

QUANTITATIVE AND QUALITATIVE RECEPTION OF PETROLEUM PRODUCTS

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***Abstract:** Quantitative Reception aims to establish the quantity in liters (for liquid petroleum products) and in kilograms (for solid petroleum products), using the same means and methods as practiced by the supplier, as shown by the delivery documents accompanying the respective transport. Qualitative reception of petroleum products by tank-wagons, tanks, barrels, cans or pipelines shall be carried out by the commission reception unit, together with the quantitative reception.*

***Keywords:** Quantitative reception, qualitative reception, volumetric method, sampling*

Introduction

The present moment is characterized by the wide-ranging phenomena of globalization, which includes Romania as a member of the European Union where free competition on national markets has been replaced by large corporations with integrated activities from production, marketing, finance and others. They favor monopoly policies where the main purpose is to increase sales volume and maximize profits, so increasing attention to some of the company's growth-enhancing activities are absolutely necessary.

Fundamental prescriptions refer to terminology, metrology, conventions, signs and symbols in the field of petroleum products, these must be learned and applied. Without the knowledge of standards on test and analysis methods that measure the characteristics of petroleum products, one can not talk about finding quality management contributions to improving the marketing of petroleum products.

Organizational standards that relate to must be known and improved, such us the description of the functions of a petroleum product marketing system and to the relationships between them and to the structures of the activities (quality management and assurance, maintenance, value analyzes, logistics, quality management, project or system management, production management).

Regarding at the issue of the transport of petroleum products and their reception it is necessary to make some considerations in this direction.

Depending on the way of transportation of petroleum products it is distinguished: the quantitative reception of products received through pipelines, by tank wagons, by tanks, by river tanks, as well as the reception of solid bulk products received by wagons or the reception of petroleum products packed in barrels, boxes, recipients.

Qualitative reception of the products received in the commercial units is made by the reception committee, which will include the delegate of the quality laboratory (CTC) or the chairman of the reception committee, where there is no such laboratory.

1. Quantitative reception of products received in tank wagons

After the availability of the tank wagon which does not have technical or commercial deficiencies, the receiving committee of the commercial unit will proceed to the quantitative reception with the participation of:

- the supplier's delegate so that the documents concluded and signed by the supplier are enforceable in court;
- the ROMCONTROL delegate, if the ROMCONTROL stamp is stamped in the documents stating that the loading was done in the presence of its representative;
- the independent delegate;
- the delegate of the carrier, if he has permanently delegated to the commercial unit.

Depending on the technical endowment of commercial units with weighing platforms, the quantitative acceptance of tank wagons is done gravimetrically or volumetrically.

Quantitative weight acceptance by gravimetric method is carried out in commercial units equipped with weighing platforms as follows:

- determine the BRUTO weight of the tank wagon and compare it with the BRUTO weight included in the transfer / delivery documents, as follows:
 - if the BRUTO weight differs from the BRUTO weight in documents by less than $\pm 0.2\%$, continue the reception by unloading the tank wagon;
 - if the determined BRUTO weight differs from BRUTO weight in documents by more than $\pm 0.2\%$, a preliminary receipt report shall be drawn up, recording the deficiencies found, specifying all the elements that led to the respective findings.
- determine the weight of the tank wagon after unloading, respectively TARA;
- NETO weight is calculated as follows:
 - if the NETO weight determined by calculation differs from the NETO weight of the accompanying documents by less than $\pm 0.2\%$ the reception is completed;

- if NETO weight determined by calculation differs from NETO weight in documents by more than $\pm 0.2\%$, the tank wagon is kept at the supplier's disposal and a preliminary receipt report is prepared.

For the quantitative reception report by gravimetric method, the wagon weighing note must be attached. It will contain both BRUTO, TARA and NETO for the tank wagon and the following data:

- the name and surname of the person making the weighing, his signature and the stamp certifying the weighing operation;
- the date and time when the weighing operation was performed.

Quantitative reception by volumetric method is performed in commercial units that do not have weighing platforms and products are received in calibrated tank wagons.

2. Reception of petroleum products received by tanker

Reception of petroleum products received by the tanker shall be carried out in the presence of the transport accompanying person or in his absence, but in the presence of the authorized driver for this purpose, proceeding as follows:

- a) verify:
 - the existence of the calibration certificate of the non-expired tanker for each compartment;
 - the correspondence between the volume inscribed in the accompanying transport documents and the capacity entered in the calibration certificate;
 - correct sealing of the loading holes of the tank and its discharge holes, with the inscriptions on the transport accompanying documents.
- b) unsealed loading holes and check the height of the product for each compartment;
- c) check the water in the tanker compartments;
- d) the appearance of the product is visually verified on a sample taken in a glass cylinder;
- e) determine the density and temperature of the product in the tank at the time and place of reception for each compartment;
- f) the quantity actually received shall be calculated;
- g) the actual quantity received shall be compared with the quantity entered in the accompanying documents for each compartment, plus or minus the difference. If differences are less than $\pm 0.2\%$, the tanker is discharged; If the differences are greater than $\pm 0.2\%$, a preliminary drafting report shall be drawn up.

3. Qualitative reception

Qualitative reception of petroleum products by tank-wagons, tanks, barrels, cans or pipelines shall be carried out by the commission reception unit, together with the quantitative reception.

Qualitative reception is carried out in accordance with the legal provisions in force regarding the quality of products and services as well as the working instructions specific to the activity in the distribution units.

Qualitative reception of the products received in the commercial units is made by the reception committee, which will include the delegate of the quality laboratory (CTC) or the chairman of the reception committee, where there is no such laboratory.

The reception results are confronted with the data included in the delivery documents.

At commercial establishments where there are laboratories or CTC points, the quality control of the products to be received is done by analyzing the products taken by the representatives of the CTC laboratory. Product analysis is done as soon as possible, at the main parameters and depending on the laboratory equipment. The results of the analysis shall be recorded in the analysis report to be submitted to the chairman of the receiving committee.

In commercial establishments where there are no laboratories or CTC points, the quality of petroleum products is checked organoleptically by checking the samples taken from the means of transport in terms of appearance, color, smell, etc.

Sampling is done according to specific standards by one of the members of the reception committee, appointed by its president and trained appropriately. Samples taken will be labeled for identification by registering:

- product name
- number of weight note
- the number of the accompanying consignment note
- the number of the declaration of conformity
- the wagon number
- the truck number
- date, first name and last name of the person taking the sample.

Samples will be sent as soon as possible to the closest commercial unit in the branch to conduct physico-chemical analyzes. For oil products pumped through pipelines, it is mandatory to change their quality every two hours or at smaller intervals, depending on the pumped quantity and duration of pumping. If the product is found to be inadequate within the timeframe set for the quality check, the CTC laboratory will inform the management of the commercial unit to contact the carrier or refinery with the obligation to stop pumping.

The transporter or refinery is required to send a delegate to find out what has been signaled and to determine the measures to be taken to ascertain the

quality of the pumped product and resumption of pumping. Such situations at the same time refer to the CTC compartment within the branch to which the commercial unit belongs.

For packaged petroleum products the qualitative reception consists of:

- checking the integrity of the appropriate packaging, seals and inscriptions;
- sampling and analysis in the CTC laboratory to check the qualitative qualities within the parameters stipulated in the quality standards of the respective products.

If a receipt is found to be packaging with defects or products with quality deficiencies, a preliminary acceptance report shall be drawn up, recording the deficiencies found.

Petroleum products which are found to be inadequate are returned to the supplier or are kept at his disposal, in which case it will be announced in writing.

4. Transport problem - linear programming problem in standard form

The general framework of optimization methods, both theoretically and practically, is given by the mathematical programming models and methods. Many phenomena from the most diverse domains (economy, technique) can be described by linear and especially nonlinear mathematical programming models.

For the transport of petroleum products, the following specific problem (1) - (4) can be applied:

$$f = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij} \tag{1}$$

In addition, we have the following restrictions:

- on availability: $\sum_{j=1}^n x_{ij} \leq s_i, 1 \leq i \leq m$ (2)

- on the need: $\sum_{i=1}^m x_{ij} \leq d_j, 1 \leq j \leq n$ (3)

- on the variables: $x_{ij} \geq 0, i = 1, \dots, m; j = 1, \dots, n$. (4)

The model of the transport problem in balanced form is:

$$\begin{aligned} (\min) \quad & f = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij} \\ & \sum_{j=1}^n x_{ij} = s_i, 1 \leq i \leq m \\ & \sum_{i=1}^m x_{ij} \leq d_j, 1 \leq j \leq n \\ & x_{ij} \geq 0, i = 1, \dots, m; j = 1, \dots, n \end{aligned} \tag{5}$$

The transport problem (5) is a linear programming problem in the standard form, which has $m + n$ restrictions and mxn variables.

Conclusions

Concluding, we believe that the purpose of the reception is to determine effectively the quantity and quality of the petroleum products received, compared to the data included in the transfer / delivery documents and the accompanying transport documents. For this practical approach, four phases are essential to achieving the desired goal: reception of accompanying documents and state of the means of transport, quantitative reception and qualitative reception.

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