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BNIF PLATES FOR CHARACTERIZATION OF SURFACE CONDITION OF CASTINGS

Use of 110 x 160 standard specimens

I- FOREWORD

The surface condition of a casting depends in particular on the moulding process (sand, die casting, etc.), the quality of the equipment, the moulding or core sand, and the pouring and finishing, and also depends on the nature of the alloy.
The profiles of cast surfaces do not display the quasi-periodic character often found with the machined surfaces: the customary methods of measuring roughness in the engineering industry cannot be used in practice. By comparison with the basic roughness determined by the process and by, say, the fineness of the sand used, certain surface features, recessed or in relief are practically unavoidable, and the founder's art is to limit their size and number.
The founder can, by appropriate means, provide a given surface condition in a well-defined zone of casting. But it will be more expensive, or even impossible, to do the same for the whole surface of the casting. It is possible to save on the costs of finishing castings by accepting a coarser surface finish in zones that either have no special function or are to be machined subsequently. Conversely, a fine surface condition may be sought either to meet other requirements related to the utilization of the casting or to satisfy the conditions of non-destructive examination.
In the text hereunder, following terms comparators, reference materials, control samples and plate samples stand as synonyms.

II – FIELD OF APPLICATION

The aim of this Recommendation is to facilitate cooperation between founders and customers in determiníng the conditions for the acceptance of the surface condition of castings, particularly those stressed by chemical, mechanical, hydraulic phenomena.
The present Recommendation is applicable to castings or areas of castings delivered in the unmachined condition after, if necessary, the finishing operations specific to the foundry.
Normal foundry capabilities for the various alloys cast and various standard fabrication processes, are indicated in attached tables 1 to 4. These tables are intended to facilitate dialogue between founders and customers by guiding them to a choice that reconciles technical and economic requirements.
This Recommendation does not constitute a means of non-destructive examination to determine the soundness of a part by visual inspection. There is accordingly no question of using its photographs or replicas to judge the possible presence of any discontinuity extending to the surface (pinhole, hot tear, stress crack, shrinkage, etc). On the other hand, sensitivity and the reproducibility of various non-destructive methods (dye penetration test, magnetic crack detection, ultrasonic test…) depend on the surface condition of the castings submitted to these inspections.
Thus, national standards (AFNOR, DIN, etc.) as well as international ones (EN, ISO) recommend the surface condition to be inspected by means of the comparators prior to the non-destructive examination itself.

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III – SPECIFICATIONS

Article I – The Recommendation only applies to the parts of castings and to the percentages of castings to be checked. These conditions must be clearly indicated in the call for tenders, in price requests and, particularly in the order sent to the supplier and accepted by him, in order to enable the foundry to determine the manufacturing costs involved, in obtaining the required quality level, the costs of inspections and additional related operations, and the manufacturing risks they entail. Surface condition indications, when they are requested, should appear in drawing and technical specifications submitted by the customer.
Article 2 – The manufacturing stage at which the test is carried out should be clearly defined by agreement between the parties. This stage must be compatible with the rectification possibilities indicated in Article 4.
Article 3 – For each part of the castings to be checked for the surface condition, the series and the number of the reference specimen must be indicated.
Article 4 – The comparison is satisfactory if, in the considered area, the surface condition corresponds to that standard specimen or if it generally exhibits a smaller relief. In the opposite case, it is up to the founder to remedy the specified area to give it a relief similar or equivalent to that of the reference comparator.

IV- DEFINITION OF SERIES

Three series of surfaces are distinguished in accordance with the type and degree of finishing. Each series comprises a variable number of examples which cannot be classified rigorously, but which are representative of a certain number of surface conditions usually encountered.
Series n°1 – No or limited finishing, typicel of as-cast or light shot-blasted surfaces (*). 12 examples marked from 4/0 SI to 8 SI.
Series n°2 – Particular finishing, typical of ground surfaces. 7 examples marked 2/0 S2 to 5 S2.
Series n°3 – Special finishing for steel castings, typical for thermal cutting or hammering. 6 examples, marked 1 S3 to 6 S3.