

Certified Reference Materials

Catalogue



Certified Reference Materials Catalogue

Version 13 (EN)
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Laboratório de Referências Metrológicas
Centro de Química e Manufaturados
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Introduction

Institute for Technological Research

The Institute for Technological Research (IPT) is an institute linked to the Department of Economic Development, Science, Technology and Innovation of the State of São Paulo, Brazil, and for more than one hundred years is contributing to the process of development of the country.

One of the major Brazilian research institutes, IPT holds very qualified laboratories and a highly competent team of researchers and technicians, working primarily in innovation, research and development, technology services, metrology, and information & technology education.

Metrological Reference Laboratory

The Metrological Reference Laboratory (LRM) was established in 1975 with technical support from the National Institute of Standards and Technology (NIST), the National Metrology Institution of United States of America, to produce reference materials of physical and chemical properties, used by industry, universities and R&D centres.

Reference Materials

Currently, LRM is committed to the production of Certified Reference Materials and provision of Proficiency Test Programmes, thus contributing to the metrological reliability of many laboratories.

The preparation of Certified Reference Materials follows ISO Guides 34 and 35, besides ISO / IEC 17025. IPT distributes CRMs throughout Brazil and exports them to many other countries like USA, UK, Germany, France, Spain, India, South Korea, Japan, etc.

Proficiency Tests

In recent years, the laboratory has widened and improved its team, and allocated resources in new production technologies and instruments, seeking qualification and improvement of its sampling, measurement and development of materials to meet the new demands of technical means.

The Interlaboratory Proficiency Tests and are now available for physical tests and chemical analysis of lubricating oil, carbon and low alloy steels, and plastics. They are performed in agreement with standard ISO / IEC 17043, and are registered in the system The European Proficiency Testing Information System (EPTIS) by Inmetro.

Reference materials available

The Metrological References Laboratory makes available to its customers different kinds of reference materials with physical properties and certified chemical compositions. We are working to provide new materials required by work of many laboratories.

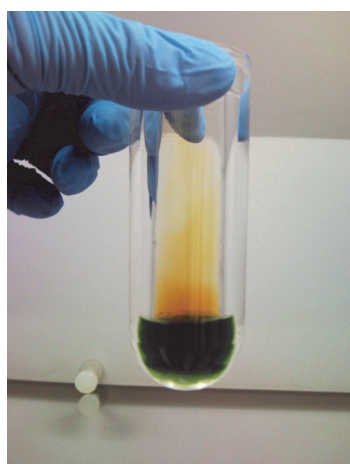
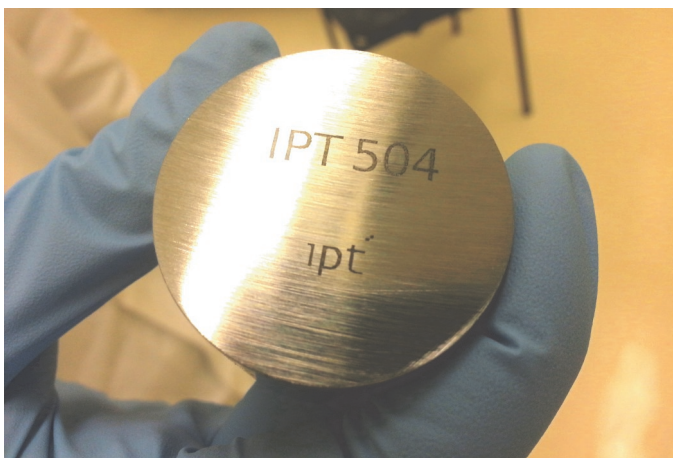
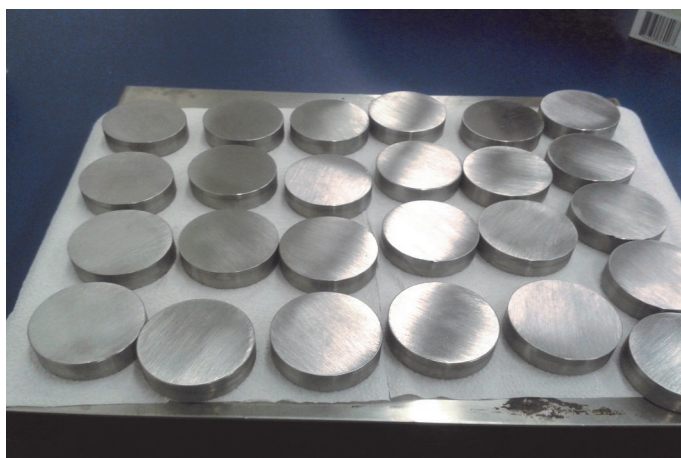
Consulting this Catalogue

In the chemical composition tables, the figures in brackets are not certified, but informational values. The symbol "~" indicates that the material has a composition similar to the composition shown, although not identical, generally relying on additions of particular elements.

In viscosity tables, the values presented are typical, i.e. they are approximate values, with batch to batch variations. Always consult the certificates of reference materials for more details on the presentation of materials, measurement uncertainties, use and storage conditions, etc.

All certificates of the materials presented in this catalogue can be found at www.ipt.br/nmr.htm page.

Chemical Composition CRMs



Carbon steels (Chips)

CRM	Type	C	Si	Mn	P	S	Ni	Cu	Cr	Mo	Al soluble	Pb	Nb	B Total	Ti	V
		[%]														
IPT 11A	AISI 1020	0,205	0,030	0,439	0,009	0,011	0,079	0,013	0,121	0,010	0,153	-	-	-	-	(0,003)
IPT 13A	AISI 1060	0,573	0,260	0,723	0,011	0,014	0,065	0,076	0,098	0,018	0,027	-	-	-	-	
IPT 14A	AISI 1040	0,415	0,292	0,699	0,029	0,036	0,104	0,278	0,100	0,029	(0,009)	-	-	-	-	
IPT 39	AISI 1005	0,048	0,061	0,340	0,021	0,034	0,048	0,019	0,084	0,012	0,169	-	-	-	-	
IPT 41B	SAE J403 12L14	0,072	0,022	1,08	0,056	0,322	0,012	0,005	0,037	-	-	0,220	-	-	-	
IPT 55	AISI 1080 modificado	0,837	0,240	0,923	0,023	0,027	0,174	0,187	0,215	0,099	0,093	-	0,061	-	-	
IPT 58A	0,3%C	0,316	-	-	-	0,021	-	-	-	-	-	-	-	-	-	
IPT 59A	0,5%C	0,495	-	-	-	0,018	-	-	-	-	-	-	-	-	-	
IPT 60A	0,7%C	0,715	-	-	-	0,012	-	-	-	-	-	-	-	-	-	
IPT 71	~ SAE J403 10B40	0,406	0,541	1,04	0,017	0,025	0,085	0,125	0,174	0,018	0,038	-	-	0,0084	-	
IPT 93	~ SAE J403 15B13	0,140	0,261	1,02	0,036	0,028	0,053	0,129	0,104	0,013	0,045	-	-	0,0022	0,034	

Carbon steels (Disks)

CRM	Type	C	Si	Mn	P	S	Ni	Cu	Cr	Mo	Al total	Al sol	Pb	Co	Ti	N	Nb
		[%]															
IPT 503	AISI 1045	0,456	0,218	0,682	0,027	0,027	0,063	0,129	0,160	0,020	0,018	-	0,008	0,006	0,0011	0,0082	-
IPT 504	AISI 1541	0,395	0,232	1,474	0,019	0,031	0,048	0,096	0,098	0,009	0,032	0,028	-	0,0077	0,0011	0,0078	(0,0012)

Low alloy steels (Chips)

CRM	Type	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	Al _{sol}	Co	V	Nb	N	Ti	B	Sn	As
		[%]																		
IPT 12A	AISI 8640	0,435	0,348	0,908	0,012	0,009	0,082	0,508	0,528	0,172	-	-	-	-	-	-	-	-	-	-
IPT 16A	AISI 8620	0,212	0,287	0,820	0,019	0,018	0,053	0,559	0,493	0,201	-	0,016	-	-	-	-	-	-	-	-
IPT 17A	AISI 4340	0,415	0,260	0,724	0,014	0,0210	0,074	1,76	0,820	0,259	-	-	0,039	-	-	-	-	-	-	-
IPT 25	AISI 4140	0,400	0,222	0,902	0,012	0,007	0,040	0,072	1,01	0,280	-	-	-	[0,004]	-	-	-	-	-	-
IPT 29A	Ni-Cr-Mo	0,614	0,372	0,565	0,012	0,0076	0,012	0,794	0,845	0,276	-	0,028	-	0,080	-	0,0039	-	-	-	-
IPT 31	AISI 6150	0,497	0,146	0,794	0,021	0,009	0,251	0,106	1,15	-	[0,099]	0,087	-	0,250	-	-	-	-	-	-
IPT 33	AISI 5160	0,603	0,133	0,772	0,011	0,007	0,036	0,059	0,793	-	-	0,099	-	-	-	-	-	-	-	-
IPT 36	Cr-Mo-Al Nitr alloy	0,315	0,291	0,430	0,016	0,0039	0,129	0,217	1,25	0,201	-	0,86	-	-	-	-	-	-	-	-
IPT 47	ASTM A588 Grade B	0,122	0,273	0,959	0,013	0,020	0,245	0,221	0,573	-	-	-	-	-	0,032	-	-	-	-	-
IPT 96	ASTM A242	0,109	0,286	0,845	0,017	0,0049	0,272	0,018	0,614	-	-	0,041	0,0048	[0,002]	0,0072	0,0092	[0,001]	-	-	-
IPT 97	WNR 1.7147	0,165	0,231	1,11	0,015	0,026	0,129	0,227	1,22	0,064	[0,035]	0,028	0,013	0,024	0,023	0,0119	[0,002]	0,0022	-	-
IPT 100	Cr-Ni-Mo-V	0,462	0,188	0,755	0,016	0,019	0,053	0,524	1,08	0,94	-	0,029	[0,006]	0,117	-	0,0075	[0,0012]	-	-	-
IPT 108	AISI 9260	0,598	1,96	0,861	0,028	0,020	0,121	0,052	0,133	0,017	-	0,019	0,006	-	-	-	0,004	-	[0,008]	[0,003]
IPT 142	AISI 8630	0,304	0,242	0,801	0,022	0,025	0,226	0,421	0,505	0,179	0,029	0,027	0,008	-	0,020	0,0133	-	-	-	-

Low alloy steels (Disks)

CRM	Type	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	Co	V	Nb	Ti	Sn	As	N
		[%]																
IPT 500	ASTM A242	0,106	0,844	0,016	0,0048	0,282	0,270	0,018	0,612	0,0013	0,046	0,0046	0,003	0,008	0,0014	0,002	0,0020	0,0092
IPT 501	SAE 4130H	0,277	0,723	0,016	0,030	0,208	0,083	0,063	1,05	0,210	0,034	0,008	-	-	0,0015	0,008	-	0,0076
IPT 502	AISI 8620	0,210	0,823	0,018	0,026	0,198	0,121	0,408	0,485	0,155	0,024	0,0083	-	-	0,0016	-	-	0,0069

Stainless steels (Chips)

CRM	Type	C	Si	Mn	P	S	Ni	Cu	Cr	Mo	N	Co	Al _{sol}	Al	W	V	Sn	Ti	Nb
		[%]																	
IPT 22	AISI 440A	0,628	0,449	0,804	0,029	0,009	0,143	0,050	16,21	-	0,008	-	-	-	-	-	-	-	-
IPT 24A	AISI 316	0,048	0,510	1,53	0,035	0,020	11,12	0,32	17,37	2,47	(0,036)	(0,16)	-	-	-	-	-	-	-
IPT 26	AISI 420	0,201	0,306	0,713	0,022	0,012	0,413	0,029	13,69	0,070	-	-	-	-	-	-	-	-	-
IPT 98	~ AISI 316Ti	0,050	0,26	1,88	0,042	0,016	11,01	0,292	16,75	1,92	0,0112	0,125	0,070	0,073	0,053	0,053	0,019	0,41	(0,007)

Tool steels (Chips)

CRM	Type	C	Si	Mn	P	S	Cu	Ni	Cr	V	Mo	W	Co	Al	Al _{sol}	Sn	Ti
		[%]															
IPT 50	AISI M2	0,916	0,326	0,280	0,031	0,015	0,091	0,33	4,49	2,00	5,54	6,40	0,260	-	-		
IPT 67	W Nr. 1.3207	1,27	0,26	0,256	0,036	0,007	0,092	0,32	4,33	2,58	4,39	8,03	9,79	-	-		
IPT 114	AISI H13	0,388	1,02	0,361	0,021	0,0023	0,064	0,165	5,20	0,89	1,29	0,174	0,018	-	0,028	(0,005)	(0,002)
IPT 117	W Nr. 1.2721	0,515	0,349	0,557	0,019	0,011	0,07	3,01	1,03	0,015	0,292	0,06	0,014	-	0,026		
IPT 145	W Nr.1.2714	0,558	0,259	0,716	0,016	0,011	0,051	1,61	1,14	0,094	0,494	(0,038)	0,024	0,023	0,021		

Cast irons (Chips)

CRM	Type	C _{total}	C _{graphitic}	Si	Mn	P	S	Cu	Ni	Cr	Ti	Mg	Mo	V
		[%]												
IPT 37B	Gray	3,37	2,85	1,66	0,737	0,148	0,069	0,052	0,074	0,088	0,034	-	-	-
IPT 49	White	2,11	-	0,78	0,272	0,012	0,019	0,040	0,021	0,020	-	-	-	-
IPT 69	-	3,34	2,50	2,07	0,715	0,267	0,018	0,473	0,272	0,353	0,019	-	0,004	-
IPT 75A	Gray - alloyed (Ni Cr Mo Cu)	3,4	2,7	1,98	0,722	0,250	0,033	0,433	0,425	0,487	0,022	-	0,439	0,030

Ferroalloys (Powder 0,04 to 0,25mm)

CRM	Type	Mn	Fe	C	P	S	Si	Cu	Cr	Ni	Ti	Al	Ca	Mg	Co	Zr	Ba	Sr	V	Mo	Zn
		[%]																			
IPT 54	Fe-Mn	80,4	15,9	1,20	0,22	0,003	1,74	0,059	0,043	0,14	-	-	-	-	[0,08]	-	-	-	[0,08]	[0,02]	[0,02]
IPT 65	Fe-Cr LC	0,128	17,9	0,051	0,006	0,017	0,71	-	71,2	0,077	-	9,2	-	-	0,016	-	-	-	-	-	-
IPT 70	Fe-Si	0,283	54,1	0,087	0,018	[0,006]	44,7	0,066	0,046	0,022	0,018	0,21	0,16	0,016	-	-	-	-	-	-	-
IPT 143	Fe-Si	0,110	22,4	0,054	0,025	0,0012	75,1	0,014	0,0044	0,0028	0,068	0,57	0,79	0,039	-	0,082	0,126	0,014	-	-	-

Copper and copper alloys (Chips)

CRM	Type	Cu	Ag	Zn	Fe	Ni	Pb	Al	As	Bi	Sb	Sn	Se	Te
		[%]						(mg . kg ⁻¹)						
IPT 64	Pure copper	99,98	0,0010	[0,001]	4,5	1,8	0,6	[<6]	[2]	[<1]	[2]	[<5]	[<2]	[<1]

CRM	Type	Cu	Sn	Pb	Zn	Fe	Ni	Sb	S	As	P	Cd	Al	Ag
		[%]												
IPT 10B	Bronze 85 _{Cu} 5 _{Sn} 5 _{Pb} 5 _{Zn}	85,2	4,61	4,74	4,73	0,211	0,33	0,114	0,068	0,019	0,003	-	-	-
IPT 74	Bronze 80 _{Cu} 3 _{Sn} 6 _{Pb} 10 _{Zn}	80,41	2,84	6,24	9,88	0,315	0,15	0,016	0,056	[0,002]	[0,002]	0,013	-	-
IPT 40	Brass 2,45 Pb	58,10	0,18	2,45	39,1	0,007	0,0012	0,023	-	-	-	0,049	0,010	[0,002]

Silicon metal (powder)

CRM	Type	Fe	Ca	Al	C	S	Mn	Ti	Mg	P	Cu	Cr	Ni	V	Pb
		[%]					(mg . kg ⁻¹)								
IPT 134	Chemical grade	0,29	0,102	0,085	0,025	[0,002]	113	97	48	33	14	11	6	[4]	[2]
IPT 135	Chemical grade	0,125	0,011	0,045	0,018	[0,002]	70	113	12	27	8	6	5	[3]	[2]

Clays (powder)

CRM	Type	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	Na ₂ O	K ₂ O	Perda ao fogo
		[%]									
IPT 32	Plastic Saracuruna Brazil	51,8	28,5	3,46	1,49	0,13	0,17	0,39	0,16	0,80	12,6
IPT 42	São Simão Brazil	51,9	32,2	1,09	0,96	0,07	0,05	0,19	0,02	0,47	12,9

Limestone (powder)

CRM	Type	CaO	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MnO	P ₂ O ₅	SrO	MgO	Na ₂ O	K ₂ O	Perda ao fogo
		[%]											
IPT 122	Dolomitic	32,0	4,3	1,24	0,65	0,06	0,042	0,048	0,018	17,5	0,019	0,43	43,3

Feldspars (powder)

CRM	Type	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	Perda ao fogo
		[%]									
IPT 53	Potassic	65,8	18,3	0,13	0,013	0,27	0,05	2,5	12,1	0,072	0,51
IPT 72	Sodic	66,2	20,26	0,09	[0,005]	0,18	[0,022]	10,0	1,47	1,03	0,66

Sand (powder)

CRM	Type	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	TiO ₂	ZrO ₂	CaO	MgO	Na ₂ O	K ₂ O	Perda ao fogo
		[%]									
IPT 61	Quartz sand	99,79	0,014	0,054	0,026	0,010	[0,004]	[0,003]	[0,002]	[0,007]	[0,06]

Fluorite (powder)

CRM	Type	CaF ₂	SiO ₂	Fe ₂ O ₃
		[%]		
IPT 95	Criciúma SC Brazil	85,4	8,3	0,36

Bauxite (powder)

CRM	Type	Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	P ₂ O ₅	TiO ₂	K ₂ O	ZnO	MnO	V ₂ O ₅	ZrO ₂	LOI	Al ₂ O ₃ usable	SiO ₂ reactive
	[%]													
IPT 131	Poços de Caldas MG Brazil	54,1	0,78	11,5	0,15	1,77	0,022	0,013	0,31	0,042	0,35	30,0	{52,0}	{0,4}

CRM	SO ₃	Cr ₂ O ₃	CaO	Ga ₂ O ₃	Ge	F	C orgânico	MgO	Be
	[%]								
IPT 131 (cont)	{0,07}	{0,004}	{0,007}	{0,012}	{0,01}	{0,1}	{0,08}	{0,002}	{0,0002}

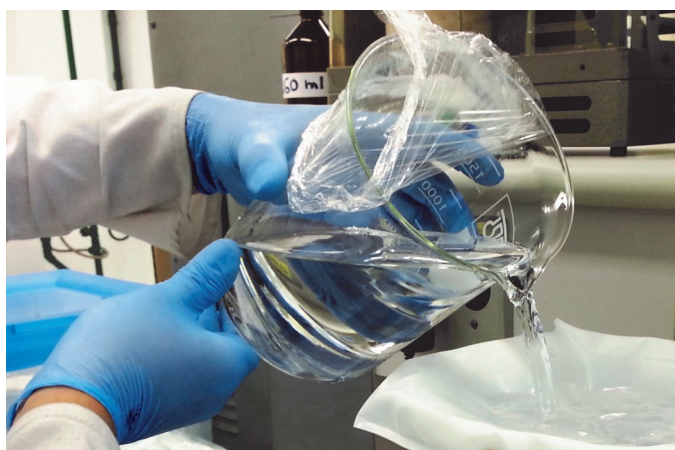
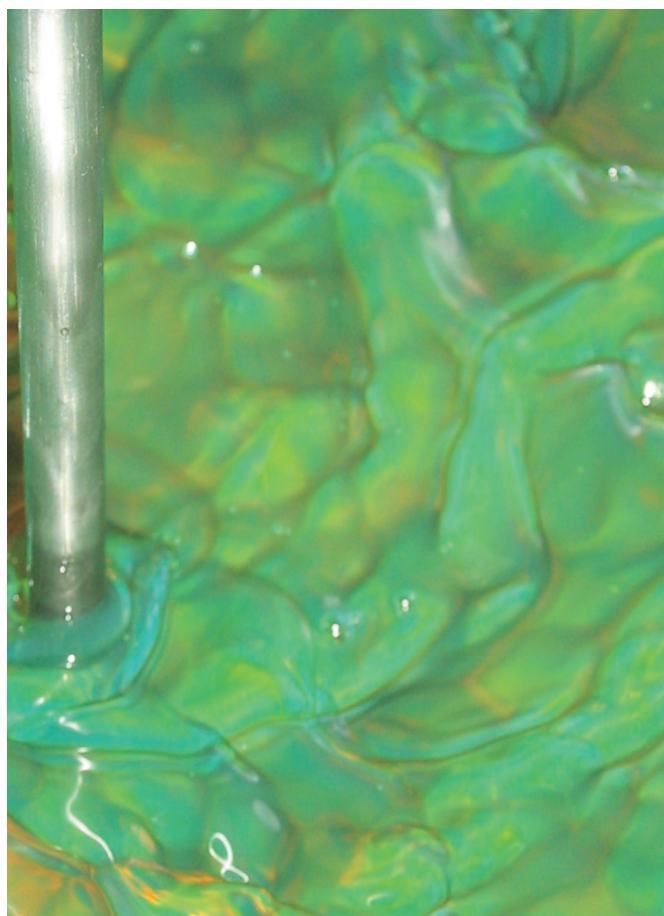
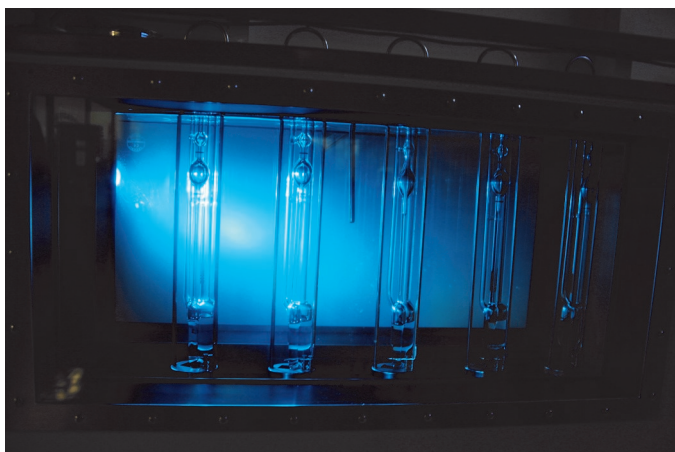
Phosphate rock concentrate (powder)

CRM	Type	P ₂ O ₅	CaO	SiO ₂	F	Fe ₂ O ₃ sol	Al ₂ O ₃ total	Al ₂ O ₃ sol	MgO sol	Na ₂ O sol	K ₂ O total	K ₂ O sol	SrO sol	MnO
		[%]												
IPT 18B	Jacupiranga Brazil	35,7	52,6	1,15	1,33	0,21	0,35	{0,31}	{1,65}	{0,14}	0,23	{0,21}	0,48	{0,026}

Refractories (powder)

CRM	Type	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	ZrO ₂	SrO	CaO	MgO	MnO	Li ₂ O	Na ₂ O	K ₂ O	P ₂ O ₅	LOI
		[%]													
IPT 51	Silica-Alumina Burnt	55,0	40,3	1,19	2,19	0,070	-	0,06	0,20	-	0,018	0,09	0,69	0,09	0,16
IPT 57	Burnt, alumina	24,3	71,5	1,25	1,19	0,20	0,009	0,05	0,13	-	0,008	0,35	0,83	0,054	0,20
IPT 63	Silica	96,28	0,48	0,52	0,030	{0,002}	-	2,21	0,18	0,008	{0,0005}	0,013	0,043	0,013	0,17

Physical Properties Standards



Kinematic Viscosity

CRM	DESCRIPTION	20,0°C	25,0°C	37,8°C	40,0°C	50,0°C	98,9°C	100,0°C
		Typical values (mm ² /s)						
IPT 76	OP 3	4,6	4,1	3,1	3	2,5	1,3	1,2
IPT 77	OP 6	10,9	9,2	6,3	6	4,6	2,0	1,9
IPT 78	OP 10	20,9	17,1	10,8	10	7	2,7	2,6
IPT 79	OP 20	48,8	38,3	22,3	20,0	14,5	4,4	4,3
IPT 80	OP 35	94,0	71,5	38,6	35,0	22,7	6,1	6,0
IPT 81	OP 45	130	96,9	50,3	45,0	29,9	7,1	6,9
IPT 82	OP 60	180	135	67,1	60	38,7	8,5	8,3
IPT 83	OP 100	330	240	110	100	61,6	11,8	11,5
IPT 84	OP 150	530	375	170	150	91,2	15,8	15,4
IPT 85	OP 200	740	510	225	200	115	18,6	18
IPT 86	OP 300	1195	815	340	300	170	24,1	23,4
IPT 87	OP 400	1680	1130	458	400	220	28,9	28,0
IPT 88	OP 600	2240	1490	592	510	280	34,7	33,5
IPT 89	OP 1000	4960	3260	1260	1000	585	66,5	64,1
IPT 90	OP 2000	10925	7060	2600	2000	1140	110	105
IPT 91	OP 4000	22190	14175	5070	4000	2140	175	170
IPT 92	OP 8000	45190	28610	9980	8000	4070	295	285
IPT 99	OP 30000	129000	80565	27100	23000	10625	665	635

Absolute Viscosity

CRM	DESCRIPTION	20,0°C	25,0°C	37,8°C	40,0°C	50,0°C	98,9°C	100,0°C
		Typical values (mPa.s)						
IPT 76	OP 3	3,6	3,2	2,4	2,3	1,9	0,92	0,91
IPT 77	OP 6	9,1	7,7	5,2	4,9	3,8	1,5	1,4
IPT 78	OP 10	17,7	14,4	9,0	8,4	6,2	2,2	2,1
IPT 79	OP 20	41,6	32,6	18,8	17,3	12,1	3,5	3,4
IPT 80	OP 35	80,9	61,3	32,8	29,8	19,9	4,9	4,8
IPT 81	OP 45	110	83,4	63,4	38,7	25,2	5,8	5,6
IPT 82	OP 60	160	115	57,4	51,5	32,8	6,9	6,7
IPT 83	OP 100	290	205	96,3	85,7	52,4	9,7	9,4
IPT 84	OP 150	470	330	150	130	79,0	13,8	13,2
IPT 85	OP 200	655	450	200	175	100	15,6	15,1
IPT 86	OP 300	1070	725	300	265	150	20,4	19,8
IPT 87	OP 400	1505	1010	405	350	195	24,6	23,8
IPT 88	OP 600	2015	1330	525	455	245	29,6	28,5
IPT 89	OP 1000	4315	2830	1080	930	500	54,9	52,9
IPT 90	OP 2000	9590	6180	2260	1930	985	90,8	87,2
IPT 91	OP 4000	19595	12480	4430	3760	1850	148	141
IPT 92	OP 8000	40180	25360	8775	7425	3555	250	240
IPT 99	OP 30000	115700	72065	24050	20220	9360	570	540

CRM	DESCRIPTION	Density at 20°C (g/cm ³)
IPT 151	Toluene	0,8668

General info

LIST OF CERTIFIED REFERENCE MATERIALS

NCM : 3822.00.90

Carbon Steel

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
11A	Carbon Steel (AISI 1020)	chips	120	250
13A	Carbon Steel (AISI 1060)	chips	100	230
14A	Carbon Steel (AISI 1040)	chips	100	230
39	Carbon Steel (AISI 1005)	chips	100	230
41B	Carbon Steel Ressulfurado 12L14 (alto enxofre)	chips	100	230
55	Carbon Steel (AISI 1080 modificado)	chips	100	230
58A	Carbon Steel (0,3% C)	chips	120	250
59A	Carbon Steel (0,5% C)	chips	100	250
60A	Carbon Steel (0,7% C)	chips	100	230
71	Carbon Steel (AISI 10B40)	chips	100	230
93	Carbon Steel (AISI 15B13)	chips	100	230
503	Carbon Steel (AISI 1045)	disk	160	270
504	Carbon Steel (SAE 1541)	disk	170	270

Tool Steel

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
50	Tool Steel (AISI M2)	chips	120	250
67	Tool Steel (10% Co 4%Mo 8% W)	chips	100	230
114	Tool Steel (Cr-Mo-V)	chips	120	250
117	Tool Steel (Ni-Cr)	chips	100	230
145	Tool Steel (DIN WNr. 1.2714)	chips	120	230

Stainless Steel

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
22	Stainless Steel (AISI 440 A)	chips	100	230
24A	Stainless Steel (AISI 316)	chips	100	230
26	Stainless Steel (AISI 420)	chips	100	230
98	Stainless Steel (Cr-Ni-Mo-Ti)	chips	100	230

Low Alloy Steel

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
12A	Low Alloy Steel (AISI 8640)	chips	100	230
16A	Low Alloy Steel (AISI 8620)	chips	100	230
17A	Low Alloy Steel (AISI 4340)	chips	100	230
25	Low Alloy Steel (AISI 4140)	chips	100	230
29A	Low Alloy Steel (Ni-Cr-Mo)	chips	100	230
31	Low Alloy Steel (AISI 6150)	chips	100	230
33	Low Alloy Steel (AISI 5160)	chips	100	230
36	Low Alloy Steel Cr-Mo-Al	chips	100	230
47	Low Alloy Steel (Nb 0,03%)	chips	100	230
96	Low Alloy Steel (ASTM A 242)	chips	120	250
97	Low Alloy Steel (20%Mn 5%Cr)	chips	100	230
100	Low Alloy Steel (Cr-Ni-Mo-V)	chips	100	230
108	Low Alloy Steel (AISI 9260)	chips	100	230
142	Low Alloy Steel (AISI 8630)	chips	100	230
500	Low Alloy Steel (A 242)	disk	150	270
501	Low Alloy Steel (AISI 4130H)	disk	170	300
502	Low Alloy Steel (AISI 8620)	disk	170	300

Cast Iron

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
37B	Cast Iron - Gray	chips	80	210
49	Cast Iron White	chips	80	210
69	Cast Iron	chips	80	210

Ferroalloys

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
54	Ferromanganese [80%Mn]	powder	120	250
65	Ferrochromium [71% Cr]	powder	100	230
70	Ferrosilicon [45% Si]	powder	60	190
143	Ferrosilicon [75% Si]	powder	50	180

Copper alloys

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
10B	Bronze [85% Cu, 5% Sn, 5% Pb, 5% Zn]	chips	80	210
40	Brass [2,45% Pb]	chips	100	230
74	Bronze [80%Cu, 3%Sn, 6%Pb, 10%Zn]	chips	60	190

Pure metals

Produto	Produto	Exterior		
64	Pure Copper	chips	50	180
134	Silicon Metal	powder	60	150
135	Silicon Metal	powder	60	150

Minerals

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
18B	Phosphate rock concentrate	powder	100	230
32	Plastic Clay [Saracuruna]	powder	50	180
42	Clay [São Simão]	powder	50	180
53	Feldspar Sodic	powder	80	210
61	Quartz Sand [0,01% Fe]	powder	100	230
72	Feldspar Potassic	powder	80	210
95	Fluorita	powder	100	230
122	Dolomitic Limestone	powder	80	210
131	Bauxite [Poços de Caldas]	powder	70	200

Ceramics - Refractories

IPT CODE	DESCRIPTION	FORM	CONTENT (g)	GROSS WEIGHT (g)
51	Refractory, Burnt Silica-Alumina [40% Al2O3]	powder	80	210
57	Refractory, Burnt Alumina [70% Al2O3]	powder	80	210
63	Refractory, Silica [96% SiO2]	powder	80	210

Density

IPT CODE	DESCRIPTION	FORM	CONTENT (ml)	GROSS WEIGHT (g)
151	Density [0,89 g/cm3], Toluene	liquid	50	90

Viscosity

IPT CODE	DESCRIPTION	FORM	CONTENT (ml)	GROSS WEIGHT (g)
76	Viscosity Standard - OP 3	liquid	500	880
77	Viscosity Standard - OP 6	liquid	500	880
78	Viscosity Standard - OP 10	liquid	500	880
79	Viscosity Standard - OP 20	liquid	500	880
80	Viscosity Standard - OP 35	liquid	500	880
81	Viscosity Standard - OP 45	liquid	500	880
82	Viscosity Standard - OP 60	liquid	500	880
83	Viscosity Standard - OP 100	liquid	500	880
84	Viscosity Standard - OP 150	liquid	500	880
85	Viscosity Standard - OP 200	liquid	500	880
86	Viscosity Standard - OP 300	liquid	500	880
87	Viscosity Standard - OP 400	liquid	500	880
88	Viscosity Standard - OP 600	liquid	500	880
89	Viscosity Standard - OP 1000	liquid	500	880
90	Viscosity Standard - OP 2000	liquid	500	880
91	Viscosity Standard - OP 4000	liquid	500	880
92	Viscosity Standard - OP 8000	liquid	500	880

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