

# رصد ومعالجة المخلفات السائلة الخطرة الناتجة عن صناعة مغاطس الأكريليك

رسالة مقدمة من الطالب

مصطفى محمد سيد فياض

بكالوريوس علوم – كلية العلوم – جامعة الأزهر – ٢٠٠٥

لاستكمال متطلبات الحصول علي درجة الماجستير  
في العلوم البيئية

قسم العلوم الأساسية البيئية

معهد الدراسات والبحوث البيئية

جامعة عين شمس

٢٠١٦

صفحة الموافقة على الرسالة  
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**MONITORING AND TREATMENT OF LIQUID  
HAZARDOUS WASTE RESULTING FROM THE  
MANUFACTURE OF ACRYLIC BATHTUBS**

**Submitted By**

**Mostafa Mohame Sayed Fayad**

B.Sc. of Science, Faculty of Science, Al Azhar University, 2005

A thesis submitted in Partial Fulfillment  
Of  
The Requirement for the Master Degree  
In  
Environmental Sciences

Department of Environmental Basic Sciences  
Institute of Environmental Studies and Research  
Ain Shams University

**2016**

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## **ABSTRACT**

Bathtubs were used for hygienic purpose, nowadays they were made of acrylic polymers supported by woods base reinforced by fiber glass / polyester resin. This industry has great risk to human health and one of the most pollutant industries to the environment. The unsaturated polyester is sprayed with an organic peroxide initiator to complete polymerization. Acetone is used as a solvent to spread fiber glass for reinforcement. The present study concerned with the recovery of acetone from waste resin. Different patches of the resin waste were collected in different periods. Then for each patch the waste resin was left to separate statically at different reasonable time in closed glass bottles in order to optimize the temperature and time for the complete separation of the liquid layer containing acetone were distilled using simple distillation on water bath at 56 C°. The distilled acetone was characterized using Gas Chromatography and simple chemical reaction. The results obtained revealed that the purity of recovered acetone was 91.6% similar to the purchased acetone. The recovery of the waste acetone from the waste resin will save money of acetone purchase which has annual cost of L.E. 16,000 / Ton; however the disposal cost of the waste resin is L.E. 3,000 /Ton. Approximately amount of recovered acetone was 76.7 % from the total waste generated. The total consumption of acetone /year is 72,940 K.G which Purchasing cost is 875,280 L.E thus after apply our study we able to recovery about 49,795.20 K.G (76%), meaning that the company will buy only 23,144.80 K.G which cover all yearly Requirement from Acetone which is 72,940 K.G. thus the revenue is 796,723 L.E .The solid residue was 23.3 % from the total waste generated needs further investigation. Measurements of air contaminates (PM10, Pollutant gases, Heat stress, Noise Intensity, Light Intensity and exhaust stack emissions).The results showed that air quality in work places are within the permissible limit

according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012 and Labor Law no. 12 /2003. The Concentrations of Thoracic Particulate (PM10) are less than the maximum permissible limits according to the Environmental Law no.4/1994 for Environment protection and its amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012 & Labor Law no. 12 /2003. ( 3 mg / m<sup>3</sup> ) , except lamination area exceed the maximum permissible limits according to Law No. 4/94 for Environmental protection and its amendments by Law No. 9/2009 and its executive regulation issued in 2012, so worker in these areas should wear filters for dust and increase the ventilation system in these areas. The Noise level measurements in some work places exceed the permissible limit according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012 (90)dB. Therefore the company should apply the safety regulations for exposure time and the workers in these points wear ear plugs. The Heat Stress are less than the maximum permissible limits according to the Environmental Law no. 4/1994 for Environment protection and its amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012& Labor Law no. 12 /2003. The light intensity complying with the work law no. 12/2003. The Concentration of Gases and Vapors are less than the maximum permissible limits according to the Environmental Law no. 4/1994 for Environment protection and its amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012& Labor Law no. 12 /2003. The Exhaust Stack emissions are less than the maximum permissible limits according to the Environmental Law no. 4/1994 for Environment protection and its



amendments by law No.9/2009 and its executive regulation issued in 1995 and its amendments issued in 2012& Labor Law no. 12 /2003.About the Hazardous & nonhazardous waste the company comply with Environmental law 4 to year 1994 which integrated by law 9 to year 2009.



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