory in which a market exists for the inventory at an interim stage in the production process.

While using the Market Approach based on Comparable Transactions, where evidence of market prices is available, valuers should make adjustments to reflect differences between the subject inventory and those involved in the comparable transactions. These adjustments are necessary to reflect the differentiating characteristics of the subject inventory and those involved in the transactions. Such adjustments may only be determinable at a qualitative, rather than quantitative, level. However, the need for significant qualitative adjustments may indicate that another approach may be more appropriate for the valuation.

Since products are different from each other and there seldom will exist an exact same comparable product, the Market Approach, i.e., reference to market activity and consideration of market prices involving identical or similar goods, has limited usage for the valuation of inventory. However, on a case-to-case evaluation, there may be situations where this method could be chosen by the valuer as most appropriate, considering all factors involved in the valuation.

11. Steps in Top-Down Method of Inventory Valuation

- a) **Estimating the selling price** - The top-down method would begin with estimating the selling price of the subject inventory assuming it is complete. The selling price so determined should reflect the market price of the finished good, i.e., the price that a market participant would pay for purchasing the inventory from the reporting entity assuming it is completed.
- b) **Estimating and deducting the remaining cost to complete sale** - This step is generally required in case of work in progress and not for finished goods. This cost includes all of the expenditures remaining to be incurred directly or indirectly, post the valuation date to bring the inventory to its finished condition. The completion costs of inventories include costs directly related to the units of production, such as direct labour/material and also include a systematic allocation of fixed and variable production overheads that are incurred in converting materials into finished goods and also the selling and distribution cost associated with the final sales of the goods.
- c) **Estimating and deducting the profits allocated to actions to be taken post valuation date** - The next step in valuation of inventory is allocation of profit between the profit earned pre-valuation date and the profit earned post-valuation date. Profit margins allocable to the completion activities pending and selling process to be undertaken, together forms the profits to be earned post valuation date.

One of the methodologies to identify the post valuation date profits can be to use operating profit margin of the company. However, this methodology assumes the profit margin would be proportional to the costs incurred which is rarely the case in real practice. Hence valuers should not simply allocate profit in proportion to different costs as this assumption can misallocate profit. For example, for manufacturers, this method is inappropriate if materials costs represent a substantial initial outflow without any significant efforts.

Hence, as discussed above understanding the economics of value chain for the entire process is crucial before starting Inventory Valuation. The profit margins generated at

different level of process chain varies depending upon the value added by that process and is not prorated based on the cost incurred at different processes.

12. Steps in Bottom-Up Method of Inventory Valuation

The bottom-up-method is generally used for valuation of raw materials and major steps involved are as under: -

- a) **Determining the Book Value of the Inventory** – The starting point of this method is to ascertain the book value of the subject inventory based on the financial statement of the party. Book value as per financial statements in India is lower of cost or net realisable value. Hence it is extremely important to understand how the book value has been arrived at and what adjustments have been made therein. Book value needs to be adjusted for these additional adjustments if the book value as per the acquiree's financial statements differ from that of a market participant in fair value determination. The book value shall represent the current replacement cost and necessary adjustments shall be made in case it does not.
- b) Add cost of holding, buying and any other manufacturing or procurement expense or **overheads that are already incurred** but not included in the book value.
- c) **Add appropriate share of profit** for total costs and efforts already incurred till pre valuation date.

13. Significant Issues to be considered in Inventory Valuation

i) Value Addition by Intangible Assets in Inventory Valuation

It is extremely critical for a valuer to determine the value added by various intangible assets like trademark, R&D, technology etc, whether purchased or internally generated, at different stages in the entire value chain process. The returns on the intangible shall be considered to determine the post and pre valuation date profit margins correctly.

In a bottom-up approach if the intangible is expected to be utilised in future and has not been used yet on the subject inventory then the profits to be earned post valuation date shall be suitably increased to account for the returns from the intangible asset, and the resultant impact will be reduction in the value of inventory. In case the intangible asset is used in the stage of production and pre valuation date then the return from same shall be added to the value of inventory by suitably adjusting the profit margins.

Further, there can be an intangible asset that contributes at more than one level of value creation, say both in the manufacturing as well as sales of the product. For eg: an automobile intangible that consists of both technology and brand name. This will require a valuer to ascertain how the returns from different elements of the intangible needs to be allocated in the entire value chain so as to determine the pre and post valuation date profits margin.

ii) Holding Cost

The Holding cost is the opportunity cost of the return on investments that is held up in the inventory during the time taken to sell the inventory. It includes not only the interest cost on the value of inventory but also warehousing cost, storage and handling and risk associated with storage. Holding costs may be immaterial if the inventory turnover is high and it is a fast moving good.

However, it is important to understand that while considering holding cost it shall not be included in any other assumptions or else it will lead to dual consideration. For eg:- if profit margins are being calculated based on EBIDTA then the post valuation profit

margins will be higher and would automatically include the interest cost and hence holding cost need not be considered separately.

14. Case Studies

Case Study 1 - Concept of Cost of Purchase

- a) Peace Ltd. imported goods for ₹ 5,00,000 including ₹ 20,000 non-refundable import duties and ₹ 10,000 refundable taxes. Peace Ltd. incurred a transport cost of ₹ 5,000 to bring the goods to the retail outlet. Peace Ltd. also incurred selling costs of ₹ 1,500 and transport cost of ₹ 2,000 to deliver the goods to the customer's place. What is the cost of purchase?
- b) Cost of a unit is ₹ 1,000. Supplier gives discount of 15% if Peace Ltd. orders 100 units or more. Peace Ltd. buys 150 units.

Solution-

- a) Paragraph 10 of Ind AS 2 states cost of inventories shall comprise
- all costs of purchase,
 - costs of conversion and
 - other costs incurred in bringing the inventories to their present location and condition.

Paragraph 11 can be summarised as:

Cost of purchase = purchase price + import duties and other taxes (non-refundable) + other direct costs – discounts and rebates

Purchase cost in this case is 500000 less refundable taxes 10000 (non-refundable import duties will be included in cost of purchase) plus 5000 (transport)

Particulars	Amount (₹)
Goods imported for	5,00,000
Less: Refundable taxes (non-refundable import duties are included in 5,00,000. That need not be deducted)	(10,000)
Add: transport cost to bring the goods to retail outlet	5,000
Cost of purchase	5,05,000

b) Cost of a unit is ₹ 1000. Supplier gives discount of 15% if Peace Ltd orders 100 units or more. Peace Ltd buys 150 units.

As explained above in Paragraph 11, cost of purchase = purchase price – discounts

Hence cost of purchase = $1,000 * 85\% * 150 = 1,27,500$

Cash and volume both discounts are to be reduced.

Case Study 2 - Comparison of Cost and Net Realisable Value

ABC Ltd., a renowned company in the field of pharmaceuticals has the following 4 items in inventory: The Cost and Net realizable value is given as follows:

Item	Cost	Net realisable value
P	5,000	4,800
Q	2,000	2,100
R	3,500	3,550
S	3,200	2,990
Total	13,700	13,440

Determine the value of Inventories:

- On an item by item basis
- On a group basis

Solution-

Inventories shall be measured at the lower of cost and net realisable value.

Inventories are usually written down to net realisable value item by item. In some circumstances, however, it may be appropriate to group similar or related items. This may be the case with items of inventory relating to the same product line that have similar purposes or end uses, are produced and marketed in the same geographical area, and cannot be practicably evaluated separately from other items in that product line.

It is not appropriate to write inventories down on the basis of a classification of inventory, for example, finished goods, or all the inventories in a particular segment.

Item by item basis	Value
P	4,800
Q	2,000
R	3,500
S	2,990
Total	13,290
Group basis	13,440

Valuer's are advised to, generally, value inventories by comparing cost and NRV on item basis.

Case Study 3 - Allocation of fixed overheads: Single product

Peace Ltd. manufactures a product AB that needs 2 units of A and 4 units of B. Cost of A is ₹ 50 and cost of B is ₹ 15. The production process is mechanised and machine has a dedicated operator. The inspection process is manual and there are 4 inspectors involved. They work full time. There are two managers employed by Peace Ltd. One for the factory and the other is responsible for administration. The premise is leased in return for a fixed annual rental. In addition, the machinery financed by loan that bears 10% interest per year.

Suppose Peace Ltd. incurred fixed production overheads of ₹ 12,00,000 during one month period in which normal capacity of production is 4,00,000 units of AB. Calculate fixed overheads allocated per unit of AB in each of the following three cases:

- a) 4,00,000 units of AB are actually manufactured
- b) 6,00,000 units of AB manufactured
- c) 2,00,000 units of AB are manufactured

Solution-

Cost of conversion = direct cost + indirect cost (allocated production overheads)

Allocated production overheads = fixed production overheads + variable production overheads

Paragraph 12

The cost of conversion includes the direct costs and fixed and variable production overheads. Direct costs in this example are the cost of materials A and B.

Fixed production overheads include

- Salary of the operator
- Salary of inspectors
- Depreciation on machinery
- Salary of factory manager
- Rent of the factory area

The interest on the loan is not a cost of production. It is finance cost and it is recognised as an expense to profit or loss.

The salary of manager who is responsible for administration is also not a production cost as it is related to non-factory related administration.

The three cases above are answered in accordance with paragraph 13 of Ind AS 2

Paragraph 13 says that the allocation of fixed overheads to the costs of conversion is based on the normal capacity of production facilities. Hence, in this case the fixed production overheads will be allocated over 400000 units of AB (normal capacity of production)

1. In case A, fixed overheads allocated per unit of AB will be = $12,00,000/4,00,000 = ₹ 3$
2. In case B, there is abnormally high production. As stated in paragraph 13, in the periods of abnormally high production, the amount of fixed overhead allocated to each unit of production is decreased so that inventories are not measured above cost.
Hence in this case, fixed overheads allocated per unit of AB will be = $12,00,000/6,00,000 = ₹ 2$ per unit
3. As per paragraph 13, the amount of fixed overhead allocated to each unit of production is not increased as a consequence of low production or idle plant. The production in C is lower than the normal capacity of production. Here the fixed overheads allocated per unit of AB will be ₹ 3 (as calculated in case A where production = normal capacity)

And the remaining unallocated overheads = $12,00,000 - (2,00,000 \times 3) = ₹ 6,00,000$, are recognised as an expense in profit or loss in the period in which they are incurred.

Case Study 4 - Allocation of fixed overheads: Joint product and By-product

Allocate overheads over Joint Product and By Product on the basis of data below.

Input	Units	Rs.
Raw Material	1000	100000
(Say Rs.100 per unit)		
Labour/ Wages		200000
Overheads		
- Fixed	50000	
- Variable	30000	80000
Total		380000

Output	Total Units Output	Closing Stock Units
JP 1	500	100
JP 2	300	50
BP	100	Nil

Selling

Prices

JP 1	Rs.200/ Unit	Scrap - Rs.500
		Cost of Processing BP -
JP 2	Rs.300/ Unit	Rs.1000
		Cost of Packaging BP -
BP	Rs.50/ Unit	Rs.500

Solution-

Step I Calculation of NRV of By Product

Particulars	Rs.
Selling Price of by-product	5000
(-) Processing cost	-1000
(-) Packaging Cost	-500
Thus, NRV of By-Product	3500

Step II Calculation of Cost of Conversion

Particulars	Rs.
Raw Material	100000
Labour/ Wages	200000
Overheads	80000
(-) NRV of By Product (See Step I above)	-3500
(-) Sale value of Scrap	-500
Total Cost	376000

Calculation of Sale

Step III Value

Particular	JP 1	JP 2
Output Produced (units)	500	300
Selling Price/ Unit	Rs.200/ Unit	Rs.300/ Unit
Sale Value	100000	90000
Ratio = 10:9		

In this ratio, we have to allocate total conversion cost we calculated in Step II above.

Step IV Allocation and calculation of Conversion cost per unit

Particulars	JP 1	JP 2
Total cost of Rs.376000	1,97,895	1,78,105
in the ratio of 10:9		
Output (Units)	500	300
Cost/ unit	396	594

Valuation of

Step V Inventory

Particulars	JP 1	JP 2
Cost/ unit	395.7894737	593.6842105
Closing Stock (Units)	100	50
Value of Closing Stock	39578.94737	29684.21053

Case Study 5 - Consideration of Other Costs in Valuation of Inventories

Discuss if the following costs are included in cost of inventories:

1. Wasted material (abnormal)
2. Storage costs necessary in the production process before further production stage
3. Advertising
4. Administrative costs unrelated to production process

Solution-

No	Costs	Reasons
1	Wasted material (abnormal)	Excluded Abnormal amounts of wasted material, labour, production costs are excluded from inventories and recognised as expense in the period in which it is incurred.
2	Storage costs necessary in the production process before further production stage	Included Storage costs are excluded unless those costs are necessary in the production process before a further production stage.
3	Advertising	Selling costs are excluded and are recognised as expense in the period in which it is incurred
4	Administrative costs unrelated to production process	Excluded and are recognised as expense in the period in which it is incurred

Case Study 6 – Standard Cost Model

Peace Ltd. is a manufacturer of a product. Capacity of production is 10,000 units. The standard cost card for one unit of the product is:

Particulars		Amount	Cost per unit	
Raw material	2 Kgs	₹ 4 per Kg	$4 * 2$	8
Labour	8 hours	₹ 5 per hour	$8 * 5$	40
Variable overheads	8 hours	₹ 1.50 per hour	$8 * 1.50$	12

Actual quantity manufactured = 9950 units

Actual expenses incurred:

Raw material	₹ 82,000
Labour	₹ 3,90,500
Variable Overheads	₹ 1,23,500
Total	₹ 5,96,000

Estimate the cost of inventory by Standard Cost Method.

Solution-

According to paragraph 21, techniques for the measurement of the cost of inventories, such as the standard cost method or the retail method, may be used for convenience if the results approximate cost. Standard costs take into account normal levels of materials and supplies, labour, efficiency and capacity utilisation.

Standard Cost is the predetermined cost based on attainable efficiency standards for a given volume of output.

When the entity is following the standard cost method, the standard cost per unit is used to calculate standard cost for the total units produced during the period. For the 9950 units during the period:

Raw material	$9950 * 2 * 4$	79,600
Labour	$9950 * 8 * 5$	3,98,000
Variable Overheads	$9950 * 8 * 1.50$	1,19,400

Total		5,97,000
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Hence, by standard cost method, units produced (9,950 units – actual production) will be valued at ₹ 5,97,000 as shown in the calculation above.

Case Study 7 – Retail Cost Model

Peace Ltd. sells the product at ₹ 75 per unit. The profit margin is 20% on selling price. Rest of the facts are same as stated in the question above. Estimate the cost of inventory by Retail Method.

Solution-

The retail method is often used in the retail industry for measuring inventories of large numbers of rapidly changing items with similar margins for which it is impracticable to use other costing methods. For e.g. cold drink seller, fast food seller etc.

The cost of the inventory is determined by reducing the sales value of the inventory by the appropriate percentage gross margin. Thus, profit of 20% on sales shall be reduced from sales amount.

$$75 * 20/100 = 15 \text{ and } 75 - 15 = 60.$$

After reducing the profit margin from the selling price, the units produced will be valued at Rs60 per unit. Hence, for 9950 units, the value is $9950 * 60 = 597000$.



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