BIRO KLASIFIKASI INDONESIA

Regulations
for the Construction and Testing
of Towing Gears

December, 2000

The interpretation of these regulations
rests solely with Biro Klasifikasi Indonesia
No reference may be made to
the application of these regulations without
the consent of Biro Klasifikasi Indonesia

Biro Klasifikasi Indonesia Head Office
Jl. Yos Sudarso No.38-39 Tanjung Priok - Jakarta 14010 PO.Box : 1010/JKU
Indonesia
☎ *+62(021) 497021, 4300993, 4301017, 4301703, 4353291, 4353292*
✆ *FAX +62(021) 492509, 496175, 4371813*
e-mail: pt-bkib1@rad.net.id or
bki1964 @indosat.net.id
Web site: http://www.bki.co.id

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P.T. (Persero) Biro Klasifikasi Indonesia
Head Office : Jl. Yos Sudarso No.38-39
Tanjung Priok - Jakarta 14010
PO.Box : 1010/JKU
Indonesia
Telephone : +62 (021) 497021, 4300993, 4301017, 4301703, 4353291, 4353292
Telefax : +62 (021) 492509, 496175, 4371813
e-mail: pt-bkib1@rad.net.id or
bki1964 @indosat.net.id
Web site: http://www.bki.co.id

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Telefax : (0254) 571007
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CIREBON
Address : Jl. Tuparev KM.3 Cirebon 45153
Telephone : (0231) 205266
Telefax : (0231) 205266
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Telephone : (0765) 32574, 35100
Telefax : (0765) 31364
Head : Ir. Mohamad Cholil

JAKARTA / TANJUNG PRIOK
Address : Jl. Yos Sudarso 38-39 Tanjung Priok, Jakarta 14010
Telephone : (021) 490990, 4300993, 4301017, 4301701, 4301703, 4371488, 43910583
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Deputy : Ir. Nurdin Gading

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Address : Jl. Sungai Cerekang No. 28 Makassar 90115
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Telefax : (0411) 315460
Head : Ir. Arsalnan Latief

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Address : Jl. St. Syahrir No. 208 Padang 25216
Telephone : (0751) 61553
Telefax : (0751) 61553
Head : Ir. Bambang Noeljanto

PALEMBANG

Address : Jl. Perintis Kemerdekaan 5 Ilir, Palembang 30115
Telephone : (0711) 713171, 713172, 713680
Telefax : (0711) 713173
Head : Radjin Sitorus

PONTIANAK

Address : Jl. Gusti Hamzah No. 211 Pontianak 78116
Telephone : (0561) 39579
Telefax : (0561) 39579
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SEMARANG

Address : Jl. M.Pardi No. 5, Pelabuhan Tanjung Emas Semarang 50229
Telephone : (024) 543917 , 545805
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Head : Ir. Yansen Miri

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Telephone : (65) 8830634 - 43 - 51
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SURABAYA

Address : Jl. Kalianget No. 14 Surabaya 60165
Telephone : (031) 3295448, 3295449, 3295450, 3295451
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Telefax : (86) (010) 65130188
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Telex : 76 192 VERIT N
Cable : VERITAS OSLO

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Telephone : (49) (040) 36 14 9 - 0
Telefax : (49) (040) 36 14 92 00
E-mail : headoffice@germanlloyd.org
Telex : 2 12828 GLHH D
Cable : KLASSENLLOYD

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Cable : HELREGSHIP-PIRAEUS

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Head Office : 23-7 JANG-DONG, YUSUNG-KU, TAEJON 305-600, SOUTH KOREA
P.O. Box : 29 TAEJON
Telephone : (82) (042) 869-9114
Telefax : (82) (042) 862-6011 - 6
Telex : KRS HO-K45501

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Head Office : 100 LEADENHALL STREET, LONDON, EC 3A 3BP UNITED KINGDOM
Telephone : (44) (0171) 709 9166
Telefax : (44) (0171) 423 2056
Telex : 888379 LR Lon . G

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Telephone	: (81) (03) 3230-1201
Telefax	: (81) (03) 5226-2012
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Telephone	: (40) (01) 2223768, 6146431
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10	Lloyd's Register of Shipping (LR)	U K	Dual Class

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1. General

1.1 Range of Application

For vessels which are subject to supervision under Biro Klasifikasi Indonesia-class (character of class "Tug Boat") or if Biro Klasifikasi Indonesia have especially been entrusted with testing of towing gears, Biro Klasifikasi Indonesia carry out the calculations for and testing of those gears in accordance with the present Regulations.

1.2 Examination of Drawings

Drawings of all parts under stress of the towing gear (towing hook, slip arrangement, towing winch, foundations, etc.) have to be submitted at least four folds for approval to Biro Klasifikasi Indonesia Head Office.

Details on the materials to be used have to be stated in the drawings.

2. Calculation and Dimensioning of the Towing Gears

2.1 Original Data

2.1.1 For dimensioning of the towing gears, the

test load "PL"

has to be taken as a basis which has to be in a prescribed ratio to the maximum

tow rope pull "T".

Dimensioning of the towing winch has to be based on both, the tow rope pull T and the holding power of the winch.

2.1.2 Ratio of tow rope pull T to test load PL :

	T	**PL**
up to	500 KN (50 t)	2 x T
over	500 - 1500 KN (50 - 150 t)	T + 500 KN (50 t)
over	1500 KN (150 t)	1.33 x T

2.1.3 Magnitude of tow rope pull T.

If the tow rope pull T is not known, it can be estimated on the basis of the propulsive output, according to the following formula :

tug with Kort Nozzle :
T ~ 245 N/kW (18 kg/HP)
tug without Kort Nozzle :
T ~ 160 N/kW (12 kg/HP)

2.1.4 Direction of tow rope pull T.

2.1.4.1 The towing hook, the towing hook seating, the foundations in the hull and the slip arrangement will be dimensioned with a test load PL up to 500 KN (50 t) under consideration of tow rope direction from abeam position over astern to abeam and a tow rope inclination of 60° towards above against the horizontal line.

2.1.4.2 The towing hook, the towing hook seating, the foundations in the hull and the slip arrangement are dimensioned with a test load PL of more than 500 KN (50 t) under consideration of the tow rope direction from abeam over astern to abeam and a tow rope inclination of 45° towards above against the horizontal line.

2.1.4.3 For all towing hooks (independently of the magnitude of test load PL), the slip arrangement has to be tested with a tow rope inclination of 60° towards above against the horizontal line, under the tow rope pull T.

2.1.4.4 For testing of towing gear with towing winches, the direction of the tow rope has to be indicated on the drawing.

2.2 Admissible Stress

The admissible stress in the towing gear with the load assumptions as per 1, has

to be ascertained in accordance with the details in Sect. 3. C of the "Regulations for the Construction and Survey of Lifting Appliances"; here, the compensating factor $\varphi = 1$ and load condition B have to be assumed.

With the tow rope pull T, the tow rope should at least have 2.5 times the safety against the minimum breaking load of the rope.

3. Construction of Towing Gears

3.1 Towing Hook and Slip Device

3.1.1 The towing hook is to be arranged as deep as possible. The towing hook has to be designed such as to permit adjusting in each tow rope direction as per 2. 1.4.

3.1.2 The towing hook has to be fitted with an adequate arrangement guaranteeing slipping of the hook in case of emergency, from the bridge as well as in the vicinity of the hook itself. These release stations have to be arranged in away that free visibility of the towing hook is guaranteed.

3.1.3 Slip devices can be equipped with mechanical, hydraulic and pneumatic transmission appliances. A safety device has to guarantee that unintentional slipping is avoided.

3.1.4 A mechanical slip device has to be designed such that the required release force does not exceed 150 N (15 kg) at the towing hook and 250 N (25 kg) on the bridge if the hook is subjected to test load PL. For tests under tow rope pull T this values are to be reduced in relation T/PL.

3.1.5 In case of a mechanical slip device, the releasing rope has to be guided

over rope sheaves.
If necessary, slipping should be possible by downward drawing, using the whole body weight. A corresponding rope guide has to be provided.

3.1.6 For a pneumatic slip device, a complete mechanical slip device has to be additionally provided always (among other reasons, because of possible icing).

3.1.7 An adequately heavy hatchet or axe accessible from all sides which is closely located to the towing hook is used for emergency slipping by cutting the tow rope in case of failure of the slip device.

3.2 Tricing Winches

Control platforms for the tricing winches must not be located in the dangerous zone of the tow rope. Apart from the control stations on deck, another control station should be available on the bridge.

The tricing winch has to be satisfactorily dimensioned in accordance with the size of the tug. For operation of the tricing winch, perfect transmission of orders has to be safeguarded.

3.3 Towing Winches

The towing winch has to be arranged such as to guarantee safe guiding of the tow ropes in all directions in accordance with 2. 1.4.

The winch drum has to be equipped with a satisfactorily dimensioned brake. It should be possible to quickly release the brake from the control stand on the bridge as well as from any other control stand. Free visibility of the winch drum should be possible from any control stand where no fairlead exists.

The operating lever for the winch has to return to zero automatically if it is freed (dead man setting). It should be possible to secure the lever at zero.

The operating levers have to be secured against unintentional release of the brake.

The regulating device for the braking, lifting and lowering forces should be fitted on the control panel of the winch.

All towing winches have also to be fitted with a mechanical hand brake.
Fastening of the towing hawser on the winch drum has to be such that it breaks if the towing hawser has to be released.

The winch drum diameter has to be at least 14 times the diameter of the towing hawser.

4. Testing of the Towing Gears

4.1 Testing at the Manufacturers

4.1.1 Towing hook with mechanical slip device.

These towing hooks, movable towing arms, and other devices have to be subjected to a test load PL with the aid of an approved testing facility. In connection with this, the slip device has to be tested likewise; the required tripping force has to be measured; this force must not exceed 150 **N** (15 kg) according to 3. 1. 4.

4.1.2 Towing hook with hydraulic slip device.[1])

These towing hooks have to be subjected to a test load PL against the standing

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1) The prescriptions under the Rules for Hull Construction, Vol. II, Sect.27. F have to be applied analogously.

piston. The hydraulic slip device need not be subjected to a test load PL. Functioning of the tripping device is to be proved with the towing hawse loosely resting on the hook.

4.1.3 Towing hook with pneumatic slip device.

These towing hooks have to undergo testing according to 4.1.1. See also 3.1.6.

4.1.4 Towing winch.

4.1.4.1 The towing winch undergoes survey and functioning test at the manufacturers.

4.1.4.2 A load test at the manufacturers is not required. The manufacturer is responsible for fulfilment of the requirements. Testing as per 4.2 may be carried out.

4.1.5 Certificate and stamping of the towing hook.

For each testing carried out in accordance with 4.1.1, 4.1.2, or 4.1.3, a certificate as per Form F 121-2000 (sample please find attached), Part I and II, is issued which has to be handed on board with the towing hook.

4.2 Initial Testing of Towing Hooks on Board (Bollard Pull Trial)

4.2.1 The installed towing gear should be tested on the tug under operational conditions. See also 2.1.4.3.

4.2.2 For obtaining comparable values for sister vessels when carrying out inspections at different places and on different dates, the following details should

be given :

- compass course
- wind direction and force
- current direction and intensity
- length of towing hawse from hook or winch to fixed point (approx. 100 m)
- output and rpm of engine plant.

4.2.3 The functional tests of the slip device have to be carried out on board for all types of hooks; for the mechanical slip devices, the tripping forces have to be measured. Observance of the values under 3. 1. has to be proved.

4.2.4 After each initial testing on board (bollard pull trial), entries are to be made into Part III (Repeat test) of the Certificate Form F 121-2000 (sample of which please find attached) issued as per 4.1.5.

4.3 Repeat Tests of Towing Hooks

4.3.1 Functional safety of towing hook and slip device has to be checked by the ship's master at least once a month.

4.3.2 Towing hooks with mechanical and / or pneumatic slip device have to be dismounted every two years and have to be tested in compliance with 4.1.1 on an approved testing equipment. After fitting of the hook on the tug, the slip device has to be subjected to a functional test, by tripping the hook without load.

4.3.3 For avoiding dismounting of these towing hooks, the test load PL can also be produced by fastening in front of the first tug towed to the bollard, the hook of which is intended to be tested, another tug of almost equal power. Slipping has to

be effected whilst both tugs are pulling with full engine power and, thus, are additionally generating a shear effect through moving of rudder. If the hook of the aft tug has been tested, the tugs change their positions, so that towing hook and slip device of the second tug can be tested likewise.

4.3.4 Towing hooks with hydraulic slip arrangement are subjected to a functional test on board every two years. They are ready for operation with the tow rope loosely resting on the hook.

4.3.5 The repeat test will be confirmed by the surveyor by making an entry into Part III of Certificate F 121-2000 (sample please find attached).

4. 4 Repeat Tests of Towing Winches

Repeat tests are not required for towing winches. The towing winches, however, have to be subjected to an external survey for wear and tear, within the scope of class renewal surveys.

5. Materials

The towing hooks can either be made of forged steel (C 15; C 22), of structural steel (R St 37.2; R St 42.2) or of cast steel (GS-45.3 DIN 1681) or equivalent. The cast steel pieces have to be tested by BKI in compliance with its Rules for Materials, Volume V. The material certificate has to be presented to the surveyor upon testing according to 4. 1.

The materials of the winches are to be selected according to their purpose.

6. Welding

For welding on towing gears, the Rules for Welding, Volume VI of BKI have to be applied.

Appendix

Certificate No. _____

BIRO KLASIFIKASI INDONESIA

Test Certificate for Towing Hooks

I. Testing at Manufacturers Works

We hereby certify that the towing hook described in the following was tested by BKI Surveyor.

Date of test _____ Supplier _____

Type _____ Serial No. _____

Testload PL _____ KN Tow-rope pull T _____ KN

The drawing has been approved by BKI, with approval No. _____

No defects were found.

The hook was stamped as follows :

_____

_____ K _____

T = _____ KN

PL = _____ KN

Place and date _____

_____

Head of Branch Office

II. Shipboard Trial

We hereby certify that the towing hook described in item " I " was tested by BKI Surveyor.

Tug _____ BKI Reg. No. _____

Signal letter _____ Owners _____

The tow-rope pull T measured amounted to _____ KN

Testing was effected under the following conditions :

Vessel's compass course _____ ° Drift _____ KN

Direction of wind _____ ° Length of towing hawser _____ m

Wind force _____ Bf Output and speed of engine _____

Set of tide _____ °

During the functioning trial stipulated of the slipping device, the following release forces resulted

At the hook _____ N

On the bridge _____ N

Place and Date _____

_____

Head of Branch Office

III. Repeat tests

1. 1st repeat test performed _____

   Releasing force at the hook _____ N

   Releasing force on the bridge _____ N

   Place _____ Date _____ Surveyor _____

2. 2nd repeat test performed _____

   Releasing force at the hook _____ N

   Releasing force on the bridge _____ N

   Place _____ Date _____ Surveyor _____

3. 3rd repeat test performed _____

   Releasing force at the hook _____ N

   Releasing force on the bridge _____ N

   Place _____ Date _____ Surveyor _____

4. 4th repeat test performed _____

   Releasing force at the hook _____ N

   Releasing force on the bridge _____ N

   Place _____ Date _____ Surveyor _____

5. 5th repeat test performed _____

   Releasing force at the hook _____ N

   Releasing force on the bridge _____ N

   Place _____ Date _____ Surveyor _____