The increase in transportation capacities of pipe-lines necessitates the introduction of new construction tubes and new production technologies. Tubes should be produced according to pipe-lines service parameters. It is therefore useful to produce tubes which vary in diameter, in construction and mainly in the type of steel used for their production. For pipe of great diameter, destined to support high pressure, we use welded tubes made of controlled rolled steel and low alloyed improved steel. Tubes are the main constituents of pipe-lines. Their quality, the properties of their material and their welded joints determine to a high degree the possible deficiencies, stoppages and failures of pipe-lines. This is the reason why it is important to determine the requirements on tube steel and welded joints in terms of the service parameters of pipe-lines in order to avoid their rupture. The welded joints of tubes are subjected to complex static and dynamic loading, which takes place during pipe transportation, and during realization and exploitation of pipelines. The welding process of big diameter pipes is characterized by a great volume of melted metal and a large heat affected zone of the parent metal. The temperature in the vicinity of the weld joints varies from the melting temperature at the joint to lower temperatures in adjacent zones. In the region of the parent metal subjected to this temperature variation important alterations in the structure and in properties of the material take place. This is why it is estimated important to study this zone in which there is a reduction in the plasticity and the resilience of the metal and consequently there will be an increase in the probability of crack formation. The creation of a mechanical non-homogeneity in this zone reduces the work capacity of the weld joints and the reliability of pipe-lines reduces. It is in this context that the paper presented includes two parts: The first part is concerned with the hardness distribution and the resilience variation as a function of the temperature distribution in the heat affected zone of pipe. The second part considers the influence of the weld joint shape and the loading regime of the pipe-lines on their weld joints life in the big diameter pipes. This work shows how the bearing capacity of the weld joints wary with the mechanical non-homogeneity of weld properties and quality with their weld shape and with the relative thickness of the diameter layer in the welding. On the other hand this study shows the resilience variations in weld joints and in the parent metal of the pipes in the as bought state and after their mechanical ageing. The stress and strain concentration resulting from irrational configuration of welded joints cause the strength of weld subjected to cyclic loading to be diminished. This has lead to finish this work by the determination of the life specimens taken from weld joints in tubes and subjected to cyclic loads during testing