GRACE
CONSTRUCTION PRODUCTS

QUALITY CONTROL MANUFACTURING MANUAL

STANDARD CONTROL TEST NO A-100, Rev. C

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PLAINTIFF'S EXHIBIT

USG-1662

REVIEWED	
DATE	INITIALS

QUALITY CONTROL OPERATING INSTRUCTION

SUBJECT: MONOKOTE Set Time Control

A. Objectives:

1. To provide the Plant Manager with an established procedure for working with gypsum suppliers to purchase raw material which will give MONOKOTE set characteristics that meet CPD finished goods specifications.

2. To provide the Plant Manager and Manufacturing Management with control limits to be applied to set time data which will result in immediate corrective action when any changes in the manufacturing process produce non-standard finished product performance.

3. To provide each manufacturing plant a permanent, chronological record of the set characteristics of finished MONOKOTE which will serve as a valid basis for dealing with field performance complaints and product liability claims.

B. Quality Control Procedure:

1. Our gypsum suppliers will furnish a quality report (including C-7A set times and receipts of new vermiculite samples) to the Zonolite Plant Manager with each truck load shipment (sample attached). Each Plant Manager will maintain a chronological file of these reports. Reports will be retained in this back-up file for at least one (1) year.

2. A copy of the Quality Control set time chart will be sent to the gypsum supplier, on a monthly basis, in order to keep him informed of current MONOKOTE set times. This is especially important in the event that set times continually fall outside the set time specification ranges. The Plant Manager will also keep the gypsum supplier supplied with samples of vermiculite by sending a 4.1 cu. ft. bag of vermiculite (representative of the material incorporated in that day's MONOKOTE production) every two months. Included with the bag of vermiculite will be an attached form that will tell the gypsum supplier to throw away all remaining vermiculite samples and only to use the material in the new sample bag for set time testing (sample attached) during the next two months.

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C. Gypsum Quality Control Responsibilities:

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1. Technical performance specifications for all gypsum purchases by CPD for use in MONOKOTE will be established by Central Research and Manufacturing. These specifications will be communicated to Purchasing and to all Manufacturing Plant Managers in the standard format of a raw material specification for ZOU (formulated gypsum).

2. The ZOU raw material specification will include a tabulation of ZOU suppliers meeting ZOU technical requirements, for each Zonolite Manufacturing Plant. Manufacturing plants purchase ZOU only from approved sources. ZOU purchases among competing but approved suppliers shall be determined by Central Purchasing on the basis of commercial considerations.

3. New gypsum suppliers must be qualified through Central Quality Control.

Supplier

1. Our gypsum suppliers will be responsible for controlling the set time of the ZOU they furnish so that the finished product set time of our MONOKOTE production falls within specified limits. The Standard Test Method C-7A (a thermal rise method) utilizing zonolite furnished standard samples of vermiculite aggregate will be used by our suppliers as the method of determining set time of ZOU.

Plant

1. Responsibility of the correlation of supplier reported ZOU sets and finished MONOKOTE set characteristics, as well as initiation of action to adjust ZOU sets to correct out-of-specification finished MONOKOTE sets, is the direct responsibility of the Zonolite Plant Manager (who will deal directly with the supplier's Plant Manager). If unusual difficulties are encountered, the Zonolite Plant Manager should request assistance from the Division Quality Assurance Manager.

2. Zonolite plants will not be required to run ZOU set times as long as supplier reports are being received and finished MONOKOTE set characteristics are normal.

D. MONOKOTE Set Time Control:

1. Set time testing will be done using mixed mortar samples prepared to carry out the vicat and wet mortar density tests C-3 and C-4. Plants will be expected to make one set time chart per operating shift. This testing procedure is described by Test C-8.

2. Set time data will be recorded on the face of the Recorder Chart as required by Test C-8.

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3. Recorder Charts will be retained in a chronological file for at least 6 months. A typical chart will be selected and mailed to the Division Quality Assurance Manager along with the Quality Control Chart monthly as required by Instruction A-101.

4. Any MONOKOTE batch tested which falls outside of the control limits should be immediately retested. If a retest still indicates a set time outside of the control limits, the Plant Manager will take the following action:

    1. Check for possibility of the use of an old gypsum lot number in the product.

    2. Inform Central Quality Control and General Plant Manager responsible.

    3. Inform the gypsum supplier.

5. In addition to the control limits, each plant formulation will establish shipping limits which will give more latitude than the control limits. No batch beyond the shipping limit may be sent out without approval from the General Plant Manager.

6. If the retest falls outside of the shipping limits, the batch will be classified "HOLD FROM SHIPPING".

7. To determine disposition of "HOLD" batches, inform Central Quality Control and the General Plant Manager. They should also be contacted when batches are 'held from shipping' or when strong trends toward non-specification performance show in the control charts.

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Attachment #1

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ZOU Quality Report

Ship Date_____

From_____ Plant Order #_____

Shipped to_____ Plant Bag Code_____

Change in vermiculite sample since last shipment Yes_____/No_____

Standard vermiculite sample dated _____.

Retarder level change since last shipment Yes_____/No_____

Increase_____/Decrease_____

Amount _____#/Ton

Normal Consistency Base Stucco _____

Set Time (Hrs:Min) Max._____ Min._____ Average_____

Temp Rise ^{o}F. Max._____ Min._____ Average_____

Copies to: Manager Receiving Plant, W. R. Grace & Co.
(internal copies)

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Attachment #2
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CONSTRUCTION PRODUCTS DIVISION

Vermiculite Sampling Form

FROM: W. R. Grace & Co. Zonolite Plant

_____

_____

TO: ZOU Gypsum Supplier

_____

_____

On this date _____ a 4.1 cubic foot bag of vermiculite is being sent to you. This particular sample is to be used for all vermiculite accelerated set time evaluations (C-7A) performed during the next two-month period of time. All other samples of vermiculite should be discarded upon receipt of the new samples. Receipt of the new vermiculite sample should be acknowledged by noting this occurrence on the standard Quality Report sent to Zonolite plants.

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