THE DETERMINATION OF CHEMICAL RESISTANCE TO CHEMICAL REAGENTS, FIRE RETARDANT AND FLEXURAL STRENGTH OF COMMERCIAL GLASS REINFORCED FIBER

By

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ABSTRACT

The glass-reinforced fibre (GRP) is composites made by reinforcing a resin with glass fibre. They have two particular interesting characteristics. They can be given a mechanical strength greater than any other plastics composites, comparable on a weight basis with some metals and they also can be moulded without heat or pressure. The work present in these investigations carried out to determine the chemical resistance, fire retardant and flexural strength of commercial GRP materials intended for fume cupboard production. The two materials used in these investigations are General-Purpose (G/P) and Perchloric Acid (P/A) fume cupboards supplied by SERVCO Resources Sdn Bhd, Shah Alam. The objectives of these investigations were to determine the changes in weight, thickness and physical appearance of the specimens after immersion in the chemical reagents, to determine the linear burning rate of the specimens, and to determine the flexural strength of the specimens. In these investigations, the specimens were exposed to various chemical reagents classified as mineral acids, organic acids, polar solvents and non-polar solvents. The changes in physical appearances are swelling, shrinking and discoloration. For the fire retardant test, specimens were exposed to flame for 30 s and the rate of the burning was determined from the distance the flame travelled and stopped. For the flexural strength test, Testometer Micro 500 was used at a loading edge moving rate of 10mm/min ± 2mm and deflection of 20mm.

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CHAPTER ONE

INTRODUCTION

Exposing test specimens of commercial General-Purpose (G/P) fume cupboard glass reinforced plastics (GRP) to liquid chemicals and determining the changes in properties resulting from such exposure. Exposure in this case is by immersion of the entire surface of the specimen. The evaluations include reporting changes in weight, dimensions, appearance, and strength properties. Examine specimen by means of a lens if necessary, in comparison with an untreated specimen and record any changes in appearance as follows: -

a) loss of gloss
b) developed texture and decomposition
c) discoloration
d) swelling and shrinking
e) tackiness and rubberness
f) crazing and cracking
g) bubbling
h) solubility

Exposing the test specimen to fire or flame may be used as elements of a fire risk assessment that takes into account all of the factors that are pertinent to an assessment of the fire hazard of a particular end used.