

STEEL PIPES



7a) Petroleum And Natural Gas Industries - Steel Pipe For Pipeline Transportation Systems

(Extracts from ANSI/API SPECIFICATION SL: 44th Edition)

<p>General Information</p>	<p>This International Standard specifies requirements for the manufacture of two product specification levels (PSL 1 and PSL 2) of seamless and welded steel pipes for use in pipeline transportation systems in the petroleum and natural gas industries.</p>																																																																																																																																																																																																																							
<p>Chemical Composition</p>	<p>For PSL 1, the Chemical composition for standard grades shall be as given in Table 1.</p> <p>Table 1. Chemical composition for PSL 1</p> <table border="1"> <thead> <tr> <th rowspan="2">Steel Grade (Steel Name)</th> <th colspan="7">Mass Fraction, Based Upon Heat And Product Analyses^a</th> </tr> <tr> <th colspan="7">%</th> </tr> <tr> <th></th> <th>C max.^b</th> <th>Mn max.^b</th> <th>P max.</th> <th>S max.</th> <th>V max.</th> <th>Nb max.</th> <th>Ti max.</th> </tr> </thead> <tbody> <tr> <td colspan="8" style="text-align: center;"><i>Seamless Pipe</i></td> </tr> <tr> <td>L175 or A25</td> <td>0.21</td> <td>0.60</td> <td>0.030</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L175P or A25P</td> <td>0.21</td> <td>0.60</td> <td>0.045 ~ 0.080</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L210 or A</td> <td>0.22</td> <td>0.90</td> <td>0.030</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L245 or B</td> <td>0.28</td> <td>1.20</td> <td>0.030</td> <td>0.030</td> <td>c, d</td> <td>c, d</td> <td>d</td> </tr> <tr> <td>L290 or X42</td> <td>0.28</td> <td>1.30</td> <td>0.030</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L320 or X46</td> <td>0.28</td> <td>1.40</td> <td>0.030</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L360 or X52</td> <td>0.28</td> <td>1.40</td> <td>0.030</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L390 or X56</td> <td>0.28</td> <td>1.40</td> <td>0.030</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L415 or X60</td> <td>0.28^e</td> <td>1.40^e</td> <td>0.030</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> <tr> <td>L450 or X65</td> <td>0.28^e</td> <td>1.40^e</td> <td>0.030</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> <tr> <td>L485 or X70</td> <td>0.28^e</td> <td>1.40^e</td> <td>0.030</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> <tr> <td colspan="8" style="text-align: center;"><i>Welded Pipe</i></td> </tr> <tr> <td>L175 or A25</td> <td>0.21</td> <td>0.60</td> <td>-</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L175P or A25P</td> <td>0.21</td> <td>0.60</td> <td>0.045 ~ 0.080</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L210 or A</td> <td>0.22</td> <td>0.90</td> <td>-</td> <td>0.030</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>L245 or B</td> <td>0.26</td> <td>1.20</td> <td>-</td> <td>0.030</td> <td>c, d</td> <td>c, d</td> <td>d</td> </tr> <tr> <td>L290 or X42</td> <td>0.26</td> <td>1.30</td> <td>-</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L320 or X46</td> <td>0.26</td> <td>1.40</td> <td>-</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L360 or X52</td> <td>0.26</td> <td>1.40</td> <td>-</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L390 or X56</td> <td>0.26</td> <td>1.40</td> <td>-</td> <td>0.030</td> <td>d</td> <td>d</td> <td>d</td> </tr> <tr> <td>L415 or X60</td> <td>0.26</td> <td>1.40</td> <td>-</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> <tr> <td>L450 or X65</td> <td>0.26</td> <td>1.45</td> <td>-</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> <tr> <td>L485 or X70</td> <td>0.26</td> <td>1.65</td> <td>-</td> <td>0.030</td> <td>f</td> <td>f</td> <td>f</td> </tr> </tbody> </table> <p>Remark:</p> <ul style="list-style-type: none"> a. 0.50% maximum for copper; 0.50% maximum for nickel; 0.50% maximum for chromium; and 0.15% maximum for molybdenum. For grades up to and including L360 / X52, Cu, Cr and Ni shall not be added intentionally. b. For each reduction of 0.01% below the specified maximum concentration for carbon, an increase of 0.05% above the specified maximum concentration for manganese is permissible, up to maximum of 1.65% for grades ≥ L245 or B, but ≤ 360 or X52; up to a maximum of 1.75% for grades > L360 or X52, but < L485 or X70; and up to a maximum of 2.00% for grade L485 or X70. c. Unless otherwise agreed, the sum of the niobium and vanadium contents shall be ≤ 0.06%. d. The sum of the niobium, vanadium and titanium concentrations shall be ≤ 0.15%. e. Unless otherwise agreed. f. Unless otherwise agreed, the sum of the niobium, vanadium and titanium concentrations shall be ≤ 0.15%. 	Steel Grade (Steel Name)	Mass Fraction, Based Upon Heat And Product Analyses ^a							%								C max. ^b	Mn max. ^b	P max.	S max.	V max.	Nb max.	Ti max.	<i>Seamless Pipe</i>								L175 or A25	0.21	0.60	0.030	0.030	-	-	-	L175P or A25P	0.21	0.60	0.045 ~ 0.080	0.030	-	-	-	L210 or A	0.22	0.90	0.030	0.030	-	-	-	L245 or B	0.28	1.20	0.030	0.030	c, d	c, d	d	L290 or X42	0.28	1.30	0.030	0.030	d	d	d	L320 or X46	0.28	1.40	0.030	0.030	d	d	d	L360 or X52	0.28	1.40	0.030	0.030	d	d	d	L390 or X56	0.28	1.40	0.030	0.030	d	d	d	L415 or X60	0.28 ^e	1.40 ^e	0.030	0.030	f	f	f	L450 or X65	0.28 ^e	1.40 ^e	0.030	0.030	f	f	f	L485 or X70	0.28 ^e	1.40 ^e	0.030	0.030	f	f	f	<i>Welded Pipe</i>								L175 or A25	0.21	0.60	-	0.030	-	-	-	L175P or A25P	0.21	0.60	0.045 ~ 0.080	0.030	-	-	-	L210 or A	0.22	0.90	-	0.030	-	-	-	L245 or B	0.26	1.20	-	0.030	c, d	c, d	d	L290 or X42	0.26	1.30	-	0.030	d	d	d	L320 or X46	0.26	1.40	-	0.030	d	d	d	L360 or X52	0.26	1.40	-	0.030	d	d	d	L390 or X56	0.26	1.40	-	0.030	d	d	d	L415 or X60	0.26	1.40	-	0.030	f	f	f	L450 or X65	0.26	1.45	-	0.030	f	f	f	L485 or X70	0.26	1.65	-	0.030	f	f	f
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