1 INTRODUCTION
1.1 Natural Gypsum
1.2 Synthetic Gypsum
1.3 Insoluble Anhydrite
1.4 Utilization
1.4.1 Dehydration
1.4.2 Rehydration
1.4.3 Limitations for Utilization
1.5 Published Information

2 HISTORY
2.1 Scientific Aspects
2.2 Practical Aspects

3 ORIGIN
3.1 Natural Gypsum
3.2 Natural Insoluble Anhydrite
3.3 Synthetic Gypsum and Synthetic Insoluble Anhydrite
3.3.1 Flue-Gas Desulfurization Gypsum
3.3.2 Phosphogypsum
3.3.3 Other Synthetic Gypsum
3.3.4 Synthetic Fluoroanhydrite

4 BASIC PROPERTIES.
4.1 Phases
4.2 Dihydrate and Dehydration Products
4.2.1 Dihydrate
4.2.2 Dehydration
4.2.3 α-Hemihydrate and β-Hemihydrate
4.2.4 Soluble Anhydrite
4.2.5 Insoluble Anhydrite
4.3 Rehydration to Dihydrate
4.3.1 From Hemihydrate
4.3.2 From Insoluble Anhydrite
4.3.3 Acceleration and Retardation
4.4 Misconceptions.
4.4.1 Soluble Anhydrite “Prime”
4.4.2 2/3-Hydrate
4.4.3 Colloidal Hydration
4.4.4 Formation of α-Hemihydrate in Stucco
4.4.5 Aging

5 CALCINATION PROCESSES
5.1 Natural Gypsum Preparation
5.1.1 Receiving and Storage
5.1.2 Drying
5.1.3 Crushing
5.1.4 Grinding
5.2 Flue Gas Desulfurization (FGD) Gypsum Preparation
5.2.1 Initial Drying
5.2.2 Receiving and Storage
5.2.3 Final Drying
5.2.4 Grinding
5.2.5 Agglomeration
5.3 Preparation of Other Gypsum and Anhydrite
5.3.1 Phosphogypsum
5.3.2 Titanogypsum
5.3.3 Insoluble Anhydrite
5.4 Calcination Methods
5.4.1 Batch Kettle.
5.4.2 Continuous Kettles
5.4.3 Submerged Combustion Kettles.
5.4.4 Conical Kettle
5.4.5 Rotary Kilns
5.4.6 Impact Mill Calciner
5.4.7 Ring Ball and Roller Mills
5.4.8 Calcidyne Unit
5.4.9 Anhydrous and Multiphase Plaster
5.4.10 α-Hemihydrate Plasters

6 PROPERTIES OF STUCCOS AND PLASTERS.
6.1 Stucco Requirements
6.2 Wet Plaster Properties
6.2.1 Normal Consistency
6.2.2 Setting Characteristics
6.2.3 Volume Changes
6.3 Properties of Hardened Plaster (Gypsum)
6.3.1 Drying Conditions
6.3.2 Apparent Density and Porosity
6.3.3 Strength
6.3.4 Temperature Tolerance
6.3.5 Fire Protection

7 GYPSUM BOARD
7.1 Essential Manufacturing Features
7.1.1 Board Weight.
7.1.2 Fire Resistance
7.1.3 Board Strength
7.1.4 Water Demand
7.1.5 Setting Behavior
7.2 Core Manufacturing
7.2.1 Stucco Supply
7.2.2 Volumetric Feeder
7.2.3 Additive Systems
7.2.4 Pin Mixer
7.2.5 Roll Coater
7.2.6 Forming Table.
7.3 Core Composition
7.3.1 Gauging Water
7.3.2 Foam System
7.3.3 Accelerator System
7.3.4 Retarders
7.3.5 Starch
7.3.6 Other Additives
7.3.6.1 Boric Acid
7.3.6.2 Water Reducing Agents
7.3.6.3 Paper Pulp
7.3.6.4 Hydrophobes (Asphalt Wax Emulsions/Silicones/Siloxyanes)
7.3.6.5 Glass Fiber, Vermiculite, and Clay
7.4 Paper Liners
7.4.1 Paper Handling
7.4.2 Paper Liner Performance
7.5 Conveyor Section to Dryer
7.5.1 Board Conveyors
7.5.2 Knife
7.5.3 Acceleration and Transfer Section
7.5.4 Bond between Core and Paper
7.6 Board Drying and Handling
7.6.1 Board Drying
7.6.2 Dry Board Handling
7.7 Joint Compounds and Cements
7.8 Recycling

8 GLASS MAT GYPSUM BOARD
8.1 Sheathing
8.2 Backing Board.

9 GYPSUM FIBER BOARD

10 TESTING, ANALYSIS, AND INSTALLATION
10.1 Materials Testing
10.2 Materials Specifications
10.3 Product Testing
10.4 Product Specifications
10.5 Testing Problems
10.6 Analyses
10.7 Application and Installation Procedures