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FINAL REPORT PHASING OUT CFC-11 IN THE MANUFACTURING OF FLEXIBLE MOULDED PU FOAM THROUGH THE USE OF CO2 BLOWING TECHNOLOGY AT SÜNGERSAN A.S.

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Index

Hennecke GmbH

1. Introduction

2. Installation

3. Dry run

4. Start-up and commissioning

5. Existing equipment dismantling

6. Recommendations for future projects

1. INTRODUCTION

The equipment was shipped end of July and arrived in Turkei beginning of August whereby we have to note that the equipment was not send directly to Bursa (2 hours from Istanbul) but to Ankara (10 hours from Bursa). This inconvenience brought higher transport costs to us as well to the final end user Süngersan.

The actual installation of the high pressure machine, HK 650L/MX and HK 270L/MX both with NovaForm equipment started end of September 2000 due to the fact in August customs are closed in Turkei and in this month most of people are in Holiday. Most delays could have been avoided by sending the equipment directly to Bursa.

No changes have been applied to the original installation plan.

2. INSTALLATION

Süngersan had already placed the CO2 tank before our arrival and the installation has been performed according to plan. The machines have been placed and the piping from the CO2 tank connected to the CO2 feed pump supplied by Hennecke and to the NovaForm CO2 generator of the high pressure machines.

The time required for the installation by our mechanical and electrical engineer was more then one week.

Note that in the original plan the use of CO2 bottles was envisaged instead of a liquid CO2 tank, this additional transformation has not lead to problems.

3. DRY RUN

After the installation of the mechanical and electrical connections a Process engineer has performed the dry run start up and commissioning with the support of a Software engineer for quick troubleshooting.

The dry run is performed with all the raw materials loaded whereby the pumps are tested for:

- Leakage
- Pressure output and stability
- Calibration of the pumps
- Electrical and software test
- Mixhead output calibration

No problems incurred during the dry run testing for one machine, with regard to the other machine we had to unlock the mixing head which was fallen on the ground due to fact the boom was not properly fixed, the time required was app. 1 day with an additional day for the mixhead problem solving by our process engineer.
Our mechanical technician, modified the foot of the boom so that the fixation to the floor was increased, the reason that the boom was ripped out of the cement was that the whole workshop floor had been renewed after the recent earthquake and the surface cement layer was not reinforced with steel. With the increased boom bottom plate and longer plugs the problem was solved.

4. START-UP and COMMISSIONING

The commissioning with good foam produced had been completed beginning of November, Süngersan had provided the right raw materials according to our indications. Our process engineer foamed together with Süngersan the seat cushions, provided the training on site which took in total 1 week.

Foam densities have been measured by comparing the weight of the produced seat cushions with previous CFC produced cushions and these where comparable. The hardness of the cushions was slightly lower, only evidenced by hand due to the fact measuring equipment was not available, but for the kind of production it satisfied the requirements, for completeness the liquid CO2 content in the foam was between 2 to 4%.

We believe, as also stated by Süngersan, that the conversion to CO2 has been very well accepted GmbH and the idea of Süngersan to use an additional CO2 tank instead of our system with CO2 bottles worked out perfectly. With the advantage that the workers do not need to exchange bottles and therefore reducing hazards of CO2 release in case of non skilled installation.

5. EXISTING EQUIPMENT DISMANTLING

The existing machines have been removed, the old Hennecke machine broke down just before we started the installation and the Cannon machine has been dismantled.

6. RECOMMENDATIONS FOR FUTURE PROJECTS

Customs clearance should take place in the city or nearest customs office to the final end-user in order to speed up clearance.

Feed pump for CO2 from bulk storage to the high pressure machines can be a good option especially for clients which have a high production rate.