

# CERTIFIED REFERENCE MATERIALS (CRM)



Sufficiently Homogenized Indian Reference Materials Certified as per ISO 17034:2016 used to check the quality and metrological traceability of products, to validate analytical measurement methods or for the calibration of Instruments



prepared by



**CRM UNIT, AAC DIVISION,  
CSIR-NATIONAL METALLURGICAL LABORATORY  
JAMSHEDPUR-831007, JHARKHAND, INDIA**

# METALS / ALLOYS

<b>1</b>	<b>CAST IRON (CRM No. 201.8) (Turning form)</b>		<b>5</b>	<b>STEEL 0.4% C (CRM No. 217) (Turning form)</b>	
	Carbon (C)	2.97%		Carbon (C)	0.38%
	Silicon (Si)	2.64%		Silicon (Si)	0.27%
	Manganese (Mn)	0.44%		Manganese (Mn)	0.73%
	Phosphorus (P)	0.052%		Phosphorus (P)	0.057%
	Sulfur (S)	0.11%		Sulfur (S)	0.068%
	Chromium (Cr)	0.030%		Chromium (Cr)	0.077%
	Copper (Cu)	0.034%		Nickel (Ni)	0.078%
	Nickel (Ni)	0.025%		Price: Rs. 10000.00 (for 100 gm pack)	
	Price: Rs. 9000.00 (for 100 gm pack)		<b>6</b>	<b>STAINLESS STEEL (CRM No. 220A) (Turning form)</b>	
<b>2</b>	<b>ALLOY CAST IRON (CRM No. 207.3) (Turning form)</b>			Carbon (C)	0.086%
	Total Carbon (C)	3.13%		Silicon (Si)	0.57%
	Silicon (Si)	1.22%		Manganese (Mn)	1.35%
	Manganese (Mn)	0.83%		Phosphorus (P)	0.031%
	Phosphorus (P)	0.20%		Sulfur (S)	0.014%
	Sulfur (S)	0.016%		Copper (Cu)	0.13%
	Nickel (Ni)	1.90%		Cobalt (Co)	0.15%
	Copper (Cu)	0.034%		Nickel (Ni)	8.74%
	Chromium (Cr)	0.37%		Chromium (Cr)	19.21%
	Price: Rs. 9000.00 (for 100 gm pack)			Price: Rs. 9000.00 (for 100 gm pack)	
<b>3</b>	<b>STEEL 0.10 % C (CRM No. 213) (Turning form)</b>		<b>7</b>	<b>NICKEL STEEL (CRM No. 221) (Turning form)</b>	
	Carbon (C)	0.10%		Carbon (C)	0.18%
	Silicon (Si)	0.07%		Silicon (Si)	0.19%
	Sulfur (S)	0.012%		Manganese (Mn)	0.39%
	Phosphorus (P)	0.017%		Sulfur (S)	0.015%
	Manganese (Mn)	0.47%		Phosphorus (P)	0.013%
	Chromium (Cr)	0.028%		Nickel (Ni)	3.22%
	Price: Rs. 9000.00 (for 100 gm pack)			Chromium (Cr)	0.67%
<b>4</b>	<b>STEEL 0.6 % C (CRM No. 216) (Turning form)</b>			Molybdenum (Mo)	0.23%
	Carbon (C)	0.61%		Price: Rs. 9000.00 (for 100 gm pack)	
	Silicon (Si)	0.25%			
	Manganese (Mn)	0.72%			
	Phosphorus (P)	0.018%			
	Sulfur (S)	0.021%			
	Chromium (Cr)	0.037%			
	Nickel (Ni)	0.0033%			
	Price: Rs. 9000.00 (for 100 gm pack)				

Note- 18 % GST will be applicable extra on above price of each CRMs.

# METALS / ALLOYS

<b>8</b>	<b>LOW ALLOY STEEL (CRM No. 223.6 A) (Turning form)</b>		<b>11</b>	<b>6% Si-Al ALLOYS (CRM No. 251.1) (Turning form)</b>	
	Carbon (C)	0.21%		Silicon (Si)	6.09%
	Silicon (Si)	0.28%		Iron (Fe)	0.76%
	Manganese (Mn)	0.65%		Magnesium (Mg)	0.63%
	Sulfur (S)	0.036%		Copper (Cu)	0.28%
	Phosphorus (P)	0.038%		Manganese (Mn)	0.22%
	Nickel (Ni)	0.98%		Zinc (Zn)	0.077%
	Chromium (Cr)	0.88%		Lead (Pb)	0.054%
	Molybdenum (Mo)	0.17%		Tin (Sn)	0.02%
	Copper (Cu)	0.14%		Nickel (Ni)	0.02%
	Aluminium (Al)	0.041%		Price: Rs. 9000.00 (for 100 gm pack)	
	Cobalt (Co)	0.015%		<b>(Newly Developed)</b> <b>GASEOUS STANDARDS IN STEEL</b>	
	Price: Rs. 9000.00 (for 100 gm pack)				
<b>9</b>	<b>BRASS 60:40 (CRM No. 241) (Turning form)</b>		<b>12</b>	<b>C &amp; S IN STEEL (CRM 504) (Pin Shape)</b>	
	Copper (Cu)	58.10%		Carbon (C)	0.107%
	Zinc (Zn)	38.94%		Sulfur (S)	0.027%
	Lead (Pb)	2.64%		Price: Rs. 10000.0 (for 100 gm pack)	
	Phosphorus (P)	0.004%	<b>13</b>	<b>C &amp; S IN STEEL (CRM 505) (Pin Shape)</b>	
	Tin (Sn)	0.14%		Carbon (C)	0.79%
	Nickel (Ni)	0.044%		Sulfur (S)	0.006%
	Iron (Fe)	0.13%		Price: Rs. 10000.0 (for 100 gm pack)	
	Price: Rs. 9000.00 (for 100 gm pack)		<b>14</b>	<b>H, N &amp; O IN STEEL (CRM 506) (Pin Shape)</b>	
<b>10</b>	<b>BRASS 70:30 (CRM No. 242) (Turning form)</b>			Hydrogen (H)	2.90 PPM
	Copper (Cu)	70.20%		Nitrogen (N)	0.0110%
	Zinc (Zn)	29.51%		Oxygen (O)	0.0104%
	Lead (Pb)	0.028%		Price: Rs. 12000.0 (for 100 gm pack)	
	Phosphorus (P)	0.005%	<b>15</b>	<b>H, N &amp; O IN STEEL (CRM 507) (Pin Shape)</b>	
	Tin (Sn)	0.060%		Hydrogen (H)	6.12 PPM
	Nickel (Ni)	0.041%		Nitrogen (N)	0.0383%
	Iron (Fe)	0.059%		Oxygen (O)	0.0081%
	Price: Rs. 9000.00 (for 100 gm pack)			Price: Rs. 12000.0 (for 100 gm pack)	

Note- 18 % GST will be applicable extra on above price of each CRMs.

# FERRO-ALLOYS & ALLIED MATERIAL

<b>16</b>	<b>L.C. Fe-CHROMIUM (CRM No. 229) (Powder form)</b>	Carbon ( C )	0.14%
		Silicon (Si)	0.77%
		Phosphorus (P)	0.029%
		Sulfur (S)	0.010%
		Chromium (Cr)	58.96%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>17</b>	<b>H.C. Fe-CHROMIUM (CRM No. 230) (Powder form)</b>	Chromium (Cr)	62.91%
		Silicon (Si)	3.53%
		Carbon (C)	7.85%
		Phosphorus (P)	0.035%
		Sulfur (S)	0.036%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>18</b>	<b>Fe-SILICON (CRM No. 231) (Powder form)</b>	Silicon (Si)	72.72%
		Aluminium (Al)	1.51%
		Phosphorus (P)	0.024%
		Sulfur (S)	0.005%
		Carbon (C)	0.20%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>19</b>	<b>Fe-MOLYBDENUM (CRM No. 232) (Powder form)</b>	Molybdenum (Mo)	56.65%
		Silicon (Si)	0.85%
		Phosphorus (P)	0.04%
		Carbon (C)	0.10%
		Sulfur (S)	0.048%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>20</b>	<b>L.C. Fe-Manganese (CRM No. 233.1) (Powder form)</b>	Manganese (Mn)	84.79%
		Silicon (Si)	1.65%
		Phosphorus (P)	0.13%
		Carbon (C)	0.12%
		Sulfur (S)	0.006%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>21</b>	<b>H.C. Fe-MANGANESE (CRM No.233.2) (Powder form)</b>	Manganese (Mn)	75.55%
		Silicon (Si)	0.36%
		Phosphorus (P)	0.20%
		Carbon (C)	6.68%
		Sulfur (S)	0.0053%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>22</b>	<b>Fe-TITANIUM (CRM No. 234) (Powder form)</b>	Titanium (Ti)	25.56%
		Silicon (Si)	2.84%
		Phosphorus (P)	0.041%
		Carbon (C)	0.051%
		Sulfur (S)	0.011%
		Aluminium (Al)	5.40%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>23</b>	<b>Fe-VANADIUM (CRM No. 235) (Powder form)</b>	Vanadium (V)	51.53%
		Silicon (Si)	1.05%
		Carbon (C)	0.054%
		Phosphorus (P)	0.040%
		Sulfur (S)	0.024%
		Price: Rs. 9000.00 (for 100 gm pack)	
<b>ALLIED MATERIAL</b>			
<b>24</b>	<b>BLAST FURNACE SLAG (CRM No. 435.2) (Powder form)</b>	Silica (SiO <sub>2</sub> )	32.22%
		Alumina (Al <sub>2</sub> O <sub>3</sub> )	20.79%
		Calcium Oxide (CaO)	34.79%
		Magnesium Oxide (MgO)	7.60%
		Total Iron [Fe (T)]	0.43%
		Sulfur (S)	0.97%
		Phosphorus (P)	0.007%
		Titanium Dioxide (TiO <sub>2</sub> )	0.88%
		Price: Rs. 9000.00 (for 100 gm pack)	

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# ORES / COAL

<b>25</b>	<b>IRON ORE (CRM No. 161.4 A) (Powder form)</b>		<b>30</b>	<b>LIME STONE (CRM No.172) (Powder form)</b>	
	Total Iron [Fe (T)]	44.52%		Calcium Oxide (CaO)	52.74%
	Silica (SiO <sub>2</sub> )	12.23%		Magnesium Oxide (MgO)	1.54%
	Alumina (Al <sub>2</sub> O <sub>3</sub> )	12.33%		Silica (SiO <sub>2</sub> )	1.92%
	Sulfur (S)	0.009%		Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> )	0.26%
	Phosphorus (P)	0.088%		Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.25%
	Titanium Dioxide (TiO <sub>2</sub> )	0.47%		Loss on Ignition (LOI)	42.58%
	Price: Rs. 9000.00 (for 100 gm pack)			Sulfur (S)	0.009%
	Price: Rs. 9000.00 (for 100 gm pack)			Price: Rs. 9000.00 (for 100 gm pack)	
<b>26</b>	<b>IRON ORE (CRM No. 161.5 A) (Powder form)</b>		<b>31</b>	<b>COAL (CRM No. 152 ) (Powder form)</b>	
	Total Iron [Fe (T)]	53.91%		<b>(On dry basis)</b>	
	Silica (SiO <sub>2</sub> )	7.14%		Gross Calorific Value (GCV)	4928 Cal/gm
	Alumina (Al <sub>2</sub> O <sub>3</sub> )	7.50%		Volatile Matter (VM)	21.92%
	Sulfur (S)	0.009%		Ash	35.78%
	Phosphorus (P)	0.07%		Total Sulfur (S)	0.65%
	Titanium Dioxide (TiO <sub>2</sub> )	0.29%		Carbon (C)	51.05%
	Price: Rs. 9000.00 (for 100 gm pack)			Hydrogen (H)	3.26%
	Price: Rs. 9000.00 (for 100 gm pack)			Nitrogen (N)	1.13%
<b>27</b>	<b>IRON ORE (CRM No.161.6 A) (Powder form)</b>			Price: Rs. 12500.00 (for 50gm pack)	
	Total Iron [Fe (T)]	62.83%			
	Silica (SiO <sub>2</sub> )	2.66%			
	Alumina (Al <sub>2</sub> O <sub>3</sub> )	2.93%			
	Sulfur (S)	0.009%			
	Phosphorus (P)	0.065%			
	Titanium Dioxide (TiO <sub>2</sub> )	0.093%			
	Price: Rs. 9000.00 (for 100 gm pack)				
	Price: Rs. 9000.00 (for 100 gm pack)				
<b>28</b>	<b>MANGANESE ORE (CRM No.166.3 A) (Powder form)</b>				
	Total Manganese [Mn (T)]	28.20%			
	Total Iron [Fe (T)]	24.63%			
	Silica (SiO <sub>2</sub> )	8.98%			
	Alumina (Al <sub>2</sub> O <sub>3</sub> )	5.06%			
	Phosphorus (P)	0.058%			
	Sulfur (S)	0.008%			
	Price: Rs. 9000.00 (for 100 gm pack)				
<b>29</b>	<b>MANGANESE ORE (CRM No.166.4 A) (Powder form)</b>				
	Total Manganese [Mn (T)]	38.75%			
	Total Iron [Fe (T)]	19.30%			
	Silica (SiO <sub>2</sub> )	2.88%			
	Alumina (Al <sub>2</sub> O <sub>3</sub> )	3.52%			
	Phosphorus (P)	0.13%			
	Sulfur (S)	0.008%			
	Price: Rs. 9000.00 (for 100 gm pack)				

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# SPECTROGRAPHIC STANDARDS

<b>32</b>	<b>PLAIN CARBON STEEL (CRM No. 304A) (Disc Form)</b>		<b>34</b>	<b>STAINLESS STEEL (CRM No. 302) (Disc Form)</b>	
	Carbon ( C )	0.17%		Carbon ( C )	0.072%
	Silicon (Si)	0.21%		Silicon (Si)	0.48%
	Manganese (Mn)	0.56%		Manganese (Mn)	1.05%
	Phosphorus (P)	0.098%		Phosphorus (P)	0.030%
	Sulfur (S)	0.022%		Sulfur (S)	0.017%
	Chromium (Cr)	0.009%		Chromium (Cr)	16.91%
	Price: Rs. 10000.00 (for each piece)			Nickel (Ni)	10.12%
<b>33</b>	<b>STAINLESS STEEL (CRM No. 301) (Disc Form)</b>			Molybdenum (Mo)	2.04%
	Carbon ( C )	0.072%		Vanadium (V)	0.061%
	Silicon (Si)	0.39%		Cobalt (Co)	0.19%
	Manganese (Mn)	1.42%		Copper (Cu)	0.40%
	Phosphorus (P)	0.036%		Price: Rs. 10000.00 (for each piece)	
	Sulfur (S)	0.021%	<b>35</b>	<b>STAINLESS STEEL (CRM No. 303) (Disc Form)</b>	
	Chromium (Cr)	18.00%		Carbon ( C )	0.16%
	Nickel (Ni)	7.86%		Silicon (Si)	0.40%
	Molybdenum (Mo)	0.37%		Manganese (Mn)	7.15%
	Vanadium (V)	0.072%		Phosphorus (P)	0.035%
	Cobalt (Co)	0.17%		Sulfur (S)	0.051%
	Copper (Cu)	0.42%		Chromium (Cr)	12.69%
	Price: Rs. 10000.00 (for each piece)			Nickel (Ni)	1.59%
				Molybdenum (Mo)	0.18%
				Vanadium (V)	0.067%
				Cobalt (Co)	0.060%
				Copper (Cu)	0.69%
				Price: Rs. 10000.00 (for each piece)	

Note- 18 % GST will be applicable extra on above price of each CRMs.

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## BULK ORDER PROMOTIONAL OFFER FOR CRM SERVICE

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1. On bulk purchase of 15 bottles (100g each) 3 bottles any of 100g may be given free.
2. On bulk purchase of 30 bottles (100g each) 8 bottles any of 100g may be given free.
3. On bulk purchase of 100 bottles (100g each) 25 bottles any of 100g may be given free.

**Note:** *Bulk Order Promotional Offer (as free items) is not applicable for Coal Standard, Gaseous Standard and Spectrographic Standards.*

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## ORDERING INFORMATION

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Additional \*@18 % GST is applicable on the listed price. The CRMs will be sent through SPEED POST PARCEL/COURIER on receipt of full payment in advance. All payments are to be made in favour of "**DIRECTOR, NATIONAL METALLURGICAL LABORATORY, JAMSHEDPUR**" by e-payment (NEFT/RTGS) or Demand Draft payable at State Bank of India, Jamshedpur. *No cash will be accepted.* The bank details are given below.

### Bank Details:

Banker's detail: STATE BANK OF INDIA, NML BRANCH, JAMSHEDPUR- 831007, JHARKHAND, INDIA

Electronic A/c No.: **30271713826**

RTGS No.: SBIN 0003329

MICR No.: 831002013

PAN No.: AAA TC 2716R

\*GST No.: 20AAATC2716R2ZS

HSN/SAC Code: 998346

### Accreditation Information:

CRM Unit, AAC Division, CSIR-National Metallurgical Laboratory has been accredited by **NABL as per ISO 17034:2016 for the production of Certified Reference Material** for above materials having **Certificate No.: RC-1019.**

### Contact Details:

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