VERMICULAR CAST IRON (FGV) and AUSTEMPERED DUCTILE IRON (ADI)

1) VERMICULAR CAST IRON (FGV)

This type of cast iron is characterized by its graphite’s form.

The vermicular cast iron presents graphite in the shape of a bar, which gives it mechanical characteristics between the lamellate graphite cast and the spheroidal graphite cast.

The vermicular cast iron is obtained by metallurgical treatment of the alloy.

Vermicular graphite cast irons have an intermediate structure and mechanical characteristics between the lamellar graphite cast (FGL) and the spheroidal graphite cast (FGS). Although they have been experimentally known for a few years under various names, it is only recently that they have been developed as a material used for commercial purposes. The combination of their high strength, their relatively good thermal conductivity and their plasticity, makes vermicular material interesting for numerous manufacturing applications, particularly for parts subjected to thermic changes like in the car industry.

To date, there is no normalisation standart. The characteristics have to be specified by common agreement.

FGV:
In order to be coherent in writing, the denomination is based on NF IN 1560

CONTIFONTE usually produces a vermicular cast iron of type IN GJV 350-5
2) AUSTEMPERED DUCTILE IRON (ADI)

ADI Cast iron (Ductile Austempered Iron) is obtained by heat treatment. The latter modifies the microstructure of the basic cast iron to obtain a bainitic type matrix.

This cast iron treatment enables reaching mechanical characteristics comparable with those of certain steels.

The ADI castings manufactured to high specifications, in particular wear-shock-surface fatigue, require a control of the as-cast iron GS (Ductile Iron) metallurgical quality, follow-up the bainitic treatment with austenitizing, followed by a stage chill (Austempered) in order to guarantee an “ADI” stable microstructure.

**Goals**

The development of castings out of nodular cast iron (F.G.S.) “A.D.I.” with high mechanical specifications demands perfect control of the metallurgical parameters. These guarantee a stable production, free from foundry, heat treatment and machining defects, and are the only ones able to lead to an attractive price, compared with the traditional welded steel or forged steel solutions.

**Characteristics**

- toughness, ductility and high ultimate tensile strength
- high fatigue strength
- high wear resistance
- high shock resistance

**Specific advantages**

- excellent flowability and low production costs
- possibility to make complex forms with a minimum of machining
- self lubrication
- high amortization capacity
- characteristics not sensitive to the massivity

**Applicability**

ADI cast iron is recommended for

- as a means of substitution for cast or forged steels (for applications with important dynamic loads),
- as the prime compromise between ductility and hardness where resistance is required,
- in replacement or as extension to the use of ductile iron,
- for applications which require complex forms in very resistant materials.