

Grey Cast Iron Composition Casting Quality

Machine Drawing is divided into three parts. Part I deals with the basic principles of technical drawing, dimensioning, limits, fits and tolerances. Part II provides details of how to draw and put machine components together for an assembly drawing. Part III contains problems on assembly drawings taken from the diverse fields of mechanical, production, automobile and marine engineering.

Provides a methodology for integrating materials selection with the design process, including simultaneous technical and economic evaluation. Save hours of frustrating research time: Get fast answers about the best material for a particular application. In the past, researching the endless sources on corrosion and materials in their countless applications were next to impossible. That's why this book was written: to help simplify your materials selection problems. It's an exhaustive source on the different corrosion-resistant materials, types of corrosion, factors affecting corrosion, passivation, corrosion monitoring, corrosion control measures, methodology of materials selection, and more.

Cast iron offers the design engineer a low-cost, high-strength material that can be easily cast into a wide variety of useful, and sometimes complex, shapes. This handbook from ASM covers the entire spectrum of one of the most widely used and versatile of all metals.

This resource covers all areas of interest for the practicing engineer as well as for the student at various levels and educational institutions. It features the work of authors from all over the world who have contributed their expertise and support the globally working engineer in finding a solution for today's mechanical engineering problems. Each subject is discussed in detail and supported by numerous figures and tables.

A basic text meeting requirements of core courses in this area. Apart from covering all necessary topics, the book gives procedures, standards and specifications for materials and their testing, as per conditions and practices prevalent in the country. Trade names, compositions, properties and applications of engineering materials commonly used in industry have been given in the form of tables. A large number of schematic diagrams, engineering curves, tables and microstructures have been included to make the approach of the subject more illustrative, informative and demonstrative.

This text emphasizes the underlying metallurgical principles of casting technology so that the students can develop a sound set of analytic skills, helpful in the development of improved casting processes and products. The pictorial and diagrammatic support provided throughout reinforces the clarity of the text for a thorough understanding of the metal casting concepts and technologies. Besides comprehensive coverage of the casting processes and elaborate discussion of properties of cast irons, cast steels, and cast nonferrous alloys, the text also familiarizes the students with the most recent developments in binder systems, casting practices, solidification processing, metal filtration, metallurgy of cast alloys, alloy design, and energy and environment management. The book is primarily designed for degree and diploma students pursuing courses in metallurgical, mechanical, and production engineering disciplines as well as for candidates studying for Associate Membership Examinations (AMIIM, AMIE, Grad. IIF). It would also benefit M.Tech./M.E. students specializing in foundry technology and allied disciplines. This standard specifies the terms and definitions of the grey cast iron, grey cast iron designation, technical requirements, sampling requirements, test methods, test rules and casting mark, package and storage and transportation requirements. This standard applies to grey iron castings cast in sand mould or mould with in the mold with equal thermal conductivity of sand mould and other grey iron casting cast in other cast moulds can be used as reference.

This project is to investigate mechanical properties and microstructure of white cast iron using sand casting. There are three objectives for this project which are firstly to study the processing method of gray cast iron to produce white cast iron. Secondly, to investigate the microstructure and hardness of white cast iron compared to gray cast iron and lastly, to study the microstructure and hardness of white cast iron in differential type of quenching medium. The first part for this project is foundry laboratory which is involving the process of sand casting was performed by using furnace to melt the raw material. Then, the melted raw material produced is then poured into the desired mould and let it solidify by itself. After the casting process, the material will be through second part which involves heat treatment. The material is heated at 1020oC for two hours. Then, the material is quenched into the medium of water and oil before inspection parameter was performed to investigate the mechanical properties (hardness) and microstructure of material before and after heat treatment process. To validate the prediction result, experimental values compared. Result showed that the hardness of material after heat treatment is higher than hardness before heat treatment. The grain size formed on material after heat treatment is finer grain size and there are no flakes. Different with material before heat treatment, it shows that there are flakes and the grain size is thin inside it. The predicted result showed that heat treatment exerted on material is influencing the change of mechanical properties and microstructure.

This treatise on Engineering Materials and Metallurgy contains comprehensive treatment of the matter in simple, lucid and direct language and envelopes a large number of figures which reinforce the text in the most efficient and effective way. The book comprise five chapters (excluding basic concepts) in all and fully and exhaustively covers the syllabus in the above mentioned subject of 4th Semester Mechanical, Production, Automobile Engineering and 2nd semester Mechanical disciplines of Anna University.

A study of the production and use of iron and steel in early China, and simultaneously a methodological study of the reconciliation of archaeological and written sources in Chinese cultural history. Includes chapters on the technology of iron production based on studies of artifact microstructures.

This book provides an overview of the surface effects at the interface boundary of metal/sand moulds, and their influence on the surface quality, microstructure and mechanical and anticorrosive properties of high-quality cast iron. It explores utilitarian aspects of the production of high-quality cast iron castings, including thin-walled castings of high-quality cast iron alloys, and examines problems related to the determination of moulding sands and reclaim quality, and their influence on castings. Presenting new material, this book takes into account the influence of metal quality, pouring temperature, solidification time, the quality of moulding sand with the reclaim application, as well the binders of moulding sands, on the formation of the degenerated graphite near surface layers. It also employs the latest research methods, such as a wavelength-dispersive spectrometer (WDS) analysis and thermodynamic calculations, which were carried out on the reactions occurring in the study area. Providing a valuable resource to academics and researchers interested in materials science, metal casting and metallurgy, this book is also intended for metal industry professionals.

The revised and updated second edition of this book gives an in-depth presentation of the basic principles and operational procedures of general manufacturing processes. It aims at assisting the students in developing an understanding of the important and often complex interrelationship among various technical and economical factors involved in manufacturing. The book begins with a discussion on material

properties while laying emphasis on the influence of materials and processing parameters in understanding manufacturing processes and operations. This is followed by a detailed description of various manufacturing processes commonly used in the industry. With several revisions and the addition of four new chapters, the new edition also includes a detailed discussion on mechanics of metal cutting, features and working of machine tools, design of molds and gating systems for proper filling and cooling of castings. Besides, the new edition provides the basics of solid-state welding processes, weldability, heat in welding, residual stresses and testing of weldments and also of non-conventional machining methods, automation and transfer machining, machining centres, robotics, manufacturing of gears, threads and jigs and fixtures. The book is intended for undergraduate students of mechanical engineering, production engineering and industrial engineering. The diploma students and those preparing for AMIE, Indian Engineering Services and other competitive examinations will also find the book highly useful. New to This Edition : Includes four new chapters Non-conventional Machining Methods; Automation: Transfer Machining, Machining Centres and Robotics; Manufacturing Gears and Threads; and Jigs and Fixtures to meet the course requirements. Offers a good number of worked-out examples to help the students in mastering the concepts of the various manufacturing processes. Provides objective-type questions drawn from various competitive examinations such as Indian Engineering Services and GATE. Tables and general data; Sands and sand bonding systems; Coatings for moulds and cores; Light alloy castings; Copper and copper alloy castings; Iron castings; Die-castings; Steel castings; Feeding of castings; Computer modelling of solidification of castings, the SOLSTAR system; Filtration of castings; Principal Foseco products.

The study is to investigate the microstructure and mechanical properties of grey cast iron by using sand casting process. The casting process influences the microstructure and mechanical properties of grey cast iron. In sand casting process, normally there were defects such as shrinkage and porosity that can affect the quality of product. Defects need to be removed in order to have a good quality of casting product. Casting is done by using sand casting operation with riser and without riser, as to identify the effect of riser. The parameters analyzed are the hardness, tensile strength, microstructure and defect of casting product. There were six products which having same dimension and shape. Besides, those patterns of product were made by wood together with the gating system and riser. Three patterns were cast with the help of riser, while another three patterns were form by casting without riser. As a result, the effect of using riser and without riser in casting gives influence on the hardness, tensile strength, microstructure, and even the defect of grey cast iron significantly. The existing of riser in casting is directly provide higher value of hardness, higher value of estimated tensile strength, and a finer microstructure with lower the formation of porosity. Besides, riser tends to reduce defects in casting. Casting with additional part of riser gives a better quality to product. The result generated can be more accurate if the software ProCAST for gravity sand casting is introduced to detect the location of the last freezing regions or can be called as hot spot. As in short, riser is the solution to control defects in casting operation, as riser increase the casting yield.

This book provides basic information covering every aspect of iron and steel production and was originally a textbook for Soviet vocational schools, as well as a practical aid for workers engaged in the field.

Reflecting the changes that have occurred in making castings, this book provides a practical reference for all those concerned with making castings in any of the commonly used alloys by any of the usual moulding methods. International SI units, Metric and Imperial units are used throughout.

Cast Iron: Physical and Engineering Properties describes the importance of iron and its properties, as well as the process of casting in the different fields of engineering. The book covers topics such as the mechanical, physical, and electrical properties of iron and the different tests under which it is subjected; the effects of heat treatment on gray cast iron; and the resistance of cast iron to heat and stress. Topics also include internal casting stresses; cast iron beams and columns; and the application of the specifications for cast iron to design. The text is recommended for metallurgists and engineers who are interested in cast iron, its properties, and its uses in construction.

Applied Science in the Casting of Metals focuses on metallurgical operations. The book first discusses the manufacture of iron and steel. Concerns include treatment of liquid iron and steel; treatment of molten iron between blast furnace and steelworks; and treatment of liquid steel. The text takes a look at casting pit practice, including ingot feeding, hot topping of alloy steels, methods of applying hot-tops, and hot-topping methods. The selection focuses on spray steel making and continuous casting of steel. The process involved in spray steel making; the basic principles of casting of steel; and metallurgical aspects are discussed. The text describes the treatment of cast iron; treatment of non-ferrous heavy metals; treatment of aluminum and magnesium alloys; and treatment of molding sand from molds and cores. The book explains the feeding of steel castings. Topics include development of exothermic feeding; mechanisms of alumino-thermic reactions; applications of exothermics to steel castings; and surface additions. The text is a valuable source of data for readers interested in metallurgical operations.

More than 30,000 listings are presented in this edition with increased coverage from major steel producing countries such as China, India, and Japan.

The demand for cast iron components, with weights ranging from a few kilograms to several tons, has increased significantly in recent years, both for technical and economic reasons. In fact, the lower cost compared to other alloys, and the good castability, which allow one to obtain near-net shape components in as-cast conditions, and the mechanical properties that can be obtained, are just some of the motivations that attract mechanical designers. However, correct design requires a good knowledge of the intrinsic correlation among alloy chemical composition, process parameters, microstructure (with casting defects) and mechanical properties. This book is aimed at collecting excellent and recent research experimental and theoretical works in this filed. Technological (say, wear resistance and weldability) and mechanical properties (say, Young modulus, static and fatigue strength) of different grades of cast irons, ranging from solution strengthened ferritic ductile iron to compacted graphite iron as well as white and nodular cast irons, are correlated with the alloy chemical composition, process parameters and casting dimension.

The book has been thoroughly revised. Several new articles have been added, specifically, in chapters in mortar, Concrete, Paint: Varnishes, Distempers and Antitermite treatment to make the book to still more comprehensive and a useful unit for the students preparing for the examination in the subject.

This Standard specifies the designations, order information, manufacturing methods, chemical composition, technical requirements, sample preparation, test methods, inspection rules, marking, quality certificate, rust prevention, packaging and storage of spheroidal graphite iron castings.

Cast iron is an alloy of iron containing more than 2% carbon as an alloying element. It has almost no ductility and must be formed by casting. Ductile iron structure is developed from the melt of cast iron. The presence of silicon in higher amount promotes the graphitization, inhibiting carbon to form carbides with carbide forming elements present. The carbon forms into spheres

when Ce, Mg are added to the melt of iron with very low sulphur content. Due to this special microstructure containing graphite in nodular form ductile iron possesses ductility & toughness superior to that of any cast iron & steel structure resulting in numerous successes in industrial application. Ductile iron castings with 3 and 12 mm thickness with varying chemical composition were cast in furan resin sand molds to identify the effect of sample thickness on microstructural changes and selected mechanical properties. The effect of melt chemistry and molten metal processing variables (i.e., pre-conditioning of the base iron, inoculation type and practice, and pouring temperature, etc.) on the tensile and impact properties of thin-wall ductile iron castings has been investigated. Comparison of 3 and 12 mm sections within the same casting showed that section size was the main factor influencing tensile properties of ductile irons. While many samples from 3 mm sections showed low elongation values, likely caused by a high pearlite content or presence of carbides, many others showed higher elongations and superior strengths well above those required in ASTM A536 grades. At moderate to high elongations, the thin-wall samples were significantly stronger than samples from identical irons of 12 mm section. A direct comparison between impact values could not be made due to different test specimen sizes, but it is clear that toughness in the two section sizes was roughly equivalent when account was made for the total cross sectional area. The main difference between the Impact properties in the two se.

Ferrous materials have made a major contribution to the development of modern technology. They span a tremendous range of properties and applications. Part A of this book is dedicated to the fundamental relationships between the structure and the properties of ferrous materials. The considerably larger Part B deals with standardised materials, recent developments and industrial applications, which also affect processing aspects. Details are given for general engineering materials, tool and functional materials, as well as high-strength, creep-resistant and wear-resistant grades. This book closes the gap in the treatment of steel and cast iron. Each chapter takes into account the gradual transitions between the two types of ferrous materials. The authors demonstrate that steel and cast iron are versatile and customisable materials which will continue to play a key role in the future.

The sixth edition of Modern Physical Metallurgy provides a comprehensive overview of the structure of matter, the physical properties of materials and their mechanical behaviour and some of the most recent advances in physical metallurgy.

This thesis deals with the investigation of microstructure and mechanical properties of malleable cast iron using metal casting process. The objective of this thesis is to investigate the influence of different annealing rate to the mechanical properties and microstructure of malleable cast iron. The thesis describes the proper sand casting process in order to investigate the effect on microstructure and mechanical properties of malleable cast iron. The CO₂ sand was used as the mould and pig iron as the raw material to produce malleable iron in this thesis. The studies of mechanical properties that are involved in this thesis consists of hardness, tensile strength, percent of elongation, carbon content, and the composition of malleable iron before and after metal casting process. Three different annealing rate was used in order to determine the correlation between mechanical properties and microstructure of malleable cast iron. As result, we observed that as the annealing rate increases, ductility of the samples also increased but compromising with hardness and strength. The microstructure shows graphite nodules in the samples , however it decreases the strength and percent of elongation. As for the recommendation, the mechanical properties including the wear, corrosion resistance, impact resistance, and noise reduction should be considered in order to optimally select a material for its specific application.

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