## TECHNICAL AND VOCATIONAL EDUCATION

# CHEMICAL ENGINEERING LABORATORY

## (11TV)

* Center: "....."
* Country: "....."
* Date: "....."
* Issue: "....."

### Quality Certificates:

**ISO 9000: Quality Management**
(for Design, Manufacturing, Commercialization and After-sales service)

**European Union Certificate**
(total safety)

**Certificates ISO 14000** and
**ECO-Management and Audit Scheme**
(environmental management)

**Worlddidac Quality Charter Certificate**
(Worlddidac Member)

# Technical and Vocational Education Chemical Engineering Laboratory

(11TV)

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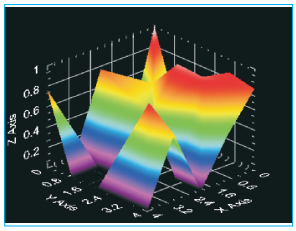
# Project content

## Modern design

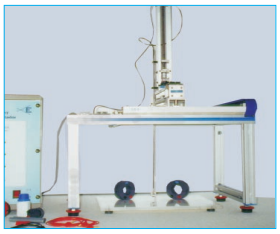



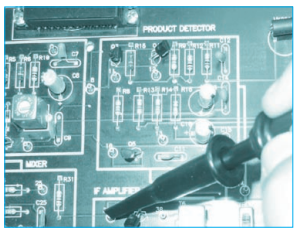

## Main blocks

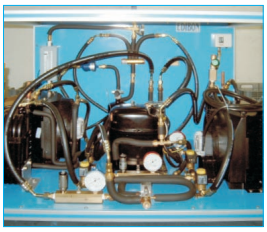


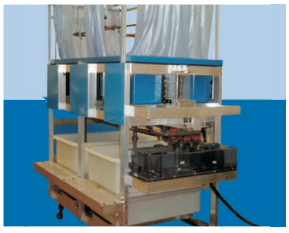


## Products

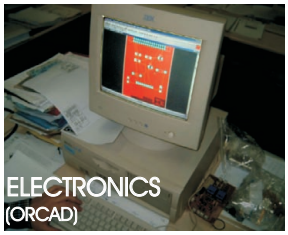


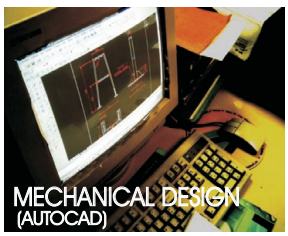


## Full units design





# Technical areas available

- Physics & Chemistry.
- Electronics.
- Electricity.
- Mechanics & Materials.
- Fluids Mechanics & Aerodynamics.
- Thermodynamics & Thermotechnics.
- Process Control.

*** Chemical Engineering.**

- Environment.
- Complements, Instruments and Tools.

***Main area directly related with Technical and Vocational Education Chemical Engineering Laboratory labelled in bold letters.**

Note: The complete technical design “is ready” at our premises

# Economical Proposal

## Teaching Units:

### "Priority 1"

**1100. Chemical Engineering**
1110/20S:Chemical Engineering Basic Module (20 CAI + CAL)
1110/PLC: PLC's Module
1111/20S: Chemical Engineering Medium Module (20 CAI + CAL)
1111/PLC: PLC's Module
1112/20S: Chemical Engineering Advanced Module (20 CAI + CAL)
1112/PLC: PLC's Module
1120: Chemical Process Basic Module
1120/PLC: PLC's Module
1121: Chemical Process Medium Module
1121/PLC: PLC's Module
1100/ESN: EDIBON Scada-Net for Chemical Engineering

### "Priority 2"

**0200. Electronics**
0230: Transducers and Sensors Module
**0800. Fluid Mechanics & Aerodynamics**
0813-810/20S: Elementary Fluid Mechanics (20 CAI + CAL)
**0900. Thermodynamics & Thermotechnics**
0950/20S: Heat Transfer Basic Module (20 CAI + CAL)
0950/PLC: PLC's Module
0953/20S: Heat Exchange Basic Module (20 CAI + CAL)
0953/PLC: PLC's Module
**1000. Process Control**
1010: Process Control Basic Module
1010/PLC: PLC's Module
1011: Process Control Medium Module
1011/PLC: PLC's Module
1000/ESN: EDIBON Scada-Net for Process Control and Thermodynamics Units

### "Priority 3"

**0100. Physics, Chemisty and Biology**
0120: ChemistryBasic Module
0121: Chemistry Medium Module
**0200. Electronics**
0213-210/20S: Elementary Electronics (20 CAI + CAL)
0231: Sensors Instrumentation
0240: Control Electronics Module
**0400. Electricity**
0413-410/20S: Domestic Electric Installations (20 CAI + CAL)
**0700. Mechanics and Materials**
0710/20S: MechanicsBasic Module (20 CAI + CAL)
**1300. Environmental**
1320: Dirty Water Treatment Module
1320/PLC: PLC's Module
1321 Clear Water Treatment Basic Module
1321/PLC: PLC's Module

## Complements, Instruments and Tools:

**5100. Complements, Instruments and Tools**
5110-1: Cupboard & Shelves Module
5120-10: Computer Module
5122: Teaching Aids Module
5124: Complete Health & Safety
5140-1: Mechanical Toolkit Module
5142-1: Electricity Toolkit Module
5143-20: Electronics Toolkit Module

## Services:

* Furnitures:
* Electrical, Water and Air Installation and others laboratory services
* Installation of all units supplied, Starting up, Training, Teacher Training and Technology Transfer

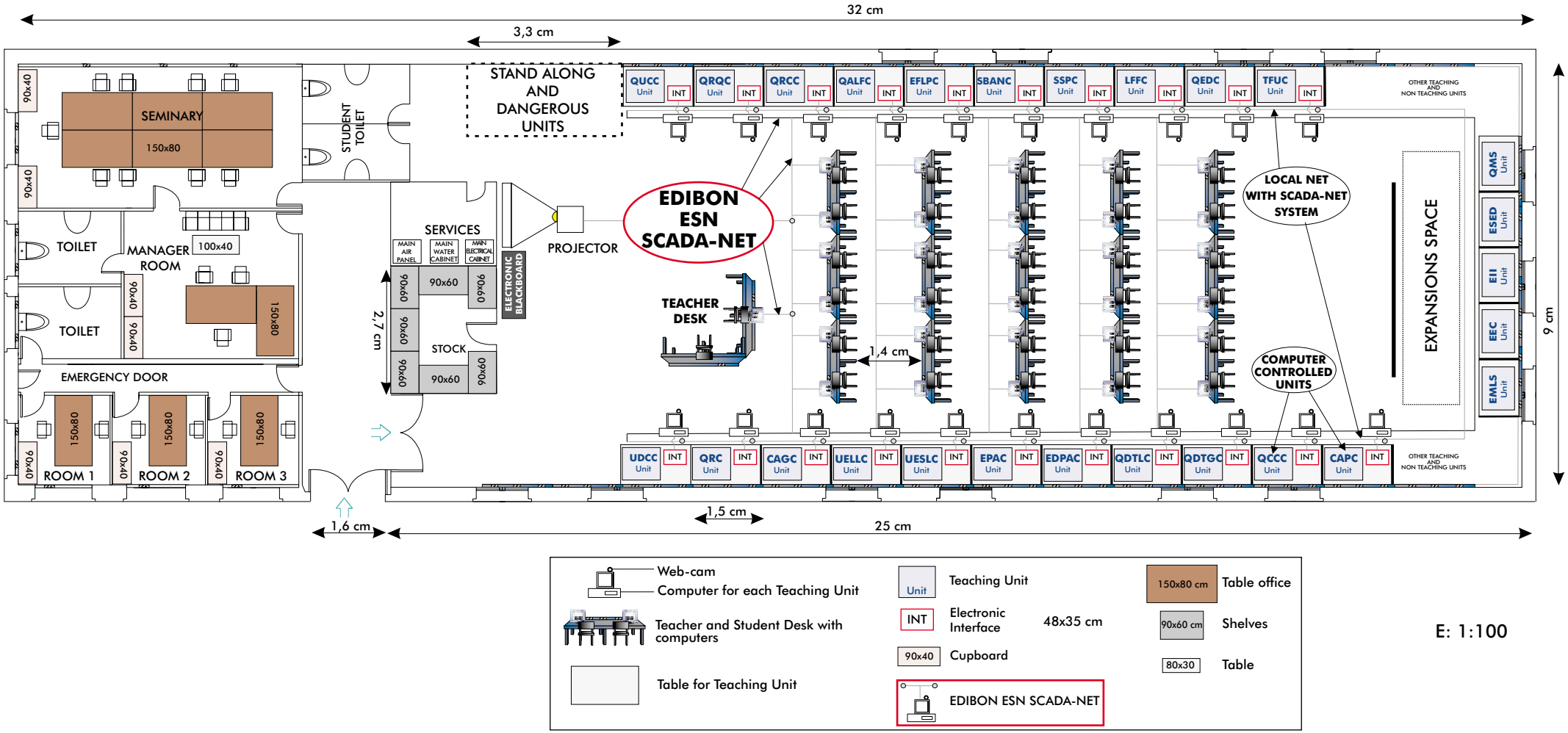
# Classroom and Laboratory Lay Out

## TECHNICAL AND VOCATIONAL EDUCATION

# CHEMICAL ENGINEERING LABORATORY

(Example of Priority 1)

(11TV)




Web-cam

Computer for each Teaching Unit

Teacher and Student Desk with computers

Table for Teaching Unit

Unit — Teaching Unit

INT — Electronic Interface — 48x35 cm

90x40 — Cupboard

EDIBON ESN SCADA-NET

150x80 cm — Table office

90x60 cm — Shelves

80x30 — Table

E: 1:100

# Main Teaching Units
## (included in priority 1)
## **Priority 01:**

| | |
|---|---|
| **UDCC** | Computer Controlled Continuous Distillation Unit. Automatic feeder. |
| **QRC** | Computer Controlled Chemical Reactors Trainer. |
| **CAGC** | Computer Controlled Gas Absorption Column. |
| **UELLC** | Computer Controlled Liquid-Liquid Extraction Unit. |
| **UESLC** | Computer Controlled Solid-Liquid Extraction Unit. |
| **EPAC** | Computer Controlled Rising Film Evaporator. |
| **EDPAC** | Computer Controlled Double Effect Rising Film Evaporator. |
| **QDTLC** | Computer Controlled Liquid Mass Transfer and Diffusion Coefficient Unit. |
| **QDTGC** | Computer Controlled Gaseous Mass Transfer and Diffusion Coefficient Unit. |
| **QCCC** | Computer Controlled Cracking Column. |
| **CAPC** | Computer Controlled Wetted Wall Gas Absortion Column. |
| **QUCC** | Computer Controlled Crystallization Unit. |
| **QRQC** | Computer Controlled Chemical Reactors Training System. |
| **QRCC** | Computer Controlled Catalytic Reactors. |
| **QALFC** | Computer Controlled Fixed Bed Adsorption Unit |
| **EFLPC** | Computer Controlled Deep Bed Filter Unit. |
| **EMLS** | Liquid/Solid Mixing Unit. |
| **EEC** | Corrosion Study Unit. |
| **EII** | Ion Exchange Unit. |
| **SBANC** | Computer Controlled Tray Drier. |
| **SSPC** | Computer Controlled Spray Drier. |
| **ESED** | Sedimentation Study Unit. |
| **LFFC** | Computer Controlled Fixed and Fluidised Bed Unit. |
| **QEDC** | Computer Controlled Batch Solvent Extraction and Desolventising Unit. |
| **QMS** | Solids Handling Study Unit. |
| **TFUC** | Computer Controlled Batch Filtration Unit. |

# Main target

* To help the students:

  - By “quick” understanding.
  - By “clear” understanding (clear concepts).
  - By “saving” time.
  - By “extending” the laboratory to their homes.

* To help the teachers:

  - By “easy” teaching.
  - By increasing the teaching “efficiency”.
  - By “reducing” teaching costs (less time consume).
  - By “integrating” classroom and laboratory in the same place.

# Project options covered

This *"Technical and Vocational Education Chemical Engineering Laboratory"* will cover the following:

a) To train students at laboratory.
b) To train trainers.
c) To be used for training and update educators in current teaching technologies.
d) To give courses to workers in the industry, as it simulates industrial process.
e) To be used for carrying out applied research, in several processes and different technical areas.
f) To be used as research tool for international projects.
g) To train other countries teachers.

# Project conditions

The *"Technical and Vocational Education Chemical Engineering Laboratory""* includes the following technical and commercial conditions:

a) Technical conditions:

- Laboratories adaptation.
- Installation of all units supplied.
- Starting up for all units.
- Training about the exercises to be done with any unit.
- Teacher training related with the teaching unit and the teaching techniques used.
- Technology transfer.

b) Commercial conditions:

- Packing.
- Financing Charges.
- C.I.F. Charges.

c) Other conditions:

- 8 Manuals for each teaching equipment:

. Required services manual.
. Assembly and installation manual.
. Interface and software/control console manual.
. Set in operation manual.
. Safety norms manual.
. Practices manual.
. Maintenance manual.
. Calibration manual.

# TEACHING TECHNIQUES USED

## 3D. EDIBON THREE DIMENSIONS SYSTEM



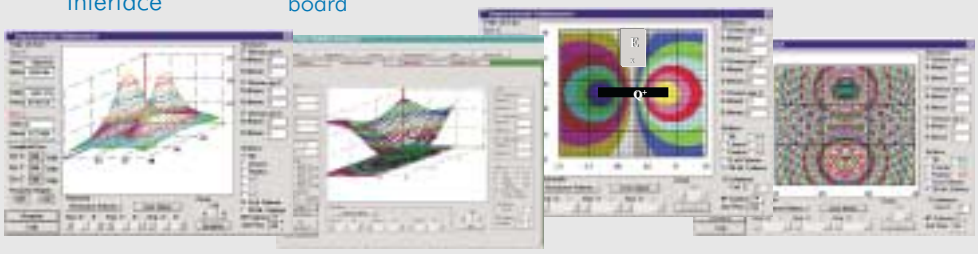
Unit


Interface


Data acquisiton board

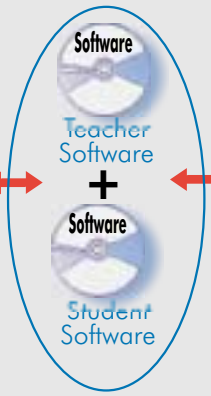

Software included:
**-Control**
**-Data Acquisition**
**-Data Management**

Used for:
**Physics ( Magnetic fields, Electrical fields, Mechanics, Acoustics, Optics, Thermodynamics and Fluid Mechanics)**

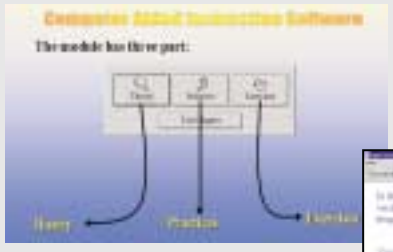


## CAI. COMPUTER AIDED INSTRUCTION SYSTEM


Unit




Used for:
**Basic Electronics and Electricity.**
**Communications.**
**Basic Mechanics.**
**Basic Fluid Mechanics.**



## EDAS. EDIBON DATA ACQUISITION SYSTEM

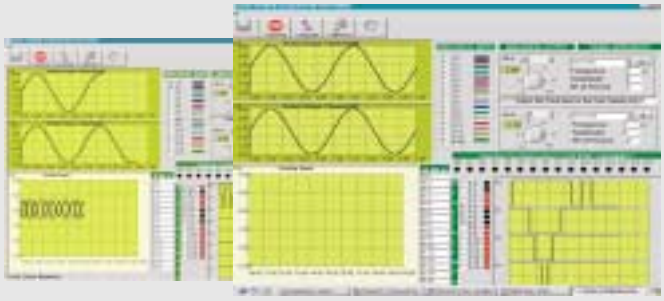

Unit


Interface


Data acquisiton board


Data Acquisition Software

Used for:
**Basic Electronics.**
**Communications.**
**Electricity.**

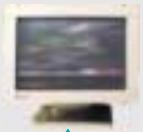


## RTC. EDIBON SYSTEM FOR HIGH ELECTRONICS (Real time control)



Unit


Data acquisiton board




Control Software

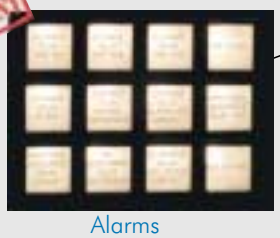
Option: Simulation Software

Used for:
**High Tech Electronics (Control Electronics, Digital Electronics and Industrial Electronics).**

## HYBRID. **EDIBON TEACHING HYBRID SYSTEM (ENERGY)**

EDIBON PATENT

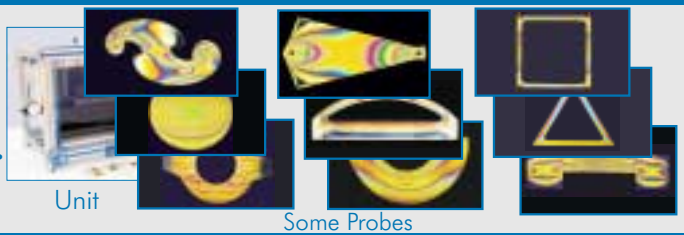
Used for:
**Energy Power Plants.**



Alarms

## PHOTOELASTICITY

Used for:
**Strength of Materials.**

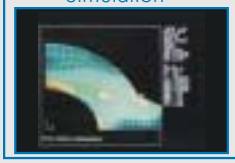


Unit

Some Probes

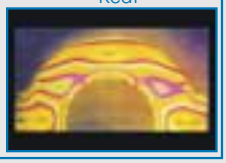
RESULTS

Simulation



Diferences between the simulation and the photoelastic reality.

Real



## SACED. **EDIBON COMPUTER CONTROL SYSTEM: Control+Data Acquisition+Data Management**

EDIBON PATENT

Unit

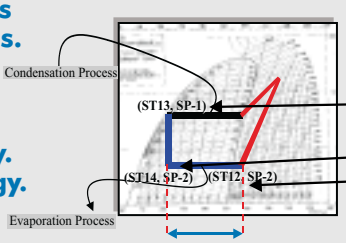
Interface

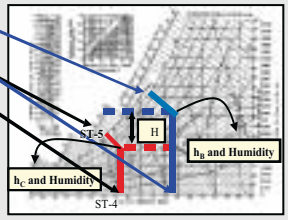
Data Acquisiton board


Software included:
**-Control**
**-Data Acquisition**
**-Data Management**

PLC option

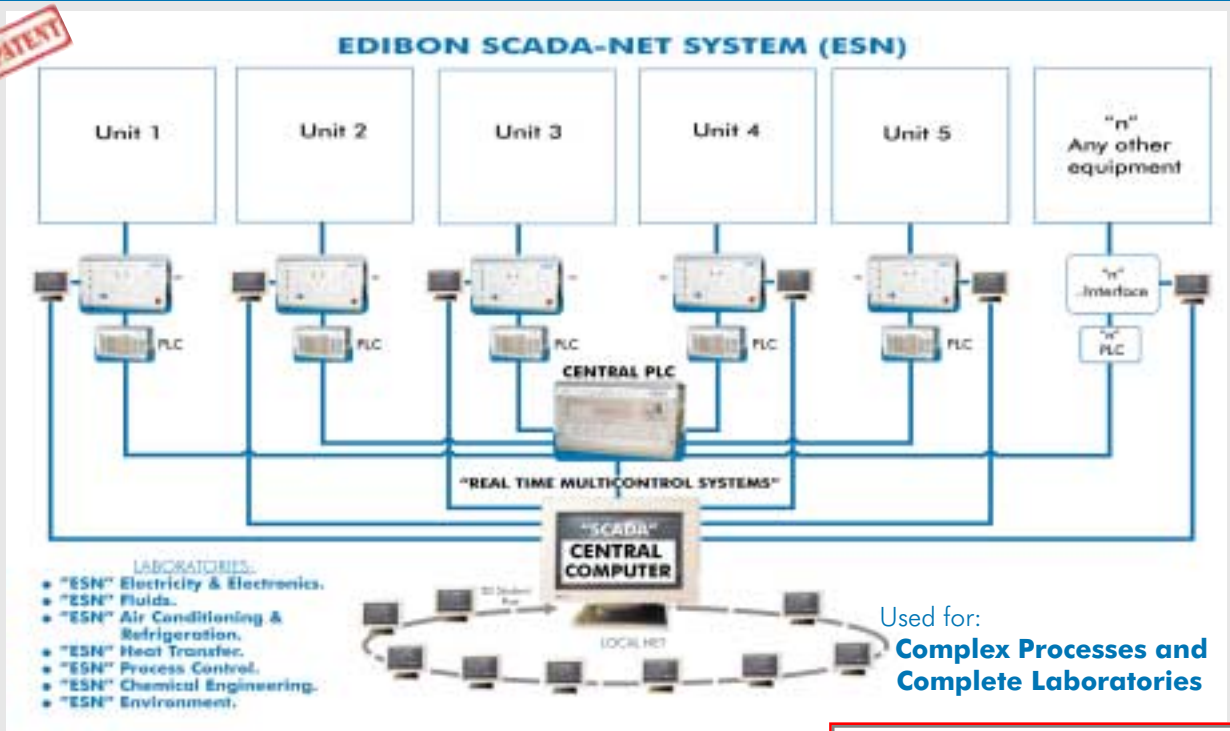
Used for:
**Fluid Mechanics.**
**Aerodynamics.**
**Thermodymanics &Thermotechnics.**
**Process Control.**
**Chemical Engineering.**
**Food Technology.**
**Water Technology.**
**Environment.**




## ESN. **EDIBON SCADA-NET SYSTEM**

EDIBON PATENT




Used for:
**Complex Processes and Complete Laboratories**

**WEB: www.edibon.com**

**Information in detail-CLICK HERE**