



PT. GEOSERVICES



Transportable Moisture Limit, Dan Analisa untuk Cargo B

Banjarmasin, 27 September 2023



Profile



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Pendahuluan



Barang Curah Padat terbagi menjadi 3 Grup, sbb:
(Daftar barang curah padat mengacu pada Lampiran Buku IMSBC Code & perubahannya)



4

PM 6 2021

BAB II GRUP BARANG CURAH PADAT

Pasal 3

- (1) Barang Curah Padat dikelompokkan menjadi:
 - a. grup A, Barang Curah Padat yang dapat mencair;
 - b. grup B, Barang Curah Padat yang memiliki bahaya kimia;
 - c. grup C, Barang Curah Padat selain grup A dan grup B; dan
 - d. grup A dan grup B, Barang Curah Padat yang dapat mencair dan memiliki bahaya kimia.
- (2) Daftar Barang Curah Padat sebagaimana dimaksud pada ayat (1) mengacu pada Lampiran IMSBC Code beserta perubahannya.

Pasal 5

- (1) Pengirim harus menyediakan informasi Barang Curah Padat yang akan dimuat di Kapal.
- (2) Informasi Barang Curah Padat sebagaimana dimaksud pada ayat (1) terdiri atas:
 - a. informasi Barang Curah Padat yang terdaftar dalam Lampiran I IMSBC Code; atau
 - b. informasi Barang Curah Padat yang tidak terdaftar dalam Lampiran I IMSBC Code.

untuk Barang Curah Padat grup A:

1. sertifikat TML;
2. sertifikat MC dengan besaran nilainya tidak lebih besar dari nilai TML;

PERATURAN PEMERINTAH

untuk Barang Curah Padat Grup B:

1. sertifikat yang berkaitan dengan kadar atau tingkat bahaya kimiawi dari Barang Curah Padat paling sedikit terdiri atas:
 - a) sertifikat kadar racun; dan
 - b) sertifikat kadar korosifitas;

- c. untuk Barang Curah Padat Grup C berupa pernyataan Pengirim bahwa Barang Curah Padat yang akan dimuat sudah memiliki dokumen yang dibutuhkan.

- a. Pengirim harus melampirkan sertifikat dan dokumen:
 1. sertifikat TML dan sertifikat MC dan/atau sertifikat kadar racun dan sertifikat kadar korosifitas; dan

EDARAN HUBLA

SURAT EDARAN
Nomor SE-DJPL 8 Tahun 2023

TENTANG

SERTIFIKAT HASIL PENGUJIAN LABORATORIUM
UNTUK BARANG CURAH PADAT

Pada saat pengajuan Surat Persetujuan Kegiatan bongkar/muat barang curah padat, pihak kapal dan atau pemilik muatan (*Shipper*) harus melampirkan hasil pengujian laboratorium untuk barang curah padat yang terdaftar dan/atau barang curah padat yang belum terdaftar sesuai dengan ketentuan pengujian groupnya (group A atau group B atau group C) sebagaimana diatur dalam *IMSBC Code*;

c. Guna mencegah terjadinya perubahan bentuk sampel yang akan diuji, maka *Shipper* atau pemilik barang curah padat atau laboratorium dalam pengambilan sampel Barang Curah Padat yang terdaftar dan atau Barang Curah Padat yang tidak terdaftar dalam *IMSBC Group A* :

- 1) Telah memiliki persetujuan prosedur pengambilan dan pengendalian MC sampel barang curah padat;
- 2) Pengujian MC / TML sampel dilakukan oleh Laboratorium yang telah mendapatkan pengakuan dari Otoritas yang Berwenang.

d. *Shipper* atau pemilik barang curah padat yang terdaftar di *IMSBC Code group B* atau *group C* dan yang tidak terdaftar dalam *IMSBC Code*, harus melakukan pengujian di laboratorium yang telah mendapatkan pengakuan dari Otoritas yang Berwenang dengan tetap memperhatikan kemungkinan terjadinya perubahan bentuk dan kerentanan bahaya yang dapat timbul saat menempuh lokasi laboratorium yang dituju.

Jarak Pengiriman sample max
5000 km

Ditetapkan di Jakarta
Pada tanggal 23 Februari 2023
a.n Direktur Jenderal Perhubungan Laut
Direktur Kesatuan Penjagaan Laut dan Pantai.

Material Hazard in Bulk

Chemical hazard	Notational reference
Combustible solids	CB
Self-heating solids	SH
Solids that evolve flammable gas when wet	WF
Solids that evolve toxic gas when wet	WT
Toxic solids	TX
Corrosive solids	CR
Other hazards	OH

9.2.3.5 Solids that evolve toxic gas when wet: MHB (WT)

9.2.3.5.1 These are materials that evolve toxic gases when in contact with water when transported in bulk.

9.2.3.5.2 A material shall be classified as MHB if, in tests performed in accordance with the test method given in the *United Nations Manual of Tests and Criteria*, part III, 33.4.1, the toxic gas evolution rate is greater than zero. Toxic gas evolution shall be measured using the same test procedure for flammable gas evolution as prescribed in the test method. When performing this test, the rate of evolution of gas shall be calculated over 48 hours at 1-hour intervals. If at the end of the 48-hour period the rate of evolution is increasing, the test period shall be extended in accordance with the test method.

9.2.3.5.3 The gas shall be collected over the test period prescribed above. The gas shall be chemically analysed and tested for toxicity if the gas is unknown and no acute inhalation toxicity data is available. If the gas is known, inhalation toxicity shall be assessed based on all information available, using testing as a last resort option for concluding this hazard. Toxic gases in this respect are gases showing acute inhalation toxicity (LC_{50}) of or below 20,000 ppmV or 20 mg/L by 4 hours' testing (GHS Acute Toxicity Gases/Vapours Category 4).

WT (Toxic Gas When Wet)

Substance di uji dengan cara dibasahi dan dilakukan pengamatan sama dengan uji WF selama 48 jam, LC_{50} 20mg/L dalam 4 jam waktu uji

Toxic solids

9.2.3.6 Toxic solids: MHB (TX)

9.2.3.6.1 These are materials that have toxic hazards to humans if inhaled or with contact with skin when loaded, unloaded, or transported in bulk and do not meet the established criteria for inclusion in class 6.1 (see 9.2.2.5).

9.2.3.6.2 A material shall be classified as MHB in accordance with the criteria laid down within part 3 of the GHS:

- 1 cargoes developing cargo dust with an acute inhalation toxicity (LC_{50}) of 1-5 mg/L by 4 hours' testing (GHS Acute Toxicity Dusts Category 4);
- 2 cargoes developing cargo dust exhibiting an inhalation toxicity of equal to or less than 1 mg/L/4 h (GHS Specific Target Organ Toxicity Single Exposure Inhalation Dust Category 1) or below 0.02 mg/L/6 h/d (GHS Specific Target Organ Toxicity Repeated Dose Inhalation Dust Category 1);
- 3 cargoes exhibiting an acute dermal toxicity (LD_{50}) of 1,000-2,000 mg/kg (GHS Acute Toxicity Dermal Category 4);
- 4 cargoes exhibiting a dermal toxicity of or below 1,000 mg (GHS Specific Target Organ Toxicity Single Exposure Dermal Category 1) or below 20 mg/kg bw/d by 90 days' testing (GHS Specific Target Organ Toxicity Repeated Dose Dermal Category 1);
- 5 cargoes exhibiting carcinogenicity (GHS Category 1A and 1B), mutagenicity (GHS Category 1A and 1B) or reprotoxicity (GHS Category 1A and 1B).

Toxic testing

1. INHALASI

Dengan memaparkan object makhluk hidup menggunakan substance 1-5mg/L selama 4 jam

2. DERMAL

Dengan memaparkan kulit makhluk hidup 20mg/kg Selama 90 hari.

melakukan TX dan WT perlu info terkait

- Izin menyakiti hewan
- Selain Lab. Klinis apakah boleh melakukan test ini

Apakah semua kargo curah padat memiliki analisa MHB yang sama terkait keselamatan Pelayaran ? Lihat contoh di buku IMSBC Appendix I

IMSBC
APPENDIX I

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NICKEL ORE																							
Description Mixed ore varies in colour. There are several types of ore of variable particle size and moisture content. Some may contain clay-like ores. For concentrates, see NICKEL CONCENTRATE.																							
Characteristics <table border="1"> <thead> <tr> <th colspan="4">Physical properties</th> </tr> <tr> <th>Size</th><th>Angle of repose</th><th>Bulk density (kg/m³)</th><th>Stowage factor (m³/t)</th></tr> </thead> <tbody> <tr> <td>Various</td><td>Not applicable</td><td>1,400 to 1,800</td><td>0.66 to 0.71</td></tr> <tr> <td colspan="2">Hazard classification</td><td>MHB</td><td>Group A</td></tr> <tr> <td colspan="2">Subsidiary hazard(s)</td><td>Not applicable</td><td></td></tr> </tbody> </table>				Physical properties				Size	Angle of repose	Bulk density (kg/m ³)	Stowage factor (m ³ /t)	Various	Not applicable	1,400 to 1,800	0.66 to 0.71	Hazard classification		MHB	Group A	Subsidiary hazard(s)		Not applicable	
Physical properties																							
Size	Angle of repose	Bulk density (kg/m ³)	Stowage factor (m ³ /t)																				
Various	Not applicable	1,400 to 1,800	0.66 to 0.71																				
Hazard classification		MHB	Group A																				
Subsidiary hazard(s)		Not applicable																					
Hazard This material may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code. This cargo is non-combustible or has a low fire risk.																							
Stowage and segregation No special requirements.																							
Hold cleanliness Cargo spaces must be clean and dry.																							
Weather precautions When a cargo is carried in a ship other than a ship complying with the requirements in 7.3.2 of this Code, the following provisions shall be complied with:																							
<ol style="list-style-type: none"> 1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage; 2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation; 3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatchways of the cargo spaces into which the cargo is loaded, or to be loaded, shall be closed; 4 the cargo may be handled during precipitation under the conditions stated in the procedures required in 4.3.3 of this Code; and 5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port. 																							
Loading Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code. When the stowage factor of this cargo is equal to or less than 0.56 m ³ /t, the tank top may be over-stressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.																							

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SCRAP METAL																							
(see appendix to this schedule)																							
Description Scrap iron or steel covers an enormous range of ferrous metals, principally intended for recycling.																							
Characteristics <table border="1"> <thead> <tr> <th colspan="4">Physical properties</th> </tr> <tr> <th>Size</th><th>Angle of repose</th><th>Bulk density (kg/m³)</th><th>Stowage factor (m³/t)</th></tr> </thead> <tbody> <tr> <td>Various</td><td>Not applicable</td><td>Various</td><td>Various</td></tr> <tr> <td colspan="2">Hazard classification</td><td>MHB</td><td>Group C</td></tr> <tr> <td colspan="2">Subsidiary hazard(s)</td><td>Not applicable</td><td></td></tr> </tbody> </table>				Physical properties				Size	Angle of repose	Bulk density (kg/m ³)	Stowage factor (m ³ /t)	Various	Not applicable	Various	Various	Hazard classification		MHB	Group C	Subsidiary hazard(s)		Not applicable	
Physical properties																							
Size	Angle of repose	Bulk density (kg/m ³)	Stowage factor (m ³ /t)																				
Various	Not applicable	Various	Various																				
Hazard classification		MHB	Group C																				
Subsidiary hazard(s)		Not applicable																					
Hazard No special hazards.																							
This cargo may be non-combustible or has a low fire risk except when cargo contains swarf (fine metal turnings liable to spontaneous combustion) refer to the entry for FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS UN 2793 in this Code.																							
Stowage and segregation No special requirements.																							
Hold cleanliness No special requirements.																							
Weather precautions This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo, all non-working hatchways of the cargo spaces to which this cargo is loaded, or to be loaded, shall be closed.																							
Loading Refer to the appendix to this schedule.																							
Precautions Refer to the appendix to this schedule.																							
Ventilation Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.																							
Carriage Bilges in the cargo spaces carrying this cargo shall not be pumped unless absolutely necessary. Bilgewater of this cargo may contain a certain amount of dirt and oil from old machinery. Refer to the appendix to this individual schedule.																							
Discharge When this cargo is discharged by magnet or spider grab:																							
<ol style="list-style-type: none"> 1 the deck and deck machineries shall be protected from falling cargo; and 2 damages to the ship shall be checked after the completion of discharge. 																							
Clean-up Prior to cleaning up the cargo spaces for this cargo, the crew shall be informed of danger due to broken glass and sharp edges. Prior to washing out the residues of this cargo, any oil																							

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SEED CAKE, containing vegetable oil UN 1365

(a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined

The range of oil and moisture content is indicated in the figure.

The graph shows a shaded rectangular area representing the permissible range of oil and moisture content. The vertical axis (y-axis) is labeled 'Oil [%]' and ranges from 0 to 20. The horizontal axis (x-axis) is labeled 'Moisture [%]' and ranges from 0 to 20. The shaded area is bounded by Oil content from approximately 10% to 20% and Moisture content from 0% to 20%.

To be carried in bulk only with special permission from the competent authority.

Description

Residue remaining after oil has been expelled mechanically from oil-bearing seeds. The cereals and cereal products included in this schedule are those derived from:

Bakery materials	Mill feed pellets
Barley malt pellets	Millet seed, expellers
Beet	Oil cake
Bran pellets	Oil kernel
Brewer's grain pellets	Peanuts
Citrus pulp pellets	Pellets, cereal
Coconut	Pollard pellets
Coconut	Rape seed
Corn gluten	Rice bran
Cotton seed	Rice broken
Expellers	Safflower seed
Gluten pellets	Seed expellers, oily
Ground nuts, meal	Soya bean
Hominy chop	Straw pellets
Linseed	Sunflower seed
Maize	Toasted meals
Meal, oily	

The above may be shipped in the form of pulp, meals, cake, pellets and expellers

Characteristics

Physical properties			
Size	Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Not applicable	Not applicable	478 to 719	1.36 to 2.06
Hazard classification			
Class	Subsidiary hazard(s)	MHB	Group
4.2	Not applicable		B

Hazard

May self-heat slowly, and, if wet or containing an excessive proportion of unoxidized oil, ignite spontaneously. Liable to oxidize, causing subsequent reduction of oxygen in the cargo space. Carbon dioxide may be produced.

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LIMESTONE

Description

Limestone varies in colour from cream through white to medium dark grey (when freshly broken).

Moisture: up to 4%.

Characteristics

Physical properties			
Size	Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Fines up to 90 mm	Not applicable	1,150 to 1,490	0.67 to 0.84
Hazard classification			
Class	Subsidiary hazard(s)	MHB	Group
Not applicable	Not applicable	Not applicable	C

Hazard

No special hazards.

This cargo is non-combustible or has a low fire risk.

Stowage and segregation

No special requirements.

Hold cleanliness

No special requirements.

Weather precautions

No special requirements.

Loading

Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions

Ridge walls shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

Ventilation

No special requirements.

Carriage

No special requirements.

Discharge

No special requirements.

Clean-up

No special requirements.

IMSBC
APPENDIX I

COAL

(see also the appendix to this schedule)

IMSBC

Coal shall be classified as group A and B unless classified as group B only by a test determined by the appropriate authority or where it has the following particle size distribution:

- not more than 10% by weight of particles less than 1 mm ($D_{10} > 1$ mm); and
- not more than 50% by weight of particles less than 10 mm ($D_{50} > 10$ mm).

Notwithstanding the above, a blend of two or more coals shall be classified as group A and B unless all original coals in the blend are group B only.

Description

Coal (bituminous and anthracite) is a natural, solid, combustible material consisting of amorphous carbon and hydrocarbons.

Characteristics

Physical properties			
Size	Angle of repose	Bulk density (kg/m ³)	Stowage factor (m ³ /t)
Up to 50 mm	Not applicable	654 to 1,266	0.79 to 1.53
Hazard classification			
Class	Subsidiary hazard(s)	MHB	Group
Not applicable	Not applicable	CB and/or SH and/or WF and/or CR	B (and A)

Hazards

Coal may create flammable atmospheres, may heat spontaneously, may deplete the oxygen concentration, may corrode metal structures. This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.

Stowage and segregation

Refer to the appendix to this schedule.

Batubara diklasifikasikan pada Grup A dan B
Setidaknya Diklasifikasikan hanya grup B jika :

- Particle size under 1 mm kurang dari 10%
- Particle size under 10 mm kurang dari 50%

Grup B perlu dilakukan klasifikasi Chemical Hazard

- Combustible solid (CB)
- Self Heating (SH)
- Substance which in contact with water evolve Flammable Gas (WF)
- Corrosive to metal (CR)

CB

SH

WF

CR

SIZE ANALYSIS

THIS IS TO CERTIFY : That we have performed the inspection, sampling and analysis of the coal consignment nominated above. Samples were taken by PT Geoservices during loading mother vessel and using ISO Standard methods. Samples were prepared and analysed in accordance with ISO Standard methods.

The following average results were obtained :

BASED ON ISO STANDARDS FOR QUALITY AND ANALYSIS AT LOADING PORT:

PARAMETER		UNIT	STANDARD NO.	VERSION NO.
Not more than 10% is less than 1 mm	:	%	ISO - 1953	: 2015
Not more than 50% is less than 10 mm	:	%	ISO - 1953	: 2015

THE SAMPLING AND ANALYSIS IS PERFORMED BY PT. GEOSERVICES



Pendahuluan



Dalam melaksanakan 3 prosedur sampel barang curah padat, Pengirim harus memastikan:





Pendahuluan



4.5 Interval between sampling/testing and loading for TML and moisture content determination

4.5.1 The shipper shall be responsible for ensuring that a test to determine the TML of a solid bulk cargo is conducted within six months to the date of loading the cargo. Notwithstanding this provision, where the composition or characteristics of the cargo are variable for any reason, the shipper shall be responsible for ensuring that a test to determine the TML is conducted again after it is reasonably assumed that such variation has taken place.

4.5.2 The shipper shall be responsible for ensuring that sampling and testing for moisture content is conducted as near as practicable to the date of commencement of loading. The interval between sampling/testing and the date of commencement of loading shall **never be more than seven days**. If the cargo has been exposed to significant rain or snow between the time of testing and the date of completion of loading, the shipper shall be responsible for ensuring that the moisture content of the cargo is still less than its TML, and evidence of this is provided to the master as soon as practicable.

Uji TML berlaku 6 bulan setelah sampling
Uji MC berlaku 7 hari

Jika kargo terpapar hujan atau salju significant, MC perlu diulang untuk memastikan nilainya dibawah TML

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Pendahuluan



1 Test procedures for materials which may liquefy and associated apparatus


Six methods of testing for the transportable moisture limit are currently in general use:

- .1 flow table test;
- .2 penetration test; and
- .3 Proctor/Fagerberg test.


As each method has its advantages, the selection of the test method should be determined by local practices or by the appropriate authorities.

- .4 Modified Proctor/Fagerberg test procedure for iron ore fines;
- .5 Modified Proctor/Fagerberg test procedure for coal; and
- .6 Modified Proctor/Fagerberg test procedure for bauxite.

4



Pendahuluan



1.1 Flow table test procedure

1.1.1 Scope

The flow table is generally suitable for mineral concentrates or other fine material with a maximum grain size of 1 mm. It may also be applicable to materials with a maximum grain size up to 7 mm. It will not be suitable for materials coarser than this and may also not give satisfactory results for some materials with high clay content. If the flow table test is not suitable for the material in question, the procedures to be adopted should be those approved by the authority of the port State.

1.4 Modified Proctor/Fagerberg test procedure for iron ore fines

1.4.1 Scope

.1 The test procedure specified in this section (this test) should only be used for determining transportable moisture limit (TML) of iron ore fines. See individual schedule for iron ore fines.

.2 Iron ore fines is iron ore containing both:

.1 10% or more of fine particles less than 1 mm; and

.2 50% or more of particles less than 10 mm.

1.2 Penetration test procedure

The penetration test constitutes a procedure whereby a material in a cylindrical vessel is vibrated. The flow moisture point is determined on the basis of the penetration depth of an indicator.

1.2.1 Scope

.1 The penetration test is generally suitable for mineral concentrates, similar materials and coals up to a top size of 25 mm.

1.5 Modified Proctor/Fagerberg test procedure for coal

1.5.1 Scope

This procedure details the laboratory determination of transportable moisture limit (TML) for coals up to a nominal top size of 50 mm. The procedure is based on a modification of the Proctor/Fagerberg test described in 1.3 of this appendix.

1.3 Proctor/Fagerberg test procedure

1.3.1 Scope

.1 Test method for both fine and relatively coarse-grained ore concentrates or similar materials up to a top size of 5 mm. This method should not be used for coal or other porous materials.


1.6 Modified Proctor/Fagerberg test procedure for bauxite

1.6.1 Scope


.1 The test procedure specified in this section (this test) should only be used for determining transportable moisture limit (TML) of bauxite cargoes containing both:

.1 more than 30% of fine particles less than 1 mm ($D_{30} < 1$ mm); and

.2 more than 40% of particles less than 2.5 mm ($D_{40} < 2.5$ mm).



Pendahuluan



Tugas Laboratorium :

- Melakukan pengujian sampel barang curah padat
- Menerbitkan Sertifikat / dokumen hasil uji barang curah padat (cth: sertf. MC, TML. Lembar Penentuan MC / FMP, Sertf. Korosifitas, dll)

Pengakuan oleh Competent Authority yang berlaku selama 5 tahun untuk Laboratorium yang melaksanakan pengujian sampel barang curah padat **dg persyaratan, sbb:**

- Bukti berbentuk badan hukum Indonesia;
- Salinan akta pendirian badan hukum beserta perubahannya yang terakhir serta pengesahan dari Kemenkumham;
- Struktur organisasi dan daftar personil dg status pegawai tetap;
- Salinan surat akreditasi dari Badan Standarisasi Nasional;
- Salinan surat penetapan tenaga ahli surveyor dari Menteri yang menyelenggarakan urusan pemerintahan di bidang ESDM (min. 2 tenaga ahli);
- 2 rangkap Prosedur pengujian sampel Barang Curah Padat;
- Keputusan peralatan pengujian.

Prosedur Pengujian Sampel, meliputi:

- Gambaran /uraian singkat metode pengujian MC
- Gambaran/uraian singkat metode penentuan TML, dg ketentuan:
 - sesuai dg metode yg dipersyaratkan dlm Lampiran II IMSBC Code
 - Dapat dengan mudah dilakukan pengujian kembali
 - Memberikan hasil yg sesuai dg stabilitas kapal
 - Konsisten atau selaras dg umpan balik
 - Dapat memberikan margin atau batas keselamatan sehubungan dg resiko pencairan
 - Memberikan kriteria dapat diangkut utk memastikan MC yg akan dimuat kurang dari TML
- Petunjuk penerapan metode pengujian, dg ketentuan:
 - dibuat dlm bahasa Indonesia dan Inggris
 - memuat prosedur pengawasan/pengendalian internal secara berkala untuk memastikan prosedur telah dijalankan dg benar, yaitu:
 - Formulir bahwa barang curah padat yg akan dimuat di kpl telah ditandai atau diidentifikasi dan hasil pengujiannya telah dilaporkan
 - Daftar, pemeliharaan & kalibrasi peralatan untuk pengujian
 - Uraian singkat utk menentukan pihak yg melakukan pengujian
 - Uraian singkat utk menentukan penanggung jawab pelaksanaan prosedur pengujian & pelatihan pengujian
 - Memuat nama penanggung jawab prosedur pengujian



Pendahuluan



METODE PENGUJIAN GRUP A

- ❑ Transportable Moisture Limit atau batas dari kargo yang dapat mencair adalah kandungan kadar air maksimum dari kargo yang dianggap aman untuk diangkut dalam kapal yang tidak memenuhi ketentuan khusus
- ❑ Untuk ketentuan hubungan M_c dan TML, yaitu nilai dari M_c tidak boleh lebih besar dari nilai TML. Apabila M_c lebih besar dari nilai TML, maka kargo tersebut akan mencair / mengeluarkan air yang diresap secara berlebihan, dan kemungkinan hal ini berakibat bahaya
- ❑ Adapun cara-cara untuk mengetahui nilai TML dapat dilakukan dengan metode sebagai berikut :
 - ❑ 1. Methode Penetration test
 - ❑ 2. Metode Proctor Fagerberg
 - ❑ 3. Metode Flow Table test

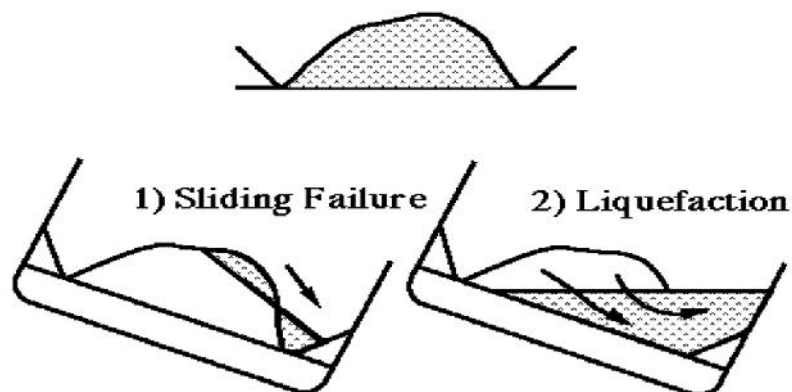
4



Pendahuluan



Cargo curah bergerak/berpindah didalam palka kapal dengan dua cara yaitu "sliding failure" dan "liquefaction"



4



KONDISI CARGO ON BOARD




KONDISI CARGO ON BOARD




“normal condition”



“Liquefy condition”



PENDAHULUAN



Cargo yang mengandung partikel-partikel kecil dan sejumlah air memungkinkan untuk terjadinya proses liquefaction (pencairan) atau terbentuknya slurry pada saat pelayaran.

Cargo yang memungkinkan akan terjadi proses liquefaction hanya dapat dimuat jika kadar air aktual lebih kecil daripada Transportable Moisture Limit (TML)

4



Referensi



- The International Maritime Solid Bulk Cargoes Code (“IMSBC Code”) Section 8 - Appendix 2 : Laboratory Test Procedures, Associated Apparatus and Standards
- ISO 589 : Hard Coal – Determination of Total Moisture
- ISO 18283-2006 : Hard Coal and Coke – Manual Sampling

4



IMSBC IMSBC Section 4.3.2 states



Ketika konsentrat atau muatan lain yang mungkin mencair diangkut, pengirim harus menyediakan nakhoda kapal atau miliknya perwakilan dengan sertifikat TML yang ditandatangani dan a/ menandatangani sertifikat atau deklarasi kelembaban isi. Sertifikat TML harus berisi atau disertai dengan hasil tes untuk menentukan TML. Deklarasi kadar air harus mengandung atau disertai pernyataan dari pengirim bahwa kadar air sesuai dengan pengetahuan dan keyakinannya, kadar air rata-rata muatan pada saat itu deklarasi disampaikan kepada otoritas yang bersangkutan.

When a concentrate or other cargo which may liquefy is carried, the shipper shall provide the ship's master or his representative with **a signed certificate of the TML and a signed certificate or declaration of the moisture content. The certificate of TML shall contain or be accompanied by the result of the test for determining the TML.**

The declaration of moisture content shall contain or be accompanied by a statement by the shipper that the moisture content is to the best of his knowledge and belief, the average moisture content of the cargo at the time the declaration is presented to the Master

4



IMSBC

IMSBC Section 4.5.2 states:



Pengambilan sampel dan pengujian kadar air harus dilakukan sedekat mungkin dengan waktu memuat. Jika terjadi hujan atau salju yang signifikan antara waktu pengujian dan pemuatan, pengujian pemeriksaan harus dilakukan untuk memastikan bahwa kadar air kargo masih kurang dari TML-nya. Interval antara pengambilan sampel/pengujian dan pemuatan tidak boleh lebih dari tujuh hari

Sampling and testing for moisture content shall be conducted as near as practicable to the time of loading. If there has been significant rain or snow between the time of testing and loading, check tests shall be conducted to ensure that the moisture content of the cargo is still less than its TML. The interval between sampling/testing and loading shall never be more than seven days

4



Metode Penetapan TML



Modified Proctor Faberberg Test

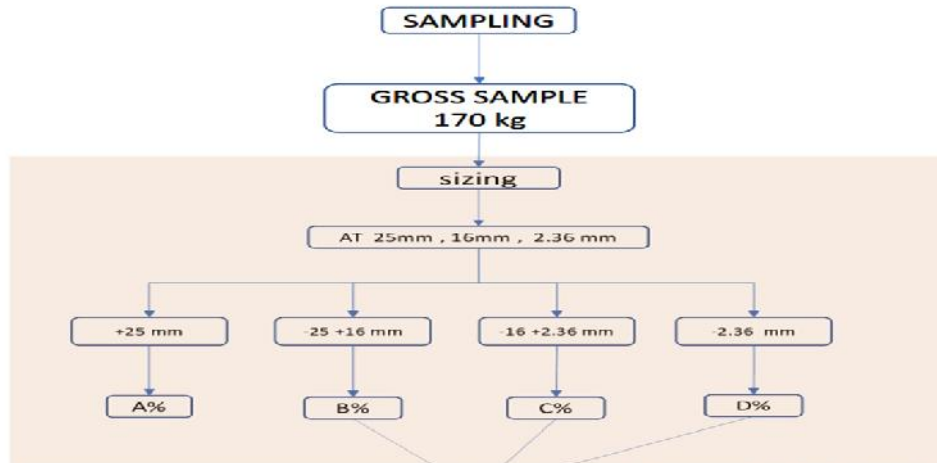
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Metode Penetapan TML Proctor Test



Modified Proctor / Fagerberg Transportable Moisture Limit



4



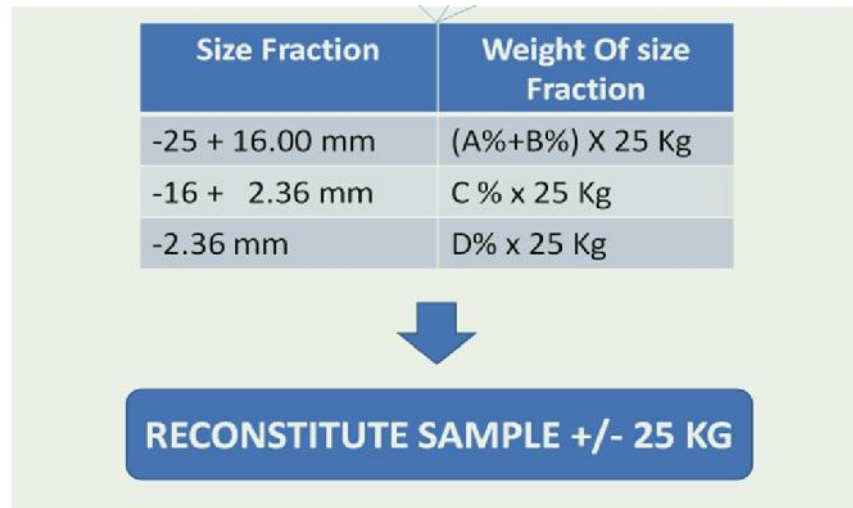
Metode Penetapan TML (Proses Size)



4



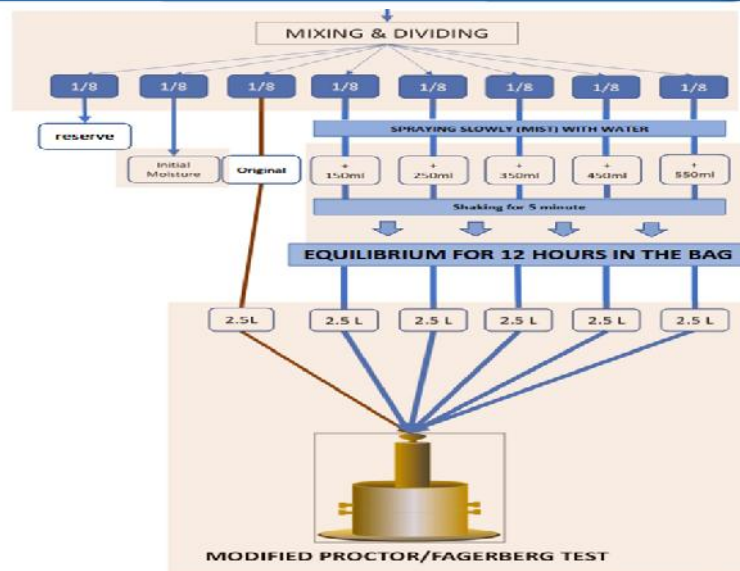
Metode PenetapanTML Proctor Test



4



Metode PenetapanTML Proctor Test



4



Metode Penetapan TML (*Proses Dividing*)



4



Metode Penetapan TML (Pembagian Sample Dalam Bag)



4



Metode Penetapan TML (Penambahan air terhadap Sample di Dalam Bag)



4



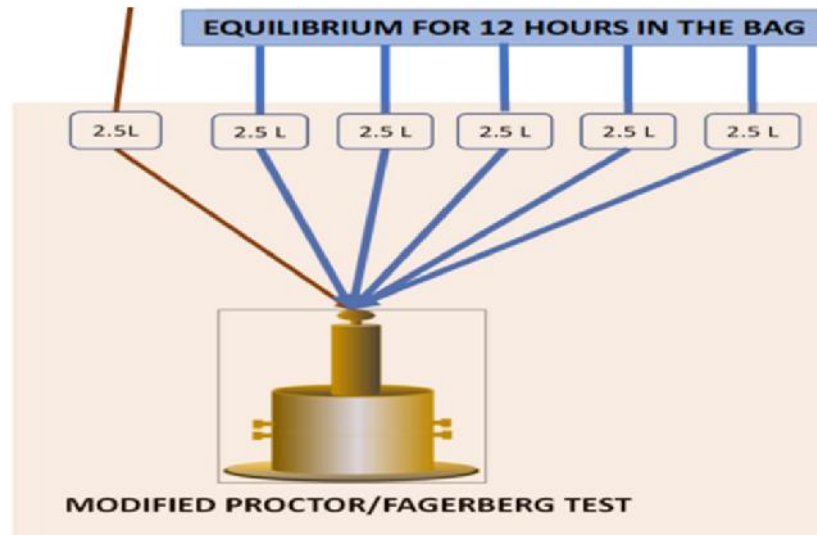
Metode Penetapan TML (Penyimpanan sample selama 12 Jam)



4



Metode Penetapan TML



4



Metode Penetapan TML Spesifikasi Alat

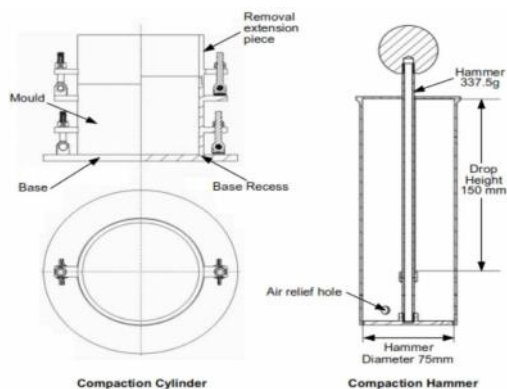


Figure 1.5.5.1.3.2 – Schematic of a Proctor/Fagerberg apparatus

Table 1.5.6.2 – Specifications and tolerances for Proctor/Fagerberg cylindrical mould and hammer

Parameter	Units	Dimension	Tolerance
Hammer mass	g	337.5	± 2
Hammer diameter	mm	75	± 0.2
Drop height	mm	150	± 2
Tube ID	mm	78	± 0.2
Tube OD	mm	82	± 0.2
Tube wall thickness	mm	2	± 0.2
Tube clearance	mm	1.5	± 0.2
Mould inner diameter	mm	150	± 0.5
Mould inner height	mm	120	± 1
Mould inner volume	cm ³	2,121	± 18
Removable extension piece height	mm	75	± 1
Depth of recess into base to seat	mm	1	± 0.2
Gap between mould and base	mm	≤ 0.1	
Gap between mould and extension piece	mm		(0 to + 0.1)
Clearance between mould and hammer	mm	≤ 6	

4



Metode Penetapan TML Proctor




4




Metode Penetapan TML Proctor (Proses Tamping dan scraping)




4





Metode Penetapan TML Proctor






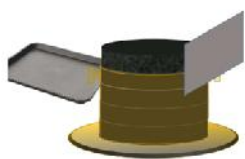
= A




















Berat batubara basah diatas tray = C₁



Masukan tray dan batubara basah kedalam oven dan panaskan pada 105 deg.C sampai berat constant




Metode Penetapan TML Proctor



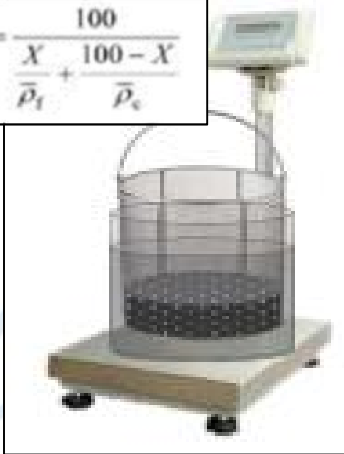
AS 1289.3.5.1 --2006

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graph TD
    A[10 KG SUB-SAMPLE] --> B[SIZE AT 2.36 MM]
    B --> C[+ 2.36 MM]
    B --> D[- 2.36 MM]
    C --> E[1/2]
    C --> F[1/2]
    E --> G[PARTICLE DENSITY + 2.36 MM]
    F --> G
    D --> H[1/2]
    D --> I[1/2]
    H --> J[PARTICLE DENSITY - 2.36 MM]
    I --> J
          
```



- 2 mm



+ 2 mm

$$\rho_a = \frac{100}{\frac{X}{\bar{\rho}_f} + \frac{100 - X}{\bar{\rho}_s}}$$



Metode Penetapan TML Proctor



4



Metode Penetapan TML Proctor



Empty Mould = A



Mould + Tamped Coal portion = B



Tamped Coal portion before drying = C_1



Tamped Coal portion after drying = D_1

> Wet Test Portion $\Rightarrow C = B - A$

> Gross Water Content $\Rightarrow W^1 = (C_1 - D_1) / C_1 \times 100 \%$

> Dry Test Portion in the Mould $\Rightarrow D = C - C \times W^1 / 100$

> Mass of Water in the Mould $\Rightarrow E = C - D$

4



Metode Penetapan TML Proctor



Date		Diameter of cylinder	150 mm
Product		Height of cylinder	120 mm
Sample		Volume of cylinder	2,121 mL
Initial gross water content (%)	5.6	TML	15.4%
Density of solids	1,416 kg/m ³	Size fraction	
Laboratory temperature	25°C	Operator	
Mass of mould (A)	7,271 g	Tamper	337.5 g
Initial dry density	899 kg/m ³		

Test number	Water added (ml)	Mass of mould + sample (g)	Tray No.	Mass of tray (g)	Mass of wet sample + tray (g)	Mass of dry sample + tray (g)	Measured gross water content (%)	Gross water content (%)	Net water content (%)	Void ratio	Dry density (g/cm ³)	Degree of saturation (%)	Wet bulk density (g/cm ³)	Mass of wet sample (g)	Mass of dry sample (g)	Mass of water (g)
		B						W ₁	e _v	e	γ	S	C	D	E	F
1	0.00	9,360.00	T1	602.5	1,658.8	1,565.7	8.84	8.67	13.437	0.573	0.899	23.4	0.905	2,009.0	1,907.0	101.2
			T2	602.3	1,643.1	1,552.5	8.70									
2	150.00	9,692.70	T3	639.7	1,811.7	1,649.6	12.72	13.51	22.097	0.433	0.908	51.1	1.142	2,421.7	2,094.6	327.1
			T4	682.9	2,126.9	1,961.6	13.29									
3	250.00	9,881.60	T5	638.7	2,081.4	1,849.7	16.08	15.58	28.104	0.362	1.036	72.2	1.231	2,610.6	2,204.0	406.6
			T6	632.4	1,822.0	1,643.0	15.09									
4	350.00	9,971.00	T7	882.2	2,340.9	2,095.4	17.34	17.31	29.630	0.344	1.053	86.1	1.273	2,700.0	2,232.5	467.5
			T8	637.0	1,858.8	1,658.0	17.39									
5	450.00	9,996.20	T9	654.3	2,013.2	1,746.5	19.83	19.73	34.780	0.372	1.031	93.5	1.265	2,725.2	2,187.5	537.7
			T10	639.8	1,999.4	1,729.7	19.83									
6	550.00	9,980.00	T11	685.0	2,251.5	1,931.6	23.41	22.17	40.311	0.423	0.994	95.2	1.277	2,709.0	2,108.4	600.6
			T12	682.5	2,191.9	1,910.1	20.93									
7																
8																
9																
10																

4



Metode Penetapan TML Proctor

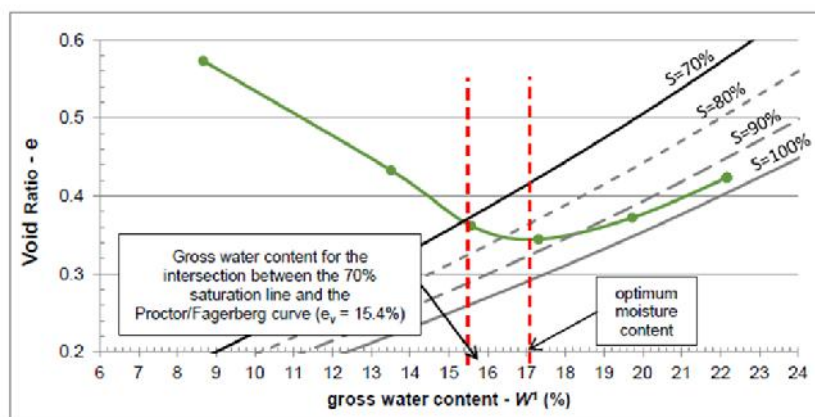


Figure 1.5.3.7 – Example of a measured compaction curve for void ratio versus gross water content with the 70%, 80%, 90% and 100% degree of saturation lines plotted

4

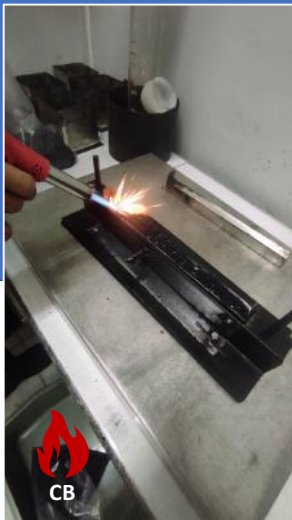


Analisis Cargo Grup B

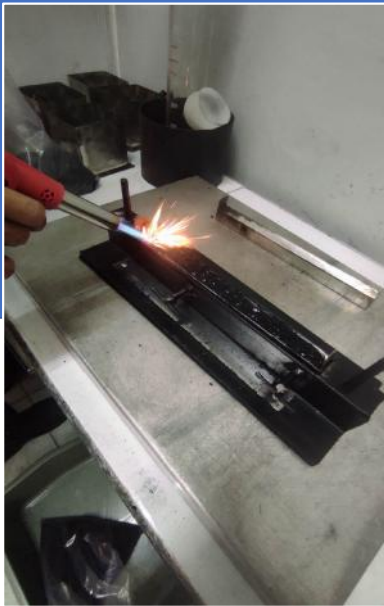
Referensi : Unece – United Nation 2019

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Analisis Cargo B – Metoda Unece – United Nation

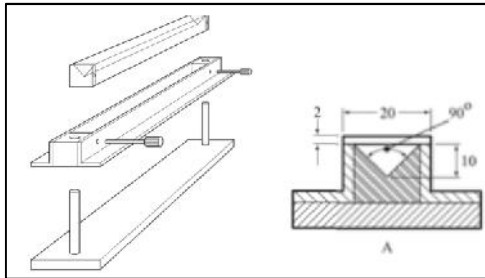


Combustible solids

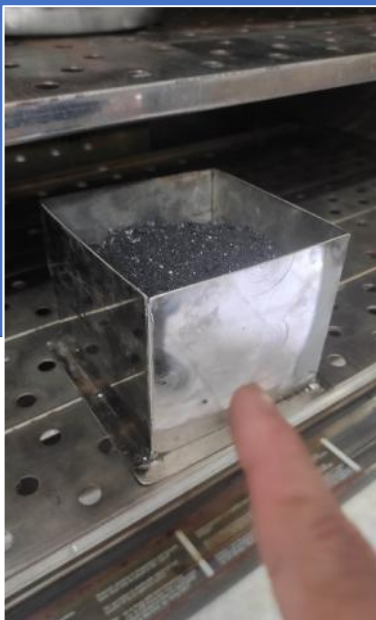


Substance dikategorikan negatif Combustible solids jika :

1. Tidak terbakar setelah dibakar ujungnya
2. Setelah sampel terbakar, nyala api atau bara api tidak menyebar lebih dari 200mm dalam 12 detik



SELF HEATING TEST



Substance dikatakan negatif self heating jika :

1. Tidak terbakar pada pemanasan 24 jam di suhu 140 °C
2. Setelah pemanasan 24 jam di suhu 140 °C, sampel memiliki suhu tidak lebih dari 200 °C atau 60 °C lebih tinggi dari suhu oven



SH

Substance which in contact with water evolve Flammable Gas (WF)



Substance dikatakan positif WF jika :

1. Terbakar spontan pada setiap langkah prosedur pengujian ini.
2. Ada evolusi gas yang mudah terbakar dengan laju lebih dari 1 liter per kilogram zat per jam



Corrosive to metal (CR)



Substance dikatakan positif uniform corrosion jika :

Kehilangan massa lebih dari 13.5% dalam 7hari



Waktu paparan (hari)	Kehilangan massa (%)
7	13.5
14	26.5
21	39.2
28	51.5

CATATAN: Nilai-nilai ini dihitung berdasarkan laju korosi 6,25 mm/tahun.



CR

SK PENGAKUAN DARI HUBLA

 <p>KEMENTERIAN PERHUBUNGAN DIREKTORAT JENDERAL PERHUBUNGAN LAUT</p> <p>Jl. Medan Merdeka Barat No. 8 JAKARTA - 10110</p> <p>TEL - (021) 3613269, 3642480 FAX - (021) 3611796, 3645430 EMAIL - djp@depkub.go.id</p> <p>IG @djkemhub151 FB Depan Perhubungan Laut Twitter @djkemhub151</p>	
<p>KEPUTUSAN DIREKTUR JENDERAL PERHUBUNGAN LAUT NOMOR : KP-DJPL 542 Tahun 2022</p>	
<p>TENTANG</p> <p>PENGAKUAN LABORATORIUM PT GEOSERVICES CABANG BANJARBARU SEBAGAI LABORATORIUM PENGUJIAN BARANG CURAH PADAT</p>	
<p>MEMUTUSKAN:</p>	
Menetapkan :	KEPUTUSAN DIREKTUR JENDERAL PERHUBUNGAN LAUT TENTANG PENGAKUAN LABORATORIUM PT GEOSERVICES CABANG BANJARBARU SEBAGAI LABORATORIUM PENGUJIAN BARANG CURAH PADAT.
KESATU :	Memberikan pengakuan laboratorium untuk pengujian barang curah padat kepada :
Nama Intansi / :	PT Geoservices Cabang Banjarbaru
Perusahaan :	
Alamat :	Jl. Ahmad Yani No. 8 Km. 33, Loktabat, Banjarbaru, Kalimantan Selatan
Nomor Akreditasi :	LP-190-IDN
BSN/KAN :	
<p>3. melakukan pengujian terhadap barang curah padat yang akan diangkut ke kapal sebagaimana telah diatur dalam koda IMSBC Code beserta perubahannya;</p> <p>4. menerbitkan sertifikat terhadap barang curah padat yang memiliki bahaya mencair atau termasuk ke dalam barang grup A dan memiliki bahaya kimia atau termasuk kedalam grup B dan tidak memiliki bahaya mencair dan tidak memiliki bahaya kimia atau termasuk grup C;</p>	
KEENAM :	Keputusan Direktur Jenderal ini mulai berlaku pada tanggal ditetapkan dan apabila dikemudian hari terdapat kekeliruan akan diperbaiki sebagaimana mestinya.
<p>Ditetapkan di : Jakarta pada tanggal : 19 Juli 2022</p> <p>DIREKTUR JENDERAL PERHUBUNGAN LAUT</p>  <p>Ditandatangani secara elektronik ARIF TOHA</p>	



Thank You