This paper concerns the effect of cold deformation on the mechanical properties of the following stainless steels. Austenitic steels: Kh14G14N (EI212), Kh14G14N3T (EI711), Kh17AG14 (EP213), Kh9G17NM. Ferritic-austenitic steels: Kh28AN (EI657), 0Kh21N5T (EP53), 0Kh21N6M2T (EP54), Kh27N4M2. Ferritic steels: Kh17M2, Kh25M2T.

These steels were smelted in a 30 kg high-frequency furnace (see Table 1). Ingots of 17 kg were forged into billets and the billets hot rolled into sheets 3 mm thick. The hot rolled sheets were subjected to the following heat treatments. Austenitic steels were quenched from 1080°C in water; ferritic-austenitic steels were quenched from 980°C; ferritic steels were annealed at 780°C and cooled in air. After heat treatment, the sheets were etched in acid to remove scale and were cold rolled without intermediate annealing to thicknesses of 2.5, 2, 1.5, 1, 0.75, 0.50, and 0.25 mm.
Samples for tensile stress tests and hardness tests were cut from these sheets. Cold rolled strips 1, 0.75, 0.50, and 0.25 mm thick were subjected to heat treatment and the ductility was measured with the Ericksen apparatus.

The variation of the mechanical properties of the steels with the degree of swaging is shown in Figs. 1-3.

The results show that the ultimate strength, yield point, and hardness increase with the degree of cold deformation, while the relative elongation and the reduction of the section decrease. For austenitic steels the strength increases and the ductility decreases when the degree of swaging is below 30%, while for ferritic-austenitic steels the degree of swaging has a great effect below 15% swaging. It should be noted that the ultimate strength and the yield point do not increase at the same rate with the degree of deformation. The rate of increase of the yield point is higher than that of the ultimate strength, the difference decreasing with increasing degrees of swaging. The two values are close together for austenitic steels swaged 70% and for ferritic-austenitic and ferritic steels swaged 15-20%.

The ductility of these steels decreases in the following order: a) austenitic steels (swaged up to 33%): Kh14G14N, Kh14G14N3T, Kh9G17NM, Kh17AG14; b) ferritic-austenitic steels (swaged up to 15%): Kh21N6M2T, Kh27N4M2, Kh28AN, Kh21N5T; c) ferritic steels (swaged up to 15%): Kh17M2, Kh25M2T. The results of mechanical tests show...