

# Gas Industry Standard

GIS/DAT6: 2019

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Specification for

## STANDARD SIZES OF CARBON AND CARBON MANGANESE STEEL PIPE FOR OPERATING PRESSURES GREATER THAN 7 BAR

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## Contents

|  |     |
|--|-----|
| Foreword                                 | ii  |
| Mandatory and non-mandatory requirements | ii  |
| Disclaimer                               | ii  |
| Brief history                            | iii |
| 1. Scope                                 | 5   |
| 2. Normative references                  | 5   |
| 3. Terms and Definitions                 | 6   |
| 4. Conformance                           | 6   |
| 5. Pipe Data Sources                     | 6   |
| 6. General Information                   | 6   |
| 7. API Standards                         | 7   |
| Annex - A Historical Pipe Data           | 12  |

## Foreword

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**can** indicates a physical possibility;

**may** indicates an option that is not mandatory;

**shall** indicates a GIS requirement;

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## Brief history

|  |               |
|--|---------------|
| First published as BG/PS/DAT6                              | 1970          |
| Second update published as BG/PS/DAT6                      | 1988          |
| Third update published as GBE/DAT6                         | February 1994 |
| Fourth update published as T/SP/DAT/6                      | October 2003  |
| Editorial update to comply with GRM                        | August 2004   |
| Revised and re-issued as SGN/SP/DAT/6                      | December 2011 |
| Revised and re-issued as SGN/SP/DAT/6                      | December 2016 |
| Reviewed, updated and published as a Gas Industry Standard | March 2019    |

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## 1. Scope

**1.1** This Gas Industry Standard gives details of standard dimensions, material grades and pressures for specific design factors for carbon and carbon manganese steel pipe for operating pressures greater than 7 bar.

**1.2** The dimensions, materials and pressures given in this Standard are intended to provide general guidance for operating temperatures between -20 °C and +60 °C. The limiting operating condition for each pipe must be determined with reference to the design specification appropriate for the application concerned.

## 2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### 2.1 British and European standards

BS EN ISO 3183, *Petroleum and natural gas industries. Steel pipes for pipelines transportation systems*

ISO 4200, *International Standard – Plain end steel tubes, welded and seamless – General tables of dimensions and masses per unit length.*

BS EN 10208-2, *Steel pipes for pipelines for combustible fluids - Technical delivery conditions Part 2: Pipes of requirement class B (superseded).*

BS EN 10220, *Seamless and welded steel tubes. Dimensions and masses per unit length.*

### 2.2 Institution of Gas Engineers and Managers Standards

IGEM/TD/1, *Steel pipelines and associated installations for high-pressure gas transmission.*

IGEM/TD/12, *Pipework stress analysis for gas industry plant.*

IGEM/TD/13, *Pressure Regulating Installations for transmission and distribution systems.*

### 2.3 American Petroleum Institute (API) Standard

API 5L, *API Specification 5L – Specification for line pipe.*

### 2.4 Gas Transporter Specifications and former standards

BG/PS/DAT6:1998, *British Gas Engineering Standard Data sheet, Carbon and Carbon Manganese steel pipe for operating pressure greater than 7 bar. Earliest version of DAT/6 issued in January 1988.*

BGSE/DAT6:1994, *British Gas Engineering Data sheet, Carbon and Carbon Manganese steel pipe for operating pressure greater than 7 bar. Version of DAT/6 issued in 1994.*

DAT/23:June 1993, *Gas Business Engineering Data Sheet – Carbon steel pipe of nominal diameter size 15mm, 20mm and 25mm.*

T/SP/DAT6:2004, *Transco version of specification DAT/6 issued in 2004.*

LX1: September 1993, *Gas Business Engineering – Technical Specification for Submerged- arc welded pipe 400mm to 1400mm inclusive nominal size for operating pressures greater than 7 bar.*

LX4: April 1993, *Gas Business Engineering – Technical Specification for Seamless pipe 150mm to 450mm inclusive nominal size for operating pressures greater than 7 bar.*

LX5: September 1993, *Gas Business Engineering – Technical Specification for Electric- Welded pipe 150mm to 450mm inclusive nominal size for operating pressures greater than 7 bar.*

**NOTE**

Where no date is shown, the latest edition of each standard and specification shall apply.

- Gas Transporters will each have their own specifications normally in the referenced format \*/SP/XX/No, where \* is replaced by the Gas Transporters reference e.g. T for National Grid, or SGN, WWU etc. followed by the specification initials and number reference.

**3. Terms and Definitions**

For the purposes of this document, the following definitions apply.

**3.1 DAT6**

This term has been used to refer to all versions of the specifications e.g. BGES/DAT/6\*/SP/DAT/6.

**3.2 Yield stress**

The stress level at which a metal or other material ceases to behave elastically

**3.3 Material grade**

Classification of Steel pipe by its composition and physical properties

**3.4 Design factor**

Stress safety factor used in pipe wall thickness calculations.

**4. Conformance**

**4.1 Units of measurement**

In this standard, for data expressed in both SI and USC units, a dot (on the line) is used as the decimal separator, and no comma or space is used as the thousands separator, in order to be consistent with other Gas Transporter specifications.

**5. Pipe Data Sources**

**5.1 Table 1**

**5.1.1** The values of minimum wall thickness used to calculate the pressures given in Tables 2a and 2b are the nominal wall thickness values given in the table, minus the relevant under-thickness tolerances specified in Table M4 of BS EN ISO 3183 and reproduced in Table 1.

**5.2 Tables 2a and 2b**

**5.2.1** New Pipe data contained in tables 2a and 2b has been sourced from table 2 of ISO 4200. This table generally matches pipe data tables in BS EN 10208-1, BS EN 10208-2 (now withdrawn) and BS EN 10220. This data provides modern, metric and European data.

**5.3 Historical pipe data**

**5.3.1** Data relating to earlier versions of DAT/6 is provided in Annex A, some pipe manufacturers may still be willing to provide pipes to these requirements.

**6. General Information**

**6.1** The values of design factor (f) used in Tables 2 and C2 are the maximum values specified for various applications of pipe in IGEM/TD/1, IGE/TD/12, and IGEM/TD/13.



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The values of pressure P (in bar) given in Table 2.

$$P = \frac{20 f t s}{D}$$

Where f = design factor

t = minimum wall thickness of the pipe (in mm).

s = specified minimum yield stress of the pipe (in MPa or N/mm<sup>2</sup>)

D = outside diameter of the pipe (in mm) as given in Table 2.

The pressure data given under the various design factor columns in Tables 2 and C2 should be taken as indicative only. It is supplied to provide initial pressure / duty pipe selection advice. It is the responsibility of the system designer to confirm final material selection by appropriate calculations combined with any other influences upon the design.

These values apply to operating temperatures between -20 °C and +60 °C. For higher temperatures, reference should be made to the design standard appropriate for the application concerned.

**6.2** The probability of minimum wall thickness and minimum yield stress occurring together is regarded as small. In the majority of applications therefore, the actual pressures for each design factor will be greater than the values given in Tables 2a and 2b.

**6.3** Each size of pipe given in Table 2a and 2b may be identified by stating the nominal wall thickness and either the nominal size or outside diameter.

**6.4** Approximately equivalent API 5L pipe grades, based on yield strength, corresponding to those of ISO 3183 are included in Tables 2a and 2b.

## 7. API Standards

The following statement has been taken from the American Petroleum website.

*“The American Petroleum Institute specification API 5L addresses seamless and welded steel line pipe for pipeline transportation systems in the petroleum and natural gas industries. API 5L is suitable for conveying gas, water, and oil.*

*Specifications for API 5L adhere to the International Organization for Standardization ISO 3183, standardizing pipeline transportation systems within the materials, equipment and offshore structures for natural gas, petroleum, and petrochemical industries. When authoring the standards, the technical committee recognized that there are two basic Product Specifications Levels (PSL) of technical requirements and therefore developed PSL 1 and PSL 2. PSL 1 is a standard quality for line pipe where PSL 2 contains additional chemical, mechanical properties, and testing requirements.*

*Grades covered by this specification are A25, A, B and "X" Grades X42, X46, X52, X56, X60, X65, X70, and X80. The two digit number following the "X" indicates the Minimum Yield Strength (in 000's psi) of pipe produced to this grade”.*

**Table 1 - Tolerances on Wall Thickness (from table M4 of BS EN ISO 3183)**

| Wall Thickness t mm   | Permissible Tolerance - mm   |
|-----------------------|--|
| <b>Seamless Pipe:</b> |  |
| ≤ 4                   | +0.6mm / -0.5mm  |
| > 4 to 25             | +15% t / - 12.5% t   |
| ≥ 25                  | + 3.7mm or + 10% t, whichever is the greater<br>- 3.0mm or - 10% t, whichever is the greater |
| <b>Welded Pipe:</b>   |  |
| ≤ 5                   | ± 0.5mm  |
| >5 to 10              | ± 10% t  |
| >10 to <15            | + 10% t / -5% t  |
| >15 to <20            | +1.5mm / - 5% t  |
| ≥ 20                  | + 1.5mm / -1.0mm   |

**Table 2a - DIMENSIONS, MATERIALS AND PRESSURES FOR STEEL PIPE – SEAMLESS PIPE**

Calculations based on pipe data from ISO 4200 Table 2 and tolerances from Table 1

| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f) bar |       |        |        |       |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|------------------------------------|-------|--------|--------|-------|
|                    |                        |                              |                |                                  |           | f=0.3                              | f=0.5 | f=0.67 | f=0.72 | f=0.8 |
| 15                 | 21.3                   | 3.6                          | L245NE         | B                                | S         | 213                                | 356   | 477    | 513    | 570   |
| 20                 | 26.9                   | 4.0                          | L245NE         | B                                | S         | 191                                | 318   | 427    | 459    | 510   |
| 25                 | 33.7                   | 4.5                          | L245NE         | B                                | S         | 171                                | 286   | 383    | 412    | 458   |
| 40                 | 48.3                   | 5.0                          | L245NE         | B                                | S         | 133                                | 221   | 297    | 319    | 355   |
| 50                 | 60.3                   | 5.4                          | L245NE         | B                                | S         | 115                                | 191   | 257    | 276    | 307   |
| 80                 | 88.9                   | 5.4                          | L245NE         | B                                | S         | 78                                 | 130   | 174    | 187    | 208   |
| 100                | 114.3                  | 5.0                          | L245NE         | B                                | S         | 56                                 | 93    | 125    | 135    | 150   |
|                    |                        | 6.3                          | L245NE         | B                                | S         | 70                                 | 118   | 158    | 170    | 189   |
|                    |                        | 12.5                         | L245NE         | B                                | S         | 140                                | 234   | 314    | 337    | 375   |
| 150                | 168.3                  | 5.6 <sup>1</sup>             | L290NE         | X42                              | S         | 50                                 | 84    | 113    | 121    | 135   |
|                    |                        | 6.3                          | L290NE         | X42                              | S         | 56                                 | 94    | 127    | 136    | 151   |
|                    |                        | 7.1 <sup>1</sup>             | L290NE         | X42                              | S         | 64                                 | 107   | 143    | 154    | 171   |
|                    |                        | 8.0                          | L290NE         | X42                              | S         | 72                                 | 120   | 161    | 173    | 192   |
|                    |                        | 11.9 <sup>1</sup>            | L290NE         | X42                              | S         | 107                                | 179   | 240    | 258    | 287   |
|                    |                        | 12.5                         | L290NE         | X42                              | S         | 113                                | 188   | 252    | 271    | 301   |
| 200                | 219.1                  | 6.3                          | L290NE         | X42                              | S         | 43                                 | 72    | 97     | 105    | 116   |
|                    |                        | 8.0                          | L290NE         | X42                              | S         | 55                                 | 92    | 124    | 133    | 148   |
|                    |                        | 12.5                         | L290NE         | X42                              | S         | 86                                 | 144   | 193    | 208    | 231   |
| 250                | 273                    | 6.3                          | L360NE         | X52                              | S         | 43                                 | 72    | 97     | 104    | 116   |
|                    |                        | 8.8                          | L360NE         | X52                              | S         | 60                                 | 101   | 136    | 146    | 162   |
|                    |                        | 12.5                         | L360NE         | X52                              | S         | 86                                 | 144   | 193    | 207    | 230   |
| 300                | 323.9                  | 7.1                          | L360NE         | X52                              | S         | 41                                 | 69    | 92     | 99     | 110   |
|                    |                        | 10.0                         | L360NE         | X52                              | S         | 58                                 | 97    | 130    | 140    | 155   |
|                    |                        | 12.5                         | L360NE         | X52                              | S         | 72                                 | 121   | 162    | 175    | 194   |
| 400                | 406.4                  | 9.5                          | L360NE         | X52                              | S         | 44                                 | 73    | 98     | 106    | 117   |
|                    |                        | 10.3                         | L360NE         | X52                              | S         | 47                                 | 79    | 106    | 114    | 127   |
|                    |                        | 14.3                         | L360NE         | X52                              | S         | 66                                 | 110   | 148    | 159    | 177   |
| 450                | 457.0                  | 9.5                          | L360NE         | X52                              | S         | 39                                 | 65    | 87     | 94     | 104   |
|                    |                        | 11.9                         | L360NE         | X52                              | S         | 49                                 | 82    | 109    | 118    | 131   |
|                    |                        | 15.9                         | L415NE         | X60                              | S         | 75                                 | 126   | 169    | 181    | 202   |

Note 1: Additional values have been inserted to provide comparable values to the original DAT/6 document dated 1994 for completeness.

**TABLE 2b - DIMENSIONS, MATERIALS AND PRESSURES FOR STEEL PIPE – SEAM WELDED PIPE**

Calculations based on pipe data from ISO 4200 Table 2 and tolerances from Table 1

| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f) bar |       |        |        |       |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|------------------------------------|-------|--------|--------|-------|
|                    |                        |                              |                |                                  |           | f=0.3                              | f=0.5 | f=0.67 | f=0.72 | f=0.8 |
| 150                | 168.3                  | 5.6                          | L290ME         | X42                              | HFW       | 48                                 | 80    | 108    | 116    | 129   |
|                    |                        | 7.1                          | L290ME         | X42                              | HFW       | 64                                 | 106   | 143    | 153    | 170   |
|                    |                        | 12.5                         | L290ME         | X42                              | HFW       | 122                                | 204   | 274    | 294    | 327   |
| 200                | 219.1                  | 6.3                          | L290ME         | X42                              | HFW       | 42                                 | 71    | 95     | 102    | 114   |
|                    |                        | 8.0                          | L290ME         | X42                              | HFW       | 56                                 | 93    | 125    | 135    | 150   |
|                    |                        | 12.5                         | L290ME         | X42                              | HFW       | 94                                 | 157   | 210    | 226    | 251   |
| 250                | 273                    | 6.3                          | L360ME         | X52                              | HFW       | 42                                 | 71    | 95     | 102    | 113   |
|                    |                        | 8.8                          | L360ME         | X52                              | HFW       | 62                                 | 104   | 139    | 150    | 166   |
|                    |                        | 12.5                         | L360ME         | X52                              | HFW       | 93                                 | 156   | 209    | 225    | 250   |
| 300                | 323.9                  | 7.1                          | L360ME         | X52                              | HFW       | 41                                 | 68    | 92     | 99     | 110   |
|                    |                        | 10.0                         | L360ME         | X52                              | HFW       | 60                                 | 101   | 135    | 145    | 161   |
|                    |                        | 12.5                         | L360ME         | X52                              | HFW       | 79                                 | 131   | 176    | 190    | 211   |
|                    |                        | 12.5 <sup>2</sup>            | L415ME         | X60                              | HFW       | 91                                 | 152   | 203    | 219    | 243   |
| 400                | 406.4                  | 8.8                          | L360ME         | X52                              | HFW/L/H   | 41                                 | 69    | 93     | 100    | 111   |
|                    |                        | 10.0                         | L360ME         | X52                              | HFW/L/H   | 47                                 | 79    | 106    | 114    | 127   |
|                    |                        | 14.2                         | L360ME         | X52                              | HFW/L/H   | 71                                 | 119   | 160    | 172    | 191   |
|                    |                        | 14.2 <sup>2</sup>            | L450ME         | X65                              | HFW/L/H   | 89                                 | 149   | 200    | 215    | 238   |
| 450                | 457                    | 10.0                         | L360ME         | X52                              | HFW/L/H   | 43                                 | 71    | 96     | 103    | 114   |
|                    |                        | 12.5                         | L360ME         | X52                              | HFW/L/H   | 56                                 | 93    | 125    | 134    | 149   |
|                    |                        | 16.0                         | L415ME         | X60                              | HFW/L/H   | 82                                 | 138   | 184    | 198    | 220   |
| 600                | 610                    | 10.0                         | L360ME         | X52                              | L/H       | 32                                 | 53    | 71     | 77     | 85    |
|                    |                        | 14.2                         | L360ME         | X52                              | L/H       | 47                                 | 79    | 106    | 114    | 127   |
|                    |                        | 20.0                         | L415ME         | X60                              | L/H       | 77                                 | 129   | 173    | 186    | 206   |
| 750                | 762                    | 12.5                         | L360ME         | X52                              | L/H       | 33                                 | 56    | 75     | 80     | 89    |
|                    |                        | 16.0                         | L415ME         | X60                              | L/H       | 49                                 | 82    | 110    | 119    | 132   |
|                    |                        | 20.0                         | L415ME         | X60                              | L/H       | 62                                 | 103   | 138    | 149    | 165   |
|                    |                        | 22.2                         | L415ME         | X60                              | L         | 69                                 | 115   | 154    | 166    | 184   |
| 900                | 914                    | 12.5                         | L415ME         | X60                              | L/H       | 32                                 | 53    | 72     | 77     | 86    |
|                    |                        | 16.0                         | L450ME         | X65                              | L/H       | 44                                 | 74    | 100    | 107    | 119   |
|                    |                        | 20.0                         | L415ME         | X60                              | L/H       | 51                                 | 86    | 115    | 124    | 138   |
|                    |                        | 25.0                         | L450ME         | X65                              | L         | 70                                 | 118   | 158    | 170    | 189   |
| 1050               | 1067                   | 14.2                         | L415ME         | X60                              | L/H       | 31                                 | 52    | 70     | 75     | 83    |
|                    |                        | 17.5                         | L450ME         | X65                              | L/H       | 42                                 | 70    | 93     | 100    | 112   |
|                    |                        | 20.0                         | L450ME         | X65                              | L/H       | 48                                 | 80    | 107    | 115    | 128   |
|                    |                        | 28.0                         | L450ME         | X65                              | L/H       | 68                                 | 113   | 152    | 163    | 182   |

| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f) bar |       |        |        |       |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|------------------------------------|-------|--------|--------|-------|
|                    |                        |                              |                |                                  |           | f=0.3                              | f=0.5 | f=0.67 | f=0.72 | f=0.8 |
| 1200               | 1219                   | 16.0                         | L450ME         | X65                              | L/H       | 33                                 | 56    | 75     | 80     | 89    |
|                    |                        | 20.0                         | L450ME         | X65                              | L/H       | 42                                 | 70    | 93     | 101    | 112   |
|                    |                        | 22.2                         | L450ME         | X65                              | L         | 46                                 | 78    | 104    | 112    | 125   |
|                    |                        | 25.0                         | L450ME         | X65                              | L         | 53                                 | 88    | 118    | 127    | 141   |
|                    |                        | 16.0                         | L555ME         | X80                              | L         | 41                                 | 69    | 92     | 99     | 110   |
|                    |                        | 20.0                         | L555ME         | X80                              | L         | 51                                 | 86    | 115    | 124    | 138   |
|                    |                        | 22.2                         | L555ME         | X80                              | L         | 57                                 | 96    | 129    | 138    | 154   |
|                    |                        | 25.0                         | L555ME         | X80                              | L         | 65                                 | 109   | 146    | 157    | 174   |
| 1400 <sup>2</sup>  | 1422                   | 16.0                         | L555ME         | X80                              | L         | 35                                 | 59    | 79     | 85     | 94    |
|                    |                        | 20.0                         | L555ME         | X80                              | L         | 44                                 | 74    | 99     | 106    | 118   |
|                    |                        | 22.2                         | L555ME         | X80                              | L         | 49                                 | 82    | 110    | 119    | 132   |
|                    |                        | 25.0                         | L555ME         | X80                              | L         | 56                                 | 93    | 125    | 134    | 149   |

Note 1: Additional values have been inserted to provide comparable values to the original DAT/6 document dated 1994 for completeness.

Note 2: Two additional values have been added to this table:

- 1) 300mm L415ME X60 pipe with a wall thickness of 12.7mm.
- 2) 400mm L450ME X65 pipe with a wall thickness of 14.3mm

Note 3: Pipe Types:

L = Submerged Arc Welded Longitudinal Seam

H = Submerged Arc Welded Helical Seam

HFW = High Frequency Welded

## Annex - A Historical Pipe Data

- A.1** The values of minimum wall thickness used to calculate the pressures given in Table C2a and C2b are the nominal wall thickness values given in the table, minus the relevant under-thickness tolerances specified in Table 10 of BS EN 10208-2 and reproduced in Table C1.
- A.2** Pipe data contained in tables C2a and C2b has been largely sourced from earlier versions of DAT/6 e.g. BG/PS/DAT/6:1988, BGES/DAT6:1994 both of which relied upon data from DAT/23, LX1, LX4 and LX5. These data values generally match those contained in Table 1 of TS-C4GAS-PIPO and API-5L Appendix E. Values contained in ASME B36.10M are broadly equivalent to those shown in Tables 2a and 2b if allowance is made for rounding of values.
- A.3** Seamless pipe values for 150mm contained in earlier versions of DAT/6 differ to those provided in T/SP/DAT/6 and subsequent revisions. For completeness these values have been reinserted in this standard.
- A.4** Seamless Pipe values 400 and 450mm provided in earlier versions of DAT/6 and subsequently omitted in recent DAT/6 versions have been included in this revision in table 2a.
- A.5** The values of specified minimum yield stress used to calculate the pressures given in Table C2a and C2b are given in BS EN 10208-2.

**Table C1 - Tolerances on Wall Thickness (from table 10 of BS EN 10208-2)**

| Wall Thickness t mm   | Permissible Tolerance   |
|-----------------------|---|
| <b>Seamless Pipe:</b> |   |
| $t \leq 4$            | +0.6 mm / -0.5 mm   |
| $4 < t < 25$          | +15 % t / - 12.5 % t  |
| $t \geq 25$           | + 3.75mm or +10% t/ - 3.0 mm or<br>+ / - 10% t (whichever is the greater) |
| <b>Welded Pipe:</b>   |   |
| $t \leq 10$           | +1.0 mm / -0.5 mm   |
| $10 < t < 20$         | +10 %/ -5 %   |
| $t \geq 20$           | +2.0 mm / - 1.0 mm  |

**TABLE C2a - DIMENSIONS, MATERIALS AND PRESSURES FOR STEEL PIPE – SEAMLESS PIPE**

Note: Pipe Type: S = Seamless, 1- These values were stated in original versions of DAT6 only.

| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f) bar |       |        |        |         |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|------------------------------------|-------|--------|--------|---------|
|                    |                        |                              |                |                                  |           | f=0.3                              | f=0.5 | f=0.67 | f=0.72 | f=0.8   |
| 15                 | 21.3                   | 3.7                          | L245NB         | B                                | S         | 220                                | 368   | 493    | 530    | 588     |
| 20                 | 26.7                   | 3.9                          | L245NB         | B                                | S         | 187                                | 311   | 418    | 449    | 499     |
| 25                 | 33.4                   | 4.5                          | L245NB         | B                                | S         | 173                                | 288   | 387    | 415    | 462     |
| 40                 | 48.3                   | 5.1                          | L245NB         | B                                | S         | 135                                | 226   | 303    | 325    | 362     |
| 50                 | 60.3                   | 5.5                          | L245NB         | B                                | S         | 117                                | 195   | 262    | 281    | 312     |
| 80                 | 88.9                   | 5.5                          | L245NB         | B                                | S         | 79                                 | 132   | 177    | 190    | 212     |
| 100                | 114.3                  | 4.8                          | L245NB         | B                                | S         | 54                                 | 90    | 120    | 129    | 144     |
|                    |                        | 6.0                          | L245NB         | B                                | S         | 67                                 | 112   | 150    | 162    | 180     |
|                    |                        | 11.9                         | L245NB         | B                                | S         | 133                                | 223   | 299    | 321    | 357     |
| 150                | 168.3                  | 5.6 <sup>1</sup>             | L290NB         | X42                              | S         | 51                                 | 84    | 113    | 122    | No data |
|                    |                        | 6.4                          | L290NB         | X42                              | S         | 57                                 | 96    | 129    | 138    | 154     |
|                    |                        | 7.1 <sup>1</sup>             | L290NB         | X42                              | S         | 64                                 | 107   | 143    | 154    | No data |
|                    |                        | 8.2                          | L290NB         | X42                              | S         | 74                                 | 123   | 165    | 178    | 197     |
|                    |                        | 11.9 <sup>1</sup>            | L290NB         | X42                              | S         | 107                                | 179   | 240    | 258    | No data |
|                    |                        | 12.7                         | L290NB         | X42                              | S         | 114                                | 191   | 256    | 275    | 306     |
| 200                | 219.1                  | 6.4                          | L290NB         | X42                              | S         | 44                                 | 74    | 99     | 106    | 118     |
|                    |                        | 8.2                          | L290NB         | X42                              | S         | 56                                 | 94    | 127    | 136    | 151     |
|                    |                        | 12.7                         | L290NB         | X42                              | S         | 88                                 | 147   | 197    | 211    | 235     |
| 250                | 273.1                  | 6.4                          | L360NB         | X52                              | S         | 44                                 | 73    | 98     | 106    | 118     |
|                    |                        | 8.7                          | L360NB         | X52                              | S         | 60                                 | 100   | 134    | 144    | 160     |
|                    |                        | 12.7                         | L360NB         | X52                              | S         | 87                                 | 146   | 196    | 210    | 234     |
| 300                | 323.9                  | 7.1                          | L360NB         | X52                              | S         | 41                                 | 69    | 92     | 99     | 110     |
|                    |                        | 9.5                          | L360NB         | X52                              | S         | 55                                 | 92    | 123    | 133    | 147     |
|                    |                        | 12.7                         | L360NB         | X52                              | S         | 74                                 | 123   | 165    | 177    | 197     |

Note 1: Additional values have been inserted to provide comparable values to the original DAT/6 document dated 1994 for completeness.

**TABLE C2b - DIMENSIONS, MATERIALS AND PRESSURES FOR STEEL PIPE Seam Welded Pipe**

| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f) bar |       |        |        |       |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|------------------------------------|-------|--------|--------|-------|
|                    |                        |                              |                |                                  |           | f=0.3                              | f=0.5 | f=0.67 | f=0.72 | f=0.8 |
| 150                | 168.3                  | 5.6                          | L290MB         | X42                              | HFW       | 52                                 | 87    | 117    | 126    | 140   |
|                    |                        | 7.1                          | L290MB         | X42                              | HFW       | 68                                 | 113   | 152    | 163    | 181   |
|                    |                        | 11.9                         | L290MB         | X42                              | HFW       | 116                                | 194   | 261    | 280    | 311   |
| 200                | 219.1                  | 6.4                          | L290MB         | X42                              | HFW       | 46                                 | 78    | 104    | 112    | 124   |
|                    |                        | 8.7                          | L290MB         | X42                              | HFW       | 61                                 | 101   | 136    | 146    | 163   |
|                    |                        | 12.7                         | L290MB         | X42                              | HFW       | 95                                 | 159   | 213    | 229    | 255   |
| 250                | 273                    | 6.4                          | L360MB         | X52                              | HFW       | 46                                 | 77    | 104    | 111    | 117   |
|                    |                        | 8.7                          | L360MB         | X52                              | HFW       | 64                                 | 108   | 144    | 155    | 172   |
|                    |                        | 12.7                         | L360MB         | X52                              | HFW       | 95                                 | 159   | 213    | 229    | 254   |
| 300                | 323.9                  | 7.1                          | L360MB         | X52                              | HFW       | 44                                 | 73    | 98     | 105    | 117   |
|                    |                        | 9.5                          | L360MB         | X52                              | HFW       | 60                                 | 100   | 134    | 144    | 160   |
|                    |                        | 12.7                         | L360MB         | X52                              | HFW       | 80                                 | 134   | 179    | 193    | 214   |
|                    |                        | 12.7 <sup>2</sup>            | L415MB         | X60                              | HFW       | 92                                 | 154   | 207    | 222    | 247   |
| 400                | 406.4                  | 8.7                          | L360MB         | X52                              | HFW/L/H   | 43                                 | 72    | 97     | 104    | 116   |
|                    |                        | 10.3                         | L360MB         | X52                              | HFW/L/H   | 52                                 | 86    | 116    | 124    | 138   |
|                    |                        | 14.3                         | L360MB         | X52                              | HFW/L/H   | 72                                 | 120   | 161    | 173    | 192   |
|                    |                        | 14.3 <sup>2</sup>            | L450MB         | X65                              | HFW/L/H   | 90                                 | 150   | 201    | 216    | 240   |
| 450                | 457                    | 9.5                          | L360MB         | X52                              | HFW/L/H   | 42                                 | 70    | 95     | 102    | 113   |
|                    |                        | 11.9                         | L360MB         | X52                              | HFW/L/H   | 53                                 | 89    | 119    | 128    | 142   |
|                    |                        | 15.9                         | L415MB         | X60                              | HFW/L/H   | 82                                 | 137   | 183    | 197    | 219   |
| 600                | 610                    | 9.5                          | L360MB         | X52                              | L/H       | 31                                 | 53    | 71     | 76     | 84    |
|                    |                        | 14.3                         | L360MB         | X52                              | L/H       | 48                                 | 80    | 107    | 115    | 128   |
|                    |                        | 19.1                         | L415MB         | X60                              | L/H       | 74                                 | 123   | 165    | 177    | 197   |
| 750                | 762                    | 11.9                         | L360MB         | X52                              | L/H       | 32                                 | 53    | 71     | 76     | 85    |
|                    |                        | 15.9                         | L415MB         | X60                              | L/H       | 49                                 | 82    | 110    | 118    | 131   |
|                    |                        | 19.1                         | L415MB         | X60                              | L/H       | 59                                 | 98    | 132    | 142    | 158   |
|                    |                        | 22.2                         | L415MB         | X60                              | L         | 69                                 | 115   | 154    | 166    | 184   |
| 900                | 914                    | 12.7                         | L415MB         | X60                              | L/H       | 32                                 | 54    | 73     | 78     | 87    |
|                    |                        | 15.9                         | L450MB         | X65                              | L/H       | 44                                 | 74    | 99     | 107    | 118   |
|                    |                        | 19.1                         | L415MB         | X60                              | L/H       | 49                                 | 82    | 110    | 118    | 131   |
|                    |                        | 25.4                         | L450MB         | X65                              | L         | 72                                 | 120   | 160    | 172    | 192   |
| 1050               | 1067                   | 14.3                         | L415MB         | X60                              | L/H       | 31                                 | 52    | 70     | 76     | 84    |
|                    |                        | 17.5                         | L450MB         | X65                              | L/H       | 42                                 | 70    | 93     | 100    | 112   |
|                    |                        | 19.1                         | L450MB         | X65                              | L/H       | 45                                 | 76    | 102    | 110    | 122   |



| Nominal Size<br>mm | Outside Diameter<br>mm | Nominal Wall Thickness<br>mm | Material Grade | Corresponding API 5L steel grade | Pipe Type | Pressure for Design Factor (f)<br>bar |       |        |        |       |
|--------------------|------------------------|------------------------------|----------------|----------------------------------|-----------|---------------------------------------|-------|--------|--------|-------|
|                    |                        |                              |                |                                  |           | f=0.3                                 | f=0.5 | f=0.67 | f=0.72 | f=0.8 |
|                    |                        | 28.7                         | L450MB         | X65                              | L/H       | 70                                    | 116   | 156    | 168    | 186   |
| 1200               | 1219                   | 15.9                         | L450MB         | X65                              | L/H       | 33                                    | 55    | 74     | 80     | 89    |
|                    |                        | 19.1                         | L450MB         | X65                              | L/H       | 40                                    | 66    | 89     | 96     | 107   |
|                    |                        | 22.4                         | L450MB         | X65                              | L         | 47                                    | 78    | 105    | 113    | 126   |
|                    |                        | 25.4                         | L450MB         | X65                              | L         | 54                                    | 90    | 120    | 129    | 144   |
|                    |                        | 14.3                         | L555MB         | X80                              | L         | 37                                    | 61    | 82     | 89     | 98    |
|                    |                        | 15.9                         | L555MB         | X80                              | L         | 41                                    | 68    | 92     | 99     | 110   |
|                    |                        | 20.6                         | L555MB         | X80                              | L         | 53                                    | 89    | 119    | 128    | 142   |
|                    |                        | 22.9                         | L555MB         | X80                              | L         | 59                                    | 99    | 133    | 143    | 159   |

Note 1: Additional values have been inserted to provide comparable values to the original DAT/6 document dated 1994 for completeness.

Note 2: Two additional values have been added to this table:

- 1) 300mm L415MB X60 pipe with a wall thickness of 12.7mm.
- 2) 400mm L450MB X65 pipe with a wall thickness of 14.3mm

Note 3: Pipe Types:

L = Submerged Arc Welded Longitudinal Seam

H = Submerged Arc Welded Helical Seam

HFW = High Frequency Welded