

Vessels on Terminals - Release and Measurement of Products in Oil Tankers

Procedure

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

"This Standard is exclusive property of Petróleo Brasileiro S. A. - PETROBRAS, internal application and PETROBRAS Subsidiaries and shall be used by its suppliers of goods and services under contracts or similar under the conditions established in Bidding, Contract, Agreement or similar.

The use of this Standard by other companies / organizations / government agencies and individuals is the sole responsibility of the users.."

CONTEC

Comissão de Normalização
Técnica

SC - 40

Maritime Transpotation of
Petroleum, Derivatives and
Bio-Fuels

Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard N-1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 09/2013) of PETROBRAS N-2670 REV. C 09/2013. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard establishes criteria for inspection and acceptance of tanks in oil tankers in order to ensure the quantity and quality of the products to be handled.

1.2 This Standard establishes the required conditions to be enforced for measurements of liquid loads of oil, its derivatives and ethanol on loading/offloading operations on ships in terminals.

1.3 This Standard establishes the required conditions during initial, intermediate or final release on loading/offloading operations on ships in terminals.

1.4 This Standard establishes the required conditions for inspecting contracts on specialized technical services for inspection of product quantity and quality, in the loading and offloading operations of oil, its derivatives and ethanol, when transported by sea, lake or river.

1.5 This Standard applies to procedures started or revised as of its issuance date.

1.6 This Standard contains Technical Requirements and Recommended Practices.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

Portaria [ANP no. 80](#), de 30/04/1999 - Estabelece o Regulamento Técnico ANP nº 003/99, anexo a esta Portaria, que especifica os óleos combustíveis de origem nacional ou importados a serem comercializados em todo o território nacional;

Resolução [CNP no. 6](#), de 25/06/1970 - Tabelas de Correção das Densidades e dos Volumes dos Produtos de Petróleo;

[NR-33](#) - Segurança e Saúde no Trabalho em Espaços Confinados;

PETROBRAS [N-2673](#) - Embarcações em Terminais - Limpeza de Tanques;

PETROBRAS [N-2689](#) - Operação de Oleoduto Terrestre e Submarino;

PETROBRAS [N-2732](#) - Controle de Qualidade de Produtos e Petróleo;

API [MPMS 17.9](#) - Manual of Petroleum Measurement Standards - Chapter 17 - Marine Measurement - Section 9 - Vessel Experience Factor (VEF) IP Hydrocarbon Management HM 49;

ASTM [D4057](#) - Standard Practice for Manual Sampling of Petroleum and Petroleum Products;

ASTM [D1265](#) - Standard Practice for Sampling Liquefied Petroleum (LP) Gases, Manual Method;

ASTM [D3700](#) - Standard Practice for Obtaining LPG Samples Using a Floating Piston Cylinder;

[ISGOTT](#) - International Safety Guide for Oil Tankers and Terminal.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Vessel Experience Factor - VEF

established factor for a determined vessel which stems from the ratio between the quantities measured on shore tanks and those measured on the onboard tanks. The purpose of this factor is to correct the onboard quantity, and to be an auxiliary tool for checking the consistency of loading or offloading operations

3.2

GIAONT

Operational Monitoring and Inspection Group for Ships and Terminals

3.3

surveyor

independent companies, hired to provide quality and quantity inspection services on operations on ships or barges

3.4

Material Safety Data Sheet (MSDS)

contains information on transporting, handling, storing and disposal of chemicals, taking on account the aspects of safety, health and environment. Also known as the FISPQ (in Portuguese) of the product

3.5

tanker

ship built to transport oil and/or clear and dark derivatives

3.6

Load or Loading Operation (CG)

all previously scheduled operation, preferably of ethanol and oil and its derivatives, which purpose is to carry on board a specified quantity of load on the ships' tanks

3.7

Discharge or Offloading Operation (DG)

all previously scheduled operation, preferably of ethanol and oil and its derivatives, which purpose is to discharge a specified quantity from the ships' load tanks (in this category, the discharge of slop and/or oily residue are included)

3.8

Report of Onboard Quantities and Measurements (RMQB)

document which contains the records of measurements, calculations and comparison of the load quantities handled on board

3.9

slop tank

tank for receiving cleaning and other residue

3.10

ship terminal

port facilities at sea, lake or river for loading and offloading operations of vessels, including operations of anchored ships under the responsibility of the Terminal

3.11

Time Charter Party (TCP)

chartering contract of ships for a specific limited time

3.12

Time sheet (Time log)

form for registering occurrences

3.13

Ullage Temperature and Interface (UTI)

equipment for measuring temperature, ullage, innage and interface between water and oil

3.14

Total Calculated Volume - TCV

total volume of product, sediment and free water, corrected to the reference temperature (20°C in Brazil) through the volume correction factors depending on density for a standard temperature, a pressure correction temperature and others

4 General Conditions

This Section applies to ships for transporting of oil, dark and clear derivatives, and ethanol but chemical or gas tankers.

4.1 Control of Contamination of Products

4.1.1 Responsibility for the cleanliness and adequacy of the vessel's tanks, pumps and grids so they may support the scheduled load is exclusively of the ship. The terminal is in charge of cargo handling up to the manifold of the ship. However, the terminal shall evaluate compliance with PETROBRAS [N-2673](#), concerning the checking of the cleaning status of tanks and proceed as 4.3.3. In case there is contamination, the 3 involved parties (owner of the load, terminal and ship) shall check the causes and the responsibility.

4.1.2 Any contamination of the product shall be detected during loading and/or offloading operations, through quality control procedures of products and products handled.

4.1.3 The sample collecting procedures on the pier, on the manifold of the ship and on the 1st level of the load on the first receiving tank shall be performed to allow the determination of liability for potential contamination. PETROBRAS [N-2732](#) establishes the representative sample of the beginning of the onboard collected load when the product reaches 1m-high or 1 foot-high, from the first receiving tank or from the most critical tank according to the previous load plan.

NOTE To collect for analysis and to store the representative sample from the beginning of the ship's loading, i.e., the 1st meter or the 1st foot of linear height of product of the 1st tank to be loaded into the ship.

4.1.4 Whenever tests detect any contamination, to proceed as to the PETROBRAS [N-2732](#).

4.2 Tank inspection

4.2.1 Considering 4.1.1, and the sampling mechanisms and the tests performed in the terminals, the inside inspection of tanks shall be performed by certified personnel only on the following situations:

- a) loading of aviation kerosene (QAV);
- b) loading of lubricants;
- c) loading of clear products when the last load is a dark one;
- d) when the product selling contract requires such inspection;
- e) loading of products with more restrictive quality standards. Example: diesel S10;
- f) loading of ethanol.

NOTE The need of such inspections shall be confirmed by the Petrobras product quality area.

4.2.2 For scheduling under the situations listed in 4.2.1, the ship's representative shall be informed the ship shall arrive at the loading port with the tanks indicated for inspection in the "free for man" condition.

4.2.3 The inspection of the onboard tanks shall be carried out by an independent inspector, designated by Petrobras, and to be followed up by the terminal's representative.

4.2.4 The inspector shall enter the tanks due to loading for checking out the coating and cleaning conditions, and whether the piping and pumps are drained. The inspector shall comply with the safety procedures from [ISGOTT](#), [NR-33](#), and the specific ones of the ship.

4.2.5 All due procedures for quantitative inspections and determination of any leftovers on board shall be utilized.

4.3 Criteria for Acceptance and Rejection of Tanks

4.3.1 The tanks and their nets shall be fully dry and drained.

- a) QAV
 - tank coating shall be in good condition s (20% max corrosion on the tank's total area);
 - bulkheads, inner structures and bottom of tanks shall be clean and left with no visible residue;
 - the tank, including their grids, shall be left totally dry;
- b) lubes:
 - bulkheads, inner structures and bottom of tanks shall be clean and left with no visible residue;
 - the tank, including their grids, shall be left totally dry;

- c) clear product after dark product:
 - bulkheads, inner structures and bottom of tanks, including their grids, shall be clean and left with no visible residue;
 - tanks and respective grids shall be totally dry.
- d) ethanol after clear products:
 - bulkheads, inner structures and bottom of tanks, including their grids, shall be clean, freshened and left with no visible residue.

4.3.2 The terminal's representative shall not sign-off any tank inspection certificate issued by a third party as to the appropriate use of the tanks for loading.

4.3.3 For preventing undesirable delays should the ship's representative insist on the certificate sign-off for loading, a "ONLY RECEIVED" safeguard shall be issued.

4.3.4 The terminal's representative shall evaluate the information received from the ship about the 3 latest loads shipped in order to avoid product contamination. If the sequencing of the latest loads does not comply with the product to be operated, the terminal's representative shall inform the scheduling and state the reasons by issuing a letter of protest against the ship.

5 Release of Ship

5.1 The initial letter (Annex B) consists of a document which establishes the operational and safety conditions between the terminal and the ship for initial, transient and permanent regimes. This document includes the following information: onshore equipment and measurements (flow rate, pressure, arms and lines), the ship's contract terms and conditions, information about the trip, additional information and notes on operation and safety.

5.2 In order to ascertain the quantities on board and check the readiness of the ship in all aspects, the representatives of the ship and the terminal shall:

- a) hold an initial meeting (information exchange on load/offload procedures);
- b) perform an operational safety inspection of the ship ([ISGOTT](#));
- c) perform a reading of the fore draft, amidships draft and aft draft;
- d) receive documents and samples of the origin (loading/offloading);
- e) sign and deliver documents;
- f) measure product, water, temperature and sampling level, if any, inside the ship's tanks;
- g) calculate the quantities found on board;
- h) balance quantity between origin and destination.

NOTE If necessary, they can go together with an independent inspecting company or a representative of the Federal Internal Revenue.

5.3 On boarding, the terminal's representative, together with the GIAONT, shall contact the officer in charge of the information (first mate or master) about the ship, when the details of the operation to be performed shall be worked out. The representatives of the terminal and the ship shall previously get to know about the quantities and the characteristics of the products to be handled.

5.4 When applicable, all documents issued by the parties shall be signed and stamped by all.

NOTE 1 If the ship's representative refuses to receive any document, this shall be recorded on the back of the document, with sign-offs of 2 witnesses and handled to the ship's agent.

NOTE 2 If the terminal's representative refuses to receive any document, this shall be recorded on the back of the document, with sign-offs of 2 witnesses and delivered to the ship's agent.

NOTE 3 If the ship's agent refuses to receive the document of the terminal, this shall be reported to the person in charge of the ship's schedule.

NOTE 4 One can adopt a unique emitter for both the RMQB and timesheet, which is to be valid for the interested parties.

5.5 In the loading/off-loading operations, the ship's representative is to be in charge of the measurements and samplings of the inboard tanks, with calibrated, certified, and in good shape equipment. If the onboard equipment is not available, the terminal's representative shall provide it.

NOTE The terminal's representative shall supply all due paperwork for the clearance (forms, recipients, seals, labels etc).

5.6 For measurements in the tanks in the terminal, the terminal's representative shall invite the ship's representative for following up on the measurements of the products to be handled.

5.6.1 In order to perform such measurements, the operational safety recommendations provided in the [ISGOTT](#) shall be adopted as a basic safety rule, whether there is or there is not an inert gas system.

5.6.2 The measurements in the onboard tanks can be performed by automated instruments of the ship control panel, which shall have valid calibrations and certificates, in the following situations: **[Recommended Practice]**

- a) for operations in unsheltered terminals in which sea conditions are not favorable;
- b) for cabotage operations with own and chartered ships in TCP, carrying national oil directly from PETROBRAS' platforms.

5.6.3 Should there be any out-of-tolerance measurements as to items 8, 12 from this standard, one shall adopt measuring of the onboard tanks by either UTI probe or manual measuring tape under the ship's representative.

5.7 For measurements of fuel oil, the amount of water and sediment (BSW) which exceeds 1.0% in volume shall be deducted, as per the Portaria [ANP no. 80](#). In case of oil and other derivatives, the discounted shall be full.

5.8 Samples collected at any operational stage and the quality control procedures shall follow the requirements of either the ASTM [D4057](#) or the ASTM [D1265](#). For LPG, the requirements of the ASTM [D3700](#) shall be followed.

6 Initial Release on Loading

6.1 The initial letter (Annex B) consists of a document which establishes the operational and safety conditions between the terminal and the ship for initial, transient and permanent regimes. This document includes the following information: onshore equipment and measurements (flow rate, pressure, arms and lines), the ship's contract terms and conditions, information about the trip, additional information and notes on operation and safety.

6.2 When boarding the ship, the terminal's operator shall require from the ship's representative all the documents from the origin. Such documents comprise: measurement report of onboard tanks at the original port, product test certificate (for remaining product) after the last operation, existing amounts of bunker (diesel or fuel oil) and water for consumption of the ship after berthing, and other information deemed necessary for a desired operational efficiency.

NOTE Non-compliance by ship/terminal implies in the issuing of a letter-of-protest.

6.2.1 Initial release for loading consists in:

- a) measuring all load tanks which may contain residue and slop, measuring oil and free water, investigating possible remains;
- b) calculating the remaining volumes in ambient liters, in liters at 20°C, and masses in kilograms;
- c) completing, with the onboard representative, of the initial letter of operation;
- d) issuance of the RMQB document (see Annex A) as a record of measurements and their respective volumes;
- e) Operational Safety Checklist between ship and terminal ([ISGOTT](#)) prior to loading operation.

6.2.2 Prior to authorization for the beginning of the loading operation, the terminal's representative shall inquire the ship's representative about the documents described below, without which there is no "ready to operate" warranty from the ship. In case one of these documents is missing, loading shall not be authorized:

- a) notification of "ready to operate" for load "Notice for Readiness" (NOR);
- b) safe fuel declaration (flash point over 60 °C);
- c) loading plan prepared on board.

NOTE The ship/terminal shall report in writing any particularity which may impact measurements, operation, quality, and safety of loading.

6.3 The terminal's representative shall provide the ship's representative with the Material Safety Data Sheet (MSDS) as to the current legal requirements, which is available in the PETROBRAS HSE intranet portal, and product samples as to PETROBRAS [N-2732](#).

6.4 Whether or not there are load remains onboard, the terminal's representative shall issue the RMQB for recording measures and volumes found on board prior to loading. If the ship's representative shall not allow or facilitate the measurements, the terminal's representative shall issue the letter-of-protest.

6.5 For carrying out a loading operation in a tank with remaining, there must be a prior Petrobras' authorization. If approved, the terminal's representative must provide the test certificate of the total inboard volume for each product. The original invoice or fax must be provided and sent to the destiny terminal prior to the ship's arrival in order for the product to be offloaded.

6.6 Partially loaded tanks can be topped, provided they have been properly measured, and their volumes quantified and authorized by the schedulers. At the end of loading, there shall be recorded, on a specific RMQB board for handled amounts, the discount in volume at 20 °C from the Total Volume Onboard ("On Board Quantity"-OBQ) prior to loading, as to the formula below:

$$Bo = TCVb - OBQ$$

Where:

- Bo total inboard loaded volume and measured at 20 °C (original board);
- TCVb total inboard volume (product + free water + BSW) measured at 20 °C on board after loading ("Total Calculated Volume");
- OBQ total inboard volume (product + free water + BSW) measured at 20 °C on board prior to loading ("On-Board Quantity").