



WHITE PAPER

STRUCTURAL HOMOGENEITY:

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Deformations that occur during the manufacturing process of parts intended for the car market are one of the main issues faced by their manufacturers.

This problem is especially relevant in the case of forged parts which are then machined and hardened (such as, for example, gears, gear wheels...). Even if dimensional distortions appear as a consequence of the stress generated and released during machining and hardening, it is known that the structural heterogeneity of steel has a strong impact in this matter.

As a leader in the manufacture of special steels, and together with the main players of the French market of forged parts intended for the car market, Sidenor participates in a working group with the following main objectives:

- Studying all aspects related to steel and its manufacturing process which impact the emergence of deformations.
- Identifying measures leading to a reduction of these deformations.

This working group, which is coordinated by the French Technical Centre of Mechanical Industries (**CETIM** - Centre Technique des Industries Mécaniques) includes major customers of Sidenor (Renault, PSA, Gevelot, Setforge or Amis) as well as other European steel companies.

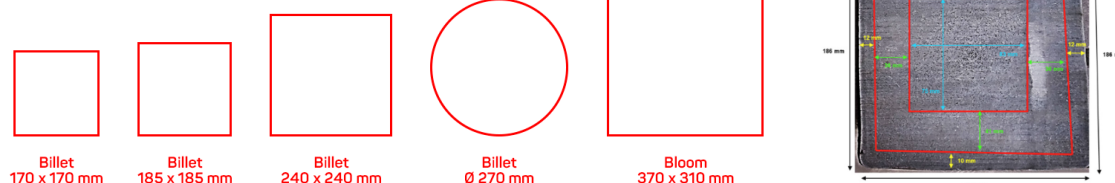


The following scheme describes a study on a **27MnCr5** in rolled bars with a diameter of **Ø 60 mm** based on various formats.

1. Characterisation of source format

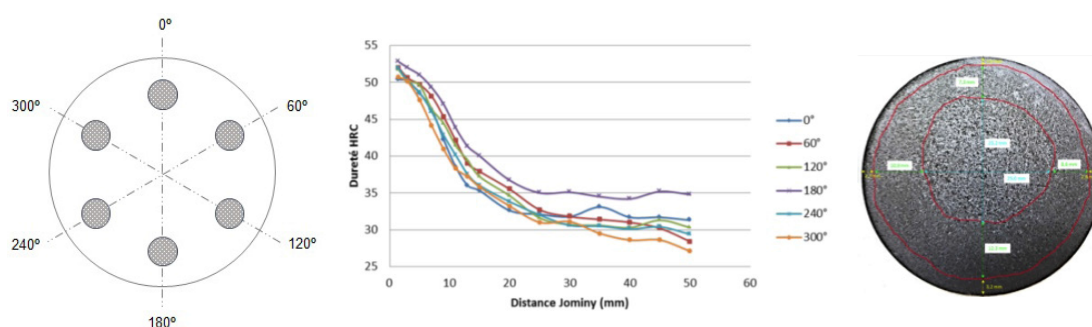
- Evaluation of segregation in the billet or bloom

Assessed formats:



2. Characterisation of rolled bars

- Evaluation of segregation in the bars
- Identification of heterogeneities according to the angular position



3. Machining and hardening of the test parts

- Before and after hardening, a complete metallographic study of the test parts and necessary measurements is carried out in order to determine the development of deformations

