MVL R&D 1990

PLAINTIFF'S
EXHIBIT
K-1592

Research Center
November 30, 1961

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M. J. Kent, DH

Insulating Fire Brick
Hydrogen Atmosphere
Your letter 11-8-61

We do not have enough information to recommend a maximum operating temperature for all of our insulating fire brick in a hydrogen atmosphere at a dew point of -30F.

JM-26 IFB were tested under a load of 10 psi for 8-hr in an atmosphere of commercially pure hydrogen at 2150F (Report No. 431-242, dated 10-5-54). The results showed the superior load bearing capacity of JM-26 IFB in comparison with that of Armstrong's A-25 IFB which had been specified by Swindell Dressler for this service. I do not know whether JM-26 IFB were actually used on this job.

The old "slinger" CA brick was tested for 8-hr at 2150F in an atmosphere of 75 per cent hydrogen and 25 per cent nitrogen at a dew point of 150F. The results indicated that the "slinger" CA brick would perform satisfactorily in a dissociated ammonia atmosphere at 2150F, if the load did not exceed 5 psi and the usual temperature gradient were present in the brick (Report No. 431-249, dated 11-30-54).

An abstract of the article, "Nature of the destruction of the refractory lining of a molybdenum furnace filled with hydrogen", in the CERAMIC ABSTRACTS, November 1961, Page 262, stated that silica-containing refractories are suitable only for the cold parts of the furnace. Studies of high-alumina and magnesite specimens after service in hydrogen atmosphere showed that reduction in the amount of silicate bond and recrystallization of the corundum led to crumbling of the roof. Dense corundum was recommended for service in hydrogen at 1000 and 1600 (assumed to be centigrade). Although the original paper was published in Ogneupory (Russia) and was not available, it is safe to assume that dry hydrogen was used in the molybdenum furnace.

Since all of our IFB contain silica and in the absence of any information on the behavior of our IFB in service, I would not recommend any of our IFB for service above 1800F in an atmosphere of hydrogen at a dew point of -32F.

However, I recommend that you ask George Grimshaw whether JM-26 IFB were actually used in Swindell-Dressler's furnace in 1954, and how long the lining lasted. If either JM-26 IFB or Armstrong's A-25 IFB were satisfactory in dry hydrogen at 2150F, then this temperature would be a safe maximum for JM-26, JM-28 and JM-3000 IFB.

S. E. Wooley

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Distribution reverse side.

DEFENDANT'S
EXHIBIT
OI-163