NIPPON KAIJI KYOKAI

Statement of Fact

No.: KC17YH00363-E

Date: 14 December 2017

THIS IS TO CERTIFY that the undersigned surveyor confirmed the followings at the request of Messrs. NIPPON YUKA KOGYO CO., LTD., Japan on 12 - 14 December 2017, in order to verify the improving performances for cold flow property of fuel oils by below product in accordance with as per attached test procedure at the laboratory of NIPPON KAIJI KENTEI KYOKAI;

Product type: Fuel oil additive (Cold flow property improver)
Product name: Wax Breaker
Manufacturer: NIPPON YUKA KOGYO CO., LTD.

1. Test procedure and method: Refer to attached test procedure
2. General properties of test fuel oils: Refer to attached report of general properties of test fuel oils
3. Results of tests:

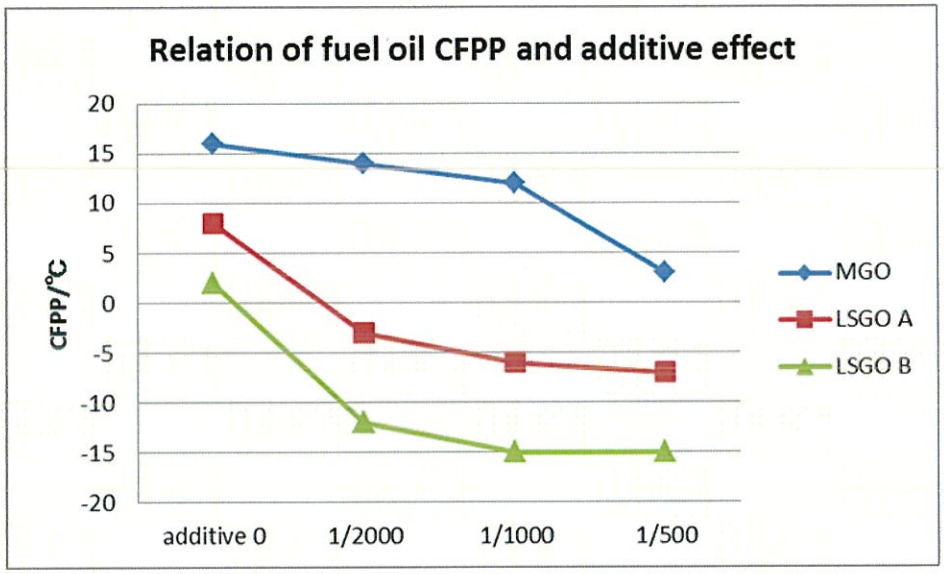
Wax Breaker Dosing Volume ratio / Test fuel oils	Without additive [°C]		With additive 1/2000 [°C]		With additive 1/1000 [°C]		With additive 1/500 [°C]	
	CFPP	PP	CFPP	PP	CFPP	PP	CFPP	PP
MGO	16	15	14	-18	12	-30	3	-33
LSGO A	8	6	-3	-15	-6	-24	-7	-27
LSGO B	2	-3	-12	-21	-15	-27	-15	-36

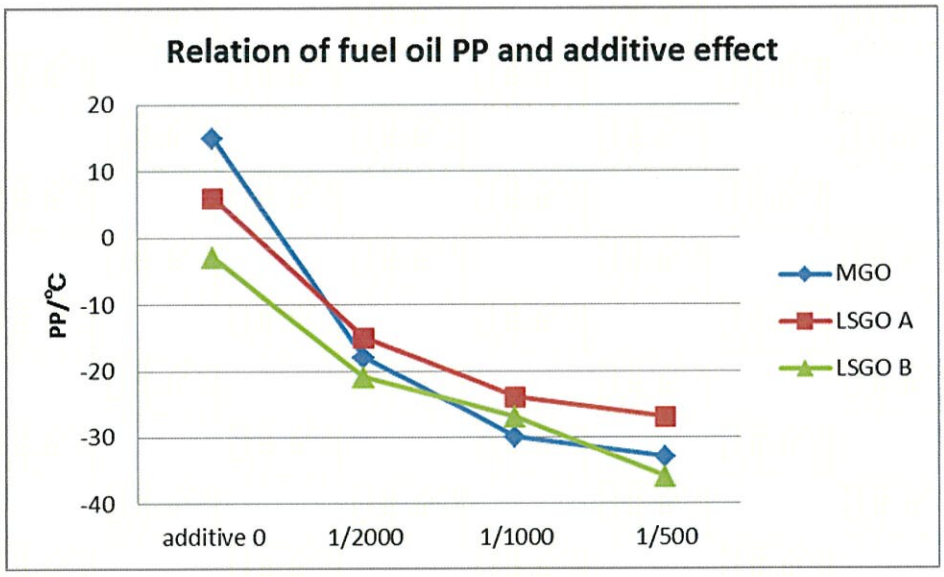
* "MGO" means Marine Gas Oil and "LSGO" means Low Sulphur Gas Oil.
* "CFPP" means Cold Filter Plugging Point and "PP" means Pour Point.

Above mentioned inspection test results were confirmed in accordance with test procedure and method.
By dosing fuel oil additive, Wax Breaker, to test fuel oils, it was confirmed that each numerical value of "CFPP" and "PP" as evaluation items of cold flow property was changed due to the effect as a cold flow property improver.

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NIPPON KAIJI KYOKAI





Therefore, this Statement of Fact has been issued.

(S. Kusuhara)
Surveyor to Nippon Kaiji Kyokai

Attach: 1. Inspection test results
2. Report of general properties of test fuel oils issued by NIPPON KAIJI KENTEI KYOKAI
3. Test procedure for verification test of fuel oil additive "Wax Breaker"

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LABORATORIES
YOKOHAMA, OSAKA

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INTERNATIONAL INSPECTION & SURVEYING
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MARINE CONSULTANT
NON-MARINE ADJUSTING
PETROLEUM AND CHEMICAL INSPECTION
LIQUEFIED GAS INSPECTION
CHEMICAL ANALYSIS
TANK CALIBRATION
SAMPLING AND TESTING
CARGO WEIGHING AND MEASURING

TRIPLICATE

(Ref. AG)

Analysis Certificate

YOKOHAMA
Date: Dec. 14, 2017
Certificate No. ZPE3680.2/17(A)

THIS IS TO CERTIFY THAT the undermentioned samples were analyzed by us, with the following results:

Applicants : NIPPON YUKA KOGYO CO.,LTD.
Description of sample : Marine Gas Oil (MGO), Low Sulfur Gas Oil (LSGO)
Sample submitted by : The applicants
Date of analysis : Dec. 12-14, 2017

Result of analysis:

Sample	Wax breaker dosing volume ratio							
	Without additive		With additive (1/2000)		With additive (1/1000)		With additive (1/500)	
	CFPP (℃)	PP (℃)	CFPP (℃)	PP (℃)	CFPP (℃)	PP (℃)	CFPP (℃)	PP (℃)
MGO	16	15	14	−18	12	−30	3	−33
LSGO A	8	6	−3	−15	−6	−24	−7	−27
LSGO B	2	−3	−12	−21	−15	−27	−15	−36

Test method: Cold filter plugging point (CFPP) IP 309, Pour point (PP) ISO 3016
Apparatus: Automatic Pour, Cloud & CFPP Tester, RPCF-106J
Serial No.: 1001000582
Date of calibration: June 15, 2017

NIPPON KAIJI KENTEI KYOKAI
Physical & Chemical Analysis Center

H. YAMAMOTO, GENERAL MANAGER

For all enquiries, please call: 045-772-1522

This Certificate/Report contains measures to prevent forgery. If you have any question regarding the contents, please refer to the Original of the Certificate/Report.
This survey/inspection has been conducted under the quality management system conforming to ISO9001/JISQ9001 registered by ClassNK, which is accredited by JAB (Japan Accreditation Board).

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SAMPLING AND TESTING
CARGO WEIGHING AND MEASURING

TRIPLICATE

(Ref. AG)

Analysis Certificate

YOKOHAMA
Date: Dec. 7, 2017
Certificate No. ZPE3680.1/17(A)

THIS IS TO CERTIFY THAT the undermentioned samples were analyzed by us, with the following results:

Applicants : NIPPON YUKA KOGYO CO.,LTD.
Description of sample : Marine Gas Oil (MGO), Low Sulfur Gas Oil (LSGO)
Sample submitted by : The applicants
Date of analysis : Dec. 4-6, 2017

Result of analysis:

Test Items	Unit	MGO	LSGO A	LSGO B	Test Method
1. Density@15℃	g/cm^3	0.8617	0.8343	0.8373	ISO 12185
2. Kinematic viscosity@40℃	mm^2/s	6.079	3.720	3.820	ISO 3104
3. Sulfur content	mass %	0.91	—	—	ISO 8754
	mass %	—	0.0007	0.0005	ISO 20846
4. Cloud point	℃	14	8	1	ISO 3015

NIPPON KAIJI KENTEI KYOKAI
Physical & Chemical Analysis Center

H. YAMAMOTO, GENERAL MANAGER

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This survey/inspection has been conducted under the quality management system conforming to ISO9001/JISQ9001 registered by ClassNK, which is accredited by JAB (Japan Accreditation Board).

Test Items	Detail
Density ISO 12185	Apparatus: Density meter, DMA 4500M Serial No.: 80711599 Date of calibration: June 14, 2017
Kinematic viscosity ISO 3104	Viscometer: Cannon-Fenske opaque Serial No.: 75-CR-105 Date of calibration: Nov. 18, 2013
	Viscometer: Cannon-Fenske opaque Serial No.: 75-CR-176 Date of calibration: April 21, 2014
	Viscometer: Cannon-Fenske opaque Serial No.: 75-CR-181 Date of calibration: July 4, 2016
Sulfur content ISO 8754	Apparatus: X-ray fluorescence sulfur-in-oil analyzer, SLFA-6800 Serial No.: TSCAFNVR Date of calibration: Sep. 27, 2017
Sulfur content ISO 20846	Apparatus: Trace sulfur analyzer, TS-100V Serial No.: C6R00323 Date of calibration: July 19, 2017
Cloud point ISO 3015	Apparatus: Automatic Pour, Cloud & CFPP Tester, RPCF-106J Serial No.: 1001000582 Date of calibration: June 15, 2017

燃料油添加剤 Wax Breaker の検証試験方案

Test procedure for verification test of fuel oil additive “Wax Breaker”

1 December 2017

＜試験目的＞

本試験の目的は、燃料油添加剤 Wax Breaker による、留出燃料油に対する低温流動性の改善効果について検証を行う事である。検証試験は、第三者機関（日本海事検定協会）の試験場にて、Class NK 検査員立会いのもと実施する。

<Purpose>

The purpose of this test is to verify the improving performances for cold flow property of the distillate fuel oil, to which fuel oil additive “Wax Breaker” is dosed.

The verification test is carried out with attendance of Class NK surveyor at a laboratory of a third party organization (Nippon Kaiji Kentei Kyokai, hereinafter called NKKK).

＜試験方法＞

各種燃料油（MGO、LSGO）に Wax Breaker を各々の体積割合で添加し、各種燃料油に対する低温流動性の改善効果を、目詰まり点（Cold Filter Plugging Point: CFPP）、及び流動点（Pour Point: PP）を計測する事により、検証する。

1. 試験対象の燃料油（MGO、LSGO）に対して Wax Breaker を添加したサンプルを用意する。
2. Wax Breaker が添加された（または添加されていない）燃料油について、低温目詰まり点（CFPP）、及び流動点（PP）を計測する。
3. これらの低温流動性の評価項目 CFPP 及び PP の数値の比較から Wax Breaker の各種燃料油に対する低温流動性の改善効果を検証する。

<Test procedure>

Dosing Wax Breaker to each test fuel oil (MGO, LSGO) at corresponding volume ratio, it is verified that the improving performances for cold flow property of the test fuel oil by means of measuring the Cold Filter Plugging Point (hereinafter called CFPP) and Pour Point (hereinafter called PP).

1. Prepare samples, which are Wax Breaker is dosed to the test fuel oils (MGO, LSGO).
2. Measure the Cold Filter Plugging Point (CFPP) and the Pour Point (PP) for test fuel oils, to which Wax Breaker is dosed (or not dosed).
3. Verify the improving performances for cold flow property of the test fuel oils, to which Wax Breaker is dosed, by comparison of each numerical value of CFPP and PP as evaluation items of cold flow property.

＜供試燃料油＞

	CFPP [°C]	PP [°C]
MGO	14	15
LSGO A	7	6
LSGO B	0	0

※各種供試燃料油の一般性状については、密度（15 度）、動粘度（40 度）、硫黄分、曇り点（CP）、CFPP、及び PP を測定する。

<Test fuel oils>

	CFPP [°C]	PP [°C]
MGO	14	15
LSGO A	7	6
LSGO B	0	0

※For general properties of test fuel oils, measure density@15°C, kinematic viscosity@40°C, sulfur content, cloud point (hereinafter called CP), CFPP and PP.

＜試験手順＞

1. 室温（約 20℃）に保管しておいた各種供試燃料油（MGO、LSGO）の Wax Breaker 無添加時の CFPP、及び PP を計測する。
2. Wax Breaker の添加率（体積比　1/2000、1/1000、1/500）を変えた各種供試燃料油（MGO、LSGO）について、CFPP、及び PP を計測する。
3. 1.および 2.で計測した値を比較し、Wax Breaker の低温流動性の改善効果を検証する。

※各種試験は、Class NK 検査員立会いのもと実施する。

<Test methods>

1. Measure CFPP and PP of test fuel oils (MGO, LSGO) stored at room temperature (approximately 20 °C) without dosing of Wax Breaker.
2. Measure CFPP and PP of test fuel oils (MGO, LSGO) with different dosing volume ratio of Wax Breaker (volume ratio 1/2000, 1/1000 and 1/500).
3. Comparing measured values above mentioned 1. & 2., verify the improving performances for cold flow property of the test fuel oils by Wax Breaker.

※ All test items are carried out with attendance of Class NK surveyor.

＜試験結果＞

<Test results>

（表-1）各種供試燃料油（MGO、LSGO）に対する Wax Breaker による低温流動性の比較表

(Table-1) Comparison table for cold flow property of the test fuel oils (MGO, LSGO) by Wax Breaker

Wax Breaker 添加率 Dosing Volume ratio / 供試燃料油 Test fuel oils	無添加 Without additive [°C]		添加 With additive 1/2000 [°C]		添加 With additive 1/1000 [°C]		添加 With additive 1/500 [°C]	
	CFPP	PP	CFPP	PP	CFPP	PP	CFPP	PP
MGO								
LSGO A								
LSGO B								

（表-2）　各種供試燃料油の一般性状　(Table-2) General properties of test fuel oils

試験項目 Test items	密度@15°C（Density @15°C）[g/cm^3]	動粘度@40°C（Kinematic Viscosity@40°C）[mm^2/s]	硫黄分（Sulfur content）[%]	曇り点（CP）[°C]	低温目詰まり点（CFPP）[°C]	流動点（PP）[°C]
試験規格 Test standard	JIS K 2249 ISO 12185	JIS K 2283 ISO 3104	JIS K 2541 ISO 8754	JIS K 2269 ISO 3015	JIS K 2288 IP 309	JIS K 2269 ISO 3016
MGO						
LSGO A						
LSGO B						