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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Crude oils

原油

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Foreword

Clause 4 of this standard is mandatory; the remainder is recommended.

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by and is under the jurisdiction of the National Energy Administration.

The drafting organizations include Daqing Oilfield Engineering Co. Ltd., the Research Institute of Petroleum Processing of SINOPEC, the Petrochemical Research Institute of PetroChina, China University of Petroleum (Beijing), Daqing Oilfield Co. Ltd., the Geoscience Research Institute of Shengli Oilfield of SINOPEC, the Quality Testing Centre of the Tarim Oilfield Branch of PetroChina, the Northwest Oilfield Branch of SINOPEC, the Dalian Petrochemical Branch of PetroChina, PetroChina Lanzhou Petrochemical Company, the Maoming Branch of SINOPEC, the Zhenhai Refining and Chemical Branch of SINOPEC, the Pipeline Branch of PetroChina, SINOPEC Long Distance Oil and Gas Pipeline Testing Co. Ltd., the Luoyang Branch of SINOPEC, the Development and Production Department of CNOOC, CNOOC Ltd., and the Mohe Sub-centre of the Inspection and Quarantine Technology Centre of the Heilongjiang Entry-Exit Inspection and Quarantine Bureau.

Warning

WARNING - If appropriate precautions are not observed, hazards may exist in the production, storage, transport and use of the product covered by this standard. This standard does not purport to address all of the safety problems associated with the product. It is the responsibility of the user of this standard to establish appropriate safety and precautionary measures before use, and to determine the applicability of relevant regulatory limitations.

1 Scope

China's mandatory national product standard for commercial crude oil - the specification a cargo of crude has to answer to when it changes hands. Crude oil is not one product but hundreds: a barrel from one field is waxy and light, another is heavy and naphthenic, and a refinery configured for the first will make a loss on the second. So the standard begins by fixing how the base of a crude is determined, distilling out two key fractions and reading their densities to place the oil in one of seven base classes running from paraffin base through the intermediate combinations to naphthene base. On that classification hangs everything else: the technical requirements are stated by base class, because the water a refiner can tolerate in a paraffinic crude and in a naphthenic one are not the same number. The standard also fixes the rules for making up a batch, which differ for pipeline, rail tank car, road tanker, inland barge and seagoing tanker, and for what has to be checked on every batch as opposed to periodically. Clause 4 is mandatory and the remainder recommended; the users are oil field operators, pipeline companies, refiners, terminal operators and the inspection bodies that arbitrate between them.

This standard specifies the determination of the base of crude oil, the technical requirements and test methods, the inspection rules, and the packaging, storage, transport and safety of crude oil.

This standard applies to commercial crude oil.

2 Normative references

The following 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 (including any amendments) applies.

The documents cited are GB/T 511, GB/T 1884, GB/T 1885, GB/T 4756, GB/T 6532, GB/T 7304, GB/T 8929, GB/T 11059, GB/T 11140, GB/T 13377, GB 13690, GB/T 17040, GB/T 17280, GB/T 17475, GB/T 17606, GB/T 18609, GB/T 18611, GB/T 18612, GB/T 27867, GB 30000.7-2013, SH 0164, SH/T 0604, NB/SH/T 0874, SN/T 2782 and SY/T 0536; their full titles are listed under the normative references of this record.

3 Determination of the base of crude oil

3.1 The crude oil is subjected to simple distillation in accordance with GB/T 18611; distillation according to GB/T 17280 and GB/T 17475 may also be used, and where the results are disputed the method of GB/T 18611 prevails. The distillation yields a first key fraction and a second key fraction, each defined by its own atmospheric boiling range.

3.2 The densities of the two key fractions are determined at the reference temperature in accordance with GB/T 13377 or SH/T 0604, and the base of each key fraction is determined from Table 1.

Table 1 is the classification table for the key fractions: it assigns each key fraction to paraffin base, intermediate base or naphthene base according to the density band its measured density falls into, the bands being stated separately for the first and the second key fraction.

3.3 The base of the crude oil is then determined from the bases of the key fractions in accordance with Table 2.

Table 2 is the classification table for the crude oil itself. It lists seven crude oil bases - paraffin base, paraffin-intermediate base, intermediate-paraffin base, intermediate base, intermediate-naphthene base, naphthene-intermediate base and naphthene base - and gives, for each, the combination of first key fraction base and second key fraction base that produces it.

4 Technical requirements and test methods

The technical requirements and test methods for crude oil are given in Table 3.

Table 3 lists the properties that a commercial crude oil is judged on and, against each, the test method to be used and the limit that applies. The properties carrying a limit are the water content, the vapour pressure at the delivery temperature, the mechanical admixture content and the organic chloride content of the fraction distilling below the stated cut point; the salt content, the density at the reference temperature, the sulfur content and the acid number are reported rather than limited. The limits for water content are given separately for three groups of bases - paraffin base or paraffin-intermediate base; intermediate base, intermediate-paraffin base or intermediate-naphthene base; and naphthene base or naphthene-intermediate base - while the remaining limits are common to all bases.

The footnotes to Table 3 govern the alternatives and the arbitration methods: in special cases the two parties may perform to an agreed arrangement; the vapour pressure requirement applies only to delivered crude that is stored and transported in the open; salt content may also be determined by SY/T 0536 or SN/T 2782, with GB/T 6532 prevailing in case of dispute; density may also be determined by SH/T 0604 or NB/SH/T 0874, with GB/T 1884 and GB/T 1885 prevailing; sulfur content may also be determined by GB/T 17040 or GB/T 11140, with GB/T 17606 prevailing; and acid number may also be determined by GB/T 7304, with GB/T 18609 prevailing.

5.1 Sampling

Sampling shall be carried out in accordance with GB/T 4756 or GB/T 27867.

5.2 Batching

5.2.1 For crude oil transported by pipeline, batches are divided by the quantity of crude oil or by the period of time agreed between the delivering and receiving parties.

5.2.2 For crude oil transported by rail tank car, where the properties of the crude oil transported are the same, each train constitutes one batch; where the properties of the crude oil carried by the same train differ, the crude oil of each single set of properties constitutes one batch.

5.2.3 For crude oil carried by road tanker and by inland waterway vessel, each fleet of vehicles or vessels carrying crude oil of the same properties constitutes one batch.

5.2.4 For crude oil carried by sea, each ship carrying crude oil of the same properties constitutes one batch; where the properties of the crude oil carried by the same ship differ, the crude oil of each single set of properties constitutes one batch.

5.3 Batch inspection

For every batch, the density and the water content shall be inspected.

5.4 Periodic inspection

The inspection period is agreed between the delivering and receiving parties. One inspection shall be carried out in each period, and each such inspection shall cover the density, the water content, the vapour pressure at the delivery temperature, the mechanical admixture content, the organic chloride content of the fraction distilling below the stated cut point, the salt content, the sulfur content and the acid number.

6 Packaging, storage and transport

The packaging, storage and transport of crude oil shall be carried out in accordance with SH 0164.

7 Safety

According to GB 13690, crude oil is a flammable liquid. Its hazard statements and precautionary statements are given in Annex D of GB 30000.7-2013.