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(РОСАВИАЦИЯ)

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**ИНОСТРАННЫЙ ЯЗЫК
ПО ПРОФИЛЮ ПОДГОТОВКИ
«АНГЛИЙСКИЙ ЯЗЫК»**

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(сборник упражнений)

по профилю «Управление технологическими процессами
авиатопливообеспечения воздушных судов» ГСМ

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Unit 1 Quality Control and Test Procedures

Section 1 White Bucket Test (Cleanliness of fuel)

Essential Vocabulary:

particulates	твёрдые частицы
entrained water	захваченная вода
suspended water	взвешенная вода
fine droplets	мелкая капелька
water laden fuel	водосодержащее топливо
coalescence	соединение (капелек эмульсии при действии реагента)
rust	ржавчина
scale	осаждение на стенках
lint	ворсинки
gaskets	уплотнительные прокладки
hoses	шланги
white porcelain lined	футерованный фаянсом
stainless steel	нержавеющая сталь
bonding cable	кабель заземления
coin with well-defined feature	монета с четким рисунком
spill	протечка
to swirl	вращать, поворачивать
slime	слизь
light-straw	светло-соломенный
contamination	загрязнение
lacy	кружевовидный
hazy	мутный (частицы крупнее)
cloudy	непрозрачный (частицы меньше)
sediment	осадочные отложения
particulate matter	взвешенные частицы
dye	краситель, окраска
surfactant	поверхностно-активное вещество
fuel water interface	граница раздела фаз топливо-вода
cross-contamination	взаимное загрязнение
odor	специфический запах
scum	плёнка на поверхности жидкости, пена

EX.1 Read and translate the text:

The white bucket is a simple but reliable test for detection of significant amounts of water and particulates.

Water occurs in different forms in the fuel;

Dissolved in the fuel, normally this water can not be removed from the fuel. Suspended or entrained in the fuel. Entrained water can be detected with the naked eye.

2. Water in high quantity into fuel may be caused by leakage into storage tanks, delivery of water laden fuel, condensation or the coalescence and subsequent settling of entrained water. Particulate or dirt is normally found in fuel in the form of rust, scale, lint, dust, particles from gaskets and hoses which have been released from the side of the tanks, piping and transportation vehicles.

Precautions to be taken prior to test: Person testing fuel should be sufficiently protected to prevent contact with fuel by wearing eye protection, gloves and appropriate apparel.

Apparatus: A bucket, white porcelain lined or stainless steel of a capacity of seven liters (7 L) and with a bonding cable (a separate cable if not equipped, must be provided). A shiny coin with well-defined feature is an additional tool.

Ex 2 Scan the test routine sequence, open the brackets, put the verbs into the correct tense. Translate the test.

Procedure, method of testing and observation:

Bucket must be clean and dry.

- a) A static bonding cable must **(to connect)** between bucket and the source of sample container, pipe or valve as required
- b) Take a sample at system operating pressure (except samples from a storage tank or transport trailer). Fuel in the drain or line should **(to remove)** or **(to displace)** before taking sample. Valve should be completely open without causing spill.
- c) **(to fill)** bucket at least 15 cm of its depth.
- d) Place bucket on a level surface and allow it **(to stand)** for few minutes to settle sample **(to ensure)** no air bubbles are present.
- e) Visually **(to inspect)** and **(to observe)** the fuel sample to determine presence of free water, particulates, unusual colour, haze, floating material and lacy substance layers.
- f) Swirling of sample **(to cause)** dirt or water to collect at the centre of bucket for easier examination.
- g) **(to drop)** a coin with well-defined features into the fuel sample bucket to assist visual detection of haze.

Ex.3 Translate the words: colour, colourful, colourless, coloured, colouring, discoloration. Use them in the appropriate context. There is one extra word.

Evaluation of observations and findings:

a) Observed () of jet fuel should be () to a light straw. () should be similar to previously acceptable test if any.

b) A cloudy or hazy condition in appearance of the fuel sample suggests water contamination.

c) If sample does not appear cloudy, a drop of food () or coffee added to the sample will ensure absence of water when () drop settles at the bottom. If it dissolves in the sample the fuel is not pure and contaminated with unacceptable amount of water.

d) Slime on the bottom surface of container or lacy substance is an indication of Microbiological Contamination.

The following definitions in Table 1.1 and 1.2 should be considered when inspecting a fuel sample;

Table 1.1

Clean	No visible particles, sediment, dye, rust or solids
Slight Particulate	Some fine to small size particles
Particulate matter	Many small particles floating or settled on the bottom
Dirty	(), many particles floating or settled on the bottom

Ex.4 Form all the possible derivatives from the words: *to contaminate, to indicate, to observe, to fuel, to appear, to contain* and use them in the sentences of your own.

Table 1.2

Bright	No water present after sample settled down after a minute. The sample sparkles
Hazy	Fine water droplets throughout sample Temporary condition due to drop in temperature
Cloudy	Extremely fine droplets or particles throughout sample
Wet	Droplets or free water found at the side of the container or at the bottom

Surfactant or Microbial	Slime on bottom or at fuel water interface, dark brown/black scum or lacy substance
Other product cross-contamination	Unusual appearance, colour and odor

Ex.5 Translate the words and word combinations from English into Russian

Bonding cable, cloudy, coalescence, coin with well-defined feature, contamination, cross-contamination, dye, entrained water, fine droplets, fuel water interface, gaskets, hazy, hoses, lacy substance, light-straw, lint, odor, particulate matter, particulates, rust, scale, scum, sediment, slime, spill, stainless steel, surfactant, suspended water, to swirl, water laden fuel, white porcelain lined.

Ex.6 Answer the following questions

1. What is the white bucket test aimed at?
2. Which water can be detected with the naked eye? How?
3. What causes the fuel contamination with great amount of water?
4. In which form is dirt found in fuel?
5. What are the safety precautions before the white bucket test?
6. Where must a bonding cable be connected?
7. What is the recommended pressure for the sample to be taken?
8. What should the bucket capacity be?
9. What material should it be made of?
10. Do you know any other materials for a “white bucket”?
11. How deep should it be filled?
12. Why should we let the bucket stand on a level surface?
13. How can we simplify the visual examination?
14. What should the observed colour of jet fuel be?
15. What does the fact that a drop of food colouring dissolves in the sample of fuel mean?
16. What indicates microbiological contamination?
17. How can we classify the fuel with discoloration and many particles floating or settled at the bottom?
18. What are the visual properties of surfactant or microbial fuel?
19. What is the difference between cloudy and hazy sample?
20. What does the wet fuel sample look like?

Ex 7 Speak about the White Bucket Test. Follow the plan

1. The aim of the procedure
2. The apparatus
3. The precaution
4. The result interpretation
5. The innovations (new bucket materials).

Ex.8 Translate the sentences

1. Вода и взвешенные твердые частицы удаляются на протяжении всего процесса производства, транспортировки и погрузки топлива.

2. При визуальном осмотре пробы видны элементы ржавчины, ворсинки и другие частицы. Это свидетельствует об износе уплотнительных прокладок и шлангов.
3. Для оценки прозрачности топлива на дно ведра для пробы помещается монетка с четким рисунком.
4. Наиболее активно процесс размножения микроорганизмов протекает в зоне границы раздела фаз «топливо — вода», в нижней части емкостей для хранения топлива.
5. В отечественной практике наличие ПАВ в реактивных топливах контролируется при испытании на взаимодействие с водой

Ex.9 Put all possible types of questions to the following sentences:

1. The fine droplets of water in fuel reflect light and in high concentration give the fuel a cloudy or hazy appearance.
2. Particulate or dirt is normally found in fuel in the form of rust, scale, lint, dust, particles from gaskets and hoses.
3. Dissolved in the fuel, normally this water can not be removed from the fuel

Section 2 Clear and Bright Test

Ex.1 Translate the words and word combinations:

Взаимное загрязнение, взвешенная вода, взвешенные частицы, водосодержащее топливо, ворсинки, вращать, поворачивать, граница раздела фаз топливо-вода, загрязнение, захваченная вода, кабель заземления, краситель, кружевовидный, мелкая капелька, монета с четким рисунком, мутный (частицы крупнее), непрозрачный (частицы меньше), нержавеющая сталь, осадочные отложения, осаждение на стенках, плёнка на поверхности жидкости, пена, поверхностно-активное вещество, протечка, ржавчина, светло-соломенный, слизь, соединение (капелек эмульсии при действии реагента), специфический запах, твёрдые частицы, уплотнительные прокладки, футерованный фаянсом, шланги.

Essential vocabulary

free water	избыточная влага
a wide mouth glass jar	лабораторный стеклянный стакан с широким горлышком
light background surface	светлый фон
to enhance	улучшать

drain	дренажный сток
tap	кран
to splash	выплеснуться
storage tank	складской резервуар
to dip	окутать, зачерпывать
solid contaminants	твёрдые загрязнения
vortex	воронка, воронкообразный водоворот с концентрированием твёрдой фазы в центре

Ex.2 Read and translate the text

Delivered fuel must be clean, bright and not contaminated with free water. “Clear” is a visual condition of fuel with the absence of cloud, emulsion, visible particulate matter or entrained water. “Bright” is the quality of fuel refers to the shiny and sparkling appearance of clean and dry fuel.

The “bright and clear” condition of the fuel is not dependent on the natural colour of the fuel. The “Clear and Bright” test is a visual check and conducted to detect water or other solid contaminants in the fuel. An evidence of external contaminants renders the fuel as “not suitable for use” and points to a requirement of further laboratory analysis.

Precautions to be taken prior to test:

Person testing fuel should be sufficiently protected to prevent contact with fuel by wearing eye protection, gloves and appropriate apparel.

Apparatus:

Glass Jar - a wide mouth glass jar of 7.5 cm (3 in.) in diameter or other similar transparent container. A white paper sheet or light background surface material is a great tool to enhance detection of contaminants.

Ex.3 Fill in the prepositions or adverbs where necessary.

At(3)/ without /of(3)/ from/ in /before/ after/ by/ above/ into/ with/ on/ for/ to

Procedure, methodtesting and observation:

Glass Jar must be clean and dry.

a) Care should be observed when opening any pressured drain or tap to prevent splash or spill.

b) Take a sample ...system operating pressure (except samplesa storage tank or transport trailer). Fuel ...the drain or line should be removed or displacedtaking sample. Valve should be completely opencausing spill.

c) A fuel sample can be taken immediately taking a white bucket sample described dipping the jar..... bucket.

d) Place jarthe fuel sample in it ...a level surfacea minute to allow any air bubble to risethe surface.

e) Visually inspect and observe the fuel sample to determine presencefree water and solid contaminants.

f) Swirling of sample would cause dirt or water to collectthe centre of the jar and would be visible... the bottom of the vortex.

g) If presencewater is evident, observe the colour and appearance of the surface of water where it contacts..... the fuel.

Ex.4 Fill in the missing words, translate the sentences.

Evaluation of observations and findings:

a) Observed colour of jet fuel **должен быть** colourless to a **светло-соломенный**. Colour should be **аналогичным** to previously acceptable test if any.

b) A cloudy or hazy condition in **внешний вид** of the fuel sample **предполагает** water contamination.

c) If sample does not appear cloudy, a drop of **пищевого красителя** or coffee added to the sample **будет свидетельствовать** absence of water when coloured drop settles at the bottom. If it **растворится** in the sample the fuel is not pure and contaminated with unacceptable amount of water.

d) **Слизь** on the bottom surface of the jar or lacy substance at the water surface where it contacts fuel is an indication of Microbiological Contamination.

e) The definitions in Table 1.1 and 1.2 in section 1 **следует рассматривать** when inspecting a fuel sample.

f) Contaminants found in fuel sample would suggest a need to inspect the **источник загрязнений** and could also be attributed to the failure of equipment or procedures.

Ex.5 Translate the words and word combinations

A wide mouth glass jar, drain, free water, light background surface, solid contaminants, storage tank, tap, to dip, to enhance, to splash, vortex.

Ex.6 Answer the following questions:

1. What does “clear” fuel imply?
2. What does “bright” fuel imply?
3. Do these properties depend on the natural colour of the fuel?
4. What will the fuel containing external contaminants be rendered as?
5. Are the “white bucket test” and the “clear and bright test” connected with each other?
6. What may be used to enhance the detection of contaminants?
7. What should be done if the presence of water is evident?
8. Why is the presence of water so crucial for jet fuel?

Ex 7. Speak about the Clear and Bright Test. Follow the plan

1. The aim of the procedure
2. The apparatus
3. The precaution
4. The result interpretation

Ex.8 Translate the following sentences

1. Пробу топлива брали из ведра из нержавеющей стали. Лаборант окунул лабораторный стакан и разбил его.
2. Почему Вы нарушаете технику безопасности? Где защитные очки, перчатки и спецодежда?
3. Вы уже установили заземляющий кабель? Когда вы это сделали?
4. В пробе топлива частицы уплотнителя и ржавчины. - Это из крана складского резервуара.
5. Зачем вы вращаете банку для отбора проб? - Я пытаюсь увидеть твердые включения в воронке невооруженным глазом.
6. Многочисленные отказы авиационной техники связаны с наличием в топливе ПАВ и введением в топлива ПАВ в виде присадок (agents).

7. Анализ проб топлива из баков самолетов показал, что в 97 случаях из 100 топливо перед заправкой содержит эмульсионную воду, в 75 случаях - эмульсионную и отстойную воду, при этом общее содержание свободной воды превышает установленные требования – 0,003%.
8. Изменение окраски, пленка на поверхности и присутствие специфического запаха свидетельствовали о низком качестве или нарушении норм хранения авиатоплива.
9. При визуальном осмотре пробы были выявлены мелкие капли свободной воды на дне и по бокам контейнера.
10. Согласно существующей технологии подготовки самолетов к полетам, отстой сливается из каждого топливного бака в количестве 0,5-1 дм³ в три приема: после полета, через 15 мин после заправки и после длительной стоянки самолета при заправленных баках.

Section 3 Free Water Detection

Ex.1 Translate the words and word combinations:

Шланг, футерованный фаянсом, улучшать, твердые загрязнения, слизь, складской резервуар, светлый фон, светло-соломенный, протечка, окунать, нержавеющая сталь, непрозрачный (частицы меньше), мутный (частицы крупнее), монета с четким рисунком, лабораторный стеклянный стакан с широким горлышком, кружевидный, кран, кабель заземления, избыточная влага, загрязнение, дренажный сток, выплеснуться, вращать, поворачивать, воронкообразный водоворот с концентрированием твердой фазы в центре

Essential vocabulary

water sensitive chemical	водочувствительный, гидрофильный химикат
water finding paste	водочувствительная паста
Ppm - part per million	Миллионная доля
gauging stick	рейка для замера
flask	узкогорлая склянка
powder	порошок
chemically treated filter	Химически обработанный фильтр

syringe	шприц
glass vial	стеклянная пробирка
To thread	Зд.наносить
sodium fluorescein	натрия флюоресцеин

Ex.2 Read and translate the text

Free water contamination in the fuel not detected by visual test methods, because of low volume finely dispersed un-dissolved water in the fuel, however it can be detected by other methods described in this section.

There are number of free water detection kits available for field use such as Velcon Hydrokit® , Shell Water Detector® and Metrocator®. A water sensitive chemical product is used with the fuel sample which reacts with the suspended water content in the fuel by change its colour. In order to detect free water content such as 15 and 30 ppm, the colour change is compared with a standard colours chart.

Large amount of free water can be detected by a test method using water finding paste. This test is significantly true in measuring depth of water layer in fuel storage tanks. A thin layer of paste is applied on the end of a gauging stick or any other wooden or steel stick and lowered to the bottom of the tank and raised again. Paste which comes in contact with the water layer changes colour, usually grey to purple.

Total water content in fuel or dissolved water content can be tested by a laboratory test methods, one example of such standard is ASTM D 1744.

Ex.3 Open the brackets, put the verbs into the correct form

Procedure, observations and comparison of results:

3.1 Velcon Hydrokit®

Generally, a fuel sample of approximately 10 ml in quantity **(to draw)** under vacuum into a flask containing special powder and **(to shake)**. After two (2) minutes the colour **(to compare)** with a standard chart.

A pink colour as dark or darker than the standard **(to indicate)** more than 30 ppm of free water in the sample hence fuel **(to fail)** the test.

For detail refer to manufacturer's recommended procedure.

3.2 Shell Water Detector®

Generally a fuel sample of an amount 5 or 10 ml (**to take**) through a capsule fitted with a small chemically treated filter or paper disk by a syringe. Change of filter colour to green (**to indicate**) free water presence to approximate 30 ppm.

At low water contamination a yellow/green colour (**to observe**), changing to blue/green and then to blue/black at significantly high water contamination levels. For detail (**to refer**) to manufacturer's recommended procedure.

3.3 Metrocator®

Generally a fuel sample (**to take**) into a glass vial and a chemical dye powder (to add). A paper disk (**to insert**) into the vial cap then tightly (**to close**). The sample (to invert) and shaken for two minutes in the vial. The vial cap (**to remove**) and (**to examine**) for colour visual comparison with the evaluation guide included in the test kit. No evidence of small purple-blue dots (**to indicate**) the amount of water presence in the sample fuel to be less than 5 ppm. If the amount of dots is present, compare it with the evaluation guide (**to determine**) results as 5 ppm, 15 ppm, 30 ppm or 60 ppm as applicable.

For detail (**to refer**) to manufacturer's recommended procedure.

Ex.4 Fill in the prepositions or adverbs where necessary

By/ through/ for/ in(4)/of(2) /with/ on/ to / under/at/in

3.4 Other similar available industry level kits are:

1. Aqua Glo® test kit: A sensitive methodmeasuring free water content.... the fuel. Ref. ASTM D3240
2. A.E.L. Free Water Detector: A fixed volume... fuel is filtereda pad threaded....sodium fluorescein. The chemicalthe pad is sensitive... the free water... the sample, producing a fluorescence pattern visible..... ultra-violet light. A method measuring free water.... levels where water... sample is not visible... naked eye.
3. Aqua Indica: measures the moisture content a sample ... fuel.

Ex.5 Put the words in the sentences into the correct order

1.with /not/must/ fuel/free water/delivered/ contaminated/ clean/ bright/ be/and

2. visually/ and/and/contaminants/inspect/observe/of free/ sample/solid /the fuel/ the presence/ to determine/ water
3. well-defined/ tool/ shiny/is / feature / coin/an/ additional/a /with?
4. person / and/apparel/ appropriate/ be/by/ contact/ eye/ protection/fuel/fuel/ gloves/ protected / should/ sufficiently/testing /to prevent/ wearing/ with.
5. slime/the/surface/on/of/container/bottom/an/contamination/indication/ is/lacy/microbiological/ of/ or/ substance?

Ex.6 Translate the words and word combinations:

Water sensitive chemical, water finding paste, to thread, syringe, sodium fluorescein, ppm - part per million, powder, glass vial, gauging stick, flask, chemically treated filter.

Ex.7 Answer the following questions:

1. Can free water contamination in the fuel be detected visually?
2. What is the basic principle of free water detection kits?
3. How can a large amount of free water be detected?
4. What colour does the sensitive paste become when in contact with the water layer?
5. Is it possible to measure the total amount of free water using the field test kits?
6. What free water test systems do you know?
7. Which items must every testing system contain?

Ex.8 Translate the sentences:

1. Shell Water Detector является специальным приспособлением для поиска не растворенной воды в реактивном топливе, которую нельзя определить при визуальном осмотре. Как правило, данный процесс связан с падением его температуры и нуждается в тщательной диагностике. В противном случае возникает риск серьезных поломок.

2. Комплекты для тестирования воды Velcon Hydrokit (НК100-15) предназначены для использования в полевых условиях для определения количества свободной воды, превышающей 15 ppm в авиационном топливе.

Проба топлива помещается в пробирку с порошком, который меняет цвет при наличии воды.

3. Цветовая диаграмма представлена для оценки уровня содержания воды в промилле.

4. При понижении температуры топлива часть растворенной воды выпадает из топлива в виде свободной воды и, наконец, оседает на дне.

5. И наоборот, при повышении температуры окружающая влага поглощается топливом до тех пор, пока не будет восстановлено равновесие.

6. Повторяющиеся циклы колебаний температуры (вызванные частой сменой высоты или маршрутом полета через холодные регионы / полярные маршруты) могут привести к накоплению значительного количества воды в топливных баках самолета.

Ex.9 Speak about the Free Water Tests. Follow the plan

1. The aim of the procedure. Basic principle.
2. The existing test systems.
3. The result interpretation

Section 4 Solid Particulate Contamination Detection:

Ex.1 Translate the words and word combinations

Шприц ,химически обработанный фильтр, улучшать, узкогорлая склянка, стеклянная пробирка, специфический запах ,светлый фон, рейка для замера, порошок, поверхностно-активное вещество, плёнка на поверхности жидкости, пена, осадочные отложения, натрия флюоресцеин, миллионная доля, лабораторный стеклянный стакан с широким горлышком, краситель, окраска, кран, избыточная влага, наносить, дренажный сток, граница раздела фаз топливо-вода, выплеснуться, водочувствительный, гидрофильный химикат, водочувствительная паста, взвешенные частицы, взаимное загрязнение.

Essential Vocabulary

fittings	детали трубопроводов
pumps cavity	рабочая полость насоса

Filter Membrane Test	Метод испытания с мембранным фильтром
Line Sampling	отборе проб на линии трубопровода
quick disconnect	быстроразъёмное соединение
to be bonded	Быть заземленным
to be backed	дублироваться
colour rating booklet	буклет с коллометрическим стандартом, коллометрическая карта
field sampling kit	набор для забора рабочих проб
sampling tap	кран для отбора проб
be flushed	1. быть промытым 2. быть заподлицо
kPa	килопаскаль
psi pounds per square inch, absolute	фунтов на кв. дюйм
residual fuel	остаточное топливо
to grab	захватить
absorbent paper	впитывающая бумага
colour bodies	окрашивающие вещества
rated capacity	номинальная пропускная способность (насоса)
blunt probe	затупленный щуп
suction device	всасывающее устройство

Ex1 Read and translate the text.

Rust is generally the leading source of particulate contamination. Frequently the sand or dust could also be present. The main source of this kind of contamination is

erosion and corrosion of container surfaces, pipes, fittings, pumps cavity erosion and any other source which come in contact with the fuel.

A regular inspection and maintenance procedure should ensure clean reliable fuel delivery at all times. All precautions should be taken to keep fuel system clean from external contaminants when conducting maintenance and inspection of entire fuel supply systems.

There are specific test methods for the detection of particulate contamination. One such method is Filter Membrane Test - Colorimetric. (Ref. ASTM D 2276/IP-216 - Test Method for Particulate Contamination in Aviation Fuel by Line Sampling)

A fixed volume of pressurized fuel (approximately 5 liters or a gallon) is passed through a filter membrane of pore size of 0.8 microns. Fuel contaminant is determined by comparing the colour and the intensity of the colour of the membrane, after the fuel has passed through it, against a standardized colour chart with number ranging from 0 for the lightest to 10 for the darkest.

It is advisable to perform simultaneous tests on the inlet and outlet of the points of the equipment, storage tank or pipeline section. A permanently installed connection is strongly recommended at the sampling points and should include a quick disconnect to match the fitting on the inlet of the field sampling kit.

Precautions to be taken prior to test:

Person testing fuel should be sufficiently protected to prevent contact with fuel by wearing eye protection, gloves and appropriate apparel.

The sampling unit must be bonded accordingly to both to the sampling connection and the measuring container to minimize static discharge.

Apparatus and Equipment: Sampling kit:

Field sampling kit (Fig 1.1); field monitor each one 37 mm diameter, 0.8 micron membrane, backed by a 34 mm diameter support pad, electrically bondable receiving container and a colour rating booklet (AMST D 2276, Appendix X).

Ex.2 Match the terms shown in Fig 1.1 and 1.2 to their translation below

Fig 1.1 Металлическая приёмная ёмкость, выпускной шланг/внутренний провод заземления, быстроразъёмное соединение, пылезащитная заглушка, трёхпутевой распределитель, поток, нижняя часть набора для забора рабочих

проб, зонд, полевое контрольное устройство, обводной шланг, быстросъёмный соединитель впускной ниппель, зажим монтажного провода

Fig 1.2 Пылезащитная заглушка, выпускное опорное кольцо, вводное опорное кольцо, мембранный фильтр с размером пор 0,37 мкм, дублирующая впитывающая прокладка

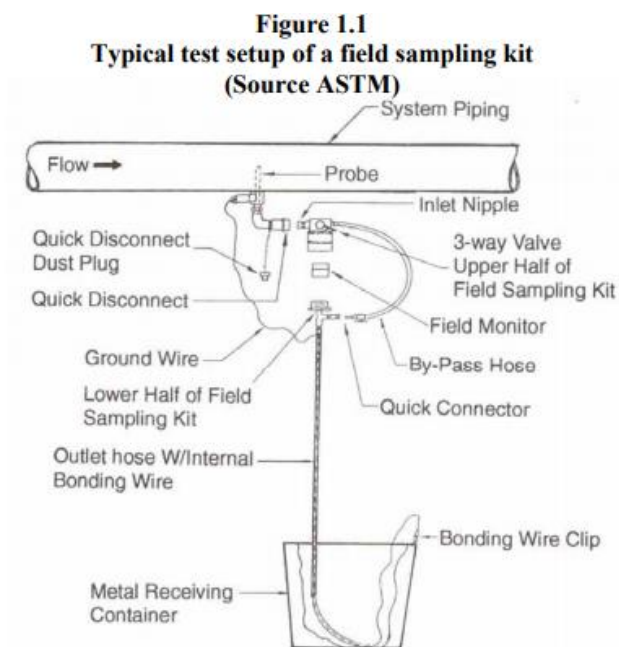
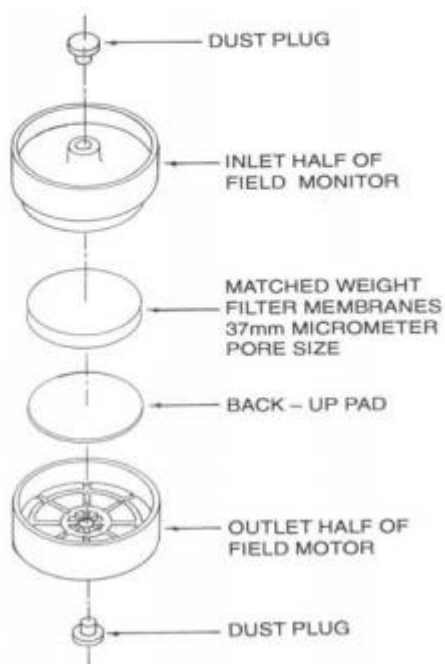


Figure 1.2
Matched weight field monitor (shown disassembled)
(Source ASTM)



Ex.4 Fill in the gaps with the appropriate prepositions**By/ for(2) /prior/ from(2)/ after/ during /in /below / to /on /into/ of**

Field sampling kit and sampling tap should be flushed.... to test. Do not operate valves in the system.....test. Prepare the field monitor membrane and test procedures as described.... detail in ASTM 2276.Do not exceed 689 kPa (100 psi). Line flow rate in the system should be50% of rated capacity. Measure the sample volume accurately. Care should be taken when removing remaining fuel in the monitor in order not to damage the membrane. A damaged membrane is not acceptable.... analysis.

After completion of test, disconnect field sampling kitinlet hose. Turn the valve to flush remaining fuel from the kit..... receiving container. Remove remaining fuel from the monitor using a suction device supplied, ensure that the suction is applied gently and.... the outlet side of the monitor.

Do not open the plastic field monitor on-sitethe test.

Reinstall coloured dust plugs and wipe residual fuel the.... exterior.... the monitor.

Open monitor in a clean environment, remove membrane carefully.... raising it from the outlet pad side using a blunt probe pushing the pad upward, use tweezers to gently grab..... the membrane. Let membrane dry... an absorbent paper or air dry 3 hours.

Ex.4 Make all the sentences in the abstract negative and interrogative.

Colour rating:

Use ASTM approved guides for colour rating.Select the colour that closely matches the sample, viewing angle should be nearly perpendicular without any shadow casting on the membrane. Report the match by scale letter and rating number, such as B-1, G-3, A-4. If the shade is between two rating numbers, report the lower number. Report the sample volume, flow conditions, sampling pressure.Report if the membrane was rated wet or dry and the test location and position in the system.

Ex.5 Fill in the modal verbs***Should(2) may can must***Interpretation of results:

There is no technical significance of any specific rating number unless it is compared with ratings from previous tests on the same fuel. A change of two numberscause concern andbe investigated. Unusual change in membrane colour rating..... indicate change in fuel contamination level(likely). Colour bodies in the fuel..... cause membrane colour change.(highly likely) To verify colour bodies use two membranes in the monitor while performing the test. If both membranes have the same colour after test then it indicates colour bodies in the fuel. If the particulate appearance in the fuel is continued test after test, it will be a to monitor the situation.

Ex.6 Translate the word and word combinations into Russian:

To grab smth, to be bonded with, to be backed by, suction device, sampling tap, residual fuel, rated capacity, quick disconnect, pumps cavity, psi pounds per square inch, absolute, line sampling, kPa, fittings, Filter Membrane Test, field sampling kit, colour rating booklet, colour bodies, blunt probe, to be flushed, absorbent paper.

Ex.7 Answer the following questions

1. What is the leading cause of particulate contamination?
2. What causes sand, dust or rust occurrence in fuel?
3. What are the ways of preventing erosion and/or corrosion?
4. Where are the samples for Filter Membrane Test obtained from?
5. What is the average amount of fuel required for the test?
6. How big are the pores of the membrane?
7. Which aircraft fuel system parts should be subjected to test?
8. What are the sampling kit components?
9. What are the safety measures to be taken prior/during and after the test?
10. What should the sample colour be compared to? Is there any technical significance if there are no ratings on the same fuel?
11. If the difference in sample colours differs by two numbers, should we be concerned?

Ex.8 Translate the following sentences:

1. Для получения представительной пробы из топливного потока и предотвращения загрязнения пробы извне проба может быть отобрана из промывочного фитинга комплекта пробоотборного оборудования для работы в полевых условиях
- 2.Следует убедиться, что вначале линия промыта отбираемым топливом и наружная поверхность линии чистая.

3. Если не используют быстроразъемное пробоотборное соединение, следует выбрать шаровой (ball valve) или конический клапан (cone valve) из нержавеющей стали, т.к. его конструкция предотвращает возможность улавливания или образования твердых частиц.

4. Пробы, отобранные для общего лабораторного или химического анализа, не всегда пригодны для настоящего метода испытания, т.к. отбор проб мог быть проведен недостаточно тщательно и соответственно могло произойти загрязнение твердыми частицами.

5. По возможности отбирают от 3,8 до 5дм³. Метод определения механических примесей (1 галлон) образца топлива предпочтительно в контейнер, который будет использован при испытании, чтобы исключить загрязнение пробы при переносе из одного контейнера в другой.

6. Желательно отбирать испытываемую пробу в один контейнер и переносить в лабораторию для испытаний.

7. Если пробу отбирают в небольшие контейнеры, например стеклянные бутылки, а затем доставляют в лабораторию, с пробоотборными контейнерами следует обращаться таким образом, чтобы топливо, содержащее механические примеси, полностью сливалось в транспортный контейнер, сертифицированный UN/ICAO для транспортирования.

8. Результаты испытаний, полученные при отборе проб других объемов, могут иметь разную степень точности

Ex.9 Speak about Filter Membrane Test for Solid Particulate Contamination Detection

Follow the plan:

- 1. The aim of the procedure. Basic principle. Safety Precautions**
- 2. The procedure, test kit components**
- 3. The result interpretation.**

Section 5 Microbiological Contamination:

Ex.1 Translate the words and word combinations:

Трёхпутевой распределитель, пылезащитная заглушка, поток, полевое контрольное устройство, обводной шланг, нижняя часть набора для забора рабочих проб, металлическая приёмная ёмкость, зонд, зажим монтажного провода выпускной шланг/внутренний провод заземления, впускной ниппель, быстросъёмный соединитель быстроразъёмное соединение, детали трубопроводов, рабочая полость насоса, метод испытания с мембранным фильтром, отбор проб на линии трубопровода, быстроразъёмное соединение, буклет с колометрическим стандартом, колометрическая карта, быть

заземленным, быть заподлицо, быть промытым, впитывающая бумага, всасывающее устройство, дублироваться, затупленный щуп, захватить, килопаскаль, кран для отбора проб, набор для забора рабочих проб, номинальная пропускная способность (насоса), окрашивающие вещества, остаточное топливо, фунтов на кв. дюйм, химически обработанный фильтр, узкогорлая склянка, рейка для замера, порошок, взвешенная вода, водосодержащее топливо, водочувствительная паста, водочувствительный, гидрофильный химикат, воронка, воронкообразный водоворот с концентрированием твёрдой фазы в центре, ворсинки, захваченная вода, мелкая капелька, миллионная доля, нержавеющая сталь, окунать, зачерпывать, осаждение на стенках, ржавчина, складской резервуар, соединение (капелек эмульсии при действии реагента), твёрдые загрязнения, твёрдые частицы, уплотнительные прокладки, футерованный фаянсом, шланг.

Essential Vocabulary

to hinder	препятствовать
additives	присадки
sludge	грязевой отстой
gelatinous matter	студенистое вещество
To lull	внушать уверенность
quantitative checks	количественные проверки
aerobic bacteria	аэробные бактерии
fungal colonies	колония грибов
sulfate-reducing bacteria (SRB)	сульфат-восстанавливающие бактерии
total dissolved solids (TDS)	общая масса растворённых механических примесей
fuel stocks	запас горючего
sump	отстойник

low point drain	дренажное устройство в нижней точке
mucus-like substance	вещество, похожее на растительную слизь
to suspect	подозревать
sump water	амбарная вода
coalescers	абсорбер воды, фильтр- коагулятор

Ex.2 Scan the text, open the brackets, put the verbs into the correct form. Translate the text.

Micro-organisms may enter in aviation fuel in many ways such as air, sea or fresh water, soil or by other means. Micro-organism **(to cause)** significant damage to the fuel system by means of slime formation, sludge and corrosion, **(to hinder)** proper function of the equipment and hence loss of proper performance. Since water **(to need)** for microbial growth, removal of water from aviation fuel system is the preferred method **(to limit)** microbiological contamination.

Microbes **(to find)** at the fuel-water interface. They use fuel as food, **(to convert)** additives into new chemicals and water as the oxygen source, thus ruining fuel. Some of their food **(to become)** new bugs or biomass, and the rest become by-products or metabolites. These metabolite molecules range from carbon dioxide to slime. Some of the metabolites contribute to sludge formation or make organic acids, which make fuel and associated water bottoms corrosive. If you **(to take)** a look at a slime sample at the fuel and water interface, you **(to find)** the proportion of the mass (that is actually bugs) is astonishingly small.

Ex.3 Fill in the gaps with the adjectives from the box

*crucial periodical hazy basic representative false quantitative appropriate high
clear bright*

Thecheck for microbiological contamination in fuel is avisual examination of a sample taken from the fuel storage, during which the signs of contamination such as black gelatinous matter, small soft particles floating in the fuel, discoloured or... fuel etc. should be checked.

It is... to make sure that a..... sample is obtained from the bottom of the tank, to avoid being lulled into asense of security by a sample taken simply by dipping the top of the tank.

Specialist laboratories which carry out microbiological analysis of samples taken from fuel tanks should provide written reports of their findings, and certification, when requested. Microbiological analysis should includechecks on the number of aerobic bacteria and fungal colonies present, and should also determine whether or not sulfate-reducing bacteria (SRB) are present. A haze test on the fuel should also be carried out. If deemed....., any free water phase should be quantitatively analysed for total dissolved solids (TDS), pH and chloride content. Those tests will then give an indication of the likely source of the water. For example, a veryTDS and chloride content might confirm that the free water was derived from sea water.

...and...or White Bucket visual testing of fuel collected from storage tanks is important. ... and ... testing can identify water and particulate contamination, and to a limited degree, microbiological contamination problems. A microbial contamination problem can show up as fine particulates which may or may not settle out to the bottom of the sample bottle. If fuel passes clear and bright criteria, and the fuel stocks are routinely rotated, chances are slight that a fuel quality problem will occur before the fuel has been consumed.

Ex.4 Put the words in the sentences into the correct order. Read the text in full.

Precautions to be taken prior to test:

and / apparel/appropriate/be/by/ contact/ eye/fuel/ fuel/ gloves/person / protected /protection/ should/sufficiently/testing/to prevent/ wearing/ with

Apparatus:

a/requires the/or/ procedure/glass/clear/bucket/ bottle/a

is/ paper/ tool/ of/ any/ bright/ additional/ a/ white/ or /sheet/ an /surface

Ex.5 Read about the test procedure, then tell about it to your partner. Use the following discourse markers: *initially/ at first/ later/then/after that/ and finally etc*

Procedure of test:

Bucket or glass bottle must be clean and dry.

- a) Care should be observed when opening any drain or tap to prevent splash or spill.
- b) Take a sample from storage tank sump, filtration equipment or low point drain in a bucket or clean transparent glass bottle.
- c) Place sample on a level surface for few (at least 2 or more minutes) to settle.
- d) Visually inspect and observe the sample to determine presence of dark coloured solids, slime or dark colour water. Tip or swirl the bucket/bottle side to side looking for evidence of mucus-like substance.
- e) If substance contamination is observed, carefully collect suspect material in a sample bottle by removing clear fuel into an approved fuel disposal container. Tightly cap the sample bottle, place identification sticker with date, location and sampling point.

Ex.6 Fill in the prepositions or adverbs where necessary

From/ around/ for/ through/ with/ to/ in front of /against.

Analysis and evaluation of findings:

Content of the sample bottle should be visually examined.... bright background light.

- a) If the sample substance is mostly dark solid particles it could be rust. To ascertain rust particle, take a magnet and slowly runmagnet..... the bottle. If particles are rust they will collect and follow..... the magnet.
- b) Fine particles discolouring the water in the fuel can be further tested ...possibility of being suspended rust particles. Filter some of the samplethe bottlea smooth white paper towel and let paper dry. Inspect the dried particle visually and amagnet to ascertain if it is rust.
- c) If the sample is dark sludge and does not responda magnet, presence of fungi is highly likely. If the sample collected properly and contain mostly water, dark brown or black in colour, scum like at the top, with noticeable foul odor, micro-organism may be present.

Ex.7 Read and translate the sentences. Put 5 questions to each sentence

Interpretation and precautionary notes:

- a) Positive results do not always indicate a microbial contamination induced investigation of an operational problem. Results should be carefully interpreted.
- b) If the visual examination of the sample indicates the possibility of microorganisms or fungi, the sample should be sent to an approved laboratory for analysis.
- d) Good house keeping can prevent fuel system microbiological contamination by complete removal of water from sump water and periodic checks of coalescers.
- e) Several commercial kits are available for testing fuel for microbiological contaminations namely bacteria, microbial growth and fungi.

Ex.8 Translate the words and word combinations:

Additives, aerobic bacteria, coalescers, fuel stocks, fungal colonies, gelatinous matter, low point drain, mucus-like substance, quantitative checks, sludge, sulfate-reducing bacteria (SRB), sump, sump water, to hinder, to lull, to suspect, total dissolved solids (TDS)

Ex.9 Answer the following questions:

1. How may the microorganisms appear in the fuel?
2. What type of damage may they cause? What is being compromised in case of microbiological contamination?
3. What is the common method of coping with microbiological contamination?
4. Where are most microbes found?
5. Why may the metabolites of microbes cause corrosion?
6. What is the basic method of check for microbiological contamination?
7. Where should a sample for visual check be obtained from?
8. What do the laboratory test provide findings of?
9. How long should the sample settle?
10. What should be done with the suspect contamination?
11. How can rust be distinguished from microbiological contamination?
12. What does the dark sludge sample not responding to a magnet suppose?
13. What sample is the likely to indicate micro-organisms?
14. What are the preventive measures against microbial or fungi contamination?
15. Is it possible to check the fuel for microbiological contamination using the kit?

Ex.10 Speak about Microbiological contamination tests. Follow the plan:

1. The reasons for microbiological contamination. Possible damage.
2. Test principle, precautions, equipment.
3. The procedure.
4. Result interpretation and conclusions.

Ex.11 Translate the sentences into English:

1. Загрязнение авиационного топлива и топливных систем микроорганизмами — реальная и серьезная угроза, которая может напрямую влиять на качественные характеристики авиакеросина и безопасность полетов воздушных судов.

2. Например, согласно результатам анализов, при сильном загрязнении в 0,5 мл авиатоплива может жить более 10 тысяч колоний микроорганизмов, изменять его физические и химические свойства и ухудшать эксплуатационные показатели.

3. Безусловно, сами нефтепродукты не могут быть источником заражения. Процесс их переработки происходит под воздействием высоких температур, поэтому получаемые из нефти различные виды топлива не содержат микроорганизмы.

4. Опасность представляет даже мельчайшее наличие воды в топливе, что практически всегда является риском для усиленного роста микроорганизмов.

5. Наиболее активно процесс их размножения протекает в зоне границы раздела фаз «топливо — вода», в нижней части емкостей для хранения топлива.

6. Именно здесь сосредотачиваются отложения продуктов жизнедеятельности микроорганизмов. Вода и водотопливная эмульсия являются прекрасной питательной средой для микробов. Рост колоний начинается уже при толщине пленки воды менее 1 мм.

7. Микробиологическое заражение авиационного топлива также возможно при транспортировке или хранении топлива, в результате попадания микробов и бактерий из атмосферы или при смешивании с ранее зараженным топливом.

8. Такое заражение выражается в образовании кислот и отложении продуктов жизнедеятельности микроорганизмов, приводящих к разъеданию поверхностей металлов, интенсивной коррозии, засорению отдельных

участков трубопроводов и фильтров, накоплению продуктов деградации углеводородов.

9. На скорость роста и размножения микроорганизмов также влияют внешние факторы: температура (особенно в районе 23–25 °С), количество воды и ее водородный показатель — баланс кислорода и двуокиси углерода.

10. Комплекс мер профилактики микробиологического загрязнения топлива включает в себя множество технологических операций, исключающих скопление воды в системах авиатопливообеспечения.

Section 6 Electrical Conductivity and Density.

Ex.1 Translate the words and word combinations

Абсорбер воды, фильтр- коагулятор, амбарная вода, аэробные бактерии, вещество, похожее на растительную слизь, внушать уверенность, грязевой отстой, дренажное устройство в нижней точке, запас горючего, количественные проверки, колония грибов, общая масса растворённых механических примесей, отстойник, подозревать, препятствовать, присадки, студенистое вещество, сульфат-восстанавливающие бактерии, пылезащитная заглушка, выпускное опорное кольцо, вводное опорное кольцо, мембранный фильтр с размером пор 0,37 мкм, дублирующая впитывающая прокладка, пылезащитная заглушка, выпускное опорное кольцо, вводное опорное кольцо, мембранный фильтр с размером пор 0,37 мкм, дублирующая впитывающая прокладка, светлый фон, улучшать, дренажный сток, кран, выплеснуться, складской резервуар, окунать, зачерпывать, твердые загрязнения.

Essential Vocabulary

hydrocarbon fuel	углеводородное топливо
to dissipate	выветриваться, улетучиваться, уходить
to be susceptible to	быть подверженным
static dissipater additives (SDA)	антистатическая присадка
refinery operators	компания-оператор нефтеперерабатывающего предприятия

to dilute	разжижать
in lieu of	за неимением
Rinse	промывать
top hatch of the tanker	верхний люк бака
pico-siemens per meter (pS/m)	пико сименс на метр
specific gravity	удельная плотность
relative density	относительная плотность
two scale division	на два деления (шкалы)
mercury head	ртутная головка термометра
to compare alike	проверить соответствие
multiply by	умножить на
add to	прибавить к
subtract from	вычесть из
divide by	разделить на

Ex.2 **Read the text, open the brackets. Put the verbs into the correct tense.**

Reference: ASTM D 2624 - Test Methods for Electrical Conductivity of Aviation and Distillate Fuels.

Hydrocarbon fuels typically **(to have)** low electrical conductivity and consequently, **(to be)** susceptible to retaining a static charge. Static charges **(to be)** induced, especially, when the fuel **(to be)** pumped at high rates through filters. Due to the relatively low conductivity, the static charge does not readily dissipate and **(to be)** retained for a considerable period of time. This condition can result in an explosion and/or fire. Aviation fuel low conductivity can **(to be)** increased by the use of static dissipater additives (SDA). These additives help rapid dissipation of static electricity charges that can **(to build up)** during normal fuel handling processes, especially during filtration. Refinery operators usually **(to add)** additives which normally **(to meet)** desired conductivity range in the field. There **(to be)** number of reasons where effectiveness of additives **(to dilute)** over a period of time and may **(to render)** fuel conductivity to an unsafe level. Conductivity range must **(to be)** monitored by using specific testing equipment.

With the additives used conductivity of the fuel should **(to be)** within product specification.

Ex.3 Fill in the gaps with the appropriate derivative of the word from the right column:

Conductivity Testing Procedure:

<p>With a portable meter conductivity 1)_____ is made almost 2) _____. Since conductivity is a function of temperature, it is very important 3) ____ the fuel temperature at which the measurement was performed.</p> <p>Rinse the probe and sample 4)_____ (if _____)is used in lieu of directly dipping probe in the fuel 5)_____ tank) using the fuel under test prior conductivity test.</p> <p>b) Sample should be taken from the nozzle or the top hatch of the tanker but not from sump 6)_____.</p> <p>c) After taking the sample wait for two (2) minutes for any 7)_____ in the fuel to dissipate.</p> <p>d) 8)_____ sampling container is metallic and properly bonded to the instrument.</p> <p>e) Calibrate the meter as per 9)_____ instructions.</p> <p>f) Having immersed the probe in the fuel, energize the instrument and read the 10)_____ units (C.U.) equivalent to pico-siemens per meter (pS/m).</p> <p>g) If checking conductivity within a storage tank, wait at least 30 minutes after pumping into the tank before inserting 11) _____ probe in to fuel. Ensure proper bonding of meter with the tank prior inserting the probe to prevent static 12)_____in case the fuel is charged.</p> <p>h) Do not use probe in areas where water may be present. If the probe has contacted the water, 13)_____ or wet fuel, follow manufacturer’s instructions for proper cleaning.</p>	<p>1)to measure</p> <p>2) instantaneous</p> <p>3) a record</p> <p>4)to contain</p> <p>5)to store</p> <p>6)to drain</p> <p>7) to charge</p> <p>8) sure</p> <p>9) _____ to manufacture</p> <p>10) to conduct</p> <p>11) to equip</p> <p>12)to charge</p> <p>13) to moist</p>
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Ex.4 Fill in the prepositions or adverbs where necessary

Between/ of(3)/ by/ in(2)/ for

Interpretation and limitation of Results:

Conductivity of untreated fuel is generally less than 10 C.U (pS/m).

Properly treated fuel range.... 50 and 450 C.U., these readings reflect amount...additive in the fuel and are affectedtemperature and time. Discrepancies may occurrepeatability of the readings because... the effect of temperature and time. For every 10°C drop in temperature of fuel, conductivity reading ...the fuel will reduce approximately..... 50 pS/m.

Note that not all the aviation fuels contain... static dissipater additives (SDA) such as “Jet A” fuel. Therefore, sufficient relaxation time must be providedstatic charges to dissipate and factored... the fuel delivery system as per API 2003 standard.

Ex.5 Put 5 types of questions to each sentence. Translate the original sentences.

Density:

1.Scientific definition of density: density (ρ) of a body is the ratio of its mass (m) to its volume (V).

2.Density of fuel is “the mass of fuel per unit volume”.

3.In some cases the density is expressed as a specific gravity or relative density, in which case it is expressed in multiples of the density of some other standard material, usually water or air.

Ex.6 Read and translate the text. Tell your partner about the use of thermometer and hydrometer. Do not forget to add the appropriate discourse markers: *initially/ at first/ later/then/after that/ and finally etc*

Use of Thermometer and Hydrometer:

a) Sample cylinder should be in a vertical stationary surface in an area free from air circulating air. Allow 1-2 minutes for air bubbles to disappear. Remaining bubbles from the surface of the sample if any should be removed by touching with

a clean paper towel. Ensure the temperature of the sample does not change during the test.

b) Gently lower the hydrometer into the sample. When it has settled, depress it about two scale division into the liquid and then release it.

c) Determine the temperature of the sample by cautiously stirring with the thermometer for approximately 30 seconds ensure total immersion of mercury head into the sample. Note the temperature to the nearest 0.5°C.

Remove the thermometer and allow hydrometer to settle again. Depress it about two scale division into the liquid and then release it. Gently spin the hydrometer when releasing it to ensure free float away from the walls of the cylinder.

e) Allow sufficient time to hydrometer to come to rest and take reading at the point where the surface of the liquid cuts the scale to 0.0002. Observe the hydrometer scale just below the surface and then raising eye slightly until the liquid surface appears as a straight line cutting the hydrometer scale.

Record observed density reading.

Ex.7 Read the instruction for the calculation of density and the example. Calculate the corrected density for the temperatures of

a) +24°C; b) +11°C; c) -6°C; d) 0°C; e)+15°C; f) +13°C;g) -12°C; h) -15°C; i) +0.2°C, j) -41°C; k) -1,8°C l) +22°C, using the corresponding lines in Table 1.3

Tell about the steps of calculation according to the example in the italics below.

Calculation:

It is necessary to correct the “observed density reading” of different samples to a “Standard Temperature/Pressure” (STP) density reading in order to compare alike.

a) From Table 1.3 below read the correction coefficient per °C shown against “Observed Density”.

	Density at Observed Temperature (with metric hydrometer)	Density Correction Coefficient
a	0.6990-0.7020	0.00086
b	0.7021-0.7160	0.00085
c	0.7161-0.7300	0.00083

d	0.7301-0.7420	0.00081
e	0.7541-0.7650	0.00077
f	0.7651-0.7760	0.00076
g	0.7761-0.7870	0.00074
h	0.7871-0.7990	0.00072
i	0.7991-0.8020	0.00070
j	0.8021-0.8280	0.00068
k	0.8281-0.8600	0.00067
l	0.8601-0.9250	0.00065

a) Multiply the coefficient by the difference between 15 °C and the temperature of the sample product when the density was recorded. This will be the actual correction factor to be applied to correct the density to STP.

b) If the recorded temperature (taken at the time of recording density) is above 15 °C then correction factor is added to the observed density.

c) If the recorded temperature (taken at the time of recording density) is below 15 °C then correction factor is subtracted from the observed density.

Example :

Observed density of sample 0.7010

Temperature of sample during determination of Density 21 °C

Correction coefficient from Table 1.3 is 0.00086

Correction factor = $(21-15) \times 0.00086$ 0.00516

Corrected density (STP) = $0.7010 + 0.00516$ 0.70616

Note: If the temperature of the sample would have been less than 15 °C, then the correction factor would have been subtracted from the observed density rather than added.

Observed density of sample was zero point zero one zero (0.7010)

Temperature of sample during determination of density was twenty-one degrees Centigrade.

Correction coefficient from Table one point three is zero point zero zero zero eight six (0.00086)

Correction factor is twenty-one minus fifteen grouped multiplied by zero point zero zero zero eight six, which equals to zero point zero zero five one five $((21-15) \times 0.00086=0.00516)$.

Thus,

Corrected density (STP) equals to zero point seven zero one zero plus zero point zero zero five one six or zero point seven zero six one six. $(0.7010 + 0.00516=0.70616)$.

Ex.8 Translate the sentences using the following parenthesis (вводные слова):

However, in order to, it is accepted that, nevertheless, on the other hand.

1. С другой стороны, топлива с большой электропроводностью могут вызвать нарушения в работе некоторых уровнемеров (емкостных) в самолетных баках.

2. Принято, что топливо электропроводностью не более 300 пСм не вызывает нарушений в работе уровнемеров. Однако уже сейчас накоплен опыт лабораторных и летных испытаний, свидетельствующий о том, что топлива электропроводностью 1000 пСм если и влияют на показания уровнемеров, то в пределах допустимых ошибок.

3. Тем не менее во многих технических условиях на реактивные топлива указаны границы электропроводности топлив (50—300 пСм).

4. Чтобы обеспечить такую электропроводность топлив типа керосина необходимо добавить 0,000075% (0,75 ч. на 1 млн) присадки А5А-3, для топлива типа широкой фракции (топливо ЛР-4) — 0,00005% (0,5 ч. на 1 млн)

Ex.9 Answer the following questions:

1. Why are fossil fuels susceptible to retaining a static charge?

2. When is there the highest risk of the static charge to be induced?

3. What can the non-dissipated static charge result in?

4. How can refinery operators rectify the problem of low conductivity?

5. Why should we monitor the fuel conductivity even with the SDAs being added?

6. Is there an instant way of measuring the conductivity?

7. What physical parameter is the conductivity dependent on?

8. How long should we wait for the charge to dissipate from the fuel sample/if checking conductivity within a storage tank?

9. What should the sampling container be made of? Is there a need to bond it?

10. What is conductivity measured in?

11. What are the precautions for measuring the conductivity with a portable probe?
12. What is the conductivity of untreated fuel?
13. What is the conductivity of fuel treated with SDAs?
14. What is the dynamics of fuel conductivity for every 10°C drop in temperature?
15. Define the term “density”.
16. How deep should we immerse the hydrometer into the sample cylinder?
17. What should the “observed density reading” be compared to?

Ex.10 Translate the words and word combinations:

Two scale division, top hatch of the tanker, to dissipate, to dilute, to compare alike, to be susceptible to, to subtract from, static dissipater additives (SDA), specific gravity, rinse, relative density, refinery operators, pico-siemens per meter (pS/m), multiply by, mercury head, in lieu of, hydrocarbon fuel, divide by, add to.

Ex.11 Translate the following sentences:

1. Во время перекачки при интенсивном перемешивании и пропускании через слой топлива струи воздуха в топливе образуется заряд статического электричества, разряд которого может привести к воспламенению горючей смеси, а это в свою очередь приводит к взрыву и пожару.

2. Опытами установлено, что способность топлива подвергаться электризации при перекачке находится в зависимости от его электропроводности: чем меньше электропроводность топлива, тем легче накапливается заряд статического электричества и тем медленнее он рассеивается.

3. Кроме этого, на скорость образования статического электричества влияют эксплуатационные факторы: скорость перекачки, присутствие в топливе механических примесей, воды, воздуха, условия хранения, температура и др.

4. Чем больше скорость перекачки, тем сильнее электризуется топливо.

5. Чем дольше перекачивать топливо, тем оно сильнее электризуется.

6. Большое влияние на электризацию топлив оказывают также механические примеси и пузырьки воздуха; чем их больше, тем сильнее электризуется топливо.

7. Растворенная или диспергированная в топливе вода значительно увеличивает образование статического электричества.

8. Однако вода, находящаяся на дне емкости в виде отдельного слоя, или не оказывает никакого влияния на скорость образования статического электричества, или способствует уменьшению его.

9. При добавлении в топливо незначительного количества веществ, повышающих электропроводность (соли щелочных металлов и др.), скорость образования статического электричества резко падает, а в некоторых случаях полностью устраняется.

10. Вместе с тем добавление к топливу углеродистых веществ (асфальта, нефтяного битума) в незначительных количествах (0,005—0,0005%) повышает способность топлива образовывать статическое электричество во время перекачки

11. В условиях работы установок заряды статического электричества возникают в трубопроводах, аппаратах и резервуарах в результате трения о стенки их нефтепродуктов, (являющихся диэлектриками) при переливаниях, перемешивании и перекачках.

Ex.11 Speak about the Fuel Electric Conductivity and Density. Follow the plan:

1. The definition of electric conductivity. The reasons of static charge.
2. The testing procedure for conductivity. The normal conductivity for non-treated and SDA-treated fuel.
3. Density, the definition. The unit of density.
4. The procedure of measurement, the use of thermometer and hydrometer.
5. The calculations.

Unit 2 Fuel Storage

Section 1 Drum storage

Ex.1 Translate the words and word combinations:

Антистатическая присадка, быть подверженным, верхний люк бака, выветриваться, улетучиваться, уходить, вычесть из, за неимением, компания-оператор нефтеперерабатывающего предприятия, на два деления (шкалы), относительная плотность, пико сименс на метр, прибавить к, проверить соответствие, промывать, разделить на, разжижать, ртутная головка термометра, углеводородное топливо, удельная плотность, умножить на, шприц, шланги, химически обработанный фильтр, футерованный фаянсом, уплотнительные прокладки, узкогорлая склянка, твердые загрязнения, сульфат-восстанавливающие бактерии, стеклянная пробирка, соединение (капелек эмульсии при действии реагента), складской резервуар, ржавчина, рейка для замера, рабочая полость насоса, порошок, подозревать, отстойник, отборе проб на линии трубопровода, осаждение на стенках, окунать,

зачерпывать, общая масса растворённых механических примесей, миллионная доля, метод испытания с мембранным фильтром, мелкая капля, запас горючего, дренажное устройство в нижней точке, детали трубопроводов, захваченная вода, ворсинки, воронкообразный водоворот с концентрированием твёрдой фазы в центре, водочувствительный, гидрофильный химикат, водочувствительная паста, водосодержащее топливо, взвешенная вода, вещество, похожее на растительную слизь, быть заземленным, быстроразъёмное соединение

Essential vocabulary

drums	стандартный бак для нефтепродуктов, бочка
extreme temperatures	перепады температур
To impair	причинять ущерб, нарушать
drum stack	штабель бочек
seal	пломба
legible	Читаемый, разборчивый
withdrawal	Выдача, извлечение
be tilted	Быть наклоненным
bung	большая пробка в бочке
agitate	встряхивать, колыхать
dipstick	щуп для измерения уровня
Barrel pumps	бочковой насос
fuel monitor	блок отделения воды (для авиационного топлива)
filter/separator	фильтр-влагоотделитель
suction pump	вакуумная помпа
to commence	начинать

foolproof indicator	индикатор с защитой от поломки в случае неумелого или неосторожного обращения
regardless of	независимо от
to thrive	плодиться, в изобилии произрастать
to clog	забивать, засорять
vent loose	разболтавшийся вентиляционный клапан
gasket	уплотнительная прокладка
compressibility	сжимаемость
standpipe	стояк присоединения шланга
hot-refuel	перегрузка топлива на ходу
wrench	гаечный ключ
fuel dump	полевой склад ГСМ
grounding	заземление
blowing snow	низовая метель
to insulate	изолировать
fuel caches	запас топлива
debris-strewn areas	замусоренные участки
anchor post	анкерный кол
to expedite	ускорять
unobtrusively	скрытым образом
map case	сумка-планшет
dab	касание, мазок
go-no-go filter	фильтр топливный, GNG Ex.

particle filter in series	последовательно подключенный фильтр тонкой очистки
intact o-rings	целый уплотнительный фильтр
sight glass	смотровое окошко
sediment filter	фильтр осадка
to squirt	сливать
foreign object damage (FOD)	повреждение посторонними предметами
pre-flight	предполетная проверка
aircraft's sump	слив отстоя из топливного бака самолета

Ex.2 Open the brackets. Put the verbs into the correct tense

General

This section (**to describe**) method and procedure of fuel stored in drums. Drums of aviation fuel (**to meet**) all quality requirements at the time of packing. Improper storage, exposure to extreme temperatures, extended storage period or any other abnormality may (**to impair**) the quality of the fuel in the drum.

The following procedures and practices (**to ensure**) the sustained quality of fuel in the drums.

Ex.3 Put all the possible types of questions to the following sentences. Translate the original sentences:

Handling of Drums

1 Extreme care should be taken not to drop fuel contained drums off the vehicles, platforms or drum stacks.

2 Seals should not be damaged and checked for tightness.

3 Any other damage to be observed and reported.

Ex.3 Put the words in the sentences in the correct order. Translate the obtained sentences:

Method of Storage

1. be /legible /marking/ Drum/ must

2. possible/ be/ Drums/ sides/ if /should /their /stored /on
3. older/ withdrawal/ should/ Stacking /drum/ first(first in - first out)/ allow /of
4. placed/ they /should drums /upright/ be/ kept/must/ under/ cover/ be /If.
5. must /upright /drums /placed /space /in/ an/ If /be /open,
they should be tilted slightly to prevent water from collecting around the bungs.

Ex.4 Fill in the prepositions or adverbs where necessary:

For(2)/ up/ in(2)/ from/ with/ to /by

Preparation of Servicing from the Drums

Stand up drums prior to their usage (...to two days, if dry conditions can be assured) to allow contaminants ...the fuel time to settle down. Avoid agitating the drums when refuelling.

For a safe and acceptable quality fuel delivery.... drums to the aircraft, the following should be observed;

1. The drum identification markings should be checkedproper fuel grade.
2. Seals should not be damaged or broken.
3. Check drum contents.... waterusing dipstick and water finding paste.
4. If water found present.... the drum, water should be removed prior using the content of the drum.
5. Ensure suitable filter/separators/monitors are used to service the aircraft.... fuel.
- 6.Barrel pumps and filter/separators/monitors must be bonded... barrel before bungs are removed.

Ex.5 Render the following instructions in indirect speech. Start with

The instruction said/stated, that....

Fuelling from Drums

1. Mount filter/separator or fuel monitor on the side of the drum and bond correctly.
2. Tilt drum slightly sideways, ensure large bung is on the high side of the drum.
3. Open large bung and insert suction pump to the bottom.
4. Bond pump to the drum.

5. Bond discharge nozzle to the aircraft before opening aircraft fuel tank.
6. Fuelling nozzle should be inserted into aircraft tank to the lowest possible to prevent fuel from splashing while fuelling.
7. Commence delivery.

Ex.6 Read and translate the text. Tell your partner about the use of thermometer and hydrometer. Do not forget to add the appropriate discourse markers: *initially/ at first/ later/then/after that/ and finally etc*

Switching to a fresh Drum

1. Remove nozzle from aircraft fuel tank and cap aircraft fuel tank.
2. Remove bonding cables and nozzle from aircraft vicinity.
3. Remove pump, filter/separator or monitor from drum.
4. Empty drum should be resealed and bonding cables removed from drum.
5. Proceed again with the fresh drum

Ex.7 Read and translate the text in the written form.

Precautions, Safety and Quality measures:

1. Ensure that the drum you are using contains the proper fuel, regardless of what is printed on the outside! Also note: different oil companies have different colours for drums, but a drum's colour is not a foolproof indicator. Confirm by the appearance and odour of the fuel each time.
2. Be suspicious of any drum that seems light or heavy: water weighs 20% more, and Avgas 10% less, than Jet B. Whatever is printed on the drum cannot be trusted if the original seal is broken or missing.
3. Somewhere on the drum is a fill date. Most oil companies discourage using fuel that is more than two years old. One reason is that a nasty fungus (*cladosporium resinae*) can thrive in small amounts of water in jet fuel, and will clog fuel lines. Older fuel can be used safely with caution. Check for any strange odour, or a dark or cloudy condition. If you have any doubt, do not use it.
4. Check all unsealed drums for an "X" marked on the end. This is the accepted marking for contamination. However, the lack of an "X" is no guarantee of quality! Many pilots who use a part drum will mark the date, aircraft registration, and approximate amount used, near the bung. (If you have any doubt, don't use it!)
5. Store the drum in the proper manner, and be suspicious of any drum that is not, especially if you have reason to doubt whether it has been well resealed (bung or vent loose; gaskets torn, missing, or twisted). Even when properly resealed and

stored, a part drum is more likely to contain moisture because of the increased "breathing" (more air content equals greater compressibility.)

6. All fuel drums should be stored on their side, with bungs and vents at the

3 o'clock and 9 o'clock positions. Make sure that the top of the drum (with the openings) is lower than the bottom. This will minimize breathing (air and moisture exchange from the outside).

7. When opening a drum, observe the following:

8. Stand the drum on end and block it with the high side at 12 o'clock, the bung at 3 o'clock, and the vent at 9 o'clock. This prevents water or dirty fuel from reaching the openings.

9. Ensure that the standpipe cannot reach the lowest point in the drum. Thus, any small amount of water or dirt will remain in the drum. You should not need the last gallon badly enough to risk using it.

10. If possible, stand up your drums prior to their usage (up to two days, if dry conditions can be assured) to allow contaminants time to settle out. Avoid agitating the drums when refuelling.

11. If you have a helicopter and you must hot-refuel, avoid putting loose items such as bungs and wrenches on top of the drum.

Note: Hot refuelling from drums should be done only during an emergency, or under very controlled conditions in compliance with CAR 602.09 and the approved Company Operations Manual (lots of ground crew, no passengers on board, pilot at the controls, and a developed refuelling procedure complete with individual duties and signals). The potential for disaster normally outweighs the potential for time saved.

12. Upon emptying the drum, locate it (with bung and vent reinstalled) so that it will not become a rolling or flying hazard to yourself or others using the fuel dump.

13. Proper grounding is critical, especially during winter operations. Dry winter air and blowing snow transform the rotors into powerful static generators. Moreover, snow insulates, and static may not dissipate on touchdown. Avoid wearing nylon clothing or wiping plexiglass when refuelling. Dusty or sandy conditions are also conducive to static build up. Check the condition of the ground cables, and replace any doubtful connections.

Note: The proper sequence for grounding is: drum to ground (anchor post), drum to pump, pump to aircraft, nozzle to aircraft, then open cap. When finished, reverse order.

14. Fuel caches should be located clear of sandy, dusty, or debris-strewn areas. They should be organized to expedite refuelling, with a good approach/departure

path. (Remember: you will be heavier leaving, than arriving, unless you arrived with a load of uranium)

15. Always carry and use water finding paste, such as Kolor Kut. A tube will fit unobtrusively in your map case and last for a long time. A dab on the end of the standpipe will give a positive indication of water.

16. Ensure that the pump is equipped with a clean and serviceable go-no-go filter and particle filter in series, with intact o-rings. The go-no-go is designed to bind up and prevent flow in the presence of water. Increased pressure usually means blockage or contamination. Observe the sight glass for dirt or water in the sediment filter.

17. Squirt the first pump strokes into a container before putting the nozzle into the aircraft. Any dirt downstream of the filters will be flushed out of the hose, and can thus be examined.

18. Dispose of plastic caps, metal rings, and date tags from your used drums carefully to prevent the risk of foreign object damage (FOD) in the refuelling area.

19. Don't forget that the first pre-flight of the day should include a draining and catching of the aircraft's sump/airframe fuel-filter contents. Do this before disturbing the aircraft.

Ex 8 Answer the following questions:

1. What may impair the quality of the fuel in the drum?
2. What standards must the drum marking meet?
3. What is the most desirable storage position of the drums?
4. What is the principle of drum stacking and withdrawal?
5. What should be done to store the drums upright safely?
6. Why should the drums be tilted slightly if they are stored upright in an open space?
7. How long does it take for the contaminants to settle down in an upright drum?
8. How can we check the contents of water in the drum?
9. What should be checked prior to removal of bungs?
10. How should the fuelling nozzle be inserted into the aircraft tank?
11. Is the drum colour always the indicator of its contents?
12. What must you suspect if the drum is too light/too heavy?
13. Why do most oil companies discourage using fuel more than two years old?

14. What does “X” marked of unsealed drums indicate?
15. What should the position of the bungs and vents/the position of the top of the drum of the stored fuel drums be?
16. Why shouldn't the standpipe reach the bottom of the drum?
17. What are the precautions for the hot refuel?
18. What should the position of the drum be after the refuelling?
19. Which conditions facilitate the static charge of the fuel?
20. What is the proper place for fuel caches?

Ex.9 Translate the words and word combinations:

Commence, wrench, withdrawal, vent, loose, unobtrusively, to thrive, to insulate, to impair, to expedite, to clog, suction pump, standpipe, sight glass, sediment filter, seal, regardless of, particle filter in series, map case, legible, intact o-rings, hot-refuel, grounding, go-no-go filter, gasket, fuel monitor, fuel dump, fuel caches, foolproof indicator, filter/separator, extreme temperatures, drums, drum stack, dipstick, debris-strewn areas, compressibility, bung, blowing snow, be tilted, barrel pumps, anchor post, agitate, dab.

Ex.10 Translate the following sentences:

1. Выдавать со склада бензин, дизельное топливо, масла следует в первую очередь из резервуаров, которые заполнены меньше и где топливо хранится более длительный срок.
2. Наливные отверстия бочек должны быть закрыты металлическими пробками с прокладками из маслобензостойкой резины или специального картона.
3. Порожняя тара из-под нефтепродуктов должна складироваться в штабеля по длине не более 10 м, по ширине - 6 м, по высоте - 2 м.
4. При загрузке светлых нефтепродуктов падающей струей в резервуарах и цистернах накапливаются значительные потенциалы статического электричества, которые могут привести к электрическому разряду, следствием чего может быть воспламенение или взрыв смеси нефтепродукта с воздухом (особенно в сухую погоду и в зимнее время).
5. Для снятия статического электричества все металлические части эстакад, наливных телескопических труб, рукава и наконечники во время слива и налива, резервуары и цистерны должны быть заземлены.

Ex.11 Speak about the Fuel Drum Storage. Follow the plan:

1. Handling of drums

- 2.Method of storage
- 3.Preparation of servicing from the drums
- 4.Fuelling from drums, switching to a fresh drum
- 5.Precautions, safety and quality measures.

Section 2 Aboveground Fuel Storage Tank

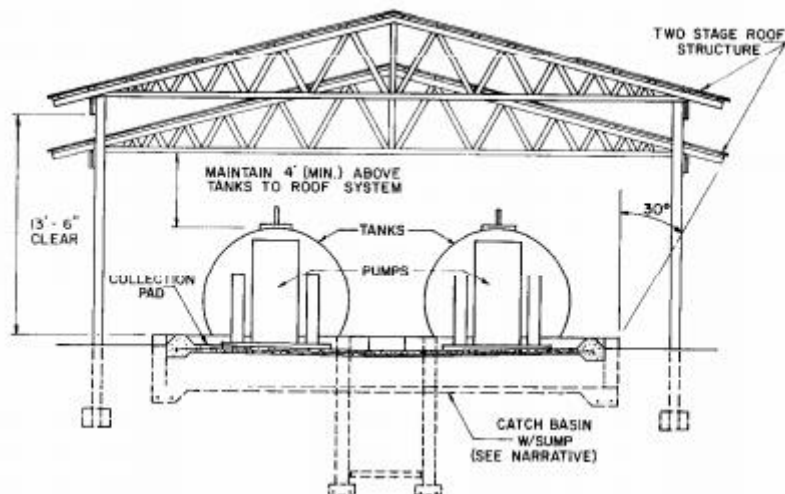
Ex.1 Translate the words and word combinations:

Анкерный кол, блок отделения воды (для авиационного топлива), большая пробка в бочке, бочковой насос, быть наклоненным, вакуумная помпа, встряхивать, колыхать, выдача, извлечение, гаечный ключ, забивать, засорять, заземление, замусоренные участки, запас топлива, изолировать, индикатор с защитой от поломки в случае неумелого или неосторожного обращения, касание, мазок, начинать, независимо от, низовая метель, перегрузка топлива на ходу, перепады температур, плодиться, в изобилии произрастать, пломба, повреждение посторонними предметами, полевой склад ГСМ, последовательно подключенный фильтр тонкой очистки, предполетная проверка, причинять ущерб, нарушать, разболтавшийся вентиляционный клапан, сжимаемость, скрытым образом, слив отстоя из топливного бака самолета, сливать, смотровое окошко, стандартный бак для нефтепродуктов, бочка, стояк присоединения шланга, сумка-планшет, уплотнительная прокладка, ускорять, фильтр осадка, фильтр топливный, GNG, фильтр-влагоотделитель, целый уплотнительный фильтр, читаемый, разборчивый, штабель бочек, щуп для измерения уровня

Essential Vocabulary

aboveground fuel storage systems	надземная система хранения топлива
competitive	способный выдержать конкуренцию
catch basin	накопитель
rupture	разорваться, треснуть
concrete pad	бетонная площадка
sump pump system	насос для очистки нефтезаводских ловушек

adverse weather	неблагоприятная погода
integrity	целостность
prominent	ярко выраженный
master valve	центральная задвижка



Ex.2 Fill in the gaps with the appropriate derivative of the word from the right column:

<p>More 1)_____ are considering the alternative of aboveground fuel 2)_____ systems. While these systems increase the risk of fire and the problems of 3) _____ and 4)_____, they are 5)_____ with underground systems, require less management, and reduce the risk of groundwater 6)_____.</p> <p>The 7)_____ system is made up of the tank itself, a catch basin to trap fuel (should a tank leak or rupture), a concrete pad to retain fuel spilled during vehicle servicing and a roof structure to reduce evaporation and to keep water from collecting in the catch basin. If a complete roof structure is not constructed as part of the total above-ground fuel storage system, quantities of rainwater will accumulate in the catch basin, more than can be expected to dissipate by evaporation. A sump pump system can handle this excess water. An 8)_____ at the base of the basin wall to drain excess water is not an 9)_____ practice. Because all of the</p>	<p>1) to own 2) to store 3)to evaporate 4)to condensate 5)to compete 6)to contaminate 7) ground 8)to open</p>
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<p>fuel components of this system are above ground, a leak can be 10)_____ detected as soon as it occurs. Also, if a leak does occur, all fuel will be contained by the concrete catch basin until it can be disposed of 11)_____. All fuel storage tanks are to be 12) _____ inspected on a weekly basis, and as soon as possible following adverse weather, to check the integrity of the storage systems and associate 13)_____.</p>	<p>9) to accept 10) visual 11)proper 12) visible 13)to plumb</p>
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Ex.3 Open the brackets, put the verbs into the correct tense

All storage tanks **(to be)** to be checked monthly to verify contents.

A record of these inspections, **(to include)** the internal cleaning of tanks, **(to be)** maintained at the station. A logbook should be established for this purpose with the date, name of personnel and results for all maintenance and inspections of fuel handling and response equipment **(to undertake)** All pumps, valves and associated equipment **(to be)** to be maintained in good working order. Any defective fixtures or fittings shall be **(to replace)** or **(to repair)** as soon as is practicable.

Ex.4 Put disjunctive questions to the following sentences:

Inspection of Fuel Storage Tanks and Safety Features

All tanks should be numbered and have the grade of fuel and maximum capacity clearly marked. All valves shall be tagged or numbered to facilitate clear and unambiguous description in operating procedures.

The delivery pump shall have an emergency stop switch or other appropriate mechanism located in a prominent, accessible position. Alternatively, a master valve shall be fitted immediately downstream of the pump to facilitate emergency shutdown.

Ex.5 Fill in the gaps with the words from the box:

Proper intact debris quality free the unnecessary same following operational stationery chemical weather

The _____ procedure is recommended before loading fuel into storage tanks;

- 1 Check receiving tank levels. Ensure receiving tank will hold the quantity to be delivered. Check that contained fuel is of ____ type and grade.
- 2 Ensure that all alarm systems, if any, are in place and_____.
- 3 Ensure receiving tanks to have no ____water present.
- 4 Conduct all required _____tests of the receipt fuel.
- 5 Allow the fuel carrier/transport tanker to sit_____ at the unloading point for long enough to permit water and particulates to settle. Allow at least 30 minutes. Check that all compartment seals are_____.
- 6 Electrically bond the carrier/transporters to the fuel receiving equipment.
- 7 Ensure there is at least one each approved dry_____ fire extinguisher on each side of the carrier. In addition, one approved fire extinguisher shall be within 30 feet of the receiving tank.
- 8 Check all fittings for tightness to ensure no leaks and no contamination will be introduced into the fuel.
- 9 Check valve alignment for ____ set up and set all valves in the storage system to make sure that the fuel will go only into the proper tank.
- 10 Check to see that all containment walls are in place and are not damaged. Ensure that all water, and other fluids or____, are removed from containment areas.
- 11 Ensure there shall be no smoking, open flames, spark or flame producing items, ___or radio transmission items within 50 feet of a fueling operation.
- 12 Remove_____ all personnel from the area.
- 13 Check all seals on carrier tanks to ensure no tampering has taken place.
- 14 Check _____ reports to ensure there are no thunderstorms within five miles of the fueling area.

Ex.6 Fill in the prepositions where necessary

On/per/after(2)/ of(2)/ for/ from

Maintaining Fuel in the Aboveground Storage Tanks

- 1 Allow three hours of settling time..... foot of fueldelivery. (Time may vary... depending.... the size..... the storage tank)
- 2 Storage tank content should be periodically checked..... water.
- 3 Ensure all water is drained.... the filter/separatorevery circulation.
- 4 Maintain accurate records.... fuel quality, condition and age.

Ex.7 Translate the words and word combinations:

Aboveground fuel storage systems, adverse weather, catch basin, competitive, concrete pad, integrity, master valve, prominent, rupture, sump pump system

Ex.8 Answer the following questions:

1. What are the limitations and advantages of the aboveground storage systems?
- 2 What does the aboveground system consist of?
3. What component can handle the excess water accumulated in a roofless aboveground system?
4. How often should the storage tanks be checked visually? And to verify contents?
5. Which information should the storage tank checks logbook contain?
6. Where should the master valve be located and why?
7. What must be done prior to loading fuel into the storage tank?
8. How long should the fuel settle in the aboveground tank after delivery?
9. How can you check the fuel tank for water?
10. What records should be kept during the fuel maintaining in the storage?

Ex.9 Translate the words and word combinations:

Ярко выраженный, центральная задвижка, целостность, способный выдержать конкуренцию, разорваться, треснуть, неблагоприятная погода, насос для очистки нефтезаводских ловушек, накопитель, надземная система хранения топлива, бетонная площадка.

Ex.10 Translate the following sentences:

1. Оборудование хранения авиатоплива должно обеспечивать: прием и выдачу авиатоплива; отстаивание и хранение авиатоплива в резервуарах, исключая гравитационное движение внутри объема; выдачу авиатоплива в трубопроводы и коллекторы пунктов налива; дренирование подтоварной воды и механических примесей; учет хранимого авиатоплива; послыйный отбор проб в процессе хранения авиатоплива; зачистку резервуаров и резервуарного оборудования.

2. Материалы, используемые для изготовления деталей, узлов и агрегатов оборудования авиатопливообеспечения, а также покрытия внутренних поверхностей трубопроводов, корпусных изделий и резервуаров, должны быть стойкими к воздействию авиатоплива (как в чистом виде, так и в смеси с ПВКЖ) в рабочем диапазоне температур.

3. Используемые предохранительные клапаны должны быть отрегулированы на повышение значения внутреннего давления не более чем на 5%-10%; в случае отказа в работе дыхательного клапана внештатная ситуация должна быть исключена.

4. Авиационный керосин представляет собой продукт глубокой переработки нефти.

5. Эта углеводородная смесь применяется в летательных аппаратах с турбореактивными и турбовинтовыми двигателями не только в качестве топлива, но и хладагента.

6. Поэтому данный вид топлива должен иметь хорошие противоизносные и низкотемпературные свойства, высокую термоокислительную стабильность и большую удельную теплоту сгорания.

7. В настоящее время наиболее распространенным авиатопливом является авиакеросин марки ТС-1, который производится для самолетов дозвуковой авиации и его европейский аналог Jet A-1.

8. Что касается технологии производства авиакеросина, то для эффективной работы двигателя самолетов применяются противоводокристаллизационные и антистатические присадки

9. В ходе работы двигателя при полете самолета при низких температурах в авиатопливе происходит процесс кристаллизации, что приводит к засорению

топливных фильтров, прекращению подачи топлива, и , в конечном счете, может обернуться остановкой двигателя.

10. Для обеспечения безопасности при перекачке топлива и заправке авиасудов применяют антистатические присадки, которые способны увеличить электропроводность топлива до 50 пСм/м. Поскольку при накоплении статического электричества существует опасность взрыва, антистатические присадки используют в целях устранения данной проблемы.

Ex.11 Speak about Aboveground Fuel Storage. Follow the plan:

1. The pros and cons of aboveground storage.
- 2 The basic structure of the aboveground storage
- 3 The inspection of the fuel storage tanks and safety features.
- 4 Loading of the storage tanks
5. Maintaining fuel in the fuel storage tanks.

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