

JUNIOR-MANVILLE RESEARCH
AND ENGINEERING CENTER

MVJ R & D 1990

Date July 15, 1966

Title: SILICATED SUPEREX FURNACE BLOCK FROM REPUBLIC STEEL
CORPORATION AT GADSDEN, ALABAMA - Cause of Failure

Requested by: K. F. Greene

Request No. IID 2031

DEFENDANT'S
EXHIBIT

02-95

Summary

Assistance was requested in determining cause of failure of SUPEREX after two years service at the Sevindell Dressler annealing furnace in Gadsden, Alabama. The MgO value of the complaint sample was found to be appreciably lower than a standard sample of SUPEREX and a sample from their Lee Wilson furnace, which was in service for ten years. This was confirmed spectrographically.

From X-ray analysis, it is suspected that the complaint sample was subjected to higher temperatures than specified. It appears that more high temperature reaction products and penetration to greater depth in the complaint sample were formed in two years than in a serviceable sample, Lee Wilson, formed after ten years.

Material Submitted

PLAINTIFF'S
EXHIBIT
K-1524

Laboratory
Index No.

Description

A93-69-1

Complaint SUPEREX from Sevindell-Dressler annealing furnace.

A93-69-2

Standard SUPEREX from Waukegan.

A93-69-3

SUPEREX from Lee Wilson furnace.

Methods of Analysis

Conventional silicate procedures were used to determine the components. Calcium and magnesium were determined by EDTA titration.

Samples were also examined by X-ray and spectrographic techniques.

Results of Analysis

Chemical (on ignited basis)

	<u>Sevindell-Dressler</u>	<u>Standard</u>	<u>Lee Wilson</u>
SiO ₂	82.3	81.1	81.7
R ₂ O ₃	11.5	10.9	10.5
CaO	1.8	1.4	1.7
MgO	3.6	5.7	5.4
Ignition Loss at 1800°F	0.76	5.2	0.82
*Basic magnesium carbonate (MBC)	8.4	13.3	12.6

*These values are based on the total MgO content. The values are probably high by about one per cent because the MgO content of other constituents in SUPEREX was not considered in the calculation.

Notebook No. 3433, pp 21-22; 3366, p 43; 3379, p 39

File 432

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MVL 2 + 15 1990
Report No. 431-502

Date May 20, 1970

TITLE: FLAKING OF "SUPEREX" M, COMPLAINT REPORT NO. 70-RI-71-10

Requested by: Sales Service Request IN-985 (Complete)

SUMMARY

It was reported that flaking at the surface of "SUPEREX" M in "aluminum soaking pits" of the Kaiser Aluminum Company in Trentwood, Washington, was contributing to an abnormal amount of dust which caused problems when the ingots were rolled into sheets. The furnaces were built by Swindell-Dressler Corp. Since "SUPEREX" M has been used successfully in this type of service for many years, excessive compressive stresses parallel to the 12 x 36 in. face of the block in these furnaces was considered to be a possible source of the unusual flaking or delamination.

Although most of the flaking in the form of approximately 1/8 to 1/4 by 6 by 6 in pieces occurred in the 3 in. intermediate layer of "SUPEREX" M, 2 in. thick blocks were used in this investigation because 3 in. blocks were not readily available from stock at Waukegan.

Pieces of "SUPEREX" M were crushed by application of the load on the smaller faces and the nature of the failure was observed. Application of the load on a 1/4 or 1/2 in. key stock on the edge of the piece resulted only in local failure, but when the load was applied to the entire surface of the smaller face of blocks which had been dried, heated on one face at 1000F or subjected to 1000F for 24 hr in a soaking heat, the results suggested that this type of compressive stress could have contributed to the separation of laminar pieces from the surface.

Contents: Summary, Appendix I (Table), Appendix II (Photographs)

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Notebook No. 4039, pp 50-51

Chrono

File: 431

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Rept. No. 432-324

Date June 19, 1970

Title: HARBISON-WALKER HARD FACED BLOCK - PROPERTIES
COMPARED WITH "SUPEREX" SG

Requested by: SSR No. IN-967 (complete)

SUMMARY

The Harbison-Walker Hard Faced Block was composed of about 3/4 in. of a high density mineral fiber sheet bonded with starch and clay. This was laminated to a conventional mineral fiber insulating block. The organic binder provided excellent strength and hardness until the organic binder was removed on exposure to heat. The hard face was then found to be seriously impaired as indicated by easy indentation with thumb pressure and extremely low resistance to abrasion. "SUPEREX", the hot face side of "SUPEREX" SG, by contrast shows only slight reduction in hardness and resistance to abrasion after exposure to service temperatures.

It must be concluded that in service the hard face of the Harbison-Walker block may be eroded by compressive forces and vibration resulting in exposure of the mineral fiber insulating block to temperatures which would cause excessive shrinkage. By contrast, if the compressible backing of "SUPEREX" SG should become damaged, the "SUPEREX" the major portion of the block, facing the heat would in no way be endangered.

Contents: Summary, Discussion, Appendix I, and Appendix II.

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Reference: Research Report No. 435-Int-1121
432-Int-747

Notebook No. 4017, pp 17-20

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