# Referências Bibliográficas


[1] NORMA MIL Designation MIL-S-16216K(SH). *Military Specification for Steel Plate, Alloy, Structural, High Yield Strength HY-80 and HY-100*, 19 June 1987.

[2] ANON. U.S. Navy Reports Welding Procedure Source of Cracks in First Seawolf Submarine. *Welding Journal*, vol. 70, n° 9, Sept. 1991, p. 5.

[3] GARCIA, C.I. et alii. Ultra-Low Carbon Bainitic Plate Steels: Processing, Microstructure and Properties. *Iron & Steelmaker*, vol. 18, n° 10, October 1991, p. 97-106.

[4] WILSON, A.D. et alii. Properties and Microstructures of Copper Precipitation Aged Plate Steels. In: Microalloying ’88. *Proceedings*. American Society for Metals, Chicago, 1988, p. 259-275.

[5] Norma ASTM Designation ASTM A 710-84. *Standard Specification for Low-Carbon Age-Hardening Nickel-Copper-Chromium-Molybdenum-Columbium Steel Plates*. In: Annual Book of ASTM Standards - Steel: Structural, Reinforcing, Pressure Vessel, Railway. American Society for Testing and Materials, West Conshohoken, vol. 4, 1999.

[6] NORMA MIL Designation MIL-S-24645A(SH). *Military Specification for Steel Plate, Sheet or Coil, Age-Hardening Alloy, Structural, High Yield Strength HSLA-80 and HSLA-100*, 24 September 1990.

[7] KRISHNADEV, M.R. et alii. Development and Characterization of a New Family of Copper

HSLA Steels. In: HSLA Steels ’83. *Proceedings*. American Society for Metals, Philadelphia, 1983, p. 129-147.

[8] HAMBURG, E.G. et alii. *Development of an Intermediate Composition for Navy HSLA-80/HSLA-100 Steels*. Report RQR 88-1, Lukens Steel Company, Coatesville, February 1988.

[9] PHILLIPS, R.H. et alii. High Strength Plate Steels for Defence Applications. In: Microalloying ‘88. *Proceedings*. American Society for Metals, Chicago, 1988, p. 235-247.

[10] BROWNRIGG, A. High Strength Steel Research in Australia. *Key Engineering Materials*, vol. 84-85, 1993, p. 1-15.

[11] KRISHNADEV, M.R. et alii. Copper-Precipitation Strengthened HSLA Steels. In: International Symposium on Low-Carbon Steels for the Nineties. *Proceedings*. The Minerals, Metals & Materials Society, Warrendale, 1993, p. 501-509.

[12] BILLINGHAM, J. Steel - A Versatile Advanced Material in Marine Environments. *Ironmaking and Steelmaking*, vol. 21, n° 6, 1994, p. 452-458.

[13] VAYNMAN, S. et alii. Copper Precipitation Hardened, High Strength, Weldable Steel. In: Materials for the New Millennium. *Proceedings*. Materials Engineering Division of the American Society of Civil Engineers, Washington, November 1996, vol. 2, p. 1551-1560.

[14] GARCIA, C.I. et alii. Structure and Properties of ULCB Plate Steels for Heavy Section Applications. In: Microalloying ’88. *Proceedings*. American Society for Metals, Chicago, 1988, p. 291-299.

[15] MONTEMARANO, T.W. et alii. High Strength Low Alloy Steels in Naval Construction. In:

*Journal of Ship Production*, vol. 2, n° 3, August 1986, p. 145-162.

[16] NORMA MIL Designation MIL-A-46100C. *Military Specification for Armour Plate, Steel, Wrought, High Hardness*. 13 June 1983.

[17] BAUJAT, V. et alii. Submarine Pressure Hull Construction in 100 HLES Steel. In: Conference on Advances in Marine Structures 2. *Proceedings*. Elsevier Science Publishers Ltd., Dumfermline, May 1991, p. 81-106.

[18] BISWAS, D.K. et alii. Some Aspects of Inclusion Characterization in Resulphurized HY-80 Steel. *ISIJ International*, vol. 31, n° 7, July 1991, p. 712-720.

[19] HURLEY, J.L. et alii. Age-Hardenable Nickel-Copper Steels. *Metals Engineering Quarterly*, vol. 6, n° 2, May 1966, p. 25-31.

[20] HYDREAN, P.P. et alii. IN-787: An Age Hardenable Steel for Line Pipe and General Structural Uses. In: Mechanical Working and Steel Processing Conference. *Proceedings*. AIME, Chicago, 1972, p. 211-236.

[21] SHELTON, C.H. et alii. New Line Pipe Steel Developed for Arctic Service. *Pipeline and Gas Journal*, November 1972, p. 31-36.

[22] FLETCHER, E.E. et alii. *Special Report on Precipitation-Strengthened, Weldable, Low-Carbon Structural Steels for Line-Pipe Applications*. NG-18 Report n° 101, Battelle Columbus Laboratories, Columbus, December 1975, 162 p.

[23] JESSEMAN, R.J. et alii. Mechanical Properties and Precipitation-Hardening Response in ASTM A710 Grade A and A736 Alloy Steel Plates. *Journal of Heat Treating*, vol. 3, n° 3, June 1984, p. 228-236.

[24] TOMITA, Y. et alii. Development of 590-MPa Class High Tensile Strength Steel with

Superior HAZ Toughness by Copper Precipitation Hardening. *ISIJ International*, vol. 34, n° 10, October 1994, p. 836-842.

[25] LLEWELLYN, D.T. Copper in Steels. *Ironmaking and Steelmaking*, vol. 22, n° 1, 1995, p. 25-34.

[26] DE PAUL, R.A. & KITCHIN, A.L. The Role of Nickel, Copper and Niobium in Strengthening a Low-Carbon Ferritic Steel. *Metallurgical Transactions*, vol. 1, n° 2, February 1970, p. 389-393.

[27] TAKAHASHI, A. et alii. Microstructural Refinement by Copper Addition and its Effect on Strengthening and Toughening of Sour Service Line Pipe Steels. *ISIJ International*, vol. 36, n°2, February 1996, p. 241-245.

[28] DUNNE, D.P. et alii. Isothermal Transformation Products in a Copper-bearing High Strength Low Alloy Steel. *ISIJ International*, vol. 36, n° 3, March 1996, p. 324-333.

[29] OHTANI, H. et alii. Morphology and Properties of Low-Carbon Bainite. *Metallurgical Transactions A*, vol. 20A, n° 4, April 1990, p. 877-888.

[30] YANG, J.R. et alii. The Development of Ultra-Low-Carbon Bainitic Steels. *Materials & Design*, vol. 13, n° 6, 1992, p. 335-338.

[31] ARAKI, T. et alii. Bainitic and Similar Microstructures of Modern Low Carbon HSLA Steels. In: International Conference on Processing, Microstructure and Properties of Microalloyed and Other Modern HSLA Steels. *Proceedings*. AIME, Pittsburgh, 1991, p. 249-255.

[32] ARAKI, T. et alii. Bainitic Intermediate Microstructures of Very Low-C Steels. In: ICOMAT ´92. *Proceedings*. Monterey Institute of Advanced Studies, Monterey, July 1992.

[33] NIIKURA, M. et al. Características da Transformação e Propriedades Mecânicas em Aços de Extra-Baixo Carbono Endurecíveis através de Transformação. *Tetsu-to-Hagané*, vol. 70, n° 10, 1984, p. 1429-1436 (Tradução n° 1218 do Centro de Informações Tecnológicas da Companhia Siderúrgica Paulista - COSIPA).

[34] MCEVILY, A.J. et al. Structure, Hardenability and Toughness of Low-Carbon High-Strength Steels. In: Transformation and Hardenability of Steels. *Proceedings*. University of Michigan e Climax Molybdenum Company, Ann Arbor, 1967, p. 179-194.

[35] VASSILAROS, M.G. et al. Impact Toughness and Cleavage Fracture Strength of an Ultra-Low-Carbon Steel. In: International Trends in Welding Science and Technology. *Proceedings*. American Society for Metals, Gatlinsburg, June 1992, p. 519-525.

[36] OKATSU, M. et alii. Weldability of Advanced Extremely-Low Carbon Bainitic Steel for Thick Plates of 570 MPa Grade through As-Rolled Process. *Kawasaki Steel Technical Report*., n. 40, May 1999, p. 49-55.

[37] COLDREN, A.P. et alii. Strength and Impact Properties of Low-Carbon Structural Steels Containing Molybdenum. In: Steel Strengthening Mechanisms. *Proceedings*. Climax Molybdenum Company, Zurich, 1969, p. 17-44.

[38] SMITH, Y.E. et alii. Manganese-Molybdenum-Niobium Acicular Ferrite Steels with High Strength and Toughness. In: Toward Improved Ductility and Toughness. *Proceedings*. The Japan Institute of Metals e Climax Molybdenum Cokmpany, Tokyo, 1971, p. 119-142.

[39] NAKASUJI, H. et alii. Development of Controlled Rolled Ultra Low Carbon Bainitic Steel for Large Diameter Linepipe. In: Alloys for the Eighties. *Proceedings*. Climax Molybdenum Company, Ann Arbor, 1980, p. 213-224.

[40] MASSIP, A. et alii. Grobblech und Warmband aus bainitischen Stählen mit sehr niedrigem Kohlenstoffgehalt. *Stahl und Eisen*, vol. 98, n° 19, 21 September 1978, p. 989-996.

[41] NAKASUJI, H. et alii. Ultra-Low Carbon Bainitic Steel for Line Pipes. In: Steels for Linepipe and Fittings. *Proceedings*. The Metals Society, London, 1983, p. 90-95.

[42] WANG, S.C. et alii. The Effects of Rolling Processes on the Microstructure and Mechanical Properties of Ultralow Carbon Bainitic Steels. *Materials Science and Engineering*, A157, 1992, p. 29-36.

[43] WANG, S.C. et alii. Effects of Chemical Composition, Rolling and Cooling Conditions on the Amount of Martensite/Austenite (M/A) Constituent Formation in Low Carbon Bainitic Steels. *Materials Science and Engineering*, A154, 1992, p. 43-49.

[44] WANG, S.C. et alii. The Effect of Alloying Elements on the Structure and Mechanical Properties of Ultra Low Carbon Bainitic Steels. *Journal of Materials Science*, vol. 28, 1993, p. 5169-5175.

[45] BAUMGARDT, H. et alii. Thermomechanisch gewalzte bainitische Stähle mit Streckgrenzen von 500 bis 700 $N/mm^2$. *Stahl und Eisen*, vol. 105, n° 13, 1985, p. 709-716.

[46] MAVROPOULOS, L.T. et alii. Retardation of Austenite Recrystallization by the Strain Induced Segregation of Boron. *Canadian Metallurgical Quarterly*, vol. 28, n° 2, 1989, p. 159-169.

[47] ABE, T. et alii. Effect of Thermo-mechanical Processing on Mechanical Properties of Copper Bearing Age Hardenable Steel Plates. *Transactions of the ISIJ*, vol. 27, n° 5, May 1987, p. 478-484.

[48] YANG, J.R. et alii. The Effect of Compressive Deformation on the Transformation Behavior

of an Ultra-Low-Carbon Bainitic Steel. International Symposium on Low-Carbon Steels for the 90's. *Proceedings*. The Minerals, Metals & Materials Society, Warrendale, 1993, p. 293-301.

[49] YAMAMOTO, S. et alii. Effects of the Austenite Grain Size and Deformation in the Unrecrystallized Austenite Region on Bainite Transformation Behavior and Microstructure. *ISIJ International*, vol. 35, n° 8, August 1995, p. 1020-1026.

[50] FUJIWARA, K. et alii. Effect of Hot Deformation on Bainite Structure in Low Carbon Steels. *ISIJ International*, vol. 35, n° 8, August 1995, p. 1006-1012.

[51] YANG, J.R. et alii. The Influence of Plastic Deformation and Cooling Rates on the Microstructural Constituents of an Ultra-Low Carbon Bainitic Steel. *ISIJ International*, vol. 35, n° 8, August 1995, p. 1013-1019.

[52] BAI, D.Q. et alii. Effect of Deformation and Cooling Rate on the Microstructures of Low Carbon Nb-B Steels. *ISIJ International*, vol. 38, n° 4, April 1998, p. 371-379.

[53] HORNBOGEN, E. et alii. A Metalographic Study of Precipitation of Copper from Alpha Iron. *Transactions of the Metallurgical Society of AIME*, vol. 218, n° 12, December 1960, p. 1064-1070.

[54] WRIEDT, H.A. et alii. The Solubility of Copper in Ferrite. *Transactions of the Metallurgical Society of AIME*, vol. 218, n°2, February 1960, p. 30-36.

[55] OSAMURA, K. et alii. SANS Study of Phase Decomposition of Fe-Cu Alloy with Ni and Mn Addition. *ISIJ International*, vol. 34, n° 4, April 1994, p. 346-354.

[56] OSAMURA, K. et alii. Precipitation Hardening in Fe-Cu Binary and Quaternary Alloys. *ISIJ International*, vol. 34, n° 4, April 1994, p. 359-365.

[57] THOMPSON, S.W. et alii. Copper Precipitation during Continuous Cooling and Isothermal Aging of A710-Type Steels. *Metallurgical and Materials Transactions A*, vol. 27A, n° 6, June 1996, p. 1573-1588.

[58] KRISHNADEV, M.R. et alii. Some Aspects of Precipitation of Copper and Columbium (Nb) Carbide in an Experimental High Strength Steel. *Metallurgical Transactions A*, vol. 26A, n° 1, January 1995, p. 222-224.

[59] HICHO, G.E. et alii. Effects of Heat Treatment on the Mechanical Properties and Microstructures of Four Different Heats of a Precipitation Hardening HSLA Steel. *Journal of Heat Treating*, vol. 5, n° 1, 1987, p. 7-19.

[60] BANADKOUKI, S.S.G. et alii. Age Hardening in a Cu-Bearing High Strength Low Alloy Steel. *ISIJ International*, vol. 36, n° 1, January 1996, p. 61-67.

[61] THOMPSON, S.W. et alii. Austenite Decomposition during Continuous Cooling of an HSLA-80 Plate Steel. *Metallurgical and Materials Transactions*, vol. 27A, n° 6, June 1996, p. 1557-1571.

[62] TERAZAWA, T. et alii. Low-Carbon Bainitic Steel with High Strength and Toughness. In: Toward Improved Ductility and Toughness. *Proceedings*. The Japan Institute of Metals and Climax Molybdenum Company, Tokyo, 1971, p. 101-117.

[63] ADRIAN, H. Thermodynamic Model for Precipitation of Carbonitrides in High Strength Low Alloy Steels Containing Up to Three Microalloying Elements With or Without Additions of Aluminium. *Materials Science and Technology*, vol. 8, n° 5, May 1992, p. 406-420.

[64] Norma ASTM Designation ASTM A370-77. *Standard Methods and Definitions for Mechanical Testing of Steel Products*. In: Annual Book of ASTM Standards - Metals: Physical, Mechanical, Corrosion Testing. American Society for Testing and Materials,

vol. 10, 1982, p. 277-300.

[65] Norma ABNT NBR-6673. *Produtos Planos de Aço – Determinação das Propriedades Mecânicas à Tração*. Associação Brasileira de Normas Técnicas, Julho 1981. 22 p.

[66] Norma ASTM Designation ASTM A 112-84. *Standard Methods for Estimating the Average Grain Size of Metals*. In: Annual Book of ASTM Standards - Metallography, Non Destructive Testing. American Society for Testing and Materials, Philadelphia, vol. 11, 1984, p. 127-131.

[67] PADILHA, A.F. et alii. *Técnicas de Análise Microestrutural,* São Paulo, Hemus Editora, 1985, cap. 5.

[68] Norma ASTM Designation ASTM E 384-73. *Standard Test Method for Microhardness of Materials*. In: Annual Book of ASTM Standards - Metallography, Nondestructive Testing. American Society for Testing and Materials, vol. 11, 1982, p. 373-396.

[69] DESALOS, Y. et alii. Influence de l´Écrouissage de l´Austenite sur les Conditions de Transformation d´Aciers Peu ou Moyenemment Alliés. *Les Mémoires et Études Scientifiques de la Revue de Metallurgie*, vol. 76, n° 6, Juin 1979, p. 377-396.