Nikkei Sangyo Shimbun Jan. 27 Tuesday, 1998

Vacuum System, Cleaning Equipment

AQUA TECH CO. LTD enables to recollect the whole amount of solvent. Using hydrocarbon system solvent

[datelined Kitakyushu]
AQUA TECH CO. (in Kitakyushu-shi, President: Masahiro Doumoto), manufacturer of cleaning equipment for metallic parts, has developed the vacuum system, cleaning and drying equipment using hydrocarbon system solvent instead of freon or ethane and starts to make an official offer in the market. The Equipment irradiates ultrasonic wave in the vacuum tank to oscillate the cleaning material at a high effect of cleaning, and dries it in a short time. Almost all quantity of solvent is recollected at steam distilling and regenerating unit for reuse. Consequently, the running cost can be greatly reduced. AQUA TECH intends to sell this Equipment as serving to clean semiconductor lead frames. The sales target for this Equipment in 1998 is planned to reach about 300 million yen.

This new equipment uses hydrocarbon system cleaning solvent which is refined from petroleum, and all processes from cleaning, drying, and recollection and regeneration of the used solvent are performed at full automation in the closed structure vacuum container. Metallic parts are put into the tank filled with the cleaning solvent and ultrasonic wave is irradiated. Then, bubbles in the vacuum state take place between molecules of the liquid, and deposited oil or stain can be removed by the impact when they burst each other..
They say that this impact gets stronger in the vacuum state, resulting in higher cleaning effect and that in case of semi-conductor lead frames in adhesion or for precision parts having micro holes or clearances, the Equipment works out very effectively.
They also say that at the drying stage, since the material is drastically put into high vacuum state, drying of lead frames takes only 7 minutes while it takes about an hour to dry them according to the water system cleaning system.
Used cleaning solvent is heated to 80 ℃ in the vacuum state, vaporized, distilled and recollected. It is said that the recollecting and regenerating rate is more than 99%.in the proving test. The Company reports that the cost of the Equipment is 30% higher than those of other companies, but that the required amount of the solvent is less than 1/10 of the case without regeneration, and that there is no need of waste water treatment facility which is needed in water system cleaning. It is, therefore, said that the total cost can be greatly reduced.

In the end of 1995, conventional use of special freon or trichloroethane was legally abolished from the viewpoint of environmental influences such as destruction of ozone layer. Then, the hydrocarbon system cleaning agent is prevailing as substitutes for them. However, it has a weekpoint that there is a fear of fire accident because of low firing point. But it is reported that there is no danger of such in the vacuum state.

AQUA TECH CO. completed the test equipment for evidence test in October 1997. And some big lead frame makers have already given orders for this new equipment.

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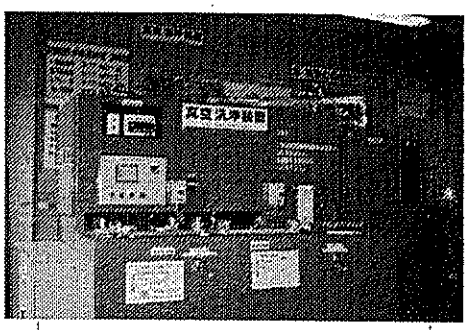
真空方式の洗浄装置

アクアテック　溶液、全量回収が可能

炭化水素系溶剤を使用



アクアテックが開発した真空洗浄乾燥装置

【北九州】金属部品の洗浄装置を製造するアクアテック（北九州市、堂元雅洋社長）は、フロンやエタンに代わる炭化水素系溶剤を使った真空方式の洗浄乾燥装置を開発し、本格受注に乗り出す。真空槽内で超音波を照射し、揺り動かして洗浄効果を高める仕組みで、短時間で乾燥できる。溶液を蒸留再生装置でほぼ全量回収・再利用できるため、運転コストも大幅に低減できる。半導体のリードフレーム洗浄用などに売り込み、九八年度は約三億円の売り上げを見込んでいる。

新装置は石油を精製して作る炭化水素系の洗浄液を使い、洗浄、乾燥、溶液の回収・再生の一連の工程を個別に設けた真空密閉構造の容器のなかで全自動処理する。溶剤を入れた水槽のなかに、金属部品を入れ超音波を発すると、液体の分子同士の間に真空状の気泡を作り、破裂する時の衝撃を利用して部品に付着した油や汚れをとる。

真空状態ではこの衝撃がより強くなり洗浄能力が高まるといい、半導体のリードフレームが密着している場合や微細な穴やすき間がある精密部品にも効果があるという。乾燥時にも一挙に高真空状態にするため、リードフレームの場合、水系洗浄では乾燥に約一時間かかるのが、七分程度で乾くとしている。

使用した洗浄液も真空状態で八〇度に加熱、気化して蒸留して回収でき、実証試験では九九％以上の再生回収率という。同社によると、装置は他社製品より約三割高いが、溶液の使用量は再生器のない場合に比べて十分の一以下ですみ、水系洗浄に必要な廃水処理設備も不要になるため、コストは大幅に抑えられるという。

炭化水素系の洗浄液は、従来使われていた特定フロンやトリクロロエタンなどがオゾン層の破壊など環境面への影響から九五年末で全廃されたため、代替物質として普及しつつある。しかし、引火点が低いため、発火などの事故発生の恐れがあるのが難点だったが、真空状態にして危険性はないという。

アクアテックは九七年十月に実証試験のためのテスト機を完成させており、この新装置には大手リードフレームメーカーなどから注目が集まっている。