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FIBERGLASS
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1. "Stronger Glass Fibers Lighten Aerospace Vehicles" J. D. Provance Cer Industry v 82, n 4 Apr. 1964, p 108-11, 132, 142.

   Optimization of methods of fiberizing glass system $MgO-Al_2O_3-SiO_2$, which had shown desirable properties for reinforcing plastics; which had a report covering design of orifice for fiberizing glass, method of determining optimum orifice design, and composition modifications; fibers with average strength of 686,000 psi and modulus of elasticity of 14.5 million psi were obtained; glass is designated as 29-A.

2. "Glass-Fibre-Reinforced Plastics" H. Haferkamp, Engrs' Digest v 24 n 12, Dec. 1963, p 81-95.

   Structure of plastics and fundamental difference between thermoplastic and thermosetting materials is described; plastics have relatively low mechanical strength, which can, however, be increased by reinforcing them with suitable agents, e.g., glass fibers, resulting in high-strength materials; of these, materials are considered together with methods of manufacturing them; number of typical applications in various technological fields are shown.

3. "Focus on Glass Fibre" Brit Plastics v 36, n 3, Mar 1963, p 110-117

   Developments in production and technology of glass fiber reinforcing materials; reference is made to manufacturing techniques for reinforcing plastics products derived from them where these are of particular significance.

4. "Protective Finish for Glass-Fiber Fabrics" P. W. Spaite, J. E. Hagan, W. F. Todd, Chem Eng Progress v 59-n 4 Apr. 1963, p 54-7

   Results from pilot scale evaluation of protective finish for glass fiber fabrics; finish shows promise of producing substantial increase in life of glass fiber used for gas filtration; method of application; pilot scale testing equipment, possible limitations of data, and cost estimates.

5. "How to Get Lower Costs and Higher Quality in Bonding of Reinforced Plastic/Honeycomb Sandwich Panels" B. Gould, Plastics Design & Processing v 3 n 1 Jan 1963, p 26-7.

   Novel production methods plus use of new type of epoxy adhesive have helped Coralume Eng., Inc. Littlestown, Pa., speed deliveries and lower costs of translucent sandwich panels constructed with polyester-fiberglass faces and kraft honeycomb cores; after one side of heney-comb core has been dipped into adhesive, which has been poured on flat surface to depth of about 6 mils, it is positioned on sheet of polyester fiberglass; exposed honeycomb is dipped and set onto second face sheet, completing sandwich.

6. "How to Use Glass Fabrics for Designing Desired-Strength Tubular Products" N. A. Martin, Plastics Design & Processing v 3 n 2 Feb. 1963, p 22-6.

   Applications for reinforced plastics in tubular/rod designs, of which few have actually been developed, are indicated; 14 glass fibracs and resin systems for use with them are considered; factors in design of pipe or pressure tubing, fishing rods, large antennas, golf shafts, structural beams, etc. are indicated; fabrication methods are noted.

7. "Epoxy-Glass-Asbestos Pipe Cuts Installation Costs, Resists Corrosiso" Indus Water & Wastes v 8 n 5 Sept-Oct 1963, p 36-7.

   New polypropylene resin plant and plastics research center at Woodbury, NJ, uses total of 4100 ft. of epoxy pipe reinforced with both fiber glass and Crocidilite asbestos for sections of plant's processing water and effulent lines; Amercoat Corp's Bondstrand 4000 is rigid pipe with high strength-to-weight ratio and withstands working pressures up to 150 psi, operating temperatures to 300 F and is resistant to virtually every corrosive material found in chemical industry.

8. "Reinforced Plastics in Shipbuilding" D. Verweij, Int Shipbldg. Progress v 10-n 110, Oct. 1963, p 396-410.

   Reinforced plastics currently used are phenol resin reinforced with cotton cloth, epoxy resin with reinforcing of fiberglass, combination of resorcinol-form-aldehyde resin with nylon cloth, and polyester resin reinforced with fiberglass; their properties, procedures for utilization, and application to components of naval and merchant ships and smaller boats such as pilot vessels and yachts are described. Before Instn Shipbldrs & Mr Engrs, Rotterdam, on Dec. 13, 1962.

9. "Glass Reinforcement for Plastics" S. S. Feuer, A. F. Torres, Chem Eng v 70 n 15 July 22, 1963, p 168, 170.

   Experimental study of effects of types of glass fibers used in reinforcing and surfacing mats; corrosion resistance of glass-fiber reinforced plastics is influenced by type of glass as well as plastic; inadequacy of alkali glass in corrosion applications; borosilicate E-glass reinforcing mat requires protection of C-glass surface mat.

10. "Fiber-Reinforced Structural Materials" D. W. Levinson, Metals Eng Quarterly, v 2 n 4 Nov. 1962 p 21-6.

    Fiber reinforced materials, both organic and inorganic, are considered from standpoint of relationship between constitution and properties; examples of how strengthening with fibers may be achieved; advantage of improved strength resulting from use of glass fiber reinforced plastic for pressure vessels; possibilities for future special applications of fiber matrix composites are seals, unlubricated bearings, magnets, as well as components of these materials in which electrical resistivity and thermal conductivity is intermediate between metals and plastics, or ceramics.

11. "Glass Fibers" D. Labino, Glass Industry v 44 n 6 June 1963, p 317-20, 356-7.

Staple (short lengths loosely packed together), and continuous filament glass fibers are considered in relation to compositions from which they are made; methods for measurement of fiber diameter, durability in water, acids and alkali, and corrosiveness of glass on steel are discussed.

12. "Glass Fibers as Textile for Industrial Applications" A. Marzocchi, Am Dyestuff Reporter v 52 n 14 July 8, 1963, p 40-8.

Survey of significance of glass fibers for industrial market; specific areas covered include new Beta Fiber, dynamic reinforcement applications and filament winding; later include some aerospace applications.

13. "Hollow Glass Fibers" R. F. Siefert, Glass Industry v 44 n 6 June 1963, p 321-2, 356.

In process developed by Pittsburgh Plate Glass Co. many filaments are continuously drawn from molten massive glass into infinitely long hollow fiber strands; variation of 0.0004-9.0007 in. OD is possible; by incorporating these hollow filaments into laminate it is possible to develop thicker, but equal-weights laminate that has improved electrical properties, lower thermal transmission through part, and is appreciably more rigid; hollow fibers are being evaluated for hydrospace vehicles, ablative laminates, bifer optics, papermaking, etc.

14. "Fiberglass Forms-Progress Report" R. J. Kirby, Concrete Construction v 7 n 7 July 1962, p 203-4.

Methods of making reinforced plastics forms for concrete construction; advantages of modular fiberglass panels for forms, include light weight versatility and good insulating properties.

15. "Glass Fibre Formwork" A. Dearnley, Structural Concrete v 1 n 11 Sept-Oct 1963, p 511-14.

Special properties of glass fiber are considered, to reach full understanding of its ultimate cost and use as formwork.

16. "Fatigue and Creep Properties of Glass-Reinforced Plastic under Compressive States of Stress" J. W. Dally, N. R. Nelson, R. N. Cornish, ASME-Paper 63-WA-236 for meeting Nov 17-22, 1963, 16 pp.

Results of investigation performed for Dept. of Navy, Bureau of Ships; ultimate compressive strength, low-cycle fatigue properties, and stress rupture strengths of several typical glass reinforced plastic materials are presented.

17. "Methods for Evaluating Shear Strength of Plastic Laminates Reinforced with Unwoven Glass Fibers" K. Romstad, U. S. Forest Products Laboratory - Research Note FPL-033 May 1964, 36 p.

Several methods were employed to evaluate shear strength of plastic laminate panels 1/8 in. thick; shear strength values at 0° to fibers obtained from axial tests on notched specimens were found to depend upon shear length between notches and type of lateral restraint; values obtained from short-span beam tests were affected by combined failures, depending on shear span-depth ratio and method of loading.

18. "Validity of Mechanical Tests for Glass Reinforced Plastics" F. R. Barnet, S. P. Prosen, Matls Protection v 3 n 6 June 1964, p 32, 34, 37-40.

Philosophy of testing; criteria are listed that should be included in measuring properties of materials; standard and non-standard tests on glass reinforced plastics; limitations of these tests; importance of analysis and reporting of data obtained by testing.

19. "Effect of Random Distribution of Glass Fibre in Concrete Mixes" I. O. Oladapo, Civ Eng (Lond) v 58, n 678, Jan 1963, p 96-8.

Addition of glass fiber to concrete caused increase in its modulus of rupture; effect is more pronounced particularly in young concrete this could be useful way of preventing early cracking in young concrete but it is doubtful if glass fibers will have any appreciable effect on mature concrete; it is suggested that load-deflection characteristics be investigated before drawing any general conclusions.

20. "Investigation of Methods for Evaluating Unwoven Glass-Fiber-Reinforced Plastic Laminates in Flexure" K. Romstad, U. S. Forest Products Laboratory-Research Note FPL-024 Feb. 1964, 10 p.

Three plastic laminates reinforced with unwoven, undirectional glass fibers were evaluated over varying spans under midpoint and 2-point loading to adapt or improve presently accepted flexure test procedures for materials; also investigated were effects of radius of loading nose, length of overhang, and different 2-point loading systems on properties of 1/8 in. laminates.

21. "Glass Fibers-New Structural Material" E. M. Lindsay, Am Dyestuff Reporter v 53, n 16, Aug. 1964, p 27-32.

Use of glass reinforced plastics in structural aerospace applications both present and future, is discussed and also shown in photographs; structural efficiencies of several materials are compared with glass reinforced plastics in terms of minimum weight for equal strength of stiffness; recent developments in glass fibers with new and improved properties are indicated.

22. "Filament Winding Goes Commercial" S. W. Keegin, R. F. Siefert, Machine Design v 36 n 11 May 7, 1964, p 130-3.

Growing importance of filament-wound fiber glass reinforced plastic in nondefense applications is shown in examples of filament-wound plastic shotgun barrel, railroad tank car, chemical tanks, cherry-picker crane boom, and automobile springs and torsion bars being presently manufactured.

23. "Filament Winding is Coming of Age" M. L. Chazottes, Can Chem Processing v 48 n 4 Apr. 1964, p 90- 93-4.

Fabrication of pressure vessels from plastics by filament winding with glass fiber makes possible high strength-to-weight ratio, uniformity of reinforcement and lower cost; methods of winding discussed.

24. "Compressional Behavior of Glass-Fiber Sheets and Forming Pressure of FRP" K. Jujino, T. Harai, S. Otsuki, Textile Machy Soc Japan-J v 10 n 1 Mar 1964, p 31-6.

Calculation of forming pressure for lamination of glass fiber reinforced plastics from compressional behavior of glass fiber sheets; compressional tests of alkali and nonalkali glass fiber sheets, and alkali glass mats; formula for reduction of thickness of sheets under compression and its application to forming process; effect of glass fiber content on forming pressure.

25. "History and Application of Glass Fiber Reinforced Resin Wearing Surface" R. S. Blanchard, Nat Research Council-Highway Research Board Research Record n 14, 1963, p 29-36.

Development and use of reinforced polyester resin as laminate to provide durable protective coating for portland cement concrete surface; resin chosen for application was isothalic ployester; data regarding weight and cost of this type of application are given.

26. "Some Developments in Plastic Tooling" J. S. King, Production Engr. v 42, n 9 Sept. 1963, p 539-45.

Study of property of castings and glass fiber laminates including density, coefficient of linear expansion, heat distortion point, modulus of elasticity and strength characteristics as compared with those of more conventional tool-making materials; methods of application of epoxide resins in secondary and primary tooling.

27. "Fiber Glass Issue" Glass Industry v 43 n 6 June 1962, p 306-31, 324-37, 339-40, 351-3.

Special issue is divided into 3 sections covering market roundup, processing techniques and end-use-products; general information is given by various persons in field; processing includes use of matched metal dies, continuous molding, hald lay-up, spray-up, reeimpregnated fiber glass fabric production, and filament winding; automobile bodies, sporting goods, boats, insulation, corrosion resistant equipment are among products mentioned.

28. "New Lightweight Structural Material" W. P.Jones, F. L. Hampson, Eng Matls & Design v 5 n 6 June 1962, p 404-9.

New Tyglas fluted glass fiber core fabric produced by Fothergill and Harvey Ltd; high strength to weight ratio constructional medium makes it useful in manufacture of structures including radomes, antennas, waveguides, tanks and containers, thermal insulating panels, fan blades light weight platforms, bulkheads and flooring for missiles and transport purposes, tests of materials used in fluted core panels; formulas on bending, tension, tranverse shear, compression, section, and bearing properties.

29. "Statistical Study of Factors Influencing Strength of Glass Fibers" R. A. Wallhaus, Illinois Univ-Dept Theoretical & Applied Mechanics- T&AM Report 217 May 1962, 66 p.

Statistical concept is investigated for describing breaking strengths of glass fibers; parameters of Weibull distribution function are used to study effects of time, static load, humidity, annealing, and various degrees of mechanical damage on fracture strength of fibers and fiber bundles; breaking strength of bundle is analyzed by use of proposed statistical distribution, and results are compared with experimentally determine values of ultimate bundle strength; work is pertinent to fibers bonded with epoxy resin.

30. "Investigation of Factors Likely to Affect Strength and Properties of Glass Fibers" W. F. Thomas, Physics & Chem of Glasses v 1 n 1 Feb. 1960, p 4-18.

Effect of production conditions on tensile strength; within experimental range it is found that strength in pounds per square inch is independent of fiber diameter; breaking stress is constant provided molten glass temperature is high enough for drawing fiber of uniform diameter; rate of decrease of room temperature strength increases with increase of annealing temperature; at 600 C strength falls to constant value immediately upon heating. 21 refs.

31. "Plastic Panels Withstand Explosion" Safety Maintenance v 118, n 5 Nov. 1959, p 35-6.

In organic chemical manufacturing building, fiber glass reinforced polyester resin based panels, used as replacement for glass windows, remained undamaged after explosion in nearby building; panels either flexed and sprang back into position or were forced loose from securing bolts and fell to ground in tact.

32. "Critical Study of Optical and Mechanical Properties of Glass Fibers" S. Bateson, J. Applied Physics v 29 n 1 Jan 1958, p 13-121.

Calculation of cooling rate for fine glass fibers in $6\text{-}16_{u}$ diam range by means of new cooling equation; comparison of typical strength vs diameter data with ratio of quenching time to Maxwell relaxation; strength increases rapidly for this ratio approaching 1, and cooling time is of order 10^{-4} sec at 1100 C; structural changes are of secondary importance as factor contributing to high strength.

33. "Glass Reinforcement for Structural Plastics" R. G. Adams, R. Sonneborn, Soc Plastics Engrs-J v 13 n 13 Dec. 1957, p 25-7, 79.

Difference between fibrous and bulk glass; manufacture of basic fiber, surface treatment; forms of reinforcement available such as mats, rovings, chopped strands, yarns, and woven fabrics and rovings.

34. "Glass Industry-1958" H. E. Simpson, Glass Industry v 40 n 1, 2 Jan 1959, p 13-20, 38, 40, 42, Feb. p 81, 98, 100.

Review of production and developments covering; plant construction and expansion; flat glass; fiber glass; technical glasses, including ceramic types for high temperature uses; electronic application; trends and experimental glasses.

35. "Shear Effects in Glass Fiber Reinforced Plastics Laminates" R. E. Chambers, F. J. McGarry, Am Soc Testing Matls-Bull. n 238, May 1959, p 38-41.

Bending tests over span depth ratios of 7 to 70 showed variation in apparent flexural modulus of fiber glass-polyester laminate to result from interlaminary shear stresses set up by applied central load; interlaminary shear stresses set up by applied central load; interlaminar shear modulus approximates shear rigidity of pure resin; true flexural modulus is average of tensile and compressive moduli; variation of apparent flexural strength with span-depth ratio appears to be related to tensile ductility of laminating resin.

36. "Some Aspects of Long-term tests on Polyester Resin-Glass Laminates" A. De Dani, K. J. Brookfield, Plastics Inst-Trans v 27 n 69 June 1959, p 94-7.

Tests of glass reinforced plastics for load bearing structures; fiberglass, Ltd, tested flexural strength of 6 glass laminated dry and after boiling in water for 1, 2, 4, and 72-hr; silane-sized borosilicate glass laminates were superior to other products; fluxural strength of 4 laminates were superior to other products; fluxural strength of 4 laminates were also tested dry and after immersion in water at 70 C for 56 days; silane-sized borosilicate glass laminates were again superior to other products. 4 refs.

37. "Strength of Glass Fiber Reinforced Polyester" S. Otsuki, Japan Soc Mech Engrs-Bul v 1 n 3 Aug 1958, p 244-50.

Tensile strength of polyester (FRP) increases with glass content by volume in linear relationship; however, it decreases when glass content exceeds certain critical point (in English).

38. "Compaction Effects in Glass Fibers" W. H. Otto, Am Cer Soc-J v 44 n 2 Feb. 1961, p 68-72.

When fibers are subjected to subsequent heat treatments, values of measured properties tend to return to those of massive glass; phenomenon is called compaction because in process density increase; effect of compaction on physical properties of fibers and mechanism of phenomenon are considered; it is concluded that changes in physical properties cannot be accounted for without changes in, or rearrangements of, glass structure.

39. "Effect of Glass Fiber Geometry on Composite Material Strength" J. E. Bell, ARS J v 31, n 9 Sept. 1961, p 1260-5.

Analysis is confined to study of effect of continuous or discontinuous fibers and their orientation in matrix; equations are derived for load and stress distribution; to determine effect of fiber geometry, epoxy resin composites are analyzed for composite and glass fiber efficiency; highest composite efficiency determined was 58% for filament wound fibers, and highest efficiency was 68% for cross laminated fibers.

40. "Design of Glass-Reinforced Plastic Structures" L. Fischer, Soc Plastic Industry-Annual Teh. & Mgmt Conference 1960, sec 3-D, 17 p.

Mathematical procedure for analyzing stresses and strains of glass fiber laminates subjected to axial and shear loads in plane of

laminates subjected to axial and shear loads in plane of laminate which is based on orthotropic plate theory; equation to predict laminate failure is presented; experimental data verify accuracy of theory; laminates are used in aircraft, missile and space structures and in building and other types of construction. 25 refs.

41. "Effect of Stress and Temperature During Forming on Strength of Glass" E. D. Lynch, F. V. Tooley, Am Cer Soc-J v 40 n 4 Apr 1957, p 107-12.

Effect of mechanical stress during drawing process on strength obtained was determined for large diameter fibers of soda lime silica glass; fibers were formed by down drawing cane at constant rate, using loads of form 100 to 8000 grams. 23 refs.

42. "Glass Industry-1956" H. E. Simpson, Glass Industry v 38, n 1 Jan 1957, p 17-24, 46-8.

Review of production and developments covering; plant expansion flat glass, containers, blocks, glass fibers and their applications, electronic components, fused quartz, aerosol packaging, lithium minerals; new developments such as radiation shielding window, heat resistant glass, etc.

43. "Effect of long-Term Loading on Glass Fiber-Reinforced Plastic Laminates" K. H. Boller, Plastics Technology v 3 n 12 Dec. 1956 p 808-18, 820-1.

U. S. Forest Products Laboratory, in cooperation with Bureau of Ships, Department of Navy, is investigating stress rupture and creep characteristics of glass fiber reinforced plastic laminates typical of these used in ship-board applications; data show that stress at rupture decreases with time, and rate of decrease is greater in water than in air.

44. "Glass Fibres and Their Use in Reinforced Plastics" A. R. Henning, Instn Production Engrs-J v 35 n 10 Oct. 19, 1956, p 626-33.

Production and physical properties of glass filament; glass cloth treatment; variation of physical properties of polyester laminates with type of reinforcement; new developments.

45. "Glass Engineering Handbook" E. B. Shand, E. H. Greene, J. A. Grant, T. S. Rogers. Corning Glass Works, Corning N. Y. 1955, 258 p.

Composition, constitution, properties and testing of glass; bonding with metal; manufacturing methods; applications of glass; fibrous glass appendices give lists of Federal and Military specifications, and definititions of terms.

46. "Automatic Balance for Measurement of Strength of Glass Fibers" D. Sinclair, Rv Sci Instruments, v 27 n 1 Jan 1956, p 34-6.

Balance used to measure tensile strength and Young's modulus of glass fibers when bent into loop has been made fully automatic differential transformer and servomotor are used to apply; chain weight as tension in looped fiber is increased by loading motor; all measurements needed to calculate tensile strength and Young's modulus are automatically recorded on drum chart driven by loading motor.

47. "Highly Filled Fibrous Glass-Reinforced Polyester Molding Compound" R. F. Shannon, L. P. Biefield Modern Plastics v 33 n 3 Nov 1955, p 1333-4, 136, 138, 258.

Physical properties of molding compositions are not directly proportional to glass concentration; compositions containing only 5% glass have physical similar to compositions containing 18.5% physical properties of glass e.g., flexural strength 13,000 psi, Izod edgewise strength 4.5 ft-lb/in. of notch and 24-hr. water absorption 0.14%; continuous method for mixing molding compound.

48. "Mechanical and Chemical Strength of Glass Fibre Reinforced Plastics" F. F. Jaray, Corrosion Prevention & Control v 3 n 2 Feb. 1956, p 29-35.

Four main requirements of design of reinforced concrete can be applied advantageously to design of reinforced plastics; study of homogeneity of reinforcement, positioning, adhesion and prestressing in order to examine whether these conditions are fully or partially met in current run of reinforced plastics; excellent chemical resistance of laminates based on furane resins noted.

49. "ASTM Standards on Glass and Glass Products" ASTM, Philadelphia, Pa. Dec. 1962, 162 p.

Completion of ASTM standard and tentative methods of test and specifications; separate sections pertain to glass, glass containers insulating block, insulators, glass fiber materials, glass spheres for use in paints, and to electrical tests and spectrochemical analysis.

50. "Glass Reinforced Plastics" D. Pickthall, EngMatls & Design v 6 n 6 June 1963, p 408-13.

Comparative study of properties of reinforced plastics by varying relative proportion of resin and glass fiber and controlling positioning of fibers, effect of unidirectional, didirectional and random form of laminates on mechanical properties; characteristics and molding methods of reinforced

plastics are discussed in connection with application of plastics to consider how properties and characteristics can be utilized for what they are most suitable.

51. "New Textile Uses for Glass Fiber Yarns" F. A. Mennerich, Modern Textiles v 43 n 12 Dec. 1962, p 43-5,67.

Properties and yarn deniers are reported, and strength comparisons shown for other textile fibers, aluminum and stainless steel; among new developments, Beta fiber is of 3u diam, conductive roving is used as resistive core in automobile ignition wires, rubber reinforcing yarns are in advanced development stage, texture yarns are available, filament would structures are used in many aerospace projects, etc.

52. "Shrinkage Stresses in Glass Filament-Resin Systems" W. H. Haslett, F. J. McGarry, Modern Plastics v 40 n 4 Dec. 1962, p 135-6, 138, 140, 143, 191-2.

Photoelastic technique was developed to study shrinkage stress effects in small diameter E-glass fibers surrounded by resin matrix; results are given for single filaments and for multiple paralled filaments.

53. "Relationship of Tensile Strength of Glass Fibers to Diameter" W. H. Otto, Am Cer Soc-J v 38 n 3 Mar 1955 p 122-4.

Measured strength of fiber is associated with special circumstances attending its formation; experimental evidence shows that, contrary to generally accepted belief, strength of fiber does not depend on fiber diameter; when fibers of different diameter are formed under controlled, nearly identical conditions, breaking strengths are identical within experimental limits and there is no significant effect of diameter as such.

54. "Effects of Time, Temperature, and Environment on Mechanical Properties of Polyester-Glass Laminates" B. B. Pusey, R. H. Carey, Am Soc Testing Matls-Bul n 204 Feb. 1955, p 54-8; see also Modern Plastics v 32 n 7 Mar 1955, p 139-40, 142, 144, 229.

Tensile, compressive, and flexural properties of six reinforced laminates determined over range from 23 to 100 C; increasing temperatures produced reduction in compressive and flexural strength that was greater than reduction in tensile strength; increased temperatures erased presence of initial "proportional limit" in tension.

55. "Note on Structure of Glass Fibres" S. Bateson, Soc Glass Technology-J v 37 n 179, Dec. 1953, p 302-5.

Works of various investigators examined to show that structure of fiber is affected by its thermal history during attenuation, which would modify Griffith's classic attribution of discrepancy between theoretical and practical mechanical strength to flaws or cracks of varying severity; experimental results show that prolong heating stabilized mechanically drawn fibers, but not those flame drawn.

56. "Woven Glass Roving" Modern Plastics v 31 n 6 Feb 1954 p 95.

Glastrand, new material made up of standard untwisted glass rovings, rather than conventional twisted and plied contiuous filiment glass yarns, to ach eve highest strengths and bulk in plastic reinforcements at cost fairly close to that of glass in mat; luminates made in accordance with Federal Specification LP 406b have acheived flexural strengths up to 91,750 psi.

57. "How to Bond Fibrous Glass to Other Materials" W.J. Clayton, Glass Industry v 33 n 9 Sept 1953 p 490-2, 509.

Specific applications of fibrous glass pads for insulating and sound deadening; adhesives, such as rubber based or asphalt types, which have been developed for fastening pads to wood, metal, concrete and other surfaces; methods of application.

58. "Highly Filled Glass-Polyester Plastics" R. F. Shannon, L. J. Biefeld, Modern Plastics v 31 n 4 Dec 1953 p 125-6, 128, 130, 132, 215, 219.

Study to determine effects of high filler concentration on product properties; typical laminating polyester plastic, representative inorganic fillers, fibrous glass reinforcing media were evaluated; it is found that reinforced plastics made with highly filled plastics slurries have excellent surfaces, improved physical properties, and reduced materials cost.

59. "What Glass Fiber-Filled Molding Resins Have to Offer" K. Rose, Matls & Methods v 37 n 1 Jan 1953, p 87-9.

Glass reinforced plastics used in compounds for small pieces and for parts of varying thicknesses; materials discussed include alkyd molding compound, silicone and fluorocarbon, polyester, and phenolic and polystyrene types; properties and applications.