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# TRANSLATION

SITAL FROM SLAGS - A  
PATH INTO LIFE

By

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## FOREIGN TECHNOLOGY DIVISION

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## UNEDITED ROUGH DRAFT TRANSLATION

SITAL FROM SLAGS - A PATH INTO LIFE

BY: V. V. Vavilov

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## Sital from Slags-a Path into Life

by

V. V. Vavilov

We recall: in the newspaper "Ekonomicheskaya Gazeta" dated October 23 (No.12) was published a report "A new Branch of Industry is being Born". Its authors - prof. I Kitaygorodskiy and engineer K. Bondarev wrote that at the Konstantinob plant "Avtosteklo" was created and tested a method of obtaining, from hot <sup>metallurgical</sup> liquid slags, a glass and on its basis - a microcrystalline material of high strength. As mentioned by the authors these materials are capable of replacing a considerable part of the metal, lumber, concrete, expensive finishing materials.

It was stated in the report that experimental samples have already been obtained of item made of glass-crystalline materials, the basic raw material of which is ordinary blast furnace slag.

The State Committee at the Council of Ministers USSR dealing in the coordination of scientific research operations recently held a scientific conference on problems of "New Technical Materials on the Basis of Glass".

Intermission was declared. Participants of the session have closely surrounded the stands filled with samples of glass and glass-crystal items. They came to Moscow from the Donbas, from the Avtosteklo plant. There is a multitude of samples, as they say...for each taste and color.

From hands to hands are passed shining flakes of sheeted sital of black color. Attention is attracted by beautiful facing plates (tiles) covered with ceramic colors of various hue. Their neighbors are ordinary bottles. Someone displays on his palm small cubes from froth sital. And some engineers take from the stands large coils and inquiringly examine the thin white threads wound over them. It is glass fiber.

Pipes from slag sital. Insulators for telegraph lines.

Special success is enjoyed by large scale objects made of sital, derived in castings under presses. They as if attest to the fact that from microcrystalline materials is possible to form sink basins, bath tubs and items similar to it.

All that has been done and intended to be done with furnace slags, fades away before the things which are being demonstrated here, says specialist from the Gosstroy (State Construction Office ) USSR. We must examine the plans.

What a riches! and to think that it is throw out waste-slag. It can be refined says the engineer-metallurgist.

The exponents are impressive. And all those assembled here in the hall are experts of glass and ceramics industries, experts in metallurgical processes.

Certain data are given, which have been presented and announced at the conference of the scientific soviet and concerning the quality of furnace slag sital.

Mechanical strength (bending) -  $1200 \text{ kg/cm}^2$  (ordinary glass - 400-500 kg):

Heat resistance...three time greater than that of glass;

Wear resistance...higher than stone casting.

Now about cost. Researchers made economical calculations. Sheeted sital in role of facing will be four times cheaper than the cheapest existing facing material. The expenditures for organizing the manufacture of sheeted sital window sills will be compensated (paid off) within one year.

Where then does the name SITAL come from? What does it designate : Let us explain. It is formed as follows: "s" (steklo-glass) "i" (union), "tal" (the second part of the word "crystal") . Our scientists, having introduced this household name have, as if taken a look into the future: there is a metallurgical industry and there will also be a sitalurgical industry.

But let us return to the meeting of the scientific soviet. Two persons lectured at this conference - Isaak Ilyich Kitaygorodskiy and Konstantin Tumdifevich Bondarev.

There was something symbolic in it, that the first one is a merited personality

in sciences, professor, for 35 years head of the faculty of glass technology at the Mendeleev Institute in Moscow, and the second one - director of the Konstantinov Avtostekle plant, only recently honored with the dissertation for cand. of techn. sc. We deal here with the most remarkable friendship (cooperation) of science and industry, greater friendship between institute and factory.

The first investigations - reported prof. Kitaygorodskiy - showed: that it is possible to convert a slag melt into a glass melt and on its basis obtain sitals. That was in march, and in June it became clear that an entirely new approach is necessary for solving the problem of organizing the manufacture of sitals.

Before it was like that... long lasting laboratory investigations, then small experimental installations... and the result was that from the origination of the idea to its practical realization seven to fifteen years have passed. I say that on the basis of my own experience.

But now, when the nation is building a material technical base of communist society it is possible to tolerate such periods? A more daring experiment was needed here, more daring steps.

In the summer the representative of the Gosekonomosoviet Aleksandr Fedorovich Zasyadko ordered the development of concrete data on broad realization of the entire problem. The scale of operations suggested for us, working in the field of glass and ceramics, was absolutely extraordinary - to replace millions of tons of pig iron used for manufacturing sanitation-technical objects.

From July through September in the experimental workshop of the Avtostekle plant were obtained various sital samples, the raw material for which were blast furnace wastes. The stand of the industry and institute was that it is better to show convincingly once than to talk about it a hundred times. Our accomplishments are placed for your appraisal.

The report by comrade Bondarev appeared to be a continuation of a long started long speech.

In my home town in Konstantinovka were first produced sital items with prefixed qualities. Up until now to manufacture structural materials were utilized slags, not considering the necessary molding properties of their melt. And it was done in our factory. Having added into hot liquid slag specific amounts (measured in proportion) of ordinary sand, we obtained chromatic glass. If in addition to sand is introduced a low number of inexpensive catalysts regulating the oxyredux processes, then we have the formation of sital.

The director of the plant offers a detailed analysis of the technology of producing glass from slag and on its basis produce sitals. Over the demonstration board appears a chart of manufacturing sheet sital with a running output of 500 tons per-diurnal period. A three meter wide strip is formed, which is cut into individual sheets. From these are made ladder rungs, sidewalk plates, facing panels. Facing materials can be of any given color - says the lecturer. It is possible to mold and obtain objects of larger dimensions, let us say, bath tubs. To make this is required a special press.

Not all the problems of new series manufacture have been solved completely, emphasizes comrade Bondarev. We have only started. Here we have presented observations and possible arrangements. Clear is one thing: on the basis of hot liquid slags is possible and economically convenient to manufacture also technical glass and sitals. The raw material base is unlimited.

And so the acquaintance of the scientific soviet with new materials did take place. Many specialists of various industrial branches have spoken at the conference. They listened to the research work done so far, they shared in their observations concerning the continuation of the research, they discussed the organization of processing slags into sitals. Here are excerpts of some of the speeches.

Comrade Myasnikov, chief engineer of Giprosteklo Planning Institute: today we can state that a new branch of industry has, in essence " been born. It is necessary to

rapidly develop the typical technology and then plan and construct installations.

Comrade Sovke (member of Gosstroy USSR): solved was one of the major problems connected with broader utilization of glass in construction, in the manufacture of structural components. The most important thing at the present stage - rapid completion of scientific research operations. They should be carried on on a wide front.

Comrade Tsezarev (Scientific Research Inst. of Glass Machine Construction): It is necessary to select objects, which can already be introduced into mass production, and the remaining items should be subjected to experimentation. To gain time is the most important thing.

Comrade Liderman (chief of planning Inst of Giprostal'): Perfectly correct are the comrades who urge the forcing of an organization for the manufacture of sital from slag. If we should follow the path of first literally investigating everything, then test on small experimental installations then much time will be lost; the real thing now is to manufacture sheet sital from hot liquid slag.

The general consensus at the meeting of the scientific soviet is that it is necessary to speed up the adoption of sital manufacture from slag. But how should it be done? It is apparent that coordination of forces and efforts of many scientific research and planning institutions are needed, large scale organizational measures are necessary.

And here comes a quite paradoxical thing: it appears, for the living problem there is no boss who would concentrate the new task in his hands.

And that is what chief specialist of Goskomitet dealing in automation in machine construction comrade Orlov had to say in this respect:

We are receiving an unbroken influx of mail on organization, sovnarkhozes dealing in slag sitals. What is our reply to these questions? Only one...write to the Mendeleev Inst, write to the Konstantinov Avtosteklo plant. Only they are sofar handling this task.

It is understood, that by the forces of one plant, one institute and even one Sovnarkhoz it is impossible to solve the entire complex problem. These words were

uttered by the chief of Stroyindustrii and chief of structural materials of the Detskiy Sovnarkhoz, comrade Minin:

When we found out, that the first experiments at the Avtostekle plant were crowned with success, we have immediately presented a report at the earliest meeting of the national economical soviet, putting aside all other matters of the day, even matters connected with coal and metal.

The Sovnarkhoz without lingering added to the staff of lab personnel twenty workers. It also assigned means for an experimental installation in order to develop the technology of rolling sheet sital. The purpose was to construct in the near future a shop for series manufacture of sitals from hot liquid blast furnace slags.

But as underlined by comrade Minin, the Sovnarkhoz can solve only a certain part of the entire problem. A special scientific research institute is necessary. Konstantinovka offers a good base for it. It is necessary to design and construct equipment, solve many other problems.

So far the apparatus of the Gosekonomsoviet nor at the Gosplan USSR is even handling these problems. And time passes on...

The scientific soviet has approved the work done by the faculty of glass and ceramics technology of the Mendeleev Inst and by the Avtostekle plant. It presented its ideas about speeding up and coordinating further industrial, scientific research, planning and other operations in this field, construction of experimental units.

Now the thing is to attribute to the new job practical and actually broad perspective. Illustrations show samples of objects made of sitals.

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