



Shijiazhuang Damei Kingmech Pump Co.,Ltd

Add: No.266 Tianshan Street Shijiazhuang city, Hebei China

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QA & QC PLAN

(API 610 BB4 Boiler Feed Water Pump Type RMD)

From: Shijiazhuang Damei Kingmech Pump Co.,Ltd

Complier:Zhao

Approved by: Liu

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GENERAL

1. Scope

(a) This procedure covers the method of QA and QC plan (inspection and test for pumps) of following item

Pump model	RMD 250-115×4
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(b) Witness inspection
N/a

2. Material test and inspection

2.1 Chemical and Mechanical Test

- (a) Material test shall be performed by material manufacturer in according with material specification ASTM standard specification. Specimen shall be sampled by charge and examined for the specified chemical compositions and mechanical property.
- (b) As for rods and plates , materials accompanying mill sheet certifying that the material are of specified chemical compositions shall be purchased and used.
- (c) Material certificate of pump for following items shall be submitted.
 - Impeller
 - casing
 - shaft

2.2 Physical performance test.

Test according to ASTM standard.

Please see attachment 1 the test report sample

2.3 NDE shall be applied to pumps as follows:

Part name	Scope of NDE	Kind of NDE	Inspection of NDE	Place of NDE
Impeller	100%	VT	machining	
Shaft	100%	UT	Before machining	foundry
casing	100%	VT	After machining	

Abbreviation VT: Visual Inspection
 PT: Penetrant Inspection
 UT: Ultrasonic Inspection

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(b) Acceptance standard and Criteria

(1) VT

Casting surfaces shall be examined visually by the manufacturer and shall be free of adhering sand ,scale ,cracks and hot tears.

(2) UT

Ultrasonic Inspection for shaft shall be carried out in according with API standard .

2.4 Welding Repair

(a)Approval by purchaser shall be obtained before any *1 major weld repair is carried out.

(b)All repairs shall meet the inspection requirement and acceptance standards for the original material.

(c)Details of all major weld repairs, and of the heat treatment where applicable, shall be recorded and reported to purchaser.

(d)All weld repairs shall be inspected by the same procedure and to the same standards as applied to the initial inspection of the casting .

*1 The definition of a major weld repairs is to be taken as either a removal or more than 50% or 25mm of the wall thickness , or a total surface area of required zone is higher than or equal 65 cm² independent of the depth.

3. Hydrostatic pressure test

3.1 General

(a)Hydrostatic test shall be carried out before assembly of the pump.

(b)The hydrostatic medium shall be industrial water at ordinary temperature.

(c)Test shall be maintained for a period of 30 minutes under the specified pressure.

(d)During the test ,leakage and pressure drop shall not be permitted.

3.2 Hydrostatic test pressure

(a)Hydrostatic test pressure for each pressure containing parts shall be as follows. Casing, casing cover, liner (assembly). The hydrostatic pressure should be 1.5 time than pump max. Working pressure.

4. Dynamic balance and static balance test

4.1 The impeller should be tested by static balance .

4.2 Dynamic balancing test for the proper of impeller and shaft together.

(a)Set on impeller properly on the balancing machined and rotate it at test speed. Then determined a phase and amount in unbalance.

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(b) Correction for unbalance shall be done by removing (eg. Grinding, etc.)

The maximum permit static unbalance weight is 800N.m and the maximum permit dynamic unbalance weight is 400N.m. The maximum removing thickness is not more than 2/3 thickness of impeller.

5. Clearance inspection

During assembling , clearances shall be measured and recorded.

The tolerance of clearance shall be in accordance with approved section drawings.

6. Performance and NPSH test

6.1 Testing methods

Capacity: electromagnetism flow meter

Pressure : Compound gauge for suction and pressure gauge for discharge.

Temperature: Thermometer.

Speed : Tachometer or Stroboscope

Vibration : Vibro meter

Motor input: watt meter.

Motor output: (calculating)

Voltage: Voltage meter

Ampere: Ampere meter

Noise: Noise level meter.

6.2 Pump performance test

(a) Measurement

During performance test, performance will be measured at about 0, 25, 50 , 75, 100 ,120% of rated flow and following data shall be measured calculated . Further , vibration and sound level measurements shall also be taken at rated flow.

(1) Suction , discharge ,and total different head

(2) Discharge capacity

(3) Rotating speed of the pump

(4) Input and output of motor

(5) Efficiency of the pump

(6) Vibration (at rated flow only)

(7) Sound level (at rated flow only)

Note. Test data shall be corrected for speed and specific gravity conditions specified in the pump data/req. Sheets.

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Pump item	Performance measured actual flow (m3/h)						
	0%	25%	50%	75%	100%	120%	
Pump Model							

6.3 NPSH test

6.4 Continuous running test

(a) The continuous running test shall be carried out for Min.1 hours or until stabilized bearing temperature including performance test.

(b) During the test following data shall be measured every 20 minutes, and the loading conditions shall be surveyed.

- Discharge capacity
- suction ,discharge ,and total different head
- Rotating speed
- Efficiency
- Input and output of motor
- Bearing box temperature

6.5 Correction of the test results

Test data shall be corrected by the following applicable formula.

When testing values differ from rated values, performance at rated values shall be calculated as follows:

(a) Specific gravity correction

(Brake horsepower at)=(brake horsepower at γ_T) $\times(\gamma/\gamma_T)$
where γ rated specific gravity; γ_T testing specific gravity)

(b) motor output power

The shaft power shall be calculated by reading out the motor efficiency from motor's test data reports.

6.6 Judgment of the test results

(a) Pump performance

Pump characteristic corrected with the specified procedure shall be according to ISO9906.

(b) Vibration

During the shop test of the pumps at rated capacity , the vibration shall be according to API 610 . Vibration shall be measured on bearing box.(V.H.O.3 direction)

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(c) Bearing box temperature

Bearing box temperature shall not exceed Ambient +40C Max 80°C on outer surface of the bearing box.

Note:

The pump shall be re-tested.

6.7 Sound level test

(a) During the continuous running test, sound pressure level shall be measured for reference data.

(b) Sound level shall be guarantee on site , and not exceed 85dB(A) at any measuring location not less than 1.0m from the pump and motor surface.

7. Dismantle inspection after running

After completion of the running test , pump shall be dismantled the suction cover shall be checked at visible parts that there is no defects by visual inspection.

-impeller

Note: Bearing shall be dismantled when any abnormal temperature rise or sound occurred.

8. Dimension and visual check

For all pumps, a dimension check against approved outline drawing combined with a visual checks.(please check them according to supply scope)

(a) Size, position and rating of flanges for the matching ends.

The tolerances of the dimension for flanges shall be in accordance with ANSI standard.

(b) Pump dimensions

Please check with pump dimensions drawings.

(c) Base plate dimensions

The allowable tolerances of the distance between the hole of the foundation bolts are as follows:

- Pitch tolerance between each neighboring holes.

within specified dimension $\pm 3.0\text{mm}$

-Diagonal distance tolerance between base plate corner to another diagonal corner.

within specified (Calculated) dimension $\pm 3.0\text{mm}$

9. Inspection before shipment

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- (a) The size ,style and/or number shall be inspected with applicable drawings and lists.
- (b) Inspection of painting and rust preventing
Painting finishing color and rust preventative shall be inspected in according with painting procedure.
- (c) Packing inspection
Packing such as boxing , marking , protection etc. and method of shipping shall be in according with approval drawing.

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