

FND PROFILE ON HOSPITALS

SCOPE OF SERVICES

FND offers comprehensive engineering consultation services for Mechanical, Electrical & Plumbing (MEP) systems for hospitals. With many years of experience in building MEP Systems for hospitals, as shown in this Profile. FND is familiar with special systems needed for hospitals and is conversant with international standards

- *IEEE, USA: Recommended practice for Electrical Systems in Health care facilities*
- *Department of Health, UK Govt.: Technical Memorandum 06-01, Electrical services supply and considerations*
- *ASHRAE, USA : STANDARD 90.1 Energy code*
- *NFPA-99- Health Care Facilities Code*
- *NFPA-72- USA Fire Alarm Code*
- *EIZ/TIA-1179-Telecommunication Cabling in HealthCare*

Mechanical Systems

- Heating, Ventilation & Air-Conditioning System
- Plumbing System- cold, hot water & drainage
- Refrigeration System
- Fire Suppression System
- Medical Gas System
- Cogeneration System

Electrical Systems

- Electrical System
- Vertical Transportation System
- Fire Detection System
- CCTV & Security System
- Communication System

FND has substantial experience of MEP services for hospitals and the following is a representative list of hospital projects designed by FND:

LIST OF COMPLETED HOSPITALS PROJECTS

1. Project No: 265
Kidney Center, Karachi

The Kidney Centre project was built entirely out of donations, and specializes in the treatment of urinary diseases. The six storied building has special care areas such as Dialysis Room, six OT's, ICU, and 80 patient beds. FND designed the Electrical & HVAC systems for this hospital.

The project was completed in 1990.



2. Project No: 373
Murshid Hospital, Karachi

This is a charitable hospital and FND designed the air-conditioning system for four operation theatres and ancillary areas.

The project was completed in 1991.

3. Project No: 374
Shifa International Hospital- Block-A, Islamabad

Block-A of this hospital was the pre-cursor to the huge hospital that is operational today. The design of Block-A set the standards for the construction of the rest of the hospital. The six storied Block-A building has an area of approximately 150,000 sft and houses diagnostic and treatment facilities of a complete hospital.



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FND designed the Mechanical, HVAC, Electrical & Plumbing systems for this project, which was successfully completed in 1991.

4. Project No: 466
Altamash Dental Clinic, Karachi

The MEP System for the then state of the art dental clinic was designed by FND. The project is a two storied building with an approximate area of 9000 sft.

The project was successfully completed in 1997.

5. Project No: 628
Bone Marrow Transplant Center, Army Medical City, Rawalpindi

This project was part of the Army Medical City in Rawalpindi. The Bone Marrow Transplant Centre required a special HVAC design, where not only the temperature and humidity was controlled to precise limits, but as the patients were very susceptible of infection due to very reduced immune function, it was extremely important to achieve a high degree of filtration and a positive pressurization to ensure that there was no ingress of contamination from external sources, and also no cross contamination. Each transplant room was designed to be fully independently controlled to meet the comfort and therapeutic needs of each patient.

The project was completed in 1997.

6. Project No: 657
Children Hospital, Quetta

This German funded project was entirely built under the supervision of German engineers. The prime EPC contractors were Siemens, who appointed FND to design the HVAC & Plumbing system. The project has central heating using hot water radiators. The project was completed in 1997.



7. Project No: 783
Katrak Wing of Lady Dufferin Hospital, Karachi

The Lady Dufferin Hospital is a pre-partition project, devoted to gynecological medical facilities. Due to the need to incorporate modern medical treatment facilities, the Katrak wing was modified to a five storied building covering an area of approximately 50,000 sft. FND designed the electrical & HVAC system for this project. The HVAC Works of Katrak Wing, extension of Lady Dufferin Hospital was divided into two phases:

The project was commissioned and completed in 2002.



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8. Project No: 868

Extension & Upgrading Works in Main Kitchen at Aga Khan Hospital, Karachi

The main kitchen at AKU Hospital was expanded and underwent a major upgrading of MEP services. The hot kitchen was entirely relocated. This was a very challenging project which required retro-fitting of new equipment into existing HVAC & Plumbing system and re-using substantial portions of the installed equipment, ducting and piping. The hot kitchen was entirely re-located and a new ventilation system designed by modifying existing 20ft long kitchen hoods to allow fresh air addition and extraction, while maintaining comfortable conditions in this hot area, which was not air-conditioned. A new grease trapping system was designed to replace the existing system which has causing the drainage system to continuously become clogged by cooking grease.

The project was commissioned and completed in 2005.

9. Project No: 871

AKU Clifton Medical Facilities, Clifton, Karachi

This is a satellite facility of the Aga Khan Hospital. The four storied building has a total covered area of 35,000 sft. FND provided consultancy services for the design of HVAC, Plumbing and Fire Suppression system. The project was acclaimed for its high quality and economical solutions adopted by the architectural & engineering team.

The project was completed in 2005.



10. Project No: 1000

Indus Hospital, Karachi

Indus Hospital, located in Korangi, is a 150-bed charitable hospital. The building has five stories with a total covered area of 62,600 sft.

FND was responsible for the design of the Electrical & HVAC system of the hospital. The HVAC system is based on electric operated water cooled chillers, having a total capacity of 160 TR.

The project was completed in 2008.



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11. Project No: 1011
National Institute of Kidney and Urological Disease, Karachi

This four storied hospital specializes in care of urinary diseases, and is built in the precincts of Karachi University. FND designed the HVAC System which has a total capacity of 235 TR. The design was completed in 2005, and the first phase commissioned in 2006, while construction for the remaining hospital is proceeding in phases.

12. Project No: 1047 & 1056
Patient Wards at Aga Khan Hospital, Karachi

The patient wards at Aga Khan Hospital were originally not provided with air-conditioning. FND was commissioned to design a retro-fitted central air-conditioning system, in Ward Blocks B, C, & D. Chilled water was tapped off from the hospital's central chilled water plant. The challenge was to install the HVAC System in an operating hospital. The project was completed over a 5 years period from 2007 to 2012.



13. Project No: 1072
National Medical Center, Karachi

The National Medical Centre is a 120 bed hospital housed in a four storied building, with a total covered area of approx 50,000 sft. The hospital covers a wide range of hospital facilities including Radiology, Pathology, Orthopaedics, Neurology, Trauma Centre, OT's, ICU, CCU, etc.

FND was commissioned to refurbish the complete central air-conditioning system, which was based on air-cooled reciprocating chilled water system, which was not able to provide adequate comfort levels in the hospital, nor meet code requirements of special areas, such as CCU, ICU, & OT's.

FND converted the chilled water central plant to gas operated absorption chillers (2 X 300 TR), replaced all existing AHU's with high quality AHU's suitable for hospital application, and added further FCU's in areas that had deficient air-conditioning. Special areas were provided with individual AHU's with HEPA filtration, laminar air-flow arrangement for OT's, required pressure gradients to maintain required cleanliness levels, etc. Again this project presented the challenge of retro-fitting the air-conditioning system in a running hospital, and the project has been successfully completed in 2011.



14. Project No: 1163
Civil Hospital, Badin

FND designed a central air-conditioning system for the Surgical Block-E at Civil Hospital, Badin. The air-conditioning system serves the Operation Suite, consisting of 5 OT's & their ancillary rooms. The design uses two water cooled screw chillers providing 60 TR of cooling. The design was delivered to the Client in 2010, and awaits funding for implementation.

15. Project No: 1162
Operation Theatres at AKU Karachi

The project consisted of constructing 3 new operation theatres and ancillary spaces adjacent to existing theatres by



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converting other spaces available. FND was commissioned by Aga Khan Hospital to design the HVAC system for these theatres. The OT's are designed as a state of the art facility with Laminar Flow Ceilings, individual temperature and humidity control, HEPA filtration, positive pressurization, etc.

The project was successfully commissioned in June 2012.

16. Project No: 1194 **Civil Hospital, Karachi**

Dow Alumni of 1982 has built 4 X Gynae Operation Theatres & ancillary spaces at Civil Hospital. FND was commissioned to design the central air-conditioning system, which is based on individual AHU's with air-cooled condensing units, which have a total load of 50TR.

The challenge on this project was to design the system after the civil construction had been completed, and the surrounding spaces had many constrains, which were overcome by designing a complete structural platform external to the building to install the AHU's.

The Project was successfully commissioned in December 2012.

17. Project No: 1248 **Indus Hospital, Karachi**

Existing Indus Hospital is undergoing a phase wise expansion program to establish an 1800 bed university hospital.

In the first phase 250 bed hospital, lab & office block are being constructed.

FND is presently providing complete consultancy services for electrical, communications, BMS, security & vertical transportation system.

The project is now under advanced stage of construction.

