

about 2780 Å. A great deal of work has been done to show that the quality and stability criterion for medicinal liquid paraffin can be based on such spectrophotometric data. The gist of this work was published in the 1951 volume of the *Journal of Pharmacy and Pharmacology*. The criterion is briefly this: for medicinal liquid paraffin to be stable, the ratio of the absorption intensities of the maximum at about 2710 Å. and the minimum at about 2490 Å. must be at least 2, and the absorption intensity of the maximum not larger than  $E_{1\text{cm}}^{1\%} = 0.1$ . When a liquid paraffin shows very little absorption in this spectral region, the absorption intensity at 2710 Å. must be smaller than  $E_{1\text{cm}}^{1\%} = 0.006$  for the material still to be stable and of good quality when its spectrum does not show any band structure in this region.

Thus, a quantitative assessment is given of the quality and stability of medicinal liquid paraffin by two figures derived from the ultra-violet spectrum of the material; its absorption intensity at 2710 Å. and the ratio of the absorption intensities at 2710 Å. and 2490 Å.

For other white oils similar types of criteria are easily possible.

From this brief description of one branch of research, it will be realised that the manufacture and use of white oils is a progressive business. Research and development work in this group of specialised products has the continuous attention of chemists and physicists not only in the oil industry but in the research laboratories of the many industries and scientific institutions concerned with their use.

## RECORDS AND COSTINGS IN THE PERFUMERY AND COSMETIC INDUSTRY

E. POLAN\*

**A straightforward method for the easy control of stock and the calculation of costs is described, and specimen record cards are given.**

### INTRODUCTION

THERE IS no need to stress the value of keeping records and calculating costs in an industrial concern. It is only by making use of these that such an organisation can run on a satisfactory basis, and the advantages are of especial value in times of depression or of severe competition. There is also the possibility that certain lines are being sold at a loss—or have such poor sales that the financial return is not worth the trouble involved or the amount of capital tied up.

Admittedly there are some manufacturers—including compounders and cosmetic manufacturers—who run at such a high rate of profit that there is

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no incentive to cut costs or eliminate waste ; but this does not apply to the majority of producers.

It can be taken for granted that the larger firms have their departments dealing with records and costing—usually under the control of an accountant; but in the smaller firms costings are often done in a very rough way, and it is the object of this article to give some indication and make some suggestions to the latter.

The first point to be considered is to what extent the practice of keeping records is to be operated. Somebody must take, collect and extend the records, and this cannot be done without some expense. It is advisable to start off in a small way with, say, one clerk to do this, and later, as the system proves its value, it should be extended, but only for so long as the record department is of economic value. A factory should not be run for the benefit of a record office, and no records should be taken, entered and extended unless some use is made of these. Every organisation must keep some records—dealing with such things as purchases and sales, hours worked and wages paid—but these may be of the simplest nature, just sufficient to carry on the business of the company and prepare a balance sheet.

The organisation of a record and costing system must be in the hands of a capable person—one who has full knowledge of all the processes employed and the materials used. In many factories the only person answering this description is the chemist. We are quite aware that at present he is fully occupied and has a great deal of responsibility, and it may seem unfair to put extra work and responsibility on his shoulders, but once the system has been organised most of the work could be passed to a junior or to the member of office staff specially employed for the work.

As noted above, it is only the economics of production that is being considered in this article, the aim being to reach a higher productive efficiency and to have reliable knowledge of manufacturing costs.

#### STOCKTAKING

All factories carry this out ; many, however, do it in a haphazard way and therefore do not get full value from the records taken. It is surprising, even in well-organised factories, what things come to light at this time—materials which have been misplaced, which are no longer used, but which can be used up in another direction, small amounts of products (left-overs) and returns, obsolete material, etc. Arrangements can be made on the spot for returning these to the production lines or scrapping, so turning some into money and at the same time making more room available.

Stocktaking must be done in a methodical way, and all productive work should be stopped during the stocktaking period. It is almost impossible to carry on production and stocktaking at the same time, and quite impossible to make any check.

Stocktaking should be anticipated in the arrangement of the various items. Every attempt should be made to prevent dispersion of material and all should be stacked in an orderly fashion so that counting is easy. The production department should have manufacture of batches completed and the filling department should try not to have any batches half filled.

In taking stock of raw materials it is advisable to mark the stock sheet with the date of delivery. The office will then know whether the account for the actual delivery has been paid—otherwise errors in value of stock can easily occur.

All consumable stocks must be entered on the stock sheet, but not items of plant or equipment.

Before stocktaking day, stock sheets should be prepared. These should be numbered, dated, give particulars of the department and also the names of the stocktaker and the checker, as well as any other particulars or instructions necessary.

These sheets are to be signed by the stocktaker and checker after stocktaking and returned to the official responsible. The latter will see that all sheets are returned (checking the numbers on the sheet), and sent to the office.

It is usual for the foreman or charge-hand in the department, with the help of an assistant, to take stock, and for the checking to be done by an executive or member of the staff—the latter, in signing the stock sheet, taking full responsibility for the correctness of the entries.

Items of stock must be entered in geographical order—starting at a convenient point and going right through the department. In this way checking is easy and things are not likely to be overlooked.

In taking stock the stocktaker's assistant should call out the different items and the stocktaker should record these on the sheet—making an occasional check, say, one item in three, to see that the description and number are correct. Attention should be given in the record to differentiate between packed and unpacked stocks and empties. The description should be sufficient for the office to be able to price correctly without reference back to the department.

In checking, at least 10 per cent of the items should be checked for description and number, and another 10 per cent should be checked to see these are actually entered on the sheets.

It might be mentioned here that for stocktaking purposes all materials are priced at the purchase price or market price, whichever is the lower.

#### GOODS RECEIVED

In addition to chemical or physical check these materials should be weighed and checked against invoices. Many of the ingredients we use are expensive, and although reputable firms will not knowingly deliver

incorrect weights or quantities, there is a possibility of mistakes by the suppliers, or of leakages or losses during transport from the supplier's to the buyer's premises.

#### MANUFACTURING USES

This entails rather more work—but if the extensions are done once every four weeks a considerable amount of time can be saved. A four-weekly period is better than a calendar month, as normally things are clearer in the department at a week-end than during the week.

The department will make daily records of batches made and the size of the batches, and batches issued to other departments. At the end of each period the total number of batches of each product can be extended to give the total usage of ingredients.

#### FILLING USAGES

The department will make daily entries of batches used after satisfying themselves that the batch is correct size, and will record number of packages produced (giving necessary details of size, type of container and type of packing). It is an advantage if each type of pack of each product is given a number as this number will give all details. Particulars of dispatches to warehouse or sale are also entered.

#### WAREHOUSE

Should agree particulars of all material received from filling and packing department. From the above records it will be quite easy to check up on the productive efficiency of each department and also the overall efficiency. Sales can also be checked against production. Abnormal losses should be investigated at once. The knowledge that records are being kept and that efficiencies are being calculated has a psychological effect on the factory staff and will help to increase efficiency and decrease losses by pilfering or worse.

#### COSTINGS

We are concerned here with the material cost of the finished product. To this material cost it would be the management's responsibility to add other charges such as labour, transport and overheads; and with reference to transport this can be a very heavy item on small deliveries.

Under present conditions when the cost of certain materials fluctuate considerably, the writer suggests the system of averaging. As each fresh delivery of a material comes in an average for value of stock and value of the new delivery is calculated and the new figure is used for costing. This system has the advantage of ironing out pronounced changes in value and gives the opportunity when prices are rising steadily to make necessary adjustments or notify the office of the need to increase prices.

## PERFUMERY COMPOUNDS

It is advisable to cost these on a conservative basis. Losses from leakages, spillages, materials left in container, in filtration and deterioration because of long storage have to be allowed for. The amount of loss will naturally depend on the conditions under which the aromatics are stored, the care with which the compounding is carried out and the size of the batch.

The writer considers that an allowance of 2½ per cent should cover these losses, but he has heard of cases where the figure was 5 per cent. As liquids are normally measured, allowance for specific gravity of the aromatic must be made in calculating the weight. Where solids are used in the compound there is an increase of gravity, but after a series of tests and calculations it has been found that the cost corrected for gravity approximated so closely to the straightforward costing that it was not worth while making this correction.

As mentioned in a previous paragraph, the ingredients are valued at the average value of all stocks of that article.

The costing of compounds must include the labour charges in the operation—because these are a much heavier item per £1 unit of compound than the factory labour charges per £1 unit of production.

The labour involved on different compounds varies enormously, depending on the size of the batch, on the number of ingredients and the amount of solids used. Experimental batches of, say, 4 oz. may take more time, owing to the necessity of accurate weighing and measuring, than a large batch.

Dealing with the experimental batch first, this should be considered as research work and in a small factory should be included in overheads, as the work is for the benefit of the factory as a whole and cannot be charged against any one product. It is suggested that a rough estimate should be made periodically of the time spent on such work and that the total wages of the department be adjusted by this amount.

Daily records must be kept of all the compounds made—these are totalled at the end of the four-week period—and a labour cost per batch figure can be calculated. This is the simplest method and gives a reasonably true figure. More accurate figures can be obtained by multiplying the number of batches by the number of ingredients in each compound and totalling the batch ingredients number, and dividing this into the wages to be accounted for.

It is advisable for the compounding laboratory to have a stock card for each ingredient in stock. These would show particulars of purchase, source, price paid, and usages each four-weekly period. On these cards the average price of the stock could be entered. These cards would show how much of each ingredient was being used and would show when it was necessary to order. A check on stock could be made at any time. These cards act as a check on the compounding department working correctly as any errors in

compounding would show up as an abnormal difference between the paper and the physical stocks. Should any difference appear the stock cards should be corrected to show the physical stock.

#### MANUFACTURING PROCESSES

The ingredient cost per batch is straightforward, but here again cost of labour must be included. A good estimate of time required for a batch of any product can be obtained in consultation with the foreman of the department. Such estimate of time must include the weighing of the ingredients, the actual manufacture, the cleaning of plant and utensils after manufacture and the despatch to the filling department—a proportional increase on such time must be made to cover the receipt of material, the general cleaning of the department and other necessary duties.

Batches ready to send to the filling department should be weighed occasionally. This is necessary to be able to work out the cost per pound of the product and to be able to check on the efficiency of the filling department.

Any abnormal differences between the weight of ingredients and the weight of the batch should be investigated. These may be due to excessive evaporation due to overheating, to spillages or to incorrect making.

#### FILLING DEPARTMENT

The only figure that requires consideration here is labour costs—and the same action to calculate this is taken as in the production department, i.e., consultation with the foreman. This figure must include the washing of containers if necessary—the handling of all empty containers and packing material—filling, labelling and packing, and the despatch of the finished article—the cleaning of equipment after use, and a proportional charge for cleaning the department and other necessary duties.

#### FORMS

The following typical forms are suggested :

1. Stock sheet for annual stocktaking.
2. Stock cards for perfumery.
3. Stock cards for materials.
4. Production department. A. Production programme ; B. Manufacture.
5. Filling department.

1. *Stock Sheet*.—It will be seen that all the necessary information required by the taker and checker is entered on the top of the sheet, and that these have entered sufficient details for the necessary calculations of value to be made. The office will know whether the 10 bags of zinc oxide delivered 27.3.54 have been paid for ; the office can also calculate the weight

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of the two parcels of tallow by working on the average weight of the casks and barrels of these deliveries. The weight of liquid caustic soda would be available from tables. It will be noticed that where necessary cwts., qrs., lbs. are altered to gross : doz. units.

FORM 1

STOCK SHEET—RAW MATERIALS & PRODUCTS

BASEMENT OFFICE BUILDING

SOAP PRODUCTS ONLY

Taken by Mr. Jones

SHEET No. 1

Check: Mr. Robinson

Date 31.3.54

MATERIAL	Size or Mar	Con-tainer	No. of Con-tainers	WEIGHT			PRICE Per	VALUE		
				Cwt.	Qrs.	Lbs.		£	s.	d.
Zinc Oxide BZ&Co	56 lb.	Bags	10	As del	27	3-54				
Zinc Oxide BZ&Co	56 lb.	"	2	1	0	0				
Zinc Oxide BZ&Co	"	"	Part		1	3				
Tallow NZG AB&Co	7 cwt.	Csks	28							
Tallow NZ L CD&Co	3 "	Brls	122							
Caustic Soda MQ 100 Lw	—	Tank	24							
Loose Soap				Gross	Doz					
Mitras 3 oz. Tablets	3 gross	Trays	56	112	0	0				
Mitras 6 oz. Tablets	1 "	"	28	28	0	0				
Packed Soap										
Mitras 3 oz. 3 in Box	1 gross	Packs	24	24	0	0				
Empty Boxes										
Mitras 3 oz. 3 in box	1 gross	Pckts	150	150	0	0				
					Chas. Jones					
					Will Robinson					
					31-3-54					

2. *Perfumery Stock Cards.*—This should be simple to follow. Stocks are taken whenever desired at the end of a four-week period and checked against estimated stock. The actual stock is accepted.

FORM 2

STOCK CARD

PERFUMERY CMP 22

Period	Source	Price	Average Price	Rcd.	Used	Est. Stock	Stock
31.3.53	Stock	29/6	—	—	—	—	225
2.5.53		29/6		—	73	152	
30.5.53		29/6	—	—	84	68	69
27.6.53	Lab	30/6	30/3	224	60	233	
25.7.53		30/3		—	70	163	
22.8.53		30/3			25	138	
19.9.53		30/3			68	70	
17.10.53	Lab	31/-	30/10	224	69	225	224
14.11.53		30/10		—	80	145	
12.12.53		30/10		—	75	70	70
9.1.54	Lab	32/6	31/1	224	20	274	
6.2.54		31/1		—	70	204	
6.3.54		31/1			86	118	
31.5.54		32/1			70	48	50

3. *Material Stock Cards.*—Are filled as perfumery stock cards except that no average price is worked out. Actual stock can be taken at any time desirable and figures entered in red.

FORM 3

STOCK CARD

MATERIAL Nerolin Bromelia

RECEIPTS

USAGES

STOCK ESTIMATED

Date of Receipt	Source	RECEIPTS			USAGES			STOCK ESTIMATED				
		Cwts	Qrs	Lbs	Date	Charge	Cwts	Qrs	Lbs	Cwts	Qrs	Lbs
25.4.53	Stock 31.3.53									1	2	0
23.5.53										1	5	26
20.6.53										2	2	19
13.7.53	J.S. & Co.	3	0	0						2	2	17
15.8.53										3	2	15
12.9.53										2	5	10
10.10.53										3	0	10

4. *Manufacturing and Packing Sheets.*—*Sheet A*: A copy of this sheet on which are entered the production and filling programme is sent to the processing and packing departments at the beginning of each week. This

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gives an opportunity for the charge-hand to check up on his requirements and to notify the buying department of any shortages, in which case the programme may have to be changed. It also helps in planning the work during the week. *Sheet B*: Processing department will fill this sheet daily and get the necessary signatures for the goods issued to the packing department. At the same time giving a receipt for any goods returned.

FORM 4A

DESPATCH TO PROCESSING AND PACKING.  
WEEKLY ORDERS to be given in on MONDAY.

Date..... No. ....

Product	Quantity Required	Size	Internal Order No.	If for Stock	Received By

FORM 4B

PROCESSING TO PACKING FLOOR

DATE..... No.....

Product	Quantity	Line	Yield	Bulk Received by	Returned to Processing	Received by

5. Packing department will fill this sheet daily, getting the necessary signatures from warehouse or dispatch department—at the same time giving a receipt for any goods returned.

FORM 5

PACKING TO DESPATCH FLOOR

DATE..... No.....

Product	Quantity	Process Sheet No.	Received by	Despatch Order No.	Internal Order No.	Received by

The above general scheme for costing should present no serious difficulty in a small or medium-sized factory. Some trouble and expense would be involved in starting up and running it, but once it is organised it should be a valuable asset. Where such a scheme is too involved or where the production, filling and dispatch departments are intermixed, it should be an easy matter to pick on the essentials of use and to operate a simpler scheme covering these points only.

## ON PURCHASING ESSENTIAL OILS

W. R. LITTLEJOHN, B.Sc., A.R.I.C.\*

**With the widening appeal of odours and flavours many not previously interested in Essential Oils have now to purchase them. Guidance is given to the accepted works of reference for the chemical analysis of samples and practical suggestions are made for their olfactory and/or gustatory evaluation. The attitude of the industry towards variation within deliveries is explained.**

THE BUYING and evaluation of essential oils is the concern of nearly all who have to impart aroma and flavour to a product. The ramifications of the essential oil industry are large, and it often falls to the lot of a buyer or a chemist in another branch of chemistry quite different from that of essential oils to have to buy and pass judgment on various samples of essential oils from different sources. The offers from different sources vary tremendously in price, and this has to be taken into account in conjunction with the quality when the final decision has to be made.

It cannot be too strongly stressed that a chemical examination to see if the essential oil fulfils certain standards set out in the literature is in reality only part of the evaluation procedure.

Another point to be noted is that essential oils are natural products and as such vary from season to season and from locality to locality. In some respects they may be likened to wine for vintage years and localities. The one salient point that must be borne in mind by the buyer and by the chemist analysing the oil is that it is bought in order to perfume or flavour a finished product, and it is the odour or flavour of the finished product which is the deciding issue since these are the selling factors of the product. So one test which *must* be carried out before any final decision can be made is to make a small batch of the finished product and to compare this with a standard one to see how the flavour or the odour of the essential oil comes through.

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