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CENTRO NACIONAL  
DE  
INVESTIGACIONES METALÚRGICAS  
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## CERTIFICADO DE ANALISIS

Muestras Patrón para espectrometría  
y fluorescencia de rayos X

### ACEROS ALEADOS CON VOLFRAMIO

CENIM Muestra número	Designa- ción numérica	C	Mn	Si	P	S	Cr	Ni	Mo	V	W	Co	Cu
203	F-5220	0,9 <sub>3</sub>	1,0 <sub>5</sub>	0,2 <sub>4</sub>	0,01 <sub>3</sub>	0,02 <sub>0</sub>	0,5 <sub>9</sub>	0,0 <sub>4</sub>	0,0 <sub>2</sub>	0,1 <sub>1</sub>	0,5 <sub>1</sub>	< 0,05	0,0 <sub>6</sub>
207	(F-525)	0,4 <sub>3</sub>	0,3 <sub>6</sub>	0,9 <sub>9</sub>	0,01 <sub>2</sub>	0,00 <sub>3</sub>	1,3 <sub>9</sub>	0,0 <sub>9</sub>	0,0 <sub>9</sub>	0,0 <sub>1</sub>	2,0 <sub>3</sub>	< 0,05	0,0 <sub>7</sub>
208	(F-527)	0,3 <sub>1</sub>	0,3 <sub>3</sub>	1,0 <sub>0</sub>	0,01 <sub>3</sub>	0,00 <sub>6</sub>	1,0 <sub>5</sub>	0,1 <sub>1</sub>	0,2 <sub>1</sub>	< 0,01	4,2 <sub>0</sub>	< 0,05	0,0 <sub>7</sub>
212	F-5530	0,9 <sub>0</sub>	0,2 <sub>6</sub>	0,2 <sub>9</sub>	0,02 <sub>2</sub>	0,00 <sub>9</sub>	4,3 <sub>0</sub>	0,2 <sub>1</sub>	1,0 <sub>6</sub>	1,7 <sub>0</sub>	18,9 <sub>0</sub>	4,7 <sub>5</sub>	0,1 <sub>0</sub>
213	F-5603	0,8 <sub>6</sub>	0,2 <sub>7</sub>	0,3 <sub>0</sub>	0,01 <sub>9</sub>	0,01 <sub>0</sub>	4,3 <sub>1</sub>	0,1 <sub>4</sub>	5,1 <sub>9</sub>	1,9 <sub>8</sub>	6,7 <sub>5</sub>	< 0,05	0,0 <sub>9</sub>
214	F-5520	0,8 <sub>7</sub>	0,3 <sub>4</sub>	0,3 <sub>1</sub>	0,02 <sub>3</sub>	0,00 <sub>8</sub>	4,2 <sub>4</sub>	0,1 <sub>7</sub>	0,3 <sub>4</sub>	0,9 <sub>9</sub>	18,5 <sub>0</sub>	0,2 <sub>5</sub>	0,0 <sub>9</sub>
215	(F-537)	0,3 <sub>4</sub>	0,3 <sub>7</sub>	1,0 <sub>0</sub>	0,01 <sub>4</sub>	0,00 <sub>7</sub>	4,8 <sub>9</sub>	0,1 <sub>4</sub>	1,6 <sub>0</sub>	0,4 <sub>0</sub>	1,3 <sub>9</sub>	< 0,05	0,0 <sub>8</sub>
220	F-5323	0,3 <sub>1</sub>	0,3 <sub>2</sub>	0,3 <sub>1</sub>	0,01 <sub>8</sub>	0,01 <sub>5</sub>	2,7 <sub>5</sub>	0,1 <sub>5</sub>	0,0 <sub>2</sub>	0,2 <sub>9</sub>	10,5 <sub>4</sub>	< 0,05	0,1 <sub>5</sub>
225	F-5540	0,9 <sub>8</sub>	0,2 <sub>7</sub>	0,2 <sub>6</sub>	0,02 <sub>9</sub>	0,01 <sub>5</sub>	4,5 <sub>2</sub>	0,1 <sub>6</sub>	1,1 <sub>2</sub>	1,8 <sub>8</sub>	18,9 <sub>5</sub>	9,5 <sub>0</sub>	0,0 <sub>8</sub>
249	F-5237	1,0 <sub>0</sub>	0,3 <sub>4</sub>	0,1 <sub>8</sub>	0,01 <sub>1</sub>	0,00 <sub>9</sub>	0,6 <sub>0</sub>	0,0 <sub>8</sub>	0,0 <sub>7</sub>	0,2 <sub>8</sub>	1,4 <sub>8</sub>	0,0 <sub>6</sub>	0,0 <sub>8</sub>
252	F-5613	0,8 <sub>5</sub>	0,2 <sub>3</sub>	0,2 <sub>5</sub>	0,01 <sub>8</sub>	0,02 <sub>3</sub>	4,1 <sub>0</sub>	0,2 <sub>3</sub>	4,7 <sub>0</sub>	1,9 <sub>5</sub>	6,3 <sub>0</sub>	4,6 <sub>5</sub>	0,1 <sub>2</sub>

**Boldface numbers:** Certified values

**Lightface numbers:** Approximate values given for guidance

### N O T E S

- 1.—These reference standards are suitable for analysis by emission spectrometry and X-ray fluorescence techniques of materials with similar composition, metallurgical history and dimensions.
- 2.—These samples have been examined spectrometrically at the Centro Nacional de Investigaciones Metalúrgicas. Their homogeneity was found to be satisfactory in all those elements whose values have been certified.
- 3.—In all these materials the elements whose content is certified have also been verified by wet analytical methods (volumetry, gravimetry, spectrophotometry and atomic absorption).
- 4.—To establish the spectrometric calibration curves employed to verify the certified elements, use was made of the reference samples from the National Bureau of Standards, the British Standards Institution, the Brammer and Japanese Standards of Iron and Steel, as many as are included in the catalogues of both Institutions. An equipment provided with a spectrometer able to operate simultaneously with the so-called "reflected beam" and two iron lines 87.30 and 27.14, as internal standard, were employed.
- 5.—The lightface values correspond to data for orientation and their real value will be given in due time in feasible cases.
- 6.—The designation given to each one of these standards indicates the type of steel for which they can be used as contrast. Nevertheless, the content of some elements in these samples does not range within the maximum and minimum established for classifying each type of steel. This fact makes it possible to have standards with lower or higher contents as compared to the minima or maxima established for classifying each material.

