

# Capability Statement

## **Introduction**

British company Hitech International & associated company Hitech BioReactors Ltd offers a highly specialised service in the field of Water and Wastewater Technology. The company was formed in 1979, and has since been involved in many large and prestigious projects around the world, in addition to providing valuable assistance on smaller schemes.

Hitech provides all necessary specialist expertise associated with the planning, process design, and commissioning of Water and Wastewater Treatment Plants of all types, and in any part of the world.

The service ranges from trouble shooting on existing works, process testing, commissioning and training, to complete design and supply of new Works. Hitech is able to provide non-specialist contractors with a full range of professional services, including proposals, tendering, and project management, both on site and off, with our diverse skills base and commitment to cost-effective engineering.

Utilising the most advanced computer based design technology, Hitech provides a highly efficient service. Unique software developed in-house is available for hydraulic design of plant piping and structures, and the design effort is supported by a sophisticated CAD system.

SBR technology is an area of particular interest, and Hitech offers a full complement of technical services, from commissioning, training and trouble shooting, to complete design and supply. Our client base includes water companies and water authorities, specialist process contractors, general contractors and consultants.

## **Scope**

### **Process Design**

This is a highly specialised service, utilising sophisticated CAD equipment. Technology is available for most Water, Sewage, and Industrial Effluent Treatment processes. Reverse Osmosis Desalination system design is computer aided, and programmed for the major membrane systems.

### **Hydraulic Analysis**

Hydraulic Analysis and design is carried out using computer based technology specially developed for optimum performance within the limits of a treatment facility.

### **Engineering Design**

Full and detailed design of all aspects of Water Treatment Systems, including Process, Civils, Mechanical, and Electrical.

### **Process Control**

Preparation of Control Specifications for fully automated treatment plant, with PLC coding if required.

### **Supervision**

Mechanical and Electrical supervision of Installation for Water, Sewage, and Industrial Effluent treatment plant.

### **Commissioning**

Mechanical and Process commissioning and trouble-shooting.

### **Feasibility Studies**

Theoretical or Pilot Plant based studies to determine and optimise the treatment process.

### **Process Testing**

Performance assessment of aeration equipment; retention characteristics and mixing efficiency of reactor tanks/vessels.

## **Process Engineering**

Hitech provides a highly specialised Process Engineering service to the water industry, with wide-ranging expertise in both water and wastewater treatment technologies.

Hitech International offers a complete process engineering service. We are able to provide fully integrated design solutions, from the largest Municipal works to compact package-plants. The service includes all design work associated with process and instrumentation, hydraulics and control philosophy, and extends naturally to on-site supervision of construction, full participation in commissioning and training, and ultimately to the achievement of handover. All drawings are supplied, including P&IDs, engineering drawings, rendered 3D models, and as-builts. All are computer generated.

In addition to new works, we take a keen interest in upgrading existing works and trouble-shooting. We are able to provide invaluable assistance in increasing output and/or treatment standard, and in an extension of our process testing service, we are able to undertake diagnostic work on failing plants. Technical reports are prepared with a view to identifying the problems and providing cost-effective solutions. Hitech process engineering includes:

### **Municipal Sewage Treatment:**

- Activated Sludge Plants
- SBR Systems, including design, supply, installation and commissioning
- Sludge thickening, de-watering and processing systems

### **Municipal Water Treatment:**

- Chemical Treatment Processes
- Lamellar Clarifier Systems
- Settlement Systems
- Dissolved Air Floatation
- Filtration Systems
- Reverse Osmosis Desalination

Our client base ranges from general contractors to specialist engineers both at home and abroad, and we welcome enquires from all parties participating in water treatment projects in any part of the world.

## Process Testing

Hitech process testing services include:

- Clean Water Oxygen Transfer Testing
- On-line Oxygen Transfer Testing
- Lithium Tracer Studies
- Vertical D.O. Profiling
- Re-suspension Tests

### **Aeration Testing**

We are able to assess the performance of aeration systems both under clean water standard conditions, and also under working conditions. We are highly competitive in this specialised area, and maintain up-to-date equipment for accurate and reliable results.

The test methods employed are:

#### **Clean Water, Unsteady State**

Logging Dissolved Oxygen probes are used to measure the rate of re-oxygenation. De-oxygenation is carried out using nitrogen gas or sodium sulphite, catalysed by cobalt chloride, according to the mixing conditions within the aeration tank. Using computer software, linear regression analysis is used to analyse the data for  $K_L a$ , SOTR (Standard Oxygen Transfer Rate), SOTE (Standard Oxygen Transfer Efficiency) and SAE (Standard Aeration Efficiency), and detailed reports are prepared.

#### **Steady State**

This method of testing is carried out on systems with activated sludge present. The basis of the test is to measure the rate of respiration of a sample of the sludge, and compare this with the concentration of oxygen which the aeration system can maintain in the test system.

#### **Mixer Testing**

We offer a testing service to assess the performance characteristics of all mixing systems, for example anoxic tanks, selector zones, and mixers designed to maintain suspension and homogeneity. We design and operate sampling systems for each specific application and system geometry — anything from manual dipping to timer operated automatic sampling. Methods range from tracer studies to vertical suspended solids and D.O. profiling. Again using computer

software, statistical methods are employed to characterise the extent and nature of the prevalent mixing conditions within a tank; the service includes preparation of method statements, provision of all materials, site attendance, sample and data analysis, and preparation of detailed reports.

## **3D CAD and Mathematical Modelling**

Our expertise is used to model New Works, or modification to existing works, for performance, layout, and appearance using Mathematical and Graphical systems. Every system is mathematically modelled before issuing design data to the project, allowing any modifications to be made with the minimum of delay.

These models give detailed and accurate insights into the layout, performance, and operation of prospective treatment works, thus providing a sound basis on which engineering decisions can be made. As with our process design service, all types of treatment systems are included. Our 3D modelling service has a range of applications from Planning to Construction logistics. A series of images showing complex pipework arrangements etc in various stages of construction can be built up using HTML, allowing workers clearly to visualise and plan construction. We are able to generate photo-real images from any angle. These are particularly useful for HAZOP studies.

## **Hitech Advanced BioReactor Systems - a new generation of SBR technologies**

Hitech BioReactors Ltd was formed after years of evaluating, designing, commissioning and working with SBRs. The lessons learned and real world requirements of this technology have been distilled into our own designs.

We have developed a superb design system for our SBRs which enables us to predict performance accurately for all conditions of flow, load, and temperature. We offer the quickest, most accurate design service available, helping us to deliver the best performance/ least cost solution to the client.

Whilst retaining the simplicity of batch reactor technology, we have developed novel strategies to improve performance, particularly in filament control, and to maximise flexibility, enabling the system to cope with a very wide range of flow and load conditions. We have systematically worked through every function of the SBR process, and optimised it. We have developed our SBR in close collaboration with our suppliers, and our plant includes the highest quality systems, components and materials available. We offer our own in-house “floating arm” decanters, and our control software is the result of a five year development programme.

Our extensive experience of aeration systems allows us to offer the most appropriate type for a particular application, and our design is readily adaptable to virtually all mainstream commercial systems. Our systems are designed to maximise flexibility and performance, with minimum running costs and maintenance. Design, installation, commissioning and training is included in the service, and we are confident of meeting the most exacting specification demands.

### **Partners**

Libya - Hitech are pleased to be associated with C D Bissell Engineering Services Ltd – a Libyan registered company. We have a long association with this Contractor, providing design expertise on all of the Water and Wastewater projects in which C D Bissell are involved. Working alongside African Coast Construction, the ability and facilities of this ‘association’ is second to none in this part of the world.

<http://www.cdbissell.com>

Iran - We are also pleased to be associated with Iranian contractor Behrad-Pardis Construction

and Technical Company. The arrangement is not fully formalised, but shows promise for future developments in Environmental Engineering in Iran.

<http://www.behrad.org>