

Reducing ethyl acetate evaporation from open vessels

Packaging Industries Company Ltd.

Amman, Jordan

COMPANY IN BRIEF

PIC was established in 1987 as a Jordan manufacturer and printer of flexible materials for the packaging industry. It is a subsidiary of Nuqul Group. PIC is a regional leader with a production capacity of 3000 tons annually.

The company has participated with two participants (Plant Manager and Quality Manager) in a PREMA training programme, organized by EJABI and carried out in Amman from March to June 2008. The PREMA programme consisted of four workshops and company visits. Between workshops three Networks Meetings allowed an exchange of experience among the companies and each company was individually assisted by local trainers.

PROBLEM AND ITS CAUSES

Highly volatile ethyl acetate is used for feeding the ink reservoirs of the printing machine and washing cylinders. It was stored in open vessel in the printing section and workers scooped the solvent with buckets from the open vessel. This practice caused avoidable evaporation losses, excessive dilution of inks and higher concentration of ethyl acetate emission in the production hall.

MEASURE(S) IMPLEMENTED IN THE COMPANY

Open vessels have been replaced by 6 closed vessels with a valve outlet. The larger buckets for cylinder cleaning have been replaced by smaller cans with finer nozzles. The first design had to be improved to avoid tipping of containers and allow faster outflow. These changes were made after a trial period and feedback of workers.



Situation before

Open vessel for storage of highly volatile solvent. Workers had to bend over the vessel to scoop solvent.



Situation after

Closed vessel with valve outlet. Evaporation is reduced, workers are not exposed to emissions. Legs of vessel are designed to avoid toppling over.

ECONOMIC BENEFITS

As the consumption of ethyl acetate is very high and depends on the weather condition, PIC started monitoring the consumption over a longer period of time. The table shows preliminary results. For a first estimation of savings, the quality manager compared the change in acetate consumption against production. The table below shows the difference between February (situation before) and April (situation after).

Month	Actual production	Ethyl acetate consumption	Acetate / kg	Saving
2	178 ton	55 ton	0.308	---
4	121 ton	33.7 ton	0.279	9 % = 3700 l ~ 3700 JD

According to the first figure, up to 9 % of Acetate can be saved, however this has to be verified by further comparison. Assuming only 50 % can be saved in the long run, savings would be 1750 JD/ month. There are no additional running costs. The investment in the new closed vessels amounts up to 350 JD for 6 vessels.

Annual net savings	21000 JD	by reduced evaporation and more efficient use
Investment cost	350 JD	6 vessels produced from local material
Payback period	Immediate	

ENVIRONMENTAL BENEFITS

Less ethyl acetate is emitted to the air and can be used for production instead. As ethyl acetate is imported from Europe, less carbon emissions from transport are expected.

ORGANISATIONAL BENEFITS

There is a slightly increased time input needed to feed the printing machines as the filling of buckets takes longer. Workers need awareness raising measures to accept the new procedures.

IMPROVEMENT OF HEALTH & WORKPLACE SAFETY

Less ethyl acetate emissions in the air result in better working condition inside the production halls. Workers skin is better protected from Ethylene acetate, as they cannot wash their hands in the open vessels.

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