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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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qs group
Integrated Industrial Automation

QS Group S.p.A.
Via Pian di Morro I, 1/A
60043 Cerreto d'Esi (AN) - ITALY
Tel. +39 0732 670.81 (r.a.)
Fax +39 0732 670.804
info@qs-group.com

www.qs-group.com
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UNIDO PROJECT NUMBER MP/CPR/99/168

ZHEJIANG AUCMA ELECTRICAL EQUIPMENT CO.

UNIDO

FINAL REPORT

INTRODUCTION

This report refers to the project activities included in the project MP/CPR/99/168 included Amendment "B" as integral part of the Project.

Activities done :

Installation, commissioning, TUV inspection and performance test on the existing plants, converted for the use of Cyclopentane as blowing agent in the production of domestic refrigerators and freezers at ZHEJIANG AUCMA ELECTRICAL EQUIPMENT CO. in JAXING, CHINA.

FINAL REPORT

This report refers the results of installation start-up and commissioning made by QSG technicians from 30th September 2002 to 19th December 2002 and from 28th February to 10th March at ZHEJIANG AUCMA factory.

During the start-up the TUV experts have visited the factory (from 11 to 13 December 2002 and from 5th to 6th March) in order to release the safety certificate as requested in the Terms of reference.

The above mentioned visits has been done at QSG costs.

Attached to this document we have included a copy of "TUV Inspection report".

Here below are reported all the activities done during installation and commissioning, we have divided the project in different groups in order to better identify the jobs made during the installation and commissioning phases. (see the general lay-out attached US000194)

All the machines and the equipment have been assembled and tested.

- **Cyclopentane storage area**
- **Premixing area**
- **Cabinet plant (Line 1)**
- **Cabinet plant (Line 2)**
- **Door plant**

CYCLOPENTANE STORAGE AREA

The cyclopentane storage area is where the pure cyclopentane is stored and through the pumping group is feed to premixing room.
The cyclopentane stotage area is positioned outside the factory building.
According with the QSG design the Counterpart have realized the concrete undergroud room in order to contain the 35.000 litres tank manufactured by a local supplier, the tank has been placed and the room has filled with sand and covered by a concrete roof.
The cyclopentane storage area has been surrounded by a wire net.
The feeding pumps, the accessories and the safety devices has been installed.
The storage area is complete of truck download place built in concrete with container tub for cyclopentane leakage.
The piping connection between storage tank and premixing room has been made as QSG drawings, the piping it is positioned above ground along the factory walls.

During the commissioning the Cyclopentane storage area has been tested and inspected by TUV experts.

PREMIXING AREA

The above mentioned area is used to mix the Polyol with Cyclopentane, in order to avoid any problem related with Cyclopentane the premixing equipment has been positioned in a separate room.
The premixing area is positioned inside the factory building, all the equipments are eclosed in a room prepared by Counterpart according to QSG specification.
Beside the premixing room has been maintained the old premix system where the Blended Polyol tank has been disconnected, The Isocyanathe tank and the pure Polyol tank has been kept for production.
The equipments has been installed by QSG technicians and include:

- Premixing unit model "Ecomix 20P" complete with Electric control panel
- Day tank 1000 litres capacity for mixed Polyol and Cyclopentane complete with Electric control panel
- Thermoregulator unit for Day tank
- Safety control panel for premix area
- Thermoregulator unit for Polyol and Isocyanathe tanks
- Pump group for Polyol and Isocyanathe (barrel)

All the equipments like Premixing unit and Day tank have the exhaust chimenys for the discharge of the possible Cyclopentane vapours outside the factory building.
The equipments have installed all the safety devices like Safety box, gas sensors, fire fighting devices.
From the Premixing room has been installed the distribution piping for Polyol + Cyclopentane to Cabinet line 1, Cabinet line 2 and Door line, the existing Isocyanathe piping has been kept.

During the commissioning the Premixing area area was tested and inspected by TUV experts.

CABINET PLANT (LINE 1)

Object of the cabinet line 1 was the conversion for the use of cyclopentane of the existing 6+6 cabinet foaming plant.
The existing high pressure foaming machines has been removed.
The QSG technicians have retrofitted the unsafe electrical parts according with the TUV requests, a new high pressure foaming machine complete two new mixing heads and chiller unit has been installed on the platform together with the safety panel.
On the loading/unloading carrier has been installed the Nitrogen flushing device in order to fill the cabinet before the injection and avoind dangerous oxygen concentration.
The factory ground (safety box area) has been painted with a special Antistatic paint
The Counterpart have realized and installed under QSG technical specifications the safety/suction box, QSG have supplied the exhaust fans groups.
The equipments have installed all the safety devices like Safety box, gas sensors, fire fighting devices.

During the commissioning the cabinet plant Line 1 has been tested and inspected by TUV experts.

DOOR PLANT

The door foaming plant has been replaced completely with a new door foaming system "Drum type" due to the very bad condition of existing paternoster.
The existing high pressure foaming machines has been removed and a new foaming machine complete with two new mixing heads has been installed on the ground floor together with the safety control panel.
The plast was designed and manufactured acccording with the TUV requests.
The factory ground (safety box area) has been painted with a special Antistatic paint
The Counterpart have realized and installed under QSG technical specifications the safety/suction box, QSG have supplied the exhaust fans groups.
The equipments have installed all the safety devices like Safety box, gas sensors, fire fighting devices.

During the commissioning the cabinet plant Line 1 has been tested and inspected by TUV experts.

CABINET PLANT (LINE 2)

Object of the cabinet line 2 was the conversion for the use of cyclopentane of the existing carousel foaming plant.
The existing high pressure foaming machines has been removed.
The QSG technicians have retrofitted the unsafe electrical parts according with the TUV requests, a new high pressure foaming machine complete with one new mixing head and chiller unit has been installed on the ground floor together with the safety panel.
On the injection station has been installed the Nitrogen flushing device in order to fill the cabinet before the injection and avoind dangerous oxygen concentration.
The factory ground (safety box area) has been painted with a special Antistatic paint
The Counterpart have realized and installed under QSG technical specifications the safety/suction box, QSG have supplied the exhaust fans groups.
The equipments have installed all the safety devices like Safety box, gas sensors, fire fighting devices.

During the commissioning the cabinet plant Line 1 has been tested and inspected by TUV experts.

NITROGEN GENERATOR

Nitrogen generator is used to supply a requsted quantity of N2 to all the equipments in contact with Cyclopentane instead to use air in order to avoid dangerous oxygen concentration, the N2 it is used in the Cyclopentane storage tank, Premixing unit, Polyol + Cyclopentane day tank, High pressure foaming machines, Cabinet and door plants.
Nitrogen generator with relevant accessories has been installed inside the factory and it has connected to the different parts of the supplied/converted equipments.
QSG have supplied all the technical information for nitrogen capacity, the Counter part have purchased it on local market.

EMERGENCY GENERATOR

The Emergency generator has been installed by Counterpart, QSG have provided the necessary technical informations for the local purchase.
The emergency generator has connected with the safety panels in order to supply the requested energy in case of black out.

LIST OF ACTIVITIES

According with the "term of reference" the follows activities has been done.

Item	Q.ty	Description	Status
3.1.1	- -	**Visit to the project site** prior to start of contract execution , including travelling costs and hotel accomodation.	OK
3.1.11	- -	**Inspection on project site for safety certification (TUV)** including travelling costs and hotel accomodation.	OK
3.1.12	- -	**Training c/o QSG Perros Division** On the job training theoretical and practical training of plant personnel on operation, on technological safety with regard, handling and use of cyclopentane as foaming agent as well as on maintenance of new and modified production equipment.	OK
3.1.13	- -	**Supervision to Installation, commission, trial operation, etc..** including travelling costs and hotel accomodation.	OK
3.1.14	- -	**Post contract visit** including travelling costs and hotel accomodation.	
3.2.3.1	N. 1	Engineering drawings and specification for **35.000 liters Cyclopentane** double wall tank. The tank has been realized by the Counterpart	OK
	N. 2	**Cyclopentane pumping group** with all necessary accessories	OK
	N. 1	**Set of accessories** and safety devices for Cyclopentane tank complete with flanges and piping for N2	OK
3.2.3.2	N. 1	**Cyclopentane distribution network** connecting the tank with CP pump and premixing units; single wall pipe, suitable for cyclopentane according to International Safety Norms.	OK
3.2.3.3	N. 1	**Premixing station model " ECOMIX" EM-20P** Complete with: Box with exhaust system All necessary safety devices/controls for cyclopentane Connection piping from premix to day tank	OK

3.2.3.4	N.1	**High-pressure foaming machine PERROS "ECODOSING" mod. ED2-50P** (Cabinet Line 1), foreseen for the use of cyclopentane, including all necessary safety accessories and exhaust system; as per technical descriptions. The machine is complete with: 2 Mixing head Krauss Maffei mod. MK 12/18 ULP-2KV Safety box with exhaust system Conection piping from the machine to mixing head Chiller for jacket conditioning	OK
3.2.3.5		**High-pressure foaming machine PERROS "ECODOSING" mod. ED2-50P** (Cabinet Line 2), foreseen for the use of cyclopentane, including all necessary safety accessories and exhaust system; as per technical descriptions. The machine is complete with: 1 Mixing head Krauss Maffei mod. MK 12/18 ULP-2KV Safety box with exhaust system Conection piping from the machine to mixing head Chiller for jacket conditioning	OK
3.2.3.6	N. 1	**High-pressure foaming machine PERROS "ECODOSING" mod. ED2-220P** (Door Line), foreseen for the use of cyclopentane, including all necessary safety accessories and exhaust system; as per technical descriptions. The machine is complete with: 2 Mixing head Krauss Maffei mod. MK 12/18 ULP-2KV Safety box with exhaust system Connection piping from the machine to mixing head Chiller for jacket conditioning	OK
3.2.3.7	N. 1	**Day tank for Polyol+Cyclopentane blend** capacity 1.000 liters. Complete with: Temperature conditioning jacket Slow stirrer Automatic levels Pumping group capacity 30 Kg/min. to feed the polyol blend to the foaming machines. The tanks are enclosed in a safety box with exhaust system with safety accessories They are foreseen to feed the foaming machines without interruption. Chiller for jacket conditioning Connection piping from day tank to the machines	OK

3.2.3.9	N. 1	**Detailed information, engineering drawings and instruction** for the modification of affected parts of fixtures, heating systems, movement mechanism and drives of the cabinets and door foaming lines located in hazardous areas. Delivery of parts for replacements of unsafe electrical equipment components in the hazardous area.	OK
3.2.3.10	N. 4	**Safety ventilation boxes** for the hazardous areas positioned on the plants: - Cabinet Line 1 (2 safety box) - Cabinet Line 2 (1 safety box) - Door Line (1 safety box) Perros have supplied the engineering drawings, The Counterpart have done the construction.	OK
3.2.3.11	N. 4	**Safety exhaust system** The exhaust system for all the safety box based on anti spark double speed motor complete with airflow switch positioned on the safety ventilation boxex as described in the para 3.2.3.10	OK
3.2.3.12		**Sets of Cyclopentane safety control** composed by gas sensors Catalitic type positioned in the hazardous areas of the plant and safety control panels.	OK
3.2.3.13	N. 4	**Antistatic paint** for the hazardous area.	OK
3.2.3.14	N. 6	**Fire extinguishing system** for the hazardous area including automatic fire detection system with sensor and controls and semiautomatic fire extinguishing.	OK
3.2.3.15.3	- -	**Nitrogen generator** with relevant tank has been installed inside the factory and it has connected to the plants and to materials storage area. QSG have supplied the data for nitrogen capacity and the Counter has provided provide have purchased locally.	OK
3.2.3.16	- -	**Emergency generator** has been installed by Counterpart, QSG have provided the necessary data as consumption.	OK

ANNEX DOCUMENTS

Pos.	QSG ref. number	Description
1	US000194	General Lay-out
2	- -	Commissioning certificate signed by Counterpart
3	TUV-IS-UL 233808	TUV Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СВИДЕТЕЛЬСТВО ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

No.: TÜV- IS - UL 233 808

This is to certify that

Object: **Pentane-PU Foaming System for Freezer and Refrigerator Production**

Producer: **QS Group S.p.A. Plastic Devision Abbiategrasso, Milano/Italy**

Operator: **Zhejiang Aucma Electrical Equip. Jiaxing, Zhejiang 314 015 P.R.China**

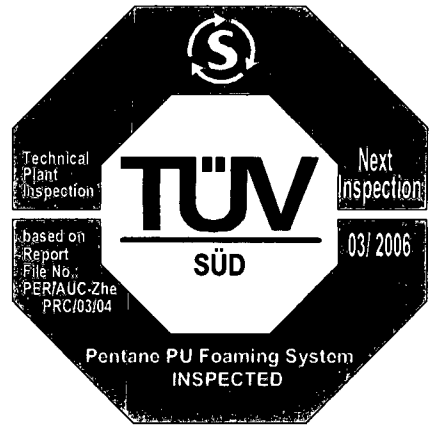
meets the requirements of TÜV Industrie Service, Branch ULM.
It was installed according to the relevant International Standards.
The Pentane PU foaming system has been submitted
to an audit to verify compliance with the state of the art.
The system was audited finally in the period
from March 5th to March 7th 2003.

This Certification is based on
TÜV-Report No. 3
Safety Plant Inspections
UNIDO-No. MP/CPR/99/168 - Foam

TÜV IS-ULM-Ri/Li
File No.: PER/AUC-ZHE-PRC/03/04

This Certification is valid until
31 March 2006

Ulm, 16th September 2004
TÜV Süd Industrie Service experts



Dipl.- Ing. Richardt **Dipl.- Ing. (FH) Lips**

TÜV Industrie Service GmbH, TÜV SÜD Group, Geschäftsstelle Ulm Benzstrasse 17 D-89079 Ulm
Tel. +49 (731) 49 15-2 30 Fax +49 (731) 49 15-3 60 e-mail: Karl-Josef.Richardt@tuev-sued.de