QUALITY CONTROL LABORATORIES Chemical, Mechanical, Metallurgical, Environmental, Non Destructive tests EPFAETHPIA ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ Χημικές, Μπανανικές, Μεταλουργικές, Περιβαλλοντικές, Μη Καταστρεπτικές δοκιμές

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LUBRICATING OIL ANALYSIS REPORT Customer information Report Identification Status Viscosity at 40°C (mm²/s) Messengers, Master & Owners of Report number: 190918-44 Report's issue date: 18.09.2019 Customer: M/Y JESTER 170 C/O: WALSH MARINE Lab sample number:190917-13-1 150 130 Ship system: MAIN ENGINE PORT 110 Last Sample Previous Samples 90 Sample Information 70 2 3 5 **Critical Limits** - 1 Λ 50 NOT REPORTED NOT REPORTED Port : norma cautio NOT REPORTED Date sampled: CLIENT Sampled by: Date delivered 17.09.2019 Delivered by: CLIENT TBN (mg KOH/gr) Date tested: 18.09.2019 Oil in use(type&grade) NOT REPORTED 30.0 Dil service hours: 100 Total engine hours: 1700 25.0 Physicochemical properties 20.0 Method VISUAL Black 15.0 Appearance Viscosity at 100°C (mm²/s) ASTM D7042 12.91 >25% or <15% 10.0 Viscosity at 40°C (mm²/s) ASTM D7042 92.69 >25% or <15% ASTM D2896 <50% to typical TBN (mg KOH/gr) 10.5 <30% to typical 5.0 TAN (mg KOH/gr) Flash point (°C) (PMC) ASTM D664 NOT REPORTED ASTM D93 >190 <190 <140 Insolubles content (%m/m) ASTM D893 0 44 <20 2.0-3.0 >3.0 ASTM D6304 0.05 < 0.5 0.5-1.0 >1.0 Nater (% vol) Wear metals and contaminants (ppm) metals (ppm) (Sn) ASTM D5185 Tin ASTM D5185 12 <100 100-200 >200 Iron (Ee) 100 Copper (Cu) ASTM D5185 31 <100 100-200 >200 Nickel (Ni) ASTM D5185 0 90 hromium (Cr) ASTM D5185 <15 15-50 >50 ead (Pb) ASTM D5185 <50 50-100 >100 ASTM D5185 888 Magnesium (Ma) 80 ASTM D5185 <15 15-50 >50 Aluminium (AI) 2 Silicon (Si) ASTM D5185 3 70 Vanadium (V) ASTM D5185 Ω <100 100-150 >150 Cleanliness level 60 4µm(c) 6µm(c) 10µm(c) 50 14µm(c) 21µm(c) ISO 4406 40 25µm(c) 38µm(c) 70µm(c) 30 ISO Code NAS Class NAS 1638 20 Comments Normal values of physical-chemical properties and wear metals. The lubricant in proper condition for further use. 10 The element Magnesium is high and could be lubricant additive. The cleanliness level testing is not applicable on black or hazy oils and the minimum required quantity of sample is 200ml. 0 NOT REPORTED OPERATOR: Christina Drakakaki- Chemical Lab Analyst APPROVED: Evagelia Mante - Chemical Lab Manager

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• The results relate only to the items tested in the premises of this laboratory. This report reflects our finding at time and place of intervention only and does not refer to any other matters. The test results shown on this report affect only the samples received in this laboratory and not necessarily the whole from which these samples were drawn. • The ster report shall not be reproduced, except in full, without written approval of the laboratory. This report is issued in accordance with the applicable Spectrum Labs General Terms and Conditions of Business available on request and accessible at: www.spectrum-labs.gr QUALITY CONTROL LABORATORIES Chemical, Mechanical, Metallurgical, Environmental, Non Destructive tests EPFAETHPIA ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ Χημικές, Μπανανικές, Μεταλουργικές, Περιβαλλοντικές, Μη Καταστρεπτικές δοκιμές

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