



EQUIPMENT REPAIR REPORT

November, 2009

Customer:

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Our Reference: SO 5000002990

Your Reference:

Subject: Repair Quotation for Model: VIC 14 x 24 CHC

Thank you for considering ProSpec Technologies Inc. as a potential source for reconditioning your Goulds' vertical turbine pump. We appreciate the opportunity to provide you with this quotation.

EQUIPMENT INFORMATION

Description: Vertical turbine, less driver.

Manufacturer: ITT-Goulds

Type: Vertical turbine, single stage

Model: VIC 14 x 24 CHC

Serial Number Reference: 302499-2 89490

RPM: 1200

Lubrication: Pumpage

Shaft Sealing: Mechanical, single

Sealing chamber: Straight bore

Rotation: CCW

Impeller: Fully enclosed, iron

Current impeller diameter: 18.0 inches

Suction porting: 16 inches at 150# RF

Discharge porting: 14 inches at 150# RF

INITIAL OBSERVATIONS

The pump was received less motor, coupling and less mechanical seal. Upon receipt we conducted a manual rotational test and found that the pump shaft rotated freely. The exterior of the unit was in very good condition with minimal rust and oxidation. The pump was dismantled and we proceed to do our measurements.

The registered fits (I.D. and O.D.) on bottom column (item 644), intermediate column (642) and top column (641) were checked and are all within the manufactures tolerance. The registered fits on the discharge head (600) and the seal housing (794) I.D. and O.D. were checked, all are within the specified tolerances.

The head shaft (608) part # B00021FKFA measuring 1.93" x 95" was checked for straightness and is within the acceptable tolerance with the average total run out less than 0.0005" T.I.R. per foot and never exceeding 0.005" T.I.R. over the 95" of shafting. The shaft is however worn at the location of the shaft bearings and in the area of the mechanical and it may not seal in the area that the seal is located. We recommend chroming of this shaft at the locations that are worn.

The pump was supplied with two (2) line shafts (item 646). Both of these shafts were checked for straightness and are within the acceptable tolerance with the average total run out less than 0.0005" T.I.R. per foot and never exceeding 0.005" T.I.R. over the length.

The first or top line shaft part # B00006FNAA measuring 1.93" diameter x 120" long has two locations that see bearings. Both of these locations are worn. The second or intermediate line shaft part # B00006FGAA measuring 1.93" diameter x 60 " long and is also worn at the one location on line shaft that mates with a bearing.

Both the top and intermediate shafts can be inverted end for end exposing a new shaft area to the bearing. Inverting the shaft is the most economical solution when the bearing wear is minimal. The shaft strength will not be compromised.

The pump shaft (660) measuring 50.25" long with part # D03123F013 is worn at the locations that mate with the bowl bearing (672) part # A 1333 0F000 and suction bearing (690) A94240F000. This wear is not severe but in order to bring the shaft back to the O.E.M. specifications we recommend chroming the shaft at these worn locations.

The pump was supplied with a suction bearing (690), bowl bearing (672), four (4) spider bearings (653) and a seal housing bearing (791). We checked all of bearings for excessive wear and corrosion. All bearing I.D.'s and O.D.'s were also checked. However all of the bearings were too badly worn to get and exact measurement on the I.D. All of the bearings will be replaced with new ones.

The impeller (673) part # B57310F000 and bowl (670) part # C2389 1 were visually checked for cracks and pitting. The impeller is in good condition except for the even wear at the location that it mates with the bell suction (689) part # B5732 1. The impeller was received with a piece of wood lodged in the impeller. This wood had no adverse affect on the impeller. The impeller will require skim machining to achieve a uniform surface to mate with a new bell suction wear ring (680). The impeller once machined will be balanced in accordance with G2.5. The bowl will

machined to accept a new wear ring. Once fitted with the wear ring the running clearance between wear rings will be in accordance with the O.E.M. specifications.

As part of a sound and complete repair we will be replacing the split ring (722), thrust ring (725), bushing (791), o-ring (743A) and (743C), seal housing to head gasket (779H).

SCOPE OF WORK

- Receive unit, perform initial visual inspection and record findings.
- Disassemble unit, sand blast the interior and exterior surfaces using Ebony Grit copper slag and polish all machine fit surfaces.
- Perform detailed component inspection and record findings.
- Repair head shaft, line shafting and pump shaft.
- Replace all shaft support bushings with new ones.
- Replace all O-rings and gaskets.
- Restore impeller running clearances with new wear rings.
- Clean and prepare exterior surface of discharge head for finish coat. Mask off accordingly.
- Apply ICI Speed Enamel 9400 green paint to exterior non-machined surfaces.
- Chase all threads, utilize all new fasteners and assemble with never seize thread lube.
- Reassemble, finish paint with Enbridge Pipelines Green Speed Dry Enamel and apply appropriate tags and identification plates.
- Touch up finish, package and prepare for shipment.

Total Price for the pump repair \$ lot net

The pricing quoted is in Cdn funds, taxes not included, freight from and back to site included and is subject to our standard terms and conditions of sale. If any further repairs or parts are required during the cleaning process. We will provide a quotation in writing prior to proceeding. The turn-around time for the proposed scope of work is 6 to 8 weeks after receipt of approval to proceed. We will make every effort to repair this pump in as short a time frame as possible.

Thank you very much for the opportunity to present our report. Please contact us with any questions or additional information requirements.

Best regards,

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Pump as it arrived at our shop.





This photo shows the wear at bell suction where it comes into contact with impeller.



The impeller shaft is worn at the bearing. This area will be built up with chrome to the OEM specifications.



The wood found in the impeller did not damage the impeller in any way. The shaft has minimal wear at the bearing however this area will be chromed and ground to size.



Impeller wear at the bowl contact area is even all around.



Line shaft bearing wear prevented an accurate measurement



Completed repair.

