

Search query (3): [SP]: background [0001] fire endurance and/or resistance of gypsum wallboard is generally a standardized testing procedure that can be carried out for various different wall construction types. typical testing is carried out to determine the time required for a passive wall structure, which includes gypsum board assembled onto studs, to fail when exposed to a standard fire. the fire endurance of a system can depend on various factors, for example, the type and thickness of gypsum board used in the system, the wall structure and/or thickness, the type of studs used to construct the wall, stud spacing, gypsum board size and orientation, use of insulation in the wall cavity, load bearing of the wall, and others. for objectively evaluating fire endurance of wall structures, standardized testing has been developed for some commonly used wall structures.[0002] the most common assemblies are three test designs defined by underwriters laboratories, inc. (ul(r)), a third party testing and certification agency. these common tests, which are designated as u305, u419, and u423, test wall assemblies using wooden or metal studs for walls having wall boards assembled on both sides of the studs and at various wall thicknesses, where the walls may or may not be load bearing. for a fire rating to be assigned to a particular board, a minimum time to failure must be exhibited by the wall board before failure occurs. in this context, failure involves a loss of wall integrity due to fire, or excessive temperature rise. excessive temperature rise failures are determined when the average temperature of the unexposed surface of the wallboard increases more than 121.1 degrees centigrade (250 degrees fahrenheit) above ambient, or any individual thermocouple in the test assembly rises more than 162.8 degrees centigrade (325 degrees fahrenheit) above ambient.[0003] gypsum is widely used in residential and commercial building constructions because of its superior fire endurance. gypsum's chemical composition is calcium sulfate dihydrate (caso4.2h2o). the two water molecules in gypsum crystals are chemically bonded and it is often termed "crystallized water". it is those two molecules of water that render gypsum high heat resistance. upon reaching about 101.7 degrees centigrade (about 215 degrees fahrenheit), one and half molecules of water are driven off from one molecule of gypsum as it is converted into hemihydrates (caso4. h2o). when the temperature reaches 121.1 degrees centigrade (250 degrees fahrenheit), the remaining half molecule water is lost as gypsum is converted into anhydrite (known as stucco). both reactions are endothermic, which enables heat absorption by the gypsum as it is converted from dihydrate to anhydrite. the combined thermal energy requirement amounts to 9.828e+004 calories (390 btu)/lb or 906 kj/kg. each of these two reactions, as they occur successively while a sample is heated, occurs at its respective temperature such that a temperature trace will exhibit two inflection points, one near 121.1 degrees centigrade (250 degrees fahrenheit) and the other near 100 degrees centigrade (212 degrees fahrenheit). at the second inflection point, the slope of the curve will also change in part due to latent heat for free water evaporation. [0004] the crystallized water loss process is commonly referred to as calcination. after calcination is completed, heat transfer through the gypsum board becomes a basic heat transfer process by conduction, convection, and radiation. in a wallboard test assembly, heat is first transferred from the furnace to the surface of exposed board through a combination of convection, conduction and radiation. as the surface temperature of the exposed wallboard increases, the temperature gradient across the board increases. if the wallboard maintains its structural integrity during a fire, it effectively blocks the passage of flame and hot air. during this condition, the primary mode of heat transfer is conduction through board. conductive heat transfer through the board depends on thermal conductivity of the wallboard. inside the cavity formed between two wallboards in a stud wall assembly, heat is primarily transferred through convection and conduction. convection is attributed to air circulation within the cavity between the two boards in a wall assembly. heat conduction within the wall cavity is also present during testing. at those unexposed wallboard surfaces within the cavity, i.e., wallboard portions exposed between studs, heat is transferred from the cavity side to the outer, ambient side at a lower rate because of the lower temperature gradient that exists between the cavity and the outer portion of the wall.[0005] fire endurance ratings are typically obtained by performing a full-size (at least 100 ft2 of wall area) fire test in a certified fire test laboratory per astm standards. the test is time-consuming and expensive. moreover, the scale of standard testing is not well suited for laboratory testing of wallboard samples during new product development, end-of-line quality control testing, or the like. these and other drawbacks of standardized testing methods and systems can be overcome as provided herein. summary [0006] in one aspect, the disclosure describes a method for predicting wallboard fire performance in a standard test. the method includes mounting a sample of a wallboard to be tested into a fixture so that one side of the sample is exposed to a heat source. a cavity is created between the sample and the fixture such that the sample is disposed between the heat source and the cavity. a temperature is measured and monitored at a predetermined location within the cavity over time. a series of temperature readings is recorded using a computer-readable medium and analyzed, at least in part, by creating a temperature trace of the series of temperature readings over time. an index time at which the temperature reaches a predetermined temperature threshold at the predetermined location within the cavity is determined. the index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted.[0007] in another aspect, the disclosure describes a method for testing the fire endurance and/or performance of a wallboard sample. the method includes mounting the wallboard sample across an opening of a chamber of a muffle furnace having temperature control, wherein one side of the wallboard sample is exposed to an oven temperature. a cavity is created between the wallboard sample and an oven door configured to enclose the chamber. a sample temperature is measured at a predetermined location within the cavity over time. the sample temperature is monitored and recorded with respect to time using a computer-readable storage medium. sample temperature information is analyzed, at least in part, by creating a temperature trace and by determining an index time at which the sample temperature reaches a predetermined temperature threshold. the index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted.[0008] in yet another aspect, the disclosure describes a method for producing wallboard. the method includes building a composite wallboard structure in a manufacturing facility using a particular batch of gypsum slurry to form a core portion of the composite wallboard structure. a sample of the composite wallboard structure is extracted. the sample is tested in a small-scale test so that a fire performance of the composite wallboard structure in a full-scale test can be extrapolated. in one embodiment, the small-scale testing is carried out by mounting the sample into a fixture so that one side of the sample is exposed to a heat source, creating a cavity between the sample and the fixture, wherein the sample is disposed between the heat source and the cavity, and measuring a temperature at a predetermined location within the cavity over time. the temperature is monitored over time and a series of temperature readings is recorded using a computer-readable medium. the series of temperature readings is analyzed, at least in part, by creating a temperature trace of the series of temperature readings over time, and by determining an index time at which the temperature reaches a predetermined temperature threshold at the predetermined location within the cavity. the index time is correlated to the full-scale test using the computer-readable medium and, based on the correlation, a fire performance of the composite wallboard structure in the full-scale test is predicted. the composite wallboard structure is released for sale to consumers when the fire performance of the composite wallboard structure is predicted to be within acceptable parameters. brief description of the drawings [0009] fig. 1 illustrates a cross section of a wall board in accordance with the disclosure.[0010] fig. 2 illustrates a side view of a board forming system in accordance with the disclosure.[0011] fig. 3 illustrates a top view of a board forming system in accordance with the disclosure.[0012] fig. 4 is a representative temperature trace for a tested sample in accordance with the disclosure.[0013] fig. 5 is a chart illustrating a correlation between testing methods in accordance with the disclosure.[0014] fig. 6 is a temperature trace for treated and untreated samples tested in accordance with the disclosure.[0015] fig. 7 is a temperature trace for treated and untreated samples tested in a standard test.[0016] fig. 8 is a flowchart for a

Results: 4

Search history

Search (pn=W02015/057598) (Results 1)

1:

Search [SP]: testing apparatus and method a system and method for predicting wallboard fire performance in a standard test includes procuring a sample of the wallboard for testing, and mounting the sample into a fixture so that one side of the sample is exposed to a heat source. a cavity is created between the sample and the fixture such that the sample is disposed between the heat source and the cavity. a temperature measurement is taken at a predetermined location within the cavity over time, and the temperature is monitored and recorded as a series of temperature readings using a computer-readable medium. the series is analyzed to determine an index time at which the temperature reaches a predetermined temperature threshold. the index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted. (Results 0)

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describes a method for predicting wallboard fire performance in a standard test. the method includes mounting a sample of a wallboard to be tested into a fixture so that one side of the sample is exposed to a heat source. a cavity is created between the sample and the fixture such that the sample is disposed between the heat source and the cavity. a temperature is measured and monitored at a predetermined location within the cavity over time. a series of temperature readings is recorded using a computer-readable medium and analyzed, at least in part, by creating a temperature trace of the series of temperature readings over time. an index time at which the temperature reaches a predetermined temperature threshold at the predetermined location within the cavity is determined. the index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted.[0007] in another aspect, the disclosure describes a method for testing the fire endurance and/or performance of a wallboard sample. the method includes mounting the wallboard sample across an opening of a chamber of a muffle furnace having temperature control, wherein one side of the wallboard sample is exposed to an oven temperature. a cavity is created between the wallboard sample and an oven door configured to enclose the chamber. a sample temperature is measured at a predetermined location within the cavity over time. the sample temperature is monitored and recorded with respect to time using a computer-readable storage medium. sample temperature information is analyzed, at least in part, by creating a temperature trace and by determining an index time at which the sample temperature reaches a predetermined temperature threshold. the index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted.[0008] in yet another aspect, the disclosure describes a method for producing wallboard. the method includes building a composite wallboard structure in a manufacturing facility using a particular batch of gypsum slurry to form a core portion of the composite wallboard structure. a sample of the composite wallboard structure is extracted. the sample is tested in a small-scale test so that a fire performance of the composite wallboard structure in a full-scale test can be extrapolated. in one embodiment, the small-scale testing is carried out by mounting the sample into a fixture so that one side of the sample is exposed to a heat source, creating a cavity between the sample and the fixture, wherein the sample is disposed between the heat source and the cavity, and measuring a temperature at a predetermined location within the cavity over time. the temperature is monitored over time and a series of temperature readings is recorded using a computer-readable medium. the series of temperature readings is analyzed, at least in part, by creating a temperature trace of the series of temperature readings over time, and by determining an index time at which the temperature reaches a predetermined temperature threshold at the predetermined location within the cavity. the index time is correlated to the full-scale test using the computer-readable medium and, based on the correlation, a fire performance of the composite wallboard structure in the full-scale test is predicted. the composite wallboard structure is released for sale to consumers when the fire performance of the composite wallboard structure is predicted to be within acceptable parameters. brief description of the drawings [0009] fig. 1 illustrates a cross section of a wall board in accordance with the disclosure.[0010] fig. 2 illustrates a side view of a board forming system in accordance with the disclosure.[0011] fig. 3 illustrates a top view of a board forming system in accordance with the disclosure.[0012] fig. 4 is a representative temperature trace for a tested sample in accordance with the disclosure.[0013] fig. 5 is a chart illustrating a correlation between testing methods in accordance with the disclosure.[0014] fig. 6 is a temperature trace for treated and untreated samples tested in accordance with the disclosure.[0015] fig. 7 is a temperature trace for treated and untreated samples tested in a standard test.[0016] fig. 8 is a flowchart for a (Results 4)

Title: FIRE RESISTANT WALLBOARD

Abstract: Source: US3616173A (Claim 1) 1. 1. Fire resistant wallboard having a core comprising the set product of: Weight Percent _____ Calcium sulfate about 71.5 to about 99.0 Glass fibers about 0.1 to about 1.0 Unexpanded vermiculite 0 to about 7.5 Small particle size inorganic material selected from the group consisting of clay, colloidal silica and colloidal alumina and mixtures thereof about 0.5 to about 20.0 _____ the core having a density ranging from about 40 to about 50 pounds per cubic foot, the amounts and proportions of ingredients comprising the core being such that when the core has a thickness of 0.5 inch, the core has a shrink resistance ranging from about 60 to about 85 and a temperature failure value ranging from about 1,200 DEG F. to about 2,000 DEG

Classifications:

International (IPC 8-9): E04B1/94 (Advanced/Invention); E04B1/94 (Core/Invention)

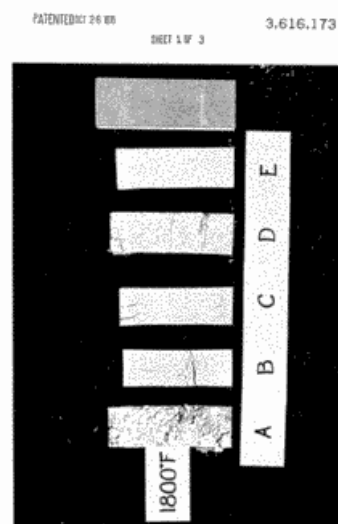
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European: E04B1/94

US: 106/711 156/39 156/42 161/162 428/331 428/921

PatBase - US3616173_A



Family:

Publication number	Publication date	Application number	Application date
US3616173 A	19711026	US19670664021	19670829

Priority:

US19670664021 19670829

Probable Assignee: GEORGIA PACIFIC CORP

Assignee(s): (std): GEORGIA PACIFIC CORP

Inventor(s): (std): SUNDBERG DONALD G ; GREEN GEORGE W

Inventor(s): GEORGE W GREEN ; DONALD G SUNDBERG

Title: LIGHTWEIGHT, REDUCED DENSITY FIRE RATED GYPSUM PANELS

Abstract: Source: US2012219785 A reduced weight, reduced density gypsum panel that includes high expansion vermiculite with fire resistance capabilities that are at least comparable to (if not better than) commercial fire rated gypsum panels with a much greater gypsum content, weight and density.

Classifications:

International (ipc 8-9): B28B1/14 B28B1/30 B28B1/50 B28B11/12

B28B11/14 B28B11/24 B32B13/00 B32B13/02 B32B17/02

B32B27/32 B32B3/00 B32B3/26 B32B38/00 B32B5/16 B32B5/20

B32B9/00 C04B11/00 C04B11/00 C04B11/28 C04B14/20

C04B14/38 C04B14/42 C04B14/46 C04B20/06 C04B22/10

C04B22/16 C04B24/22 C04B24/38 C04B28/14 C04B38/08

C04B38/10 C04B9/04 E04B1/88 E04B1/94 E04C2/04 E04C2/26

E04F13/075 (Advanced/Invention);

C04B11/00 C04B11/28 (Advanced/Non-invention);

C04B20/00 (Core/Invention)

CPC: B32B38/164 C04B28/145 C04B211/0062 C04B211/28

C04B14/386 C04B14/42 C04B14/46 C04B20/0024 C04B22/16

C04B24/38 C04B38/0054 C04B38/106 C04B2103/408 C04B14/202

Y10T428/249968 Y10T428/249979 Y10T428/26 Y10T428/31971

E04C2/04 B28B11/12 B28B11/243 B32B9/005 B32B5/16 E04B1/942

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European: C04B20/06 C04B28/14H M04B11/00T6B M04B11/28

US: 106/772 106/788 156/43 428/220 428/312.4 428/312.400P

428/315.7 428/332 428/426 428/426S 428/532 428/532S 428/703

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PatBase - US2012219785_AA

Patent Application Publication Aug. 30, 2012 Sheet 1 of 54 US 2012/0219785 A1

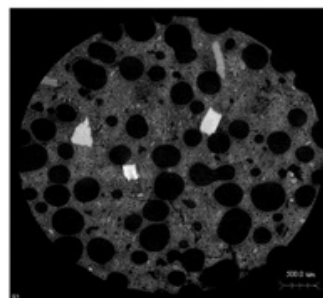


FIG. 1

Family:

Publication number	Publication date	Application number	Application date
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AU2012222102 BB	20131219	AU20120222102	20120224
AU2012222102 CA	20160602	AU20120222102	20120224
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AU2015100420 AD	20150507	AU20150100420	20150401
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AU2016203721 AA	20160623	AU20160203721	20160603
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WO12116325 A1	20120830	WO2012US26613	20120224

Priority:

AU20120222102	20120224	AU20140201626	20140318	AU20150201675	20150401
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US20110446941P	20110225	US20120669283	20121105	WO2012US26613	20120224
US20140181590	20140214	EP20120709203	20120224	JP20150100879	20120224
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Probable Assignee: UNITED STATES GYPSUM CO

Assignee(s): (std): LI ALFRED ; LUAN WENQI ; SONG WEIXIN D ; UNITED STATES GYPSUM CO ; VEERAMASUNENI SRINIVAS ; YU QIANG ; USG CORP ; YUNAJTED STEJTS DZHIPSUM KOMPANI

Assignee(s): UNITED STATES GYPSUM COMPANY

Inventor(s): (std): SONG WEIXIN DAVID ; YU QIANG ; WEIXIN DAVID SONG ; VEERAMASUNENI SRINIVAS D ; VEERAMASUNENI SRINIVAS ; SONG WEIXIN D ; QIANG YU ; LUAN WENQI ; LU QIANG ; LI ALFRED ; WENQI LUAN ; WEIXIN D SONG ; SRINIVAS VEERAMASUNENI ; ALFRED LI

Agent(s): JAMES AND WELLS INTELLECTUAL PROPERTY; MOFFAT AND CO; SCHUETTE HARTMUT; BSB INTELLECTUAL PROPERTY LAW; BAHAR SANTOSO SH; LEYDIG VOIT AND MAYER LTD; PHILIP T; DAVID F; PRADIP K; FILBIN PAUL J ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: TESTING APPARATUS AND METHOD

Abstract: Source: US2015103861A A system and method for predicting wallboard fire performance in a standard test includes procuring a sample of the wallboard for testing, and mounting the sample into a fixture so that one side of the sample is exposed to a heat source. A cavity is created between the sample and the fixture such that the sample is disposed between the heat source and the cavity. A temperature measurement is taken at a predetermined location within the cavity over time, and the temperature is monitored and recorded as a series of temperature readings using a computer-readable medium. The series is analyzed to determine an index time at which the temperature reaches a predetermined temperature threshold. The index time is correlated to a standard-test fire performance using the computer-readable medium and, based on the correlation, a fire performance of the wallboard in a standard test procedure is predicted.

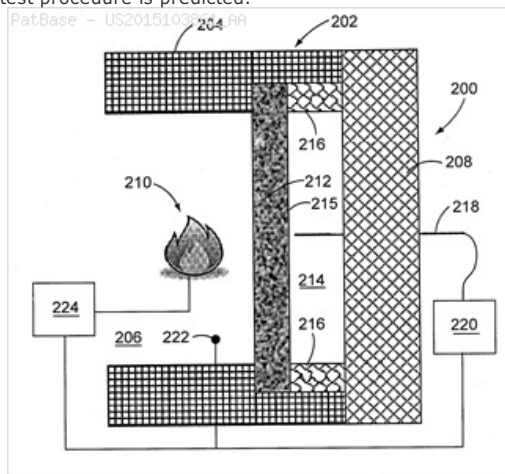
Classifications:

International (IPC 8-9): G01K3/04 G01N25/18 G01N25/50

G06F11/30 (Advanced/Invention)

CPC: G01K3/04 G01N25/18 Y10T29/49771 G06F11/3058 G01N25/50 G06F11/30

US: 29/407.05 374/103

**Family:**

Publication number	Publication date	Application number	Application date
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TW201514484 A	20150416	TW20140133312	20140925
US2015103861 AA	20150416	US20130054649	20131015
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Title: BURNING-RESISTING EXPERIMENTAL METHOD OF BURNING-RESISTING CONVEYOR BELT

Abstract: Source: CN104964998A The invention relates to a burning-resisting experimental method of a burning-resisting conveyor belt, which mainly includes two groups of experiments for simulating a damage critical point under the situation of a normal working temperature of 600 degrees centigrade and the instantaneous temperature of 900 DEG C, experimental data acquired by virtue of the two groups of experiments fill a corresponding sheet to provide accurate experiment data to the research and development personnel, thus being convenient for analyzing the performance of the burning-resisting conveyor belt. The burning-resisting experimental method has beneficial effects that the detection of various burning-resisting indexes of the conveyor belt in a real application environment can be simulated, the detection data is accurate, the production and detection requirement of the burning-resisting conveyor belt can be met, the instruction work can be performed by the technical personnel according to the experimental data, and accurate data can be provided in the process for researching and developing the burning-resisting conveyor belt.

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