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Adhesive Force with Lattice Wave Vibration in a Glass Bottle Wall Drink and the Effect of Packaging Crystal Cell Interaction Due to Minimal Allowable Thermal Cracking Using Aluminium Pellets

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Abstract:- Adhesive force it is a force of attraction which exist between unlike molecules. In this research, the effect of vibration and disturbance propagated through the crystal surface or unit cell of the atoms in glass and its constituent alloy by forming processes with an environmental parameters such as annealing ,bond strength, thermal conductivity, fatigue limit, Reverberation, toxicity, speed of light diffraction grating, Absorption coefficient, point of oscillation to an equilibrium position will be evaluated by per unit integral area surface with the direction of heat flow. It was discovered in this research the volumetric shape has an ion instability which increases the vibration by a lattice wave which decreases with a proportion in linear expansion in length with a constant lattice energy of 7.058 J. But for ice it is 0.083 J, water is 28.056 J, water vapor is 0.1278 J, carbon and carbon composite is 1024.18 J due to compressive stress the slope edge of the glass bottle drink tend to decrease it ions by creep and thermal shock if the air , temperature, precipitation, evaporation of the drinks containing carbonate is dissociated by a pull of gravitational forces downward by intense gas bubbling due to skin friction by differential temperature. During forging of glass by manufacturing process, this research paper discovered that surface defects, edge defects area or cubic expansion, non uniformity of load and geometry shot peening has to be considered to avoid sudden cracking by ice formation condensate due to uneven heat formation difference through the boundary layer of the glass shrinkage.

Keywords:- *Adhesive force, Lattice wave, Glass Bottle wall, Crystal Cell ,Thermal cracking, Aluminium Pellets*

I. INTRODUCTION

Glass is an amorphous super cooled solid compound which has a constituent of silica, cullets ,limestone and soda ash. The sodium hydrate from basic salt {sodium carbonate} moderate the hydrogen ion concentration of an acid simply that is hydrolysis the alkalinity content neutralization within the sodium and oxygen ion affinity which weakens the hydrolytic resistance[1] of glass due to temperature decrease in microstate phase to the parent material by agent of denudation from plant and animal into given pellet of rocks forming new crystal shape of sand for making glass products.

However, glass is formed by heating it [2] parent material by kinetic bond such processes effects the three types of rocks namely as igneous, sedimentary and metamorphic rock. Glass has different shapes based on requirements and it forms namely:

Container glass, Flat glass, continuous filament glass, fibre glass, Domestic glass, Special glass, Water glass ,laser glass, Display glass and Frit glass. For this research purpose the flat glass is termed glass bottle for soft drink like coca cola, fanta, sprite, Pepsi which are storage into glass. Glass bottle drink has great significance for assessment of patients health condition for organs examination on a computer interphase screen, voice interpretation, goggle glass for personal protection equipment in fabrication and metal forming processes etc. Using the kinetic theory of matter, it is observed that when the molecular size of fluid in glass become heavier their motion towards the glass gradient[5-6] heat flux density wall lining increases by elastic collision but initially the momentum is conserved before force effect is initiated on the crystal cell of the glass material at 1500^0c . When glass bottle drink is placed on a fridge light bounce back to the aluminum surface coated in glass as bimetallic strip .While few sun rays are circulated at the white shinny film packing of the glass internodes of the spherical boundary with vortices at the top cork cover with a polymer seal material. Imperfection might occur by instrumentation and control error if the computer integration manufacturing operational function fails. It will decreases the anti rust formulation for a long period of time before actualizing the mold filling time for the glass before it solidifies and that depends on material thermal diffusivity. The nature of material thermal diffusivity varies for one material to another for instance, water at temperature 25^0c 0.0143 , glass is 0.43 , water vapor is 23.38 , hydrogen at 300k at 1 atmospheric pressure {atm} is 160 while carbon and its composite is 1220.

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The geometry of glass bottle drink shape for drink packaging [3-4] alongside it angle of clearance plays an important role for stress testing, hot working ,cold working, hardening and normalizing the glass bottle drink against crack effects .Zeroth and second of thermodynamics will be used to explain the cracking of glass bottle drink for instance, Sodium carbonate hydrate form system A, calcium carbonate form system B then cullet with mercury in glass thermometers form system C when [7]heated slightly , A and B are not equal in thermal equilibrium due to either covalent or ionic bond existence with their position in the electro chemical series down the group or across the period from the periodic table .If at constant volume when pressure increases due to temperature decreases the bond strength which is weaken is actuated to undergo [8] compressive stress at repose angle less than 30^0 c of glass accompanied by explode when the tensile stress decreases for ice occupancy in a closed glass bottle drink wall surface . In this regard when using the zeroth law, surface will reduce in volume by high stress only if both material are not having content slowing the heat by impurity in which activation energy is needed to avoid excessive lost [9] of heat of formation between fusion and vaporization points. These surface defects are due to uneven edge geometry, non uniformity of chemical composition, orbital size, molecular compounds, duration of loading , characteristics of manufacturing technique. Due to the sphere appearance of glass bottle drink vertical rims when the heat is concentrated at the base and pulled by force of gravity that is the liquid juice is exposed to sunlight because the base of the glass wall is thicker hence heat energy flows down. Contraction of the glass bottle is more when the glass is cooling below it[10] crystallization point limit due to thinner appearance of the sphere at the top by temperature that is the area expansion is half of it original differential area. As the pressure further increases in 7 minutes, the carbonate constituent pushes out air molecule to the inner cork evaporation to increase the gas bubble precipitate by diffusion which decreases the preservative formula in the solvent by the network modifiers mostly by value of 0.04 mol/dm^3 of hydrogen ion concentration from sodium [11] decahydrate of carbonate from the coke solution. Fatigue is accompanied with sudden cooling and heating of the glass surface igniting radical ion exchange at the forming process in a mould cavity before solidification during annealing completion stage .If the temperature is not controlled the slicer will not cut specific size for extrusion into more required mass. Then the heat treatment has to be repeated to maintain material integrity and avoidance of air porosity at the solidus temperature when the refractive index increases by increasing the electron density by $0.02g/cm^3$ on glass silicate containing drink juice.

Properties of glass

- It absorbs , refract or transmit light
- it is used for germs culture medium
- It is affected by an alkali metal, it has high melting point.

Uses of Silicon

- To produce concrete
- for sedative products
- for elemental silicon for tablets medicine
- To remove tooth plaque.
- Fining agent for juice drinks etc.

II. MECHANICAL AND ELECTROSTATIC FORCES ON GLASS SURFACE WALL.

The formulation of reagent to preserve the beverage liquid affects the glass internal surface roughness and because more ice reduces volume of the glass by 0.001 grams faster than it normal state due to the moles of[12] ice block compartment. The adhesive force between a liquid and the surface are stronger as they travel through short distance the transverse wavelength split them so fast, they will pull the liquid down, causing it to wet the surface when the light ray converges at angle less than 15^o .However, if the cohesive forces among the liquid itself are stronger, they will resist such adhesion and cause the liquid to retain a spherical shape and the neck extrusion surface. Further heating will affect the tensile strength within the electrostatic force to induce static vibration by partial area differential with a negative heat flowing from the system to the outer glass wall surface to originate fissure line into cracking by 0.005KN/m compressive stress.

Factors affecting glass are :

- Work material variables
- Hardness Tensile
- Strength
- Chemical composition
- Microstructure and method of production

III. LITERATURE REVIEW

In this research factors like heat, cooling rate, convection will be discuss which makes this research different and very importance for glass air blow compressing and annealing process. Other researchers focus on wine bubbling and relevance of glass for aesthetic value. Since glass is made from silicate [13], the chemical formula for sand is silicon dioxide. From the bond formation the electronic configuration of silicon is 2, 8, 4. While for oxygen the electronic configuration is 2,6 that is oxygen needs 2 electrons to be stable in it outermost shell for silicon to form stable octet structure. A catalyst is needed to speed up temperature for glass melting and modeling using activation energy to be less than temperature range 1500-1550^0c .when silicon dioxide react with basic salt like sodium hydroxide or oxide compound it forms a silicates with glass then the silica bond will be si-o-si which affects the crystalline structure of glass due to covalent bond between oxygen and silicon whereby hydrogen is displaced from the chemical reaction and oxidize by two free electrons at the outermost shell to form water vapor with four volume of hydrogen and one volume of oxygen in ratio 2:1 by stoichiometry rate using the random[16] network modifier.

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Packaging crystal cell and heat effect

Packaging of food is affected by the following criteria namely:

- Light
- Humidity
- Heat
- Air
- External impact force

For the purpose of this research, the effect of light and heat will be key factor in glass manufacturing. Firstly, packaging it is an aspect of preventing, storing and monitoring of food from contaminant which could harm the end user of a given commodity. Some other importance of food packaging are: climatic change, food inflation and artificial scarcity. Researchers categorized packaging of food into four ways of degradation. This research only focus on degradation by physical change such as surface cell[14] deformation, heat and mass transfer. During transport process the glass bottle is exposed on a truck over a long distance before getting to the manufacturing site. Within such period the refractive index of the glass within the edges or at the centre of gravity which is affected due temperature increase with decreasing cooling rate at the transformation point since glass does not undergo crystallization phase with steady speed of heat flux. During annealing the tensile strength of the glass is affected by chips, crack or flaw which speed up breaking point of the glass crystal because the tensile stress concentrate at the tip of the glass bottle drink. Relatively high alkali increases the thermal expansion coefficient by 26 [15] times by an empirical study. The crystal wall is altered by ion exchange due to hydrogen and hydroxyl ion electro positivity and electro negativity by dissociation variation to form high or low PH value to create photonic reaction by chemical attack on internal surface of the glass when the thickness decreases by poise 10^{13} dyne-second/cm².

IV. EXPERIMENTAL ANALYSIS ON GLASS WALL SURFACE BY FORCE IMPACT DUE TO CREEP.

The following apparatus were used to carry out this experimental analysis namely:

Mercury in glass thermometer, digital stop watch, white ceramic tiles, colored glass 7.5m by 2m acting as a sacrificial surface, crown glass with refractive index 1.47-1.65 with 10 percent alkali metal silicate adsorption, Bunsen burner, tripod stand, R thermocouple temperature range 1600-2640 k. The colored glass is attach to the white tile for easy detection of light rays and color variant of drinks using chromatography process towards transmission at an angle of 30 ^{0} with a height of 4m and the water vapor flow rate was 55.3m^3/sec to detect the mold filling time at 21.70 sec penetration limit of heat flux density when the pressure increases, the glass particle get excited to shrinks the grain structure of the glass at 165.70 ^{0}c/ 12minutes at the base of the glass. At the top the thermal diffusivity[17] decreases with force of gravity to compensate energy loss by the soft drinks collision when the initial mass is conserved inside the glass by chemosynthetic process at 71.24 ^{0}c/ 9minutes. Subsequent increase of heat generated by the surface at 180^{0}c/35 minutes conduction due to the effect of increasing relative humidity and air dust mixture by the electrolytes with a negligible cold effect of 1.02- 0.03. After sometimes the collision of the sugar by diffusion tend to be zero to form coefficient of restitution in which the glass and the caramel solvent stick together to form perfectly inelastic collision within the wall of the glass.

V. RESULTS AND DISCUSSION

It is was observed that the boundary layer with minimum binding force is losing more crystal shape by solubility difference due to sand molecular structure and sizes inside the furnace while forming the glass .Since carbon is above silicon and silicon is tetrahedron in shape carbon will be preferentially discharge to pair with oxygen due to electro positivity of sodium atom .Because the relative humidity is above 67.7 percent from the chart flow analysis with a temperature variation of 9.57k by interpolation. It shows that white glass reflects more rays when kept in a sparkling environment of sun rays with a temperature of 6000k that is the white bulb interaction by heat is negligible with a temperature permissively to a range of 0.408k penetration with a lattice wave length of 2.99x 10^8 H_z approximately the speed of light .The figure below illustrates the boundary separation on heat flow by radiant energy of the glass bottle. Since the glass has two section of strata that is the shinny surface and the color surface surrounded by caramel preservative some of the rays will be in penumbra condition. The sugar solute retain some heat when the temperature decreases the kinetic energy with an increasing pressure at constant volume. The tensile stress is not uniformly distributed within the wall due to sudden impulse of fluid separation at 200 ^{0}c as illustrated in fig 1.0 below. While the top of the glass bottle unfilled absorb certain amount of heat due to caramel absence close to the cork suction pressure when using straw sip. The nature of the limestone with silicon dioxide mixture with the quartz content and volumetric composition plays an important factor in glass transformation. Since standard molar entropy associated with calcium oxide corresponds to 40 joules per mole Kelvin for every 5second of glass tremor within the [18]surface condensate .It means the boundary layer get a destructive wave pattern inwardly when it flow unsteady of heat energy. The glass required controlled cooling then melting and forming due to the presence of methylimidazole flash section as illustrated by fellow researchers .For this research a new dimension was initiated below with brick red[19] coloration contour in fig 1.0. The intermolecular forces will be explain in three aspect namely such as,

a. Chemical adhesion
b. Diffusive adhesion
c. Dispersive adhesion

Critically the chemical adhesion will be discussed by boundary separation roughness which increases and drop in pressure by glass wall design prototyping by modeler based

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on logo promotion or trade mark in the competitive market. Sugar condensate form films at the centre which increases the parting line for cracking due to stress- strain factor. Force of gravity is high when the gas particulate falls down which increases geometric tolerance volumetrically within the glass bond by affecting the heat circulation within the point of unequal extruding curvature of the glass prism rays into penumbra appearance.

Parameters for making reinforced glass for better fluid packaging with Aluminium Pellets.

- Functionality of the sand or silicates
- Better understanding of the internal and external pressure effect for molding the glass shape
- What pattern of the glass to be used to resist precipitation
- Geographical data distribution of the glass and critical ergonomic analysis
- How super cooled glass will flow during filling and feed during solidification of the pattern

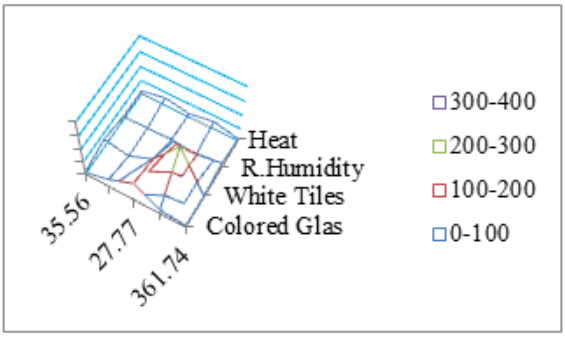

Fig 1.0 Lattice Wave Front by Vibration Glass ergonomic design for proper annealing should be based on surface and solid modeling.

Stress KN/m	Temperature k Of shinny Glass	Temperature k Of colored Glass	Liquid flow m/s
15	63.41	49.33	0.02
30	93.64	76.82	0.06
45	109.49	19.64	0.81
60	135.15	127.6	1.05
75	171.00	160.05	2.29

Table 1.1 Variation of Temperature between shiny glass and sugar caramelized solvent surface by adsorption.

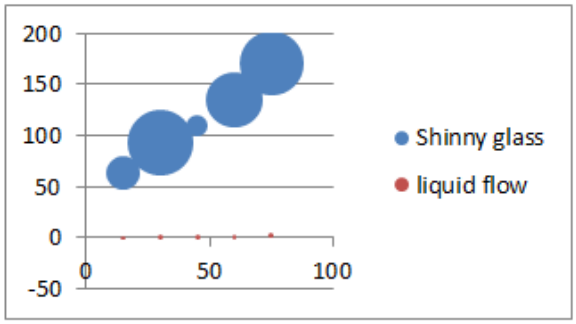

Fig 1.12 stress against temperature.

Glass has a weight and it cubic thermal expansion is affected by it forming ability at above solidus temperature in it microstate and microstate. If the maximum principal stress of the glass is 200Gpa that is the coldness of water content should not go above -273 ^{0}c to prevent sudden V ice cracking that will explode the glass free mobility of fluid by Wind bombardment of small particles of immiscible fraction of rocks, salt, sand silicates impurities to create microscopic craters which retain moisture diffusivity and pressure drag, causing corrosion of the glass and the weakening factors. [22]. It has been reviewed that the outer layer glass homogeneity depends on the redox reaction of silicate glass gel and percentage of relative humidity by psychometric chart. As the temperature increases the 2+ ion in calcium atom and 1+ ion in sodium carbonate at the bottom layer of the glass shift the it decomposition reaction to favor the product not the reactant working condition which tend to absorb coldness of the glass, which increases the heat with an outward heat generation on the glass surface by decreasing it elasticity which reduces the uniformity and strength of glass corrodible to wet environment due to chemical factor [23] interaction (Fig. 10). The homogeneity of the glass is highly dependent on after heating to 1000°C temperature glass strength decreases the quality (homogeneity) of the batch, conditions of by 25%, while the 10-hour exposure at 520°C melting phase to make hot working condition of the new product [20]. By choosing cullet with different parent material the chain of bond strength decreases by 47.4% composition in the manufacturing cycle before solidifying into saturation phase of heating formation of irregularities on the surface to eliminate non homogeneity of the nucleus cell of the material that is internal pressure decreases the strength of removing the glass surface layer partially reduced two linear expansion [21].

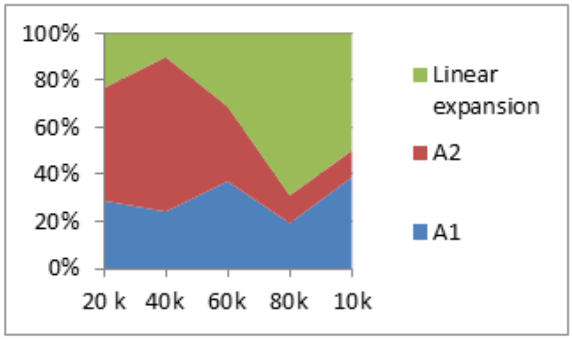

Fig 2.01 Area expansion by reducing the crest the amplitude due heat flux by an endothermic reaction phase.

The Perfect shape of the glass for instance, rounded silica of sand grain differ from one location by surface sand texture, fluid percolation, physical and chemical characteristics due to agent of denudation and geological difference. The above chat flow indicates that glass has two partition of uneven cooling which the annealing process is needed to be monitored by using finite element method, finite element analysis, computer integration method and computer aided engineering. First the neck and bottom is not specifically[24] mutual within a repose angle. When the molten glass gel gets to the bottom of the furnace, a force

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pulls the air pool to the neck initially to remove undulating elasticity of the container because more heat is needed to melt the sand. At the lehr section air is blown by compression which expand the glass wall but the area A1 contains soda ash while A2 is lime composites or calcium carbonate. Hence, For very thin films, the difference in path lengths of creep in A1 and A2 [25]in fig is 2.01 is negligible at increasing pressure at standard molar volume of 22.4dm^3.

Due to polarization of light through the glass prism from temperature variation in fig 1.12 when the temperature decreases the pH scale from 7.0 to 4.0 to increase the glass flaw in contact with magnesium ion and fillers to form pool of insoluble chemical at super heated temperature which affects the saturation effect when the solubility[27] is more alkaline in nature with an increasing ionic radii which makes the rate of reaction delayed to absorb thermal cracking by 57 percent.

VI. CONCLUSION

This research analysis was based on condition when the elementary crystal cell or atoms and the bond is higher than threshold value when the solid glass undergo diluents stagnation with shearing force. During annealing the heat energy is not uniformly distributed over the molten glass at the critical glass transition temperature above this phenomena temperature of the glass it turns from molten liquid phase to solid without reinforcement of the molecules to have string of strong bond . But at – 38.64C anomalous[29] phase the beverage or juice in a glass was affected by verification process when the speed of the reagents inside the glass cools with lower heat transit without proper diffusion or bubble to be at rest. For a critical ergonomic design of glass bottle drink the outer surface should be mixed with aluminum nanostructure molecule by 0.24nm modify volumetric thickness of the glass wall. While the inner wall of the glass should be increase by 6.62 m wavelength in 40.33 mol/dm3 concentration per cullet at forming phase before solidifying the glass into core mold. It was observed that for every cooling of the glass bottle drink the glass adsorbs heat from the bottom edges more than the tip then[26] colder at the top than the base in other to annul this phenomena, the aluminum with 3 electrons at the least shell should undergo covalence with oxygen, sodium and calcium to form new isotope dilution for easy thermal equilibrium by using the third law of thermodynamic to split the moles percentage composition by specific ratio as Al: Na: O in 10:1:10 .The least shell will have one lone pair electron revolving the orbits in every 3.02 sec with an energy of 1.4J to resist light penetration which can change possibility of the ingredient glass bottle or plaque [28]]stains at the cork bottle due to anaerobic respiration of microorganism. Some compound are not amphoteric in nature like aluminium that is they might risk light resistivity in high index . To avoid glass cracking a new prototype of base like spiral lining should be introduced into modeling of constructive solid geometry interphase to transit heat slowly with a reverberation time[30-31] of 1.69 sec through a speed of light of 2.99e-8 through the inverted cone broken out sectioning of the glass boundary for selective migration of ions and control of vibration on glasses when the temperature goes below -0 ^{0}c to -38.5 ^{0}c by water anomalous behavior with an increasing internal bond strength above recrystalization temperature point at a variable pressure. Using the theory of black body it is noticed that when a glass bottle is placed in a dark room the surface body gets cooler[32] the more than when the body radiation is at a optimum point less heat energy is liberated as the glass is kept at standard atmospheric pressure.

VII. RECOMMENDATION

When designing a glass bottle drink the falling of molten glass or metal should be avoided while the selection of allowances should be critically guided on surface and solid modeling to retain priority and avoid rejections for drink packaging. An evaluation on grain growth, crystallography, rate of cooling glass bottle, annealing, permeability ratio towards forecasting of molten aluminium has to be in state of cullet percentage proportion as the film migrate from one boundary to another without defects when polishing exterior surface to minimize crack possibility and misrun inside the molten fluid due to an electrolytic corrosion by the sticking of bubble gas into skin friction and viscosity index that is effect of under cooling temperature, nucleus initiation and overheating of crystal cell of molecular structure rearrangement of tensile or compressive stresses against mean crack aperture with destructive wave crest by elastic force propagation with a constant value of 0.94 , velocity 0.305m/s to maintain the hydrostatic pressure of the sugar to absorb heat diffraction grating.

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