

**Training Title**

**ELECTRICAL SUBMERSIBLE PUMPS – ADVANCED ESP DESIGN AND TROUBLE SHOOTING (IADC CERTIFIED)**



**Training Duration**

5 days

6 hours per day

Total 30 hours

REF ID001	Electrical Submersible Pumps – Advanced ESP Design And Trouble Shooting (IADC Certified)	5 Days	04-08 Mar 2018	\$ 5000	Dubai, UAE
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**Training Fees**

5000 US\$ per participant for Public Training. Fees Includes Course Materials/ Handouts, Tea/Coffee, refreshments, International Buffet Lunch

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

IADC Certificate



**TRAINING DESCRIPTION**

The Electric Submersible Pump System (ESP) is considered an effective and economical means of lifting large volume of fluids from great depths under a variety of well conditions. Over the years, the ESP companies, in conjunction with the major oil companies, have gained considerable experience in producing high viscosity fluids, gassy wells, high temperature wells, etc. With this experience and improved technology, wells that were once considered non-feasible for submersibles are now being pumped economically. This course is designed to provide recommendations for designing ESP systems for special applications including gassy wells, production of fluids with solids, viscous oil, dual completions, Ytool applications, shrouded motors, production through the annular, high temperature and recirculation. Pump curves (Head vs. Flow rate) for several pump speeds are generated in class as an exercise.

**TRAINING OBJECTIVES**

Provide in depth knowledge of the advantages and limitations of the Electric Submersible Pumps used in aggressive environment applications. Participants will learn well optimization and troubleshooting.

**TRAINING METHODOLOGY**

The course is designed to maximize delegate benefit from the outset. The goals of each participant are discussed to ensure their needs are fulfilled as far as possible. Questions are encouraged throughout particularly at the daily wrap up sessions. This provides opportunities for participants to

discuss specific issues and if possible find appropriate solutions. Case studies are employed to highlight particular points and appropriate video materials used to illustrate particular conditions. Understanding system design and limitations is fundamental to ensuring adequate design & specification activities are undertaken.

Moreover, some simulations will be utilized during course sessions.

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. The delegates will also be encouraged to raise their own questions and to share in the development of the right answers using their own analysis and experiences.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

### PRE REQUISITES

Delegates are expected to have relevant knowledge in Electric Submersible Pumps Application Engineering course or field experience using ESPs in order to fully benefit from the specialist training. Any similar basic or awareness training must be attended by delegates.

### LANGUAGE PRE REQUISITES

Please be aware that medium of the course is English. Prospective attendees for whom English is a second or foreign language should have a minimum of Low Intermediate level in all four skill sets (reading, writing, listening and speaking) in order to fully benefit from the awareness courses. We recommend a higher level of English language comprehension for the more technical or specialist courses

### WHO SHOULD ATTEND?

Production Engineers, technologists, people who are involved in Production Optimization. Specifically people who want to gain more knowledge about ESP

### OUTLINE

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- Introduction to artificial lift and electrical submersible pumping
- Introduction for reservoir and production considerations
- Description of all components of the electrical submersible system starting at the surface to the pump; transformers; controllers/VSD; wellhead; tubing cable; cable guards; motor lead cable; pump; intake/gas separator; equalizer/protector; motor; instrumentation
- Installation considerations and cautions
- Design of an ESP system to fit current and future well conditions
- Operation of a given design
- Analysis of an ESP system using diagnostics from installed instrumentation and using diagnostic computer programs
- Removal of failed equipment
- Controls for ESP systems including variable speed drives

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- ESP instrumentation available in the industry
- Failure analysis
- Data keeping
- Maintenance and monitoring

## DAILY OUTLINE

### • Day 1

- Review of Reservoir Performance
- Productivity Index – Darcy Exercise
- Vogel Exercise
- Centrifugal Pump Curve Development
- Applications 3.1 Standard 3.1 Non-Standard
- Equipment Selection - Exercise

### Day 2

- Affinity Laws & Nodal Analysis 4.1. Exercise
- Amperimetric Charts
- Design of High Gas Application - Exercise

### Day 3

- ESP Design for Highly Deviated Wells
- Viscous Fluids and Emulsion Application
- Production of Abrasive Fluids

### Day 4

- New Technologies
- CrossFlow
- ESP – TCP – Ytool
- Hybrid ESP – Gas Lift Application
- Recirculation System

### Day 5

- Troubleshooting
- Evaluation of Specific Cases Using Appropriate Software (DesignPro, Prosper, SubPump, etc.)
- Equipment Handling
- Introduction to ESP Failure Analysis

## TRAINING OUTCOME

By end the training participants will have an in depth knowledge of the advantages and limitations of the Electric Submersible Pumps used in aggressive environment applications. Participants will learn well optimization and troubleshooting.

Case Studies, Discussions, Last Day Review & Assessments will be carried out.



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