AMERICAN BUREAU OF SHIPPING

Customer Name	**NIIGATA POWER SYSTEMS CO., LTD.**	Purchase Order No.	**K244331**
Attending Office	**Yokohama (Kanto)**	Report Number	**YO2816836**
First Visit Date	**28-Jan-2015**	Last Visit Date	**24-Feb-2015**

Certification Of: Diesel Engine
Manufacturer: NIIGATA POWER SYSTEMS CO., LTD.

Quantity : Two (2)

Survey Location : Ohta City, Gunma Pref., Japan

Equipment Data

Item Name	Diesel Engine/ Diesel Engine
Manufacturer Number(S. No.)	26989/26990
Model Number	8L28HX
Destination Vessel (Class Number)	YY257105/YY257105
Builder/Shipyard	XIAMEN SHIPBUILDING INDUSTRY CO., LTD
Builder I.D./Hull No.	SK723/SK723
Designer Name	NIIGATA POWER SYSTEMS CO., LTD.
Purchaser Name	XIAMEN SHIPBUILDING INDUSTRY CO., LTD.

Design Details

Design State	Design Approved/Reviewed
ABS Reviewing Organization	Yokohama Engineering Services
Drawing Number	2415M-70153A Rev.1

Additional Data

ABS Stamping	YO2816836, Engine No., Engine Model, Date
Engine Duty	Propulsion
Number of Cylinders	8
Cylinder Bore	11.0236 in.
Engine Cycle	4 Stroke
Maximum Continuous Rating	2957.1046 hp
Revolutions at MCR	750 rpm
Piston Stroke	14.5669 in.
Cylinder Configuration	In-line
Piston Linkage Arrangement	Trunk
Maximum Firing Pressure	2132.0548 psi
Pressure Charging System	Turbo Charged
Number of Crankcase Explosion Relief Valve	4

This is to Certify that the undersigned surveyor(s) to this Bureau did, at the request of the customer, carry out the following survey and report as follows:

Traceability of materials used on this project has been verified.
The principal data has been verified in accordance with the applicable Rules/specifications and approved plans, and confirmed to be within acceptable tolerances.
All testing (pressure/load/operational/etc.) has been carried out as applicable and verified in accordance with the applicable Rules/specifications.
Testing machines are maintained in a satisfactory condition and records of their recheck or calibration dates confirmed.
All parts of the machinery/equipment satisfactorily complied with the approved drawings. Amendments, if any, verified to be rectified and considered satisfactory.

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Subject to satisfactory installation, testing and trials after installation onboard the vessel.
Asbestos-free declaration verified and supporting documentation reviewed.
Final markings for identification confirmed.

= Parts inspection and Shop Test of two(2) Niigata 8L28HX type Diesel Engines =

1. Material / Component Certification:

Items	Report No.
Crankshaft	KO2703221 / 04 Sep. 2014
Connecting rods	KO2732766 / 10 Oct. 2014, KO2763352 / 17 Nov. 2014
Fuel Injection Union 1	YO2677124-A / 01 Aug. 2014
Fuel Injection Union 2	YO2717494.R1 / 22 Sep. 2014
Starting Air Pipe	YO2719068 / 28 Oct. 2014 (Haneda Pipe Works M/S No. 3314&3315 dated 2014-10-16)
Geislinger coupling	YO2810600.R1 / 20 Jan. 2015
Turbocharger	MF2764180 / 15 Nov. 2014
Flywheel Bolt (M42x82, Dwg.No.:977542910)	YO2813471 / 22 Jan. 2015
GLC Bolt (M42x92, Dwg.No.:977542940)	YO2796078 / 25 Dec. 2014
Bolts for GLC & Propulsion Side Coupling (M36x87, Dwg.No.: 977745430)	YO2839596 / 25 Feb. 2015 (Not used for shop operating test, Mill Sheet, No. 15-080 became available after the shop test)

2. The following components were examined or tested in the presence of the surveyor at the Ohta plant on 28 Jan. & 3 Feb. 2015.

1) Crank Shaft	Finish inspection, NDE (MT as finish machined, UT as forgedd by Forging Manufacturer)
2) Starting Air Main Pipe	Water Pressure Test at 4.5 MPa
3) Crank Case Relief Valve	Blow-off test at 0.01 MPa
4) Fuel Injection Union 1	Hydro-tested to 162 MPa
5) Fuel Injection Union 2	Hydro-tested to 162 MPa
6) Cylinder head relief valves:	Blow-off test at 20.58 MPa
7) Lube oil pump relief valves:	Blow-off test at 1.2 MPa (Date: 3 Feb. 2015)

3. The following manufacturer's test records were reviewed on 24 Feb. 2015.

1) Connecting rod: Dimensional measurement and NDT (MT)
2) Cylinder column with cylinder liner: Hydro-test to 1.0 MPa
3) Cylinder liner, spare: Hydro-test to 0.7 MPa
4) Cylinder cover: Hydro-test to 1.0 MPa
5) Piston: Hydraulic-test to 0.7 MPa
6) Air stop valve: Hydro-test to 4.5 MPa
7) Air distributer valve: Hydro-test to 4.5 MPa
8) Lub. oil pump: Hydro-test to 1.5 MPa

9) Air cooler: Hydro-test to 0.4 MPa (Shell/Tube)
10) Cooling water pump: Hydro-test to 0.4 MPa
11) Fresh water pump: Hydro-test to 0.7 MPa

4. Shop Test: Carried out on 24 Feb. 2015. For details, refer to Mfr's SHOP TEST RECORD No. 5M / 0394, 0395 / K244331

. 1) Load test: Found the condition satisfactory.
25% Load - 20 min./ 50% Load - 20 min./ 75% Load - 20 min./ 90% Load - 20 min./ 100% Load - 60 min. / 110% Load - 30 min.

2) Governor test: Found the condition satisfactory.
Speed with 100% load: 750 min-1(Settling) => Speed without load(Transient) 765 / 766 min-1 =>
Speed without load(Settled): 750 / 750 min-1 (Stbd/Port)

3) Safety devices test: witnessed following safety trips and found satisfactory.

Items	Design point	Result(Stbd/Port)
M/E Emergency Stop	by button	OK / OK
M/E Overspeed Trip	about 865 min-1	860 / 860 min-1
M/E L.O. Low Press. Trip	0.15 +-0.015 Mpa	0.15 / 0.15 MPa
M/E FW Press Low(slowdown) alarm	0.05+-0.010 MPa	0.05 / 0.05 MPa
M/E FW Temp High(slowdown) alarm	95+-3 deg.C	96 / 95 deg.C

4) Post Trial Examination:

After the above load test, surface temperature of the following parts were measured and found the condition satisfactory.
all Main bearing metals/ all Crank pin metals/ all Piston pin metals

Surveyor(s) to The American Bureau of Shipping
Attending Surveyors

Hashimoto Ryoji — Electronically Signed on 31-Mar-2015

Sugimoto Yukiko — Electronically Signed on 31-Mar-2015 by Hashimoto, Ryoji

Yasokawa Kenji — Electronically Signed on 31-Mar-2015

Reviewed By
Iwano, Kenji — Electronically Signed on 31-Mar-2015, Kanto Port