

## COMPOSITION, APPLICATION AND HEAT TREATMENT OF DUAL PHASE STEELS

Bosire R.N.<sup>1</sup>, Nyakundi A.<sup>2</sup>, Golovin I.<sup>3</sup>

Kirinyaga University, KENYA, National University of Science and Technology,  
NUST-MISIS, MOSCOW.

**Correspondence:** [info.rodgerbos@gmail.com](mailto:info.rodgerbos@gmail.com)

### ABSTRACT

The term dual phase steels, or DP steels, refers to a class of high strength steels which is composed of two phases; normally a ferrite matrix and a dispersed second phase of martensite, retained austenite and/or bainite. DP steels were developed in the 1970's to respond to the need for new high strength steels without reducing the formability or increasing costs. Dual phase steels are characterized by a microstructure consisting of 75-85 vol% ferrite with the remainder being a mixture of martensite, bainite, and retained austenite. They have better strength-ductility combinations than ferrite-pearlite steels of equivalent tensile strength and are presently being used commercially. These HSLA steels have a typical composition of 0.12 %C, 1.7 %Mn, 0.58 %Si, 0.04 %V (Vanadium is used for microalloying). Their microstructure is composed of islands of martensite embedded in a matrix of ferrite, which is produced by giving the steel a "subcritical anneal" at ~800°C (in the two phase g-a region) and then it is quenched to room temperature. Research on these unique steels has increased exponentially since their development in the mid-1970s. Present understanding of relationships between composition, microstructure, and tensile properties is briefly reviewed, and some trends in developmental work presented.

**Keywords:** *Dual Phase Steels, Ferrite Matrix, Martensite, Bainite, Vanadium*