

Advanced Diploma of Industrial Automation

(DIA – 52886WA)

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| **Student full name:** |  | | | |
| I certify that the attached assessment is my own work and that any material drawn from other sources has been acknowledged.  Copyright in assessments remains my property, however  I grant permission to the Engineering Institute of Technology (EIT) to make copies of assessments for assessment, review and/or record keeping purposes.  I note that the EIT reserves the right to check my assessment for plagiarism.  Should the reproduction of all or part of an assessment be required by the EIT for any purpose other than those mentioned above, appropriate authorisation will be sought from me on the relevant form. | | | | |
| Please place a tick (☑) in the box below to indicate that you have read, understood, and certify the above statement.  Please include this page in/with your submission.  Any electronic responses to this submission will be sent to your Moodle account.  **AGREEMENT**       **DATE:** | | | | |
|  | | | | |
| Marks (%) | |  | Satisfactory / Not Satisfactory | |
| Assessor: | |  | Date: |  |
| Overall feedback: | |  | | |

Guidelines for Students

**How is this module assessed?**

After completion of this assessment, you will be given a result of ‘Satisfactory’ or ‘Not Satisfactory’. The assessor will give you feedback via Moodle and you will have an opportunity to submit additional evidence, if you have received a ‘Not Satisfactory’ result.

You will be allowed one (1) opportunity to resubmit the same assessment task, if required.

For a ‘Satisfactory’ result in this assessment, all questions must be answered to a satisfactory standard and you must achieve an overall mark of 60% or above.

Once all assessment tasks for this module have been completed, you will be given a final module result of ‘Competent’ or ‘Not Yet Competent’. If you are deemed ‘Not Yet Competent’ in a module after all resubmission attempts, you will be required to re-sit the module.

**How is this assessment task assessed?**

For a result of ‘Satisfactory’ in this assessment task, all module assessment criteria (as indicated on page 4) must be completed to a satisfactory standard.

Where a **critical question** is identified, you must receive a mark of 100% for these questions before a ‘satisfactory’ result can be awarded, regardless of the overall mark achieved.

At Advanced Diploma level, a ‘satisfactory’ standard, as stipulated by the Australian Qualifications Framework, means that you will demonstrate the application of knowledge and skills:

* with depth in areas of specialisation, in contexts subject to change
* with initiative and judgment in planning, design, technical or management functions with some direction
* to adapt a range of fundamental principles and complex techniques to known and unknown situations
* across a broad range of technical or management functions with accountability for personal outputs
* personal and team outcomes within broad parameters

Assessors also make decisions based on the following considerations:

* all parts of this assessment have been completed to a standard that satisfactorily meets the requirements set out in the assessment criteria (as per the module outline).
* the assessment evidence provided is the student’s own work, except as appropriately acknowledged by the use of referencing.
* the evidence is recent and the student’s knowledge is up-to-date

**Assessment Instructions:**

1. You must answer ALL questions.
2. Please ensure you complete your answers in a blue font (not red or black).
3. The best marks can be earned by giving concise, brief answers that address the questions.
4. You must reference all content used from other sources including course materials, slides, diagrams, etc. Do not directly copy and paste from course materials or any other resources.   
   Refer to the referencing section of the [EIT eLibrary](https://moodle.eit.edu.au/course/view.php?id=1054) on Moodle for referencing guides.
5. Use this document for completing your answers by typing the answers after each question without deleting the question. Make sure that you preserve the original question number format.
6. Do not add extra pictures, etc. as annexures; instead, paste them directly into this answer sheet. Hand-drawn sketches can be inserted after scanning but please ensure that the file size does not become big (more than 10 MB). You must refer to all diagrams and pictures, etc. that you have drawn or pasted in.
7. When saving your document (must be Word format), ensure you include your name in the title: COURSECODE\_MODULE#\_ASSESSMENTTYPE\_VERSION#\_YOURNAME

**E.g. DIA\_DIAPPL605\_PracticalAssessment\_PaperA\_v2\_JohnSmith**

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| **Module no. and name:** | **DIAPPL605: Process Plant Layout and Piping Design** |
| **Assessment type:** | **Practical Assessment Paper A** |
| **Total marks:** | **30** |

**Assessment Points:**

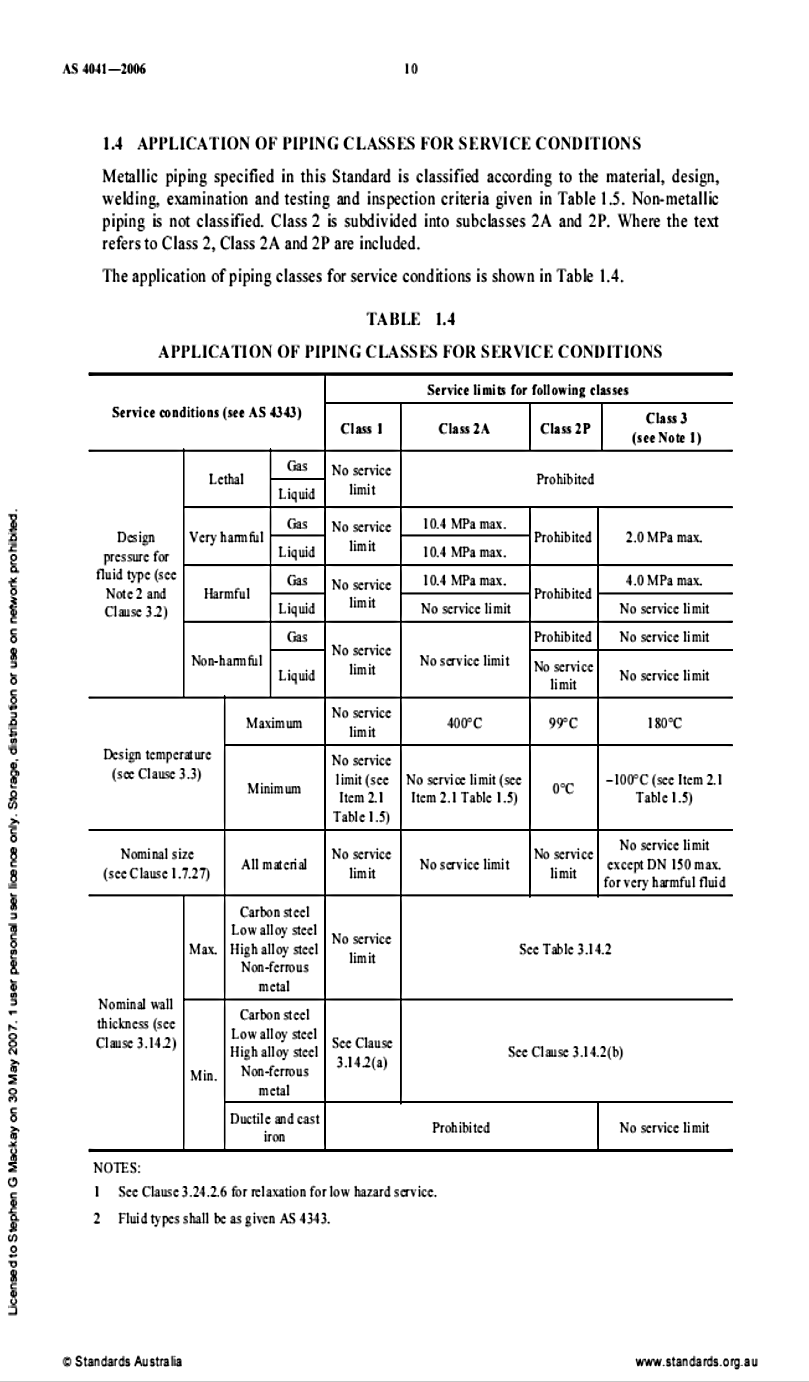
* Supply the required answers below in a blue font (not red or black).
* You must submit this assessment along with the written component.
* Answer all the questions.

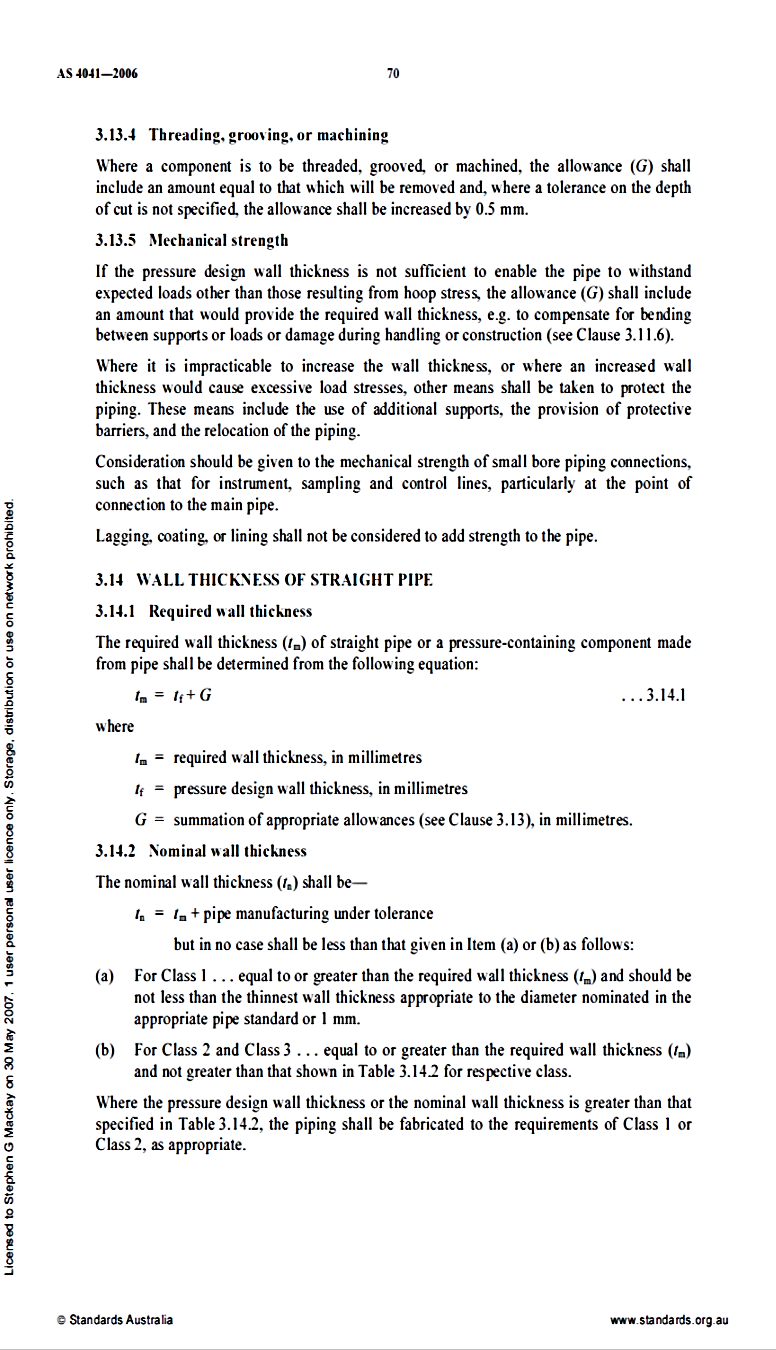
**Lab Instructions:**

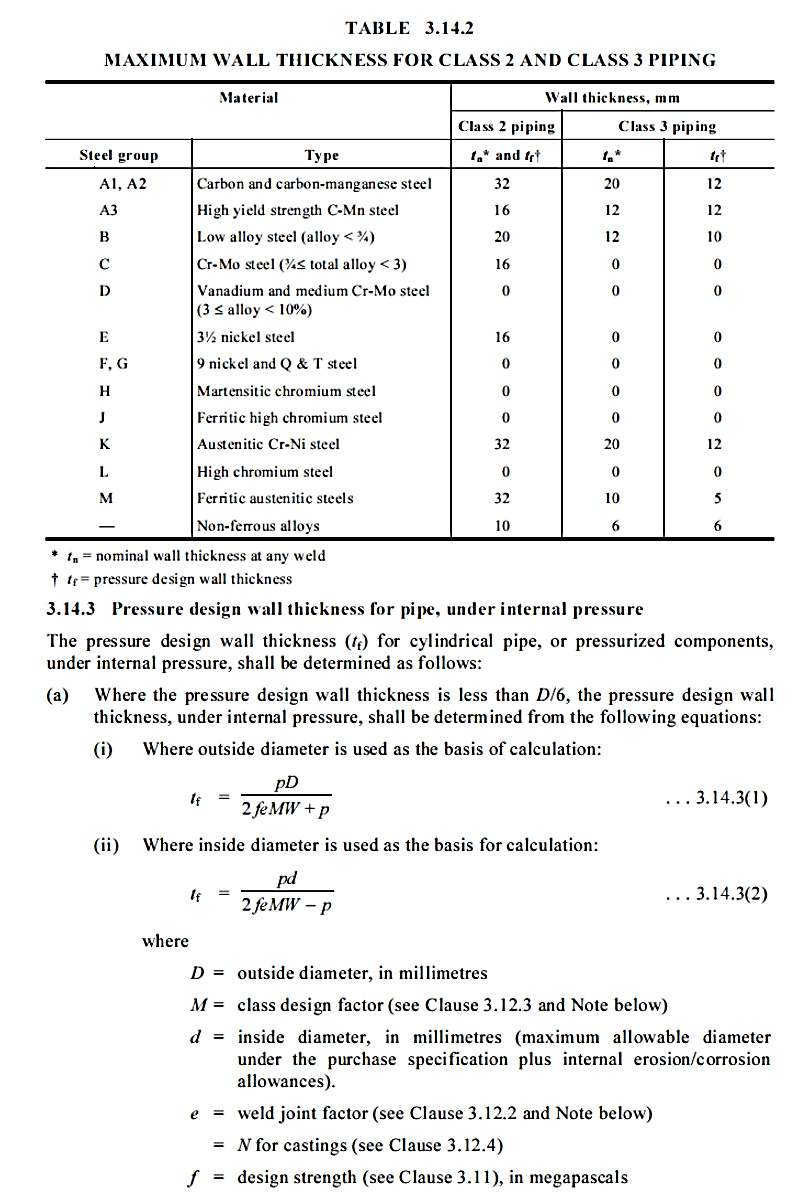
* You can use either SMARTDRAW, AutoCAD P&ID (Plant 3D), [diagrams.net](http://diagrams.net) or ANY graphical piece of software (such as PAINT or POWERPOINT) to complete this exercise. If you have the experience and wish to use SMARTDRAW or AUTOCAD, you will find additional information on the instruction sheet downloadable from Moodle. If you are using other packages of software, it would be wise to copy any relevant image from your slides, and then build up around that image (for example, showing everything asked in question 1, or the P&ID info asked in question 2.)
* The following excel files are required for part 3 of this exercise, should you wish to go the SMARTDRAW or AUTOCAD route:
* Plant&P&ID\_Bill of materials
* Plant&P&ID\_Pipe specification
* Plant&P&ID\_Piping list
* Be sure to download them from Moodle

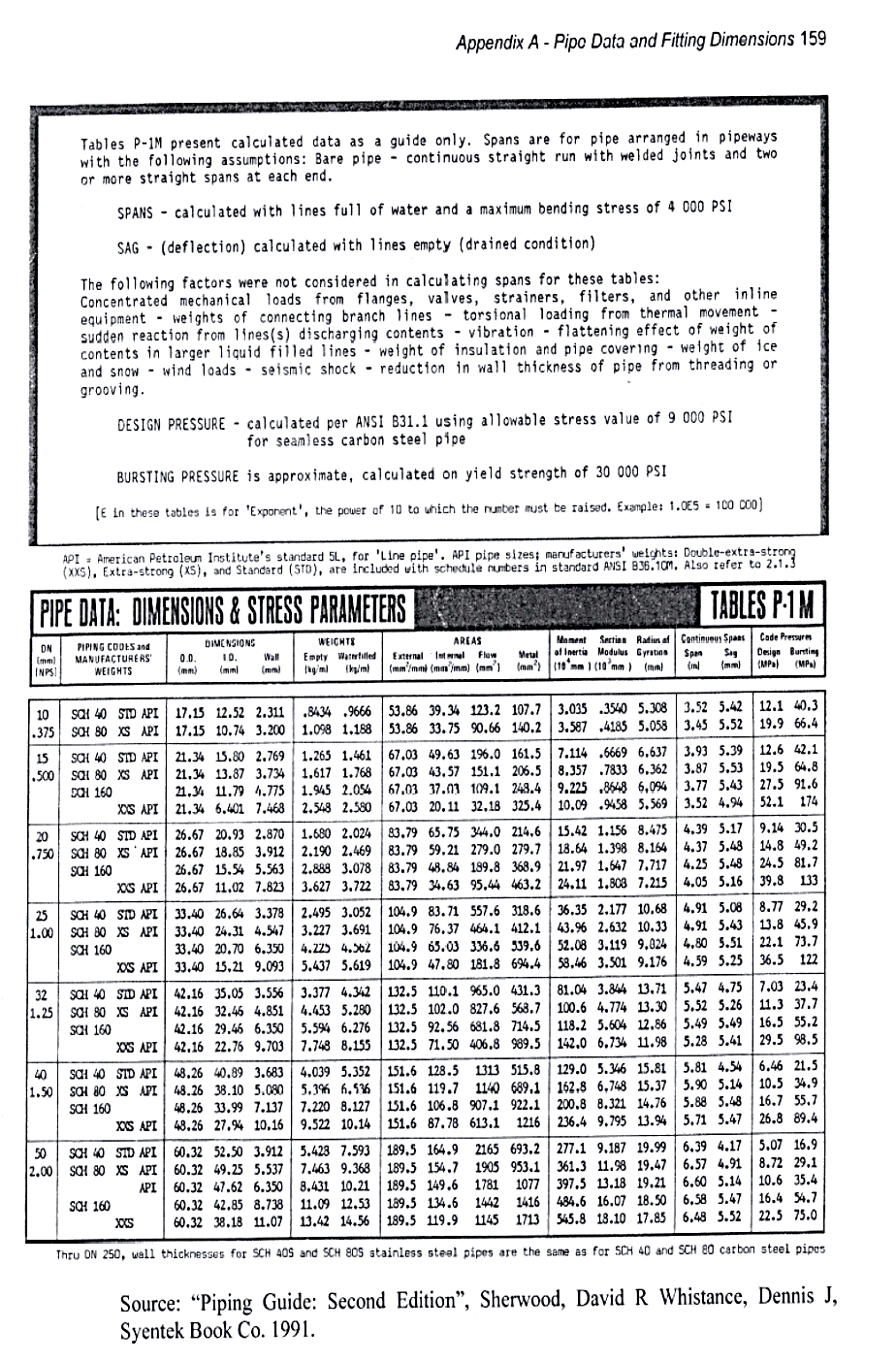
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| **Q1** | Sketch a preliminary arrangement plan for the following distillation column. On the arrangement plan indicate, access platforms, access for construction, operations and maintenance. In your answer we are looking for thought into the relative sizes of the distillation column and the different requirements for pipe racks, maintenance access and clearance. These are to be basic sketches not overly detailed; more to provide an understanding that you have thought about each element of the systems.  Attach your drawing to your assignment. You can either send it as a PDF file or take a screen shot.  Open the drawing template **Distillation PLANT**. More information can be found on the instruction sheet.    Figure 1: Process Flow Diagram (PFD) of a Typical Distillation Column. *Source: “Process Plant Layout and Piping Design”, Ed Bausbacher and Roger Hunt, Prentice Hall* | | | **(10 marks)** | |
| **A1** | Student answer | | | | |
| **F1** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q2** | Draw a Piping and Instrumentation Diagram (P&ID) for the above distillation column. Draw the complete pipe circuit connecting the pump and the reboiler to the column. Draw appropriately the remaining pipe lines assuming the connections are out of the page. Refer to figure 2 for all the connections to the distillation column and use figure 1 to get an understanding of the pipe circuit. Include in your drawing gauges for the column and valves. Pipe lines tags are not required but do come up with tags for the other parts of the drawing.  Attach your drawing to your assignment. You can either send it as a PDF file or take a screen shot.  Open the drawing template **Distillation COLUMN**. More information can be found on the instruction sheet.    Figure 2: Process Vessel Sketch for a Distillation Column. (Source: “Process Plant Layout and Piping Design”, Ed Bausbacher and Roger Hunt, Prentice Hall). | **(10 marks)** | | | |
| **A2** | Student answer | | | | |
| **F2** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q3** | Draw the piping isometric for the sample line showed below which connects nozzle N1 from vessel V-101 with nozzle C of exchanger E-101. Exact dimensions are not required. Draw approximately but in the right direction.  These equipment are exchanging a non-harmful liquid. The system operates at atmospheric pressure at a temperature of 90ºC. However, the temperature may fluctuate between 70ºC to 150ºC. The pipes are built from carbon steel. Consult the standards and create a bill of materials, a piping line list and a piping specification. Assume a corrosion allowance of 2mm is required and the minimum allowable pipe wall thickness is 5mm.  Attach your drawing to your assignment. You can either send it as a PDF file or take a screen shot.  The tables for the bill of materials, piping line list and piping specification are on a separate Excel sheet. Please attach them to your assignment.  Open the drawing template **Piping ISOMETRIC**. More information can be found on the instruction sheet.        Figure 2 a,b,c: Piping Iso for sample line (Source: “Pipe Drafting and Design”. Roy Parisher and Robert Rhea, Gulf Publishing) | | | | **(10 mark)** |
| **A3** | Student answer | | | | |
| **F3** | Assessor feedback: | | | **(marks awarded)** | |
| |  | | --- | | **Part 4 : Simtronic Softwaree** | | **Lab Instructions:**   * The simulation software for the practical assessment is called Simtronics SPM-720 Advanced Distillation Operator. * This software is represented as “DSS-100 Operator” which is available from Remote Labs (use the search button to locate the software on the relevant remote lab) * Note: Electromeet HTML5 instructions are available in Moodle. * Follow below steps to use the software * Go to          * Download the file and use information to login to the software   **Objective:** Recognize and handle the loss of a reflux pump.  **Situation:** Run DSS-100 and select Schematic # 2 (Overview). Assume the motor for Reflux Pump P-401A is failed after one minute into the simulation and it cannot be re-started. | | | | | | |
| **Q4** | 1. Fill in the gaps below: (5 marks)   The failure of Reflux Pump P-401A will adversely affect the flow of reflux to **[i]** and the flow of light product to **[ii].**  The Reflux Drum D-401 level **[iii]** quickly.  If the Reflux Drum is filled completely, then the **[iv]** of the drum will **[v].**  *Hint:*   * *Name of an equipment* * *Name of an equipment* * *Increases or decreases* * *Temperature or pressure* * *Rise or lower*  1. Propose a solution to this problem. (1 mark) 2. Provide a screenshot of the schematic in your answer and illustrate your solution on the schematic. (2 marks) | | **(8 marks)** | | |
| **A4** | Student answer | | | | |
| **F4** | Assessor feedback: | | | **(marks awarded)** | |

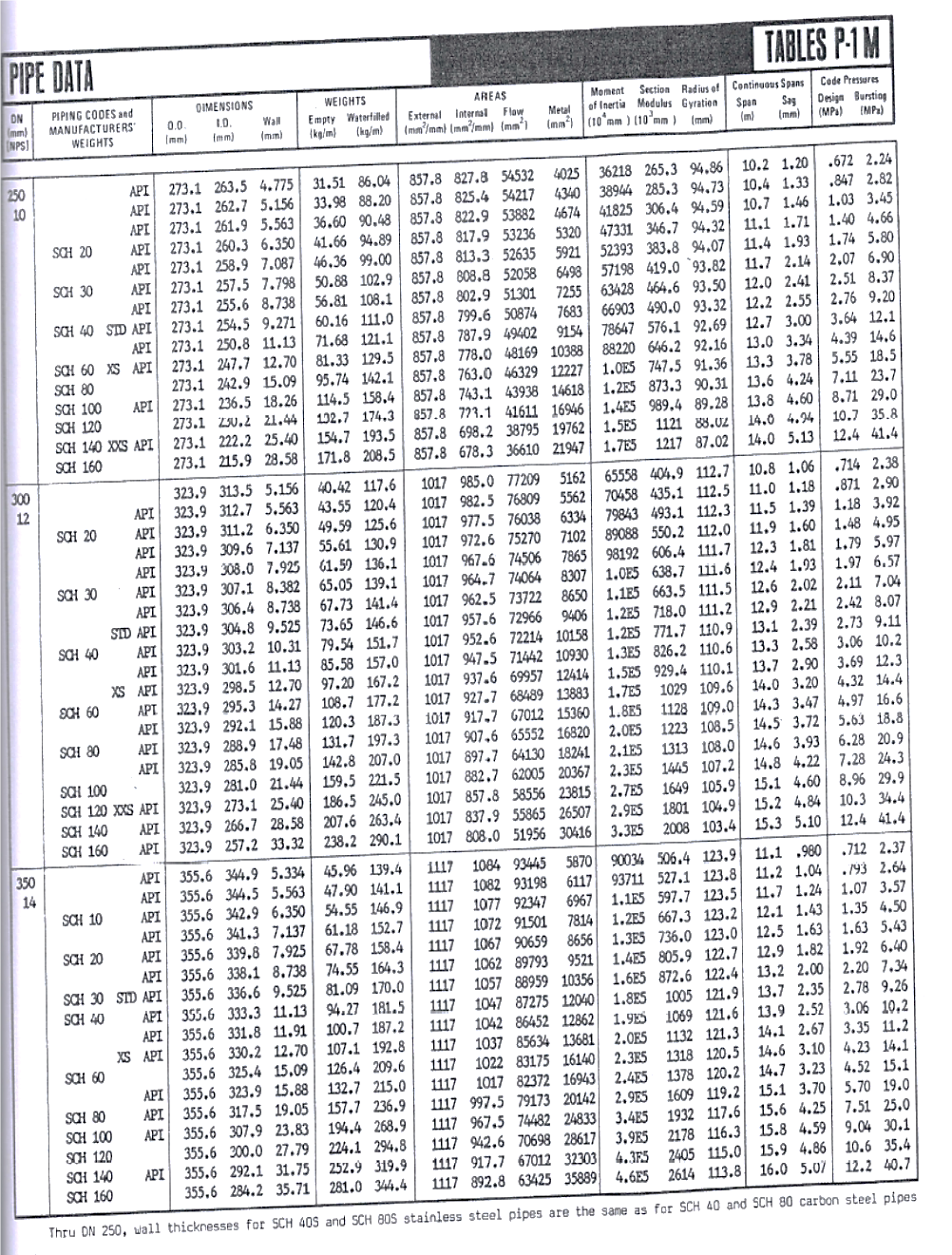
**APPENDIX**

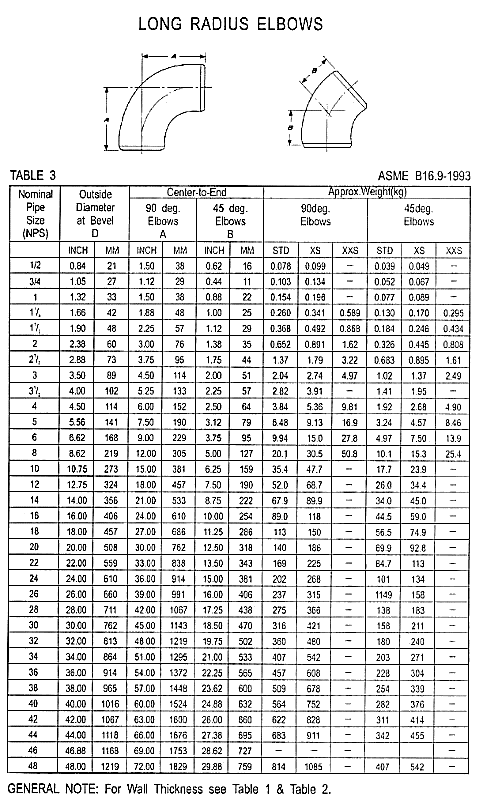
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**END OF ASSESSMENT**