Zinc Metallurgy in 1949

IN the zinc industry progress has been made in newly designed equipment of unprecedented size and functional characteristics. This is evidenced by flash roasters, sintering machines, high frequency melting furnaces, zinc condensers, and other large units. Progress has been made also by improved operating features with old equipment.

Desulfurization: Two Herreshoff roasters of the National Zinc Co. at Bartlesville, which have been in service over 21 yr, were given major repairs during the summer and are again in operation.

The staff of the Blackwell, Oklahoma plant of the American Metal Co., probably the largest of the horizontal retort plants in existence (11,200 retorts, 5600 of which are charged daily) has been conducting small scale experimental work on sintering green ore. Successful operations of this

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type of sintering have been carried on by the National Smelting Co. in Swansea Vale and Avonmouth for the past 20 yr. As a result of this experimental work a large sintering plant has been authorized to desulfurize and sinter all incoming sulfide concentrates. This will be done on one large machine, 168 ft long and 12 ft wide over the wind boxes. It is being designed and built by the American Ore Reclamation Co. of Chicago, which firm is also designing the entire plant. A Northern Co. automatic bag house is being installed to collect the cadmium dust from the sintering operation.

The plant is designed to produce sinter from more than 600 tons of sulfide concentrates per day and will operate 5 days a week. This will allow 2 days a week for inspection and maintenance of plant equipment. No acid plant is contemplated at this time but the plant is so designed that acid could be made when conditions warrant. This method of operating eliminates the necessity of carrying swing crews and therefore reduces the normally required number of skilled operators.

The New Jersey Zinc Co. (Pa.) has put into operation the largest flash roasting unit built to date, with a capacity of 250 tons of zinc sulfide concentrates per day. The roaster is built with drying hearths at the bottom, permitting the use of a stub shaft to carry the rabble arms and eliminating the necessity for extending the shaft through the entire height of the furnace.

A new sintering machine has been installed, 72 in. wide, built by the American Ore Reclamation Co. with a daily capacity of 600 tons of sulfide concentrates. A new acid plant of 250 tons daily capacity, using Monsanto designed vanadium catalyst with three stages of conversion, has also been installed at Palmerton.

During 1948-49, at their Westport, Conn. laboratories, the Dorr Co. has conducted a long series of roasting tests on zinc flotation concentrates using their Fluo-Solids process. It has produced successfully a sweet roast yielding a calcine hav-

ing many advantages for the electrolytic zinc process. In a similar manner desulfurization was terminated at 5 pct; this amount supplying fuel for subsequent sintering prior to distilling. Again the calcine appears to be ideal for the purpose intended. The very close control of temperature and stack gas composition seems to make the Fluo-Solids process ideal for zinc roasting. When acid is to be made, the strength of the SO_2 gas can be adjusted to suit desired conditions up to a maximum of about 14 pct SO_2 with a minimum production of SO_3 . No commercial or pilot plant installations have been made as yet but may be shortly.

The sintering of raw zinc concentrates, yielding SO_2 for acid production, by the National Zinc Co., Avonmouth and Swansea Vale, continues at the customary ratio 5:1 (return sinter:raw concentrates). Some modifications of this process are envisaged which should be implemented in the near future.

The large sulfuric acid interests of this company has taken it into the fluorine field and a commercial plant for the production of high grade anhydrous hydrofluoric acid has been in operation during the year. Note: Considerable interest has been aroused in diecast electrical conduit fittings made by this company from Mazak alloys. Considerable care, however, is necessary in their installation in certain surroundings.

Developments at the Selby plant of the American Smelting & Refining Co. represent the first commercial operation employing only two stages of sintering raw lead concentrate, with recirculation of part of the SO_2 gases for making contact acid or liquid SO_2 . The concentrated gases from the second-over machine are actually higher in SO_2 content than those from the higher sulfur first-over charge, both being above 6 pct. This type of desulfurization has replaced the multiple-hearth roaster at this plant except for shutdowns or other contingencies; its extension to zinc concentrates will be of interest.

Retorts: Controlled drying of retorts was developed at the Donora (Pa.) Works of the American Steel & Wire Co. and a paper on this development was published in the July issue of the Journal of Metals (R. R. Fuslang and D. H. Wertz, authors).

The controlled drying process depends upon circulation at low velocity of a large volume of conditioned air among the moist retorts. After placement of the retorts in the drying room with the stack dampers and room doors closed, they stand at the existing temperatures until the following morning. Then air circulation is started and continued for 48 hr at a dry-bulb temperature of 120°F and 72 pct humidity. The wet-bulb temperature for this humidity is 110°F which remains constant throughout the drying cycle. Then the dry-bulb temperature is raised according to a routine which develops a pro-