

 NISOC	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>خرید پکیج پمپ های آب آتشنشانی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0023_00)</p>																									
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طرح نگهداشت و افزایش تولید ۲۷ مخزن

MECHANICAL RUNNING TEST PROCEDURE

نگهداشت و افزایش تولید میدان نفتی بینک

V01	FEB. 2025	AFC	Kalaye Pump	M.Fakharian	S.Faramarzpour	
V00	NOV. 2024	IFA	Kalaye Pump	M.Fakharian	M.Sadeghian	
Rev.	Date	Purpose of Issue/Status	Prepared by:	Checked by:	Approved by:	CLIENT Approval

Status:

IFA: Issued for Approval
IFI: Issued for Information
AFC: Approved for Construction

 NISOC	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>خرید پکیج پمپ های آب آتشنشانی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0023_00)</p>	 شرکت توسعه و آبادات  Kalaye Pump Co.																								
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نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه																			
V01	0006	PR	QC	120	KP	GCS	BK																			

REVISION RECORD SHEET

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نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه																			
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1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also, PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

2.0 GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Supply Of Fire Water Pumps
EPD/EPC CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
EPC CONTRACTOR/PURCHASER:	Joint Venture of: Hirgan Energy – Design & Inspection (D&I) Companies
VENDOR:	Kalaye Pump Company
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
TPI:	Third Party Inspector.
SHALL:	Is used where a provision is mandatory.
SHOULD:	Is used where a provision is advisory only.
WILL:	Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR.
MAY:	Is used where a provision is completely discretionary.

3.0 SCOPE

This executive method aims to illustrate the way of the test and testing manufactured/repaired pumps in the factory to achieve assurance about their alignment to those determined characteristics as well as their quality.

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نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
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4.0 USAGE DOMAIN

The usage domain of this executive instruction includes all projects of Kalay-E-Pump Company and other common productions.

5.0 LIABILITIES

The quality control director is responsible for executing this instruction, furthermore product supervisor and technical office representative are present in the examination (Test) steps entirely, as auditors.

6.0 REFERENCES

The testing operation of pumps/Electro pumps/Diesel Pumps belonging to Kalay-E-Pump Company is accomplished based on derivate tests of creditable global collected standards for centrifugal and firefighting pumps and gathered movements. (API 610, NFPA 20)
- ISO 10816

7.0 PROCEEDING DESCRIPTION

The running test (including bearing temperature test, vibration test, noise level test) for all project pumps is carried out according to API 610 and this procedure as well as customer project documents. ”

8.0 MECHANICAL RUNNING TEST

This provides a unified test procedure for each mechanical running test. After the test, a report shall be issued by the testbed and controlled by this procedure.

8.1.1. The pump shall be mechanically run for 4 hours , this run shall be performed at rated flow.

8.1.2. The pump shall be run on the test stand until oil temperature stabilization has been achieved.

8.1.3. Test Condition

8.1.3.1. Test fluid is clean water.

8.1.3.2. The following meters can be used for testing.:

Flowmeter, laser thermometer, digital photo-optical speed counter, vibration meter in mm/s RMS unit, photometer for noise level.

8.1.3.3. The seal specified in the contract shall be used in the pump for testing. (for mechanical seal pumps)

8.1.4. Test items are .:

8.1.4.1. Vibration of pump bearing in horizontal & vertical direction. Vibration must be according to Table 8 of API 610, 11th edition.

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	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	KP	120	QC	PR	0006		V01


Table 8 — Vibration limits for overhung and between-bearings pumps

Criteria	Location of vibration measurement	
	Bearing housing (see Figures 31 and 33)	Pump shaft (adjacent to bearing)
	Pump bearing type	
	All	Hydrodynamic journal bearings
	Vibration at any flowrate within the pump's preferred operating region	
Overall	For pumps running at up to 3 600 r/min and absorbing up to 300 kW (400 hp) per stage: $v_u < 3,0 \text{ mm/s RMS}$ (0,12 in/s RMS) For pumps running above 3 600 r/min or absorbing more than 300 kW (400 hp) per stage: see Figure 34	$A_u < (5,2 \times 10^6/n)^{0,5} \mu\text{m peak-to-peak}$ [(8 000/n) ^{0,5} mils peak-to-peak] Not to exceed: $A_u < 50 \mu\text{m peak-to-peak}$ (2,0 mils peak-to-peak)
Discrete frequencies	$v_f < 2,0 \text{ mm/s RMS}$ (0,08 in/s RMS)	for $f < n$: $A_f < 0,33 A_u$
Allowable increase in vibration at flows outside the preferred operating region but within the allowable operating region	30 %	30 %
<p>Power calculated for BEP of rated impeller with liquid relative density (specific gravity) equal to 1,0.</p> <p>Vibration velocity and amplitude values calculated from the basic limits shall be rounded off to two significant figures</p> <p>where</p> <p>v_u is the measured overall velocity;</p> <p>v_f is the discrete frequency velocity, measured with a FFT spectrum using a Hanning window and a minimum frequency resolution of 400 lines;</p> <p>A_u is the amplitude of measured overall displacement;</p> <p>A_f is the amplitude of displacement at discrete frequencies, measured with a FFT spectrum using a Hanning window and a minimum frequency resolution of 400 lines;</p> <p>f is the frequency;</p> <p>n is the rotational speed, expressed in revolutions per minute.</p>		

- 8.1.4.2. Temperature of pump bearings.
 - 8.1.4.3. Speed of pump shaft.
 - 8.1.4.4. Noise level at 1meter distance around of package.
 - 8.1.4.5. Leakage by visual checking from the mechanical seal.
- Mentioned items shall be recorded each 1 hour.

Note: Acceptance criteria for noise level of diesel will be according to Diesel Engine Specification.

8.1.5 .Acceptable Factors

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نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه																			
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8.1.5.1 .If it is no leakage by visual checking, a mechanical seal is acceptable. Dripping leakage is acceptable for a soft packing seal.

8.1.5.2 .Noise level of pump set shall be lower than 85dB under rated flow in 1 meter distance and 1.5 m above ground.

8.1.5.3.Vibration must be according to table 8 of API 610 11th edition.

8.1.5.4 .For ring-oiled or splash systems and grease lubricated bearings, an oil temperature below 82°C (180°F) during shop testing is acceptable. The sump oil temperature rise shall not exceed 40°K (70°R) above the ambient temperature in the test cell measured at the time of each reading and if bearing temperature sensors are supplied outer ring temperature shall not exceed 93°C (200°F).

Note:

Test fluid is clean water at the temperature less than 40°C.

The following meters can be used for testing: Electromagnetic or orifice or venture flow meter, optical temperature meter, digital photo- optical speed counter, vibration measuring meter in mm/s RMS unit, phonometer for noise level.

Unless otherwise specified, seal specified in contract shall be used in pump for testing.

4 hours mechanical running test, with job motor if power is right for water.

Test items are:

- 1- Vibration of pump and electromotor bearing at Horizontal & Vertical & Axial direction.
- 2- Temperature of pump and electromotor bearing.
- 3- Speed of pump shaft.
- 4- Noise level at 1meter distance around of package.
- 5- leakage by visual checking from mechanical seal

running test shall be done under the rated flow (if power is right for water), running for 4 hours and the above items shall be recorded ever 1 hours.

Note: For diesel pumps, vibration classification numbers and guide values for reciprocating machines are given in Table A.1. (ISO 10816-6)

-Pump vibration values to be limited to class 3 machine, acceptance criteria 11.2 mm/s (rms) is given in table A.1.

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MECHANICAL RUNNING TEST PROCEDURE																										
پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه																			
BK	GCS	KP	120	QC	PR	0006	V01																			

Table A.1 — Vibration classification numbers and guide values for reciprocating machines

Vibration severity grade	Maximum values of overall vibration measured on the machine structure			Machine vibration classification number						
	Displacement μm (r.m.s.)	Velocity mm/s (r.m.s.)	Acceleration m/s^2 (r.m.s.)	1	2	3	4	5	6	7
	Evaluation zones									
1,1	17,8	1,12	1,76	A/B	A/B	A/B	A/B	A/B	A/B	A/B
1,8	28,3	1,78	2,79							
2,8	44,8	2,82	4,42							
4,5	71,0	4,46	7,01	C	C	C	C	C	C	C
7,1	113	7,07	11,1							
11	178	11,2	17,6							
18	283	17,8	27,9	D	D	D	D	D	D	D
28	448	28,2	44,2							
45	710	44,6	70,1							
71	1125	70,7	111							
112	1784	112	176							
180										

Key to zones

A: The vibration of newly commissioned machines would normally fall within this zone.

B: Machines with vibration within this zone are normally considered acceptable for long-term operation.

C: Machines with vibration within this zone are normally considered unsatisfactory for long-term continuous operation. Generally, the machine may be operated for a limited period in this condition until a suitable opportunity arises for remedial action.

D: Vibration values within this zone are normally considered to be of sufficient severity to cause damage to the machine.

NOTE — Vibration values for reciprocating machines may tend to be more constant over the life of the machine than for rotating machines. Therefore zones A and B are combined in this table. In future, when more experience is accumulated, guide values to differentiate between zones A and B may be provided.

Noise Level

Model Pump	Tag No.	Noise level criteria
KPSPF 150-570	P-2301 B	117.9
KPSPF 150-570	P-2301 A	85
KP 2532	P-2302 A/B	85