Specification For Syntactic Foam Buoyancy Units

Reinforced Polymer Matrix Syntactic Foams
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Long Term Exposure and Cycling Tests of Syntactic Foam Buoyancy Material Used in DSRV Alvin
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Modern Plastics Encyclopedia
Bureau of Ships Journal
Analysis, Design and Strength Studies of Optimum High Buoyancy Systems for Deep Submergence Applications
Journal
Technical Abstract Bulletin
Composite Modules: A New Design for Deep Ocean Buoyancy Applications
Report on the Development of Buoyancy Materials for Deep Submergence
Mechanical Properties of Metal Matrix Syntactic Foam
Oceanology International and Offshore Technology
Marine Technology 1970
Oceanology International
Hydrostatic Testing of Syntactic Foam in Mineral Oil
Proceedings of the National Conference on Advanced Manufacturing & Robotics, January 10-11, 2004
Naval Ship Systems Command Technical News
AIAA Bulletin
Technology and Applications of Autonomous Underwater Vehicles
Concept Design for a Manned Underwater Station (U)

MADALYNN ALEENA

Reinforced Polymer Matrix Syntactic Foams Elsevier
For four years, syntactic foam samples were tested in water and mineral oil at pressures of 5000, 7500, and 10,000 psi at room temperature. The samples were solid cylinders 1-3/4 in. in diameter and 6 in. long. The long-term hydrostatic test results indicate a more rapid absorption of water than of mineral oil. The buoyancy half-life (flotation reduced 50%) of the syntactic foam tested is expected to be at least 10 yr, and may be as much as 25 yr, depending on the hydrostatic pressure, material density, and test medium. This indication of useful life expectancy is based on data obtained from the exposure of 20 samples having formulation densities in the 37- to 42-lb/cubic feet range.
Journal of the Construction Division iSmithers Rapra Publishing
This book is intended to be a source of practical information on all types of plastic foams (cellular plastics) in use, including the new structural plastic foams. Elastomer (rubber-like) foams are also considered. The book is intended primarily for those who require a non-theoretical, authoritative, easy-to-use handbook in the subject area. It should be of value to materials engineers, plastics fabricators, chemists, chemical engineers and students. Recognized authorities have written several chapters and parts of chapters in their fields of expertise. The book is organized in such a way that information on a desired subject can be found rapidly. An unusual feature is a comprehensive listing of all known standardization documents (test methods, practices, and specifications), including some international standards. Each document includes a brief description of its contents.
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The oceans are a hostile environment, and gathering information on deep-sea life and the seabed is incredibly difficult. Autonomous underwater vehicles are robot submarines that are revolutionizing the way in which researchers and industry obtain data. Advances in technology have resulted in capable vehicles that have made new discoveries on how th
Handbook of Thermoset Plastics William Andrew
Syntactic foams are particulate polymer matrix composite materials consisting of hollow microspheres dispersed in a matrix. The matrix used in syntactic foams can be polymer, metal, or ceramic. Polymer matrices, particularly the thermosetting polymers, have been the most widely accepted matrices in syntactic foams. From the processing and application point of view, thermosetting syntactic foams have many advantages compared to thermoplastic ones. This chapter deals with syntactic foams based on various thermosetting resins and the chemistry of the resin systems. The resin systems are mainly phenolic, epoxy, cyanate ester, siloxane, polybenzoxazine, bismaleimide, and their blends. Apart from a brief chemistry of the parent resin systems, their syntactic foams have been described in detail. The aspects discussed are their processing, physical, thermal, and mechanical properties, applications, and degradation. Their properties can be engineered by a choice of matrix, microcell structure and its concentration, reinforcement, toughners, etc. While the thermal and thermo-physical characteristics are dictated by resin, mechanical and fracture characteristics are decided by both components. While epoxy, cyanate ester, and other such compounds provide structural syntactic foams, phenolics and their new generation versions provide thermo-structural materials. Syntactic foam ablators have made possible interplanetary space missions. Novel engineering concepts like lightweight self-healing give scope for extended applications of these systems. The recent advances in these areas are also discussed. These special materials with high specific strength are slated to replace conventional structural and thermo-structural materials in related engineering applications ranging from domestic to aerospace and defense.
An Assessment of the Navy's Undersea Technology Needs CRC Press
NASL is currently developing buoyancy systems to provide supplementary buoyancy in deep submergence vehicles, based on the module concept of including a hollow sphere reinforcement in a matrix of syntactic foam. Tests have been made showing the feasibility of this approach. Theoretical equations have been developed to determine analytically the stress distributions in these modules.
Viscoelastic Properties of Syntactic Foam Reinforced with Short Sisal Fibers Springer
A parametric analysis was performed to determine the optimum combination of variables in the design of buoyancy modules for use in deep submergence applications. The particular parameters considered in this study were hollow sphere material density and strength geometric shape of the module, three dimensional sphere array design and matrix material density and strength. Results of this investigation show that of the three module shapes considered (cubic, hexagonal and triangular), hexagonal with 14 spheres yields the highest buoyancy. From this study it is also postulated that a module can be developed with a net buoyancy ranging from 28 to 36 lbs/ft 3 which shows a 35 to 80 percent improvement over buoyancy of existing syntactic foam. (Author, modified).
Ocean Science and Ocean Engineering Allied Publishers
Thermosetting plastics are a distinct category of plastics whose high performance, durability and reliability at high temperatures makes them suitable for specialty applications ranging from automotive and aerospace through to electronic packaging and consumer products (your melamine kitchen worktop is a thermoset resin!). Recent developments in thermoset plastics technology and processes has broadened their use exponentially over recent years, and these developments continue: in November 2011, French scientists created a new lightweight thermoset that is as strong and stable as previous materials yet can be easily reworked and reshaped when heated which makes it unique amongst thermosets and allows for repair and recycling. The Handbook of Thermoset Plastics, now in its Third edition, provides a comprehensive survey of the chemical processes, manufacturing techniques and design properties of each polymer, along with their applications. Written by a team of highly experienced practitioners, the practical implications of using thermoset plastics are presented – both their strengths and

weaknesses. The data and descriptions presented here enable engineers, scientists and technicians to form judgments and take action on the basis of informed analysis. The aim of the book is to help the reader to make the right decision and take the correct action – avoiding the pitfalls the authors' experience has uncovered. The new edition has been updated throughout to reflect current practice in manufacturing and processing, featuring: Case Studies to demonstrate how particular properties make different polymers suitable for different applications, as well as covering end-use and safety considerations A new chapter on using nanoparticles to enhance thermal and mechanical properties A new chapter describing new materials based on renewable resources (such as soy-based thermoset plastics) A new chapter covering recent developments and potential future technologies such as new catalysts for Controlled Radical Polymerization Goodman and Dodiuk-Kenig provide a comprehensive reference guide to the chemistry, manufacturing and applications of thermosets Updated to include recent developments in manufacturing – from biopolymers to nanocomposites Case Studies illustrate applications of key thermoset plastics

World Index of Plastics Standards

Contributed papers presented at the conference held at Central Mechanical Engineering Research Institute, Durgapur.

Proceedings of the ... Offshore Mechanics, Arctic Engineering, Deepsea Systems Symposium

Syntactic foam samples were tested in fresh water under pressures of 3000, 5000, and 10,000 psi at 2C and at room temperature (about 25C). The samples were 1-3/4-in.-diam, 6-in.-long solid cylinders. The long-term hydrostatic test results, presented here, indicate that the rate of water absorption continues almost linearly with exposure time. Based on the data presented at the present time the life expectancy (no longer buoyant) of a good grade of 42-lb/cu ft syntactic foam at 10,000 psig is estimated to be about 10 years. (Author).

NOAA's Office of Undersea Research ... Report

Reinforced Syntactic Foams: Effect of Nano and Micro-Scale Reinforcement examines the fabrication processes, mechanism of reinforcement, and structure-property correlations of reinforced syntactic foams. The authors present the state of the art in this field, compare the properties of various types of syntactic foam systems comprising different matrix, hollow particle, and reinforcement materials. The book further identifies theories useful in predicting the properties of reinforced syntactic foams and conducting parametric studies to understand the possibility for tailoring their properties.

Naval Engineers Journal

Future exploration and exploitation of the ocean depends on the development of new vehicles capable of operating at great depths. One of the critical systems in such a vehicle is the buoyancy system. Without an adequate and dependable buoyancy system, the vehicle once submerged would not be able to return to the surface. Candidate materials for buoyant syntactic foams are reviewed. (Author, modified-PL).

Index of Specifications and Standards

Laboratory developed syntactic foam formulations MLB-1, MLB-2 and MLB-3 and several commercial materials were subjected to 917 cycles of hydrostatic pressure varying from atmospheric pressure to 10,000 psi. Each cycle consisted of the following: 4 minutes - pressure increasing from atmospheric to 10,000 psi; 12 minutes - pressure held at 10,000 psi; pressure released and held at atmospheric for 4 minutes. The most significant observations to date on the deep-submergence buoyancy materials program are: Specimen size as a definite relationship to per cent water absorption. The lower the surface area to volume ratio the less the amount of water absorbed. On the basis of information presently available the most promising materials for deep submergence application are in the following order of merit: MLB-3, 3-M scotchply, XP-241, MLB-2, GM 56200-19, MLB-1. (Author).

Bureau of Ships Journal

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