

2. MATERIALS

2.1 INTRODUCTION

Flat rolled steels are versatile materials. They provide strength and stiffness with favorable mass to cost ratios, and they allow high speed fabrication. In addition, they exhibit excellent corrosion resistance when coated, high energy absorption capacity, good fatigue properties, high work hardening rates, aging capability, and excellent paintability, which are required by automotive applications. These characteristics, plus the availability of high strength low alloy (HSLA) and alloy steels in a wide variety of sizes, strength levels, chemical compositions, surface finishes, with and without various organic and inorganic coatings, have made sheet steel the material of choice for the automotive industry.

In more recent times, stainless steels have found wide use in many applications where a combination of formability and excellent resistance to corrosion and oxidation at elevated temperatures is needed. Stainless steels are also available in a variety of sizes, shapes, strengths, chemical compositions, and surface finishes.

User fabrication methods applicable to sheet products include roll, brake and press forming, shearing, slitting, punching, welding, adhesive bonding, etc. Corrosion resistance is attained primarily by the application of coatings, either sacrificial or barrier, to flat rolled steels in continuous zinc or zinc alloy coating operations. Stainless steels possess their corrosion and oxidation resistance properties because of their chemical compositions and do not require additional protective coatings.

This section describes the sheet steel materials available to the automotive industry, by way of steelmaking practice, rolling practice, chemistries, definition of grades, and coatings. Mechanical properties and testing procedures also will be covered.

