

## **BUSINESS GUIDELINE 7 GB**

### **PUMP RUNNING AND PERFORMANCE TEST COST STRUCTURE**

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## 1. Introduction

- 1.1 It is recommended that the prices of possible tests are normally stated clearly in the offer or contract. In some special cases, however, it may be necessary to include the price of testing in the pump or contract price and this inclusion should be stated in the offer.
- 1.2 This pump running and performance test current cost structure shows the loose framework to assist the manufacturer in assessing his own costs for testing.
- 1.3 In order to unify the method of assessing pump test costs, a system using three components to make up a basic cost/price, with extra cost/prices for various detailed test requirements has been adopted.

The basic test cost/price is made up from components related to the power required to drive the pump, to the pump discharge diameter, and to the value of the pump. The individual manufacturer may decide for his own purposes whether to use all three components or not.

- 1.4 The purpose of each of the three components is as follows:
  - a) The component relating to driving power reflects the cost of setting-up the driving unit, and supplying energy with associated back-up.

This also covers the water horse power of the pump.

- b) The component related to discharge diameter will reflect the bulk of the pump and the associated costs of pipework, valves, and their assembly. It will also reflect the cost of flow measurement.
  - c) The component related to pump value allows for differences in pump materials and technical complexity and the level of technical and contractual risk associated with the test.

These components can be obtained from simple graphs (like those in section 3). Section 4 shows an example indicating a band of typical costs for each component based on experience. Each individual manufacturer may decide the manner of presentation of the costs to suit his own purposes, e.g. by graphs tables or a tailored computer programme.

The basic test cost is the sum of these components. The schedule of pump running and performance test structure attached in paragraph 2 can be used to evaluate the required test cost. Extra costs covering tests to various requirements as indicated in this schedule are added as a percentage of the basic test cost. The sum of the basic test cost and the extras can then be multiplied by the factor for the respective pump type as indicated in paragraph 2.

## 2. Pump running and performance test – current cost structure schedule

Description	Costing method
<u>Basic test cost:</u> Covers setting up pump for test	Sum of cost components from power, discharge size and pump value graphs (see 3).
<u>Extras</u>	To be added to basic cost:
: Q/H duty point	% of basic test cost ( 0 % to 5 %)
: Q/H duty three points	% of basic test cost ( 5 % to 10 %)
: Q/H duty five points	% of basic test cost ( 5 % to 15 %)
: NPSH one point	% of basic test cost (20 % to 50 %)
: NPSH three points	% of basic test cost (25 % to 55 %)
: NPSH five points	% of basic test cost (30 % to 60 %)
<u>Other test</u>	
: Vibration test	% of basic test cost (40 % to 60 %)
: Noise test	% of basic test cost (30 % to 60 %)
: Long running test (related to running time)	% of basic test cost (50 % upwards)
: Stripping for inspection during or after test	% of basic test cost (20 % to 50 %)
: Extra for test motor (where normal practice is to use client´s motor)	% of basic test cost ( 5 % to 15 %)
: Extra for using client´s motor (where normal practice is to use test motor)	% of basic test cost ( 5 % to 15 %)
<u>Factors for pump type</u>	Multiples of basic test cost + extras
Single stage horizontal	Factor (1,0 – 1,1)
Single stage vertical, motor supported on pump	Factor (1,0 – 1,1)
Single stage vertical, motor supported separately	Factor (1,3 – 1,6)
Horizontal multistage	Factor (1,1 – 1,5)
Vertical spindle suspended	Factor (1,8 – 2,2)
Vertical submersible	Factor (1,0 – 1,1)
<u>Unwitnessed works test cost</u>	Sum of basic cost + extras multiplied by pump type factor
<u>Extra</u> for witnessing by client´s inspector cost	50 % to 100 % of total running test cost
<p>Note: - Extra for witnessing by client´s inspector where the standard pump price includes unwitnessed test will be 50 % to 100 % of the unwitnessed works test cost calculated by the above method.</p>	

## Notes on the schedule

### **a) Class of tests**

The extras shown in the schedule for performance test relate to the normal commercial test requirements which are covered by the lowest classes of acceptance standards, e.g. ISO 9906, class III etc. If the manufacturer has to cost test to intermediate classes (e.g. ISO 9906) the basic test cost and percentage extras in the schedule will be increased (...times).

### **b) Type of NPSH tests**

The percentage extras for NPSH test relate to tests carried out by throttling a valve on the inlet side which is assumed to represent the lowest cost. The more expensive methods of varying the inlet sumps water level or controlling the pressure in suction tank require an increase of the percentage extra schedule (e.g. doubling).

### **c) Driving units**

The costing proposals contained in the schedule are based on electric motor driven pump tests. The basic test cost with driving units of other types will require separate consideration but the relationship between various test may still be applied.