

**IPT 75A**

Cast Iron, gray (Ni-Cr-Mo-Cu)

This reference material was certified by the consensus of a network of expert laboratories using different methodologies, and can be used for calibration, assessment of precision and trueness and, to demonstrate traceability of results in chemical analysis by classical and instrumental methods.

This material is a gray cast iron presented in the form of chips, with particle sizes between 0,60 mm (sieve 30 mesh) and 1.0 mm (sieve 18 mesh).

Properties	Certified Values	Expanded Uncertainties	Unit
C (total)	3,4	0,1	%
Si	1,98	0,03	%
Mn	0,722	0,006	%
Cr	0,487	0,006	%
Mo	0,439	0,005	%
Cu	0,433	0,004	%
Ni	0,425	0,004	%
P	0,250	0,006	%
S	0,033	0,001	%
V	0,030	0,003	%
Ti	0,022	0,002	%
C (graphitic)	2,7	0,1	%

Lot Number: 01

Valid until : 10/2030

The certified values and uncertainties are assured by the validity period, considering that the material is handled and stored in accordance with the given instructions, except in case of damage or contamination. IPT will monitor periodically the properties of this reference material during its validity period, and any observed significant change will be reported to the user.

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### Uncertainties

The expanded uncertainties of the certified values were estimated by the combination, according to ISO Guide 35:2006, of uncertainties of characterization, obtained experimentally from the interlaboratory certification program data, and where relevant, with contributions of stability of material, both estimated at IPT. The coverage factor used is approximately 2, providing a confidence level of 95%.

### Traceability

The certified values of the properties of this material were obtained by means of measurements performed at IPT and by a network of collaborating laboratories, using one or more methods for each property studied. These methods were verified using reference materials with certified values and standards with values traceable to the International System of Units (SI) through NIST and other qualified producers. The measuring instruments were calibrated with standards traceable to SI through Inmetro and the Brazilian Calibration Network (RBC).

### Mass of samples

The mass of sample required for the proper realization of the determinations depends on the particular methodology, levels of analytes, and other factors. It is recommended using the masses established in the most current editions of recognized standard methods. However, to guarantee the validity of all the certified values stated herein and their respective uncertainties, should not be employed samples with masses smaller than 100 mg. This limit was estimated from the sample masses used in the study of homogeneity of this material.

### Handling and storage

Handling: The withdrawal of samples of this material must be accomplished in appropriate environment with clean accessories. Never return material to the bottle. Keep the material in its original bottle, tightly closed. Storage: This material should be stored in a clean place, at room temperature. The ideal relative humidity for storage is under 60% RH.

### Technical Notes

None.

### Additional Information

None.

This Certificate replaces CRM IPT n° 1765-103

### Collaborating Laboratories

CENTRO TÉCNICO AEROESPACIAL – INSTITUTO DE AERONÁUTICA E ESPAÇO – CTA/IEA – São José dos Campos, SP  
Dalcy Roberto dos Santos, Júlio Cesar dos Santos, Roseli de Fátima Cardoso, Rui de Araújo Ribeiro.

MAGNETTI MARELLI – COFAP COMPANHIA FABRICADORA DE PEÇAS – FÁBRICA DE CAMISAS – São Bernardo do Campo, SP  
Elvis Guerreiro, Edgar Salvador Tersetti.

COMPANHIA SIDERÚRGICA DE TUBARÃO – CST – Serra, ES  
Aylton Coelho, Ulisses dos Santos, Wellington de Castro Rodrigues.

INSTITUTO NACIONAL DE TECNOLOGIA – INT – Rio de Janeiro, RJ  
Eliane Bigio de Melo, Antônio Narciso Ventura, Ilan Vieira, Simone Carvalho Chiapetta.

INSTITUTO DE PESQUISAS TECNOLÓGICAS DO ESTADO DE SÃO PAULO S.A. – IPT – São Paulo, SP  
Alcides Carrafa, Maria Salete de Lima Franco Soares, Patricia Mayumi Hinata.

MANNESMANN S.A. – Belo Horizonte, MG  
Paolo Moran, Renato Wanderley Dias, José da Silva, Paulo Vicente Silva.

## Methodologies Employed in the Certification of CRM IPT 75A

C (graphitic)	Direct combustion (infrared)
C (total)	Direct combustion (infrared)
Cr	Titrimetry (ferrous ammonium - permanganate) Atomic Absorption Spectrometry
Cu	Optical Emission Spectrometry (inductively coupled plasma) Atomic Absorption Spectrometry Titrimetry (iodometry - thiosulfate)
Mn	Atomic Absorption Spectrometry UV-Visible spectrophotometry (persulfate) UV-Visible spectrophotometry (periodate) Titrimetry (Persulfate-arsenite)
Mo	Optical Emission Spectrometry (inductively coupled plasma) Gravimetry (alpha-benzoinoxime) UV-Visible spectrophotometry (thiocyanate - tin (II) chloride - butyl acetate)
Ni	Gravimetry (dimethylglyoxime) Optical Emission Spectrometry (inductively coupled plasma) Atomic Absorption Spectrometry
P	Titrimetry (sodium hydroxide - Acidimetry) UV-Visible spectrophotometry (molybdenum blue)
S	Direct combustion (infrared)
Si	Gravimetry (dehydration with perchloric acid)
Ti	Atomic Absorption Spectrometry UV-Visible spectrophotometry (diantiprylmethanein) UV-Visible spectrophotometry (hydrogen peroxide) UV-Visible spectrophotometry (chromotropic acid) Optical Emission Spectrometry (inductively coupled plasma)
V	Optical Emission Spectrometry (inductively coupled plasma) Atomic Absorption Spectrometry

The latest version of the Certificates of IPT Reference Materials are available for download at: [www.ipt.br/nmr.htm](http://www.ipt.br/nmr.htm)

Sistema Certificados 9.1.accdb