

fume, since ultraviolet radiation and ozone generation end after welding stops. It is important to point out that although NO_2 is designated in these curves, it may actually be NO_2 , N_2O_4 or N_2O_3 . Low concentrations of NO_2 are formed in the first 30 minutes of welding, as shown in chart 1. On the basis of Elkins' derivations, if the total oxides are considered as NO , the amounts of NO_2 formed would also be small.

Since time is an important variable in addition to initial NO concentration, this study included recirculation of fumes in the cabinet during and after welding. Such recirculation dilutes the NO formed, and the NO_2 resulting is also influenced by this factor.

Chart 2 represents an experiment similar to that of chart 1, but the total fume generated during welding was largely (95 per cent) removed by filtration. Twenty-

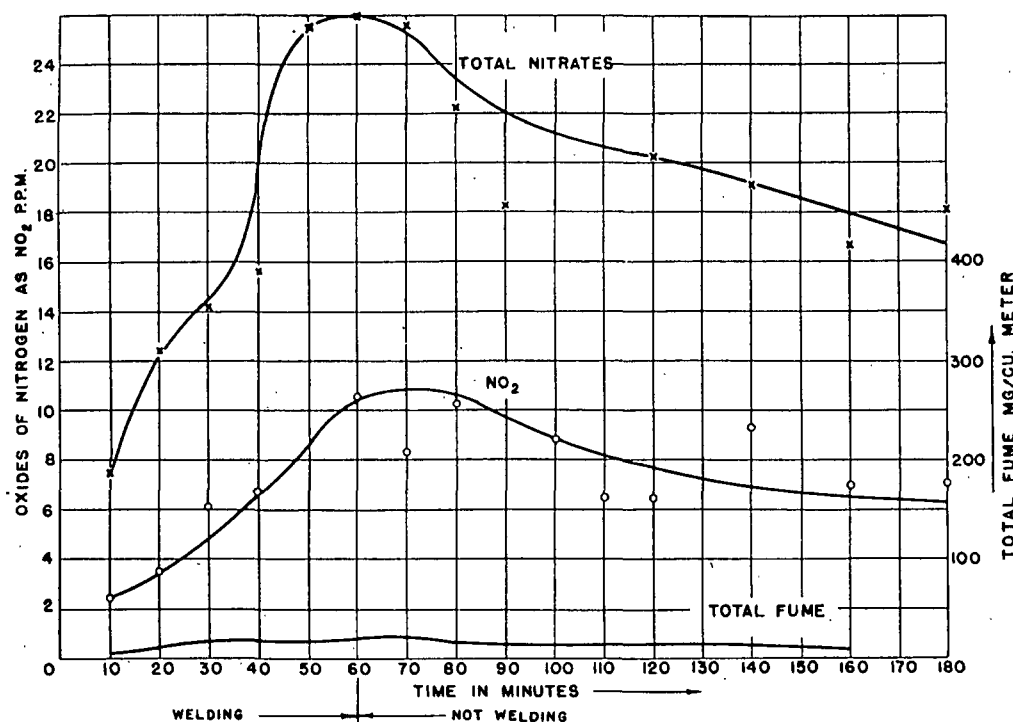


Chart 2.—Total oxides, nitrogen dioxide and total fume concentrations during and after arc welding with coated electrodes. Fumes filtered and cabinet air recirculated 0 to 60 minutes.

five electrodes were used, compared with 20 for the previous experiment, which probably accounts for significantly greater amounts of total oxides and NO_2 .

Nitrogen dioxide concentrations diminish, although most of the fume has been filtered. It should be borne in mind, however, that although the fume has been reduced below the 30 mg. per cubic meter nuisance limit, yet approximately 20 mg. per cubic meter remains. The maximum amount of NO_2 present in chart 2 is about 10 p.p.m. (approximately 19 mg. per cubic meter). The amounts of iron fume remaining are therefore still sufficient for reaction with nitrogen oxides. Complete removal of the iron fume is not possible to attain except by ultrafiltration or use of a high voltage electrostatic precipitator. The latter device would interfere with the test results because of inherent oxide of nitrogen production.