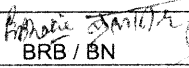


**ANNEXURE – I (TO PMS)**

**STANDARD  
PIPING MATERIAL SPECIFICATION  
GENERAL NOTES**

| 3           | 16.09.2002 | REVISED & ISSUED AS STANDARD | <br>RN | <br>PKG | <br>BRB / BN |  |
|-------------|------------|------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2           | 08.12.1994 | ISSUED AS STANDARD           | MP                                                                                        | AKG                                                                                          | BPV / GRR                                                                                         |                                                                                       |
| Rev.<br>No  | Date       | Purpose                      | Prepared<br>by                                                                            | Checked<br>by                                                                                | Standards<br>Committee<br>Convenor                                                                | Standards<br>Bureau<br>Chairman                                                       |
| Approved by |            |                              |                                                                                           |                                                                                              |                                                                                                   |                                                                                       |

**Abbreviations:**

**PMS : Piping Material Specification**

**Piping Standards Committee**

**Convenor : Mr. Brahmanand**

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## 1.0 SCOPE

- 1.1 This specification (PMS) covers the various piping classes for Process and utility Piping.
- 1.2 Deviations from this specification may be necessary to conform to specific job requirements.

## 2.0 REFERRED CODES & STANDARDS

- 2.1 All Piping shall be designed in accordance with the Process Piping Code, ASME B31.3. A particular edition (indicated in Design Basis), once selected shall be followed throughout the job.
- 2.2 Editions and addenda (if any) of referred Codes and Standards shall be as per the Job Engineering Design Basis (Piping).
- 2.3 For the sake of brevity, the initials of the society to which the codes are referred to may be omitted in the specification. For example; B16.5 is a code referring to ASME; A106 is a standard referring to ASTM.

## 3.0 MATERIAL SPECIFICATIONS

- 3.1 Individual piping Class has been generally designed to cover a set of services operating within pressure-temp. combination as per ASME B16.5 / B16.34 or part of it.
- 3.2 The PMS shall be strictly adhered to in the design, requisitioning, purchasing, fabrication and testing of the piping system. However, deviations of material may occur due to design conditions and/or availability. All substitutions must be duly approved.
- 3.3 Unless mentioned otherwise, pipe thicknesses in the specs are for above ground piping.

## 4.0 CLASS DESIGNATION CODE

The class designation shall consist of not more than three components made up of a letter, number & letter; e.g.B1A.

- 4.1 The first letter indicates pressure rating.

|   |           |   |            |   |               |
|---|-----------|---|------------|---|---------------|
| A | 150 Class | D | 600 Class  | G | 2500 Class    |
| B | 300 Class | E | 900 Class  | J | 125/150 Class |
| C | 400 Class | F | 1500 Class | K | UNCLASSIFIED  |

- 4.2 The middle number indicates difference in the specifications within the same rating and material as enlisted in the Table attached.

- 4.3 The third letter indicates type of material.

|   |                         |
|---|-------------------------|
| A | Carbon                  |
| B | Carbon Moly.            |
| C | 1.0 % Cr., 0.5 % Moly.  |
| D | 1.25 % Cr., 0.5 % Moly. |
| E | 2.25 % Cr., 1.0 % Moly. |
| F | 5.0 % Cr., 0.5 % Moly.  |
| G | 9.0 % Cr., 1.0 % Moly.  |
| H | 3.5 % Ni.               |
| I |                         |
| J | Nickel / Titanium       |

|   |                                                      |
|---|------------------------------------------------------|
| K | Stainless steel type 304, 304H, 304L.                |
| L | Aluminium                                            |
| M | Stabilised stainless steel type 316, 316H, 321, 347. |
| N | 316L                                                 |
| P | Monel / Alloy 20                                     |
| Q | Hastalloy / Inconel / Incoloy                        |
| R | Lead                                                 |
| S | PVC & FRP, PP / FRP, PVDF / FRP                      |
| T | Cast Iron / Silicon Iron                             |
| U |                                                      |
| V | Duplex Stainless Steel                               |
| W | Cupro-Nickel                                         |
| Y | Lined steel (Rubber Lined, Teflon Lined etc).        |
| Z | HDPE / PDVF / Teflon / PVC                           |

## 5.0 PIPES

- 5.1 Pipe dimension shall be in accordance with ASME B36.10, IS:1239 & IS:3589 for wrought steel and wrought iron pipe; to B36.10 / B36.19 for stainless steel pipe and respective ASTM Standard for non-ferrous and non-metallic pipes.
- 5.2 Pipe made by acid-bessemer process shall not be acceptable, steel pipe shall be made by open hearth, electric furnace or basic Oxygen process.
- 5.3 All pipe threads shall conform to ASME B1.20.1 except where otherwise noted.
- 5.4 Pipe thicknesses not covered in different classes of this specification shall be calculated to meet specific job requirement based on actual max. design condition to economise on thickness. However, in such cases the thickness shall be calculated at not less than 80% of class rating unless defined otherwise in the Job Engineering Design Basis (Piping).
- 5.5 Maximum of 10% of Corrosion Allowance may be adjusted to optimize on pipe schedule. However, if CA is suffixed by 'minimum', this downward adjustment shall not be used.
- 5.6 Non-standard pipe sizes 1¼", 2½", 3½", 5" and 22" shall not be treated as a part of this specification unless these sizes are separately called out.

## 6.0 FLANGES

- 6.1 Flanges shall be in accordance with the following codes, except where otherwise noted:

|                        |                                           |
|------------------------|-------------------------------------------|
| Upto 24" (150# -1500#) | ASME B16.5                                |
| Upto 12" , 2500#       | ASME B16.5                                |
| Above 24"              | ASME B16.47 SERIES 'B' / AWWA / EIL' STD. |

Flanges to ASME B16.47 SERIES 'A' or any other standard (e.g. DIN, GOST, JIS etc.) may be specified to mate with equipment or valve flanges with the corresponding bolting.

- 6.2 Finish of steel flange faces shall be as follows:

|                              |   |                                 |
|------------------------------|---|---------------------------------|
| Stock Finish                 | : | 1000 µin AARH max.              |
| Serrated Finish / 125 AARH / | : | Serrations with 125-250µin AARH |
| Smooth finish                |   |                                 |
| 63 AARH                      | : | 32 TO 63 µin AARH               |

6.3 Brinell hardness for RTJ groove shall be atleast 20 BHN more than that of corresponding gasket as specified.

6.4 Fig.8 Fl and SPCR & BLN shall be as per B16.48 upto 24" (150-1500#) & upto 12" for 2500#. For other sizes, refer EIL Std 7-44-0162.

## 7.0 FITTINGS

7.1 Forged steel SW and threaded fittings shall be in accordance with ASME B16.11, unless otherwise specified. For items not covered under B16.11, reference may be made to BS 3799 or appropriate MSS-SP-Std.

7.2 BW Fittings shall be in accordance with ASME B16.9, unless otherwise specified.

7.3 Dimensions of steel BW fittings for sizes not covered in ASME B16.9 shall conform to MSS-SP-48.

7.4 Usage of unions shall be restricted to utilities only.

## 8.0 BENDS, MITRES AND REDUCERS FABRICATED FROM PIPE

8.1 Mitres and Reducers fabricated from Pipe may be used if specified in particular Piping Class. 90 degree mitre shall be minimum 4-piece construction upto 24" and minimum 5-piece construction for 26" & above. 45 degree mitre shall be minimum 3-piece construction. Mitres require higher thickness than corresponding Pipe / Elbow to hold the same pressure (Refer ASME B31.3).

## 9.0 GASKETS

9.1 Non-metallic gaskets shall conform to B16.21 (corresponding to B16.5) upto 24", and B16.21 (corresponding to B16.47B) beyond 24", unless otherwise specified.

9.2 Spiral wound gaskets (SP.WND or SPWD) and Ring Joint gaskets shall conform to B16.20.

## 10.0 BOLTING

10.1 All bolts shall conform to B18.2.1, nuts to be B18.2.2. Reference shall also be made to B16.5 for studs.

10.2 Threads shall be to coarse Thread Series, B1.1, having Class 2A allowances for bolts and studs, and Class 2B tolerance for nuts.

10.3 Nuts for Bolts and Studs shall be the American Standard Hexagon Heavy Series.

## 11.0 THREADS

- 11.1 Threads for threaded Pipes, Fittings, Flanges and Valves shall be in accordance with B1.20.1 taper threads, unless otherwise specified.
- 11.2 Upto 204 deg.C, threaded joints shall be made with 1" width PTFE joining tape.
- 11.3 Above 204 deg.C, threaded joints shall be seal welded with a full strength fillet weld.
- 11.4 All threaded joints irrespective of pressure and temperature on lines carrying toxic fluid shall be seal welded with a full strength fillet weld.

## 12.0 VALVES

- 12.1 Face to Face / End to End dimension of valves shall conform to B16.10 to the extent covered. For valves not covered in B16.10, reference shall be made to BS 2080 and / or the manufacturer's drawings.
- 12.2 Flange / weld ends of the valve shall be as per the corresponding Flange / Fitting ends of the piping class, unless otherwise specified.
- 12.3 Pressure-temperature rating for flanged and butt welding end valves shall be as per ASME B16.34 except for ball, plug & butterfly valves. For these valves refer TABLE FOR PRESSURE-TEMP RATING FOR BALL, PLUG AND BUTTERFLY VALVES. Wall thickness of valve body at different locations should not be less than as calculated as per B16.34.
- 12.4 Unless called-out specifically, valves shall be as per the following Standards:

| Valve                | Size         | Rating            | Des. Std.                        | Testing Std.                     |
|----------------------|--------------|-------------------|----------------------------------|----------------------------------|
| Gate                 | 1/2"- 1-1/2" | 800 / 1500        | API-602                          | API-598                          |
| Globe / Check        | -do-         | 800 / 1500        | BS-5352                          | BS-6755 Pt-I                     |
| Gate                 | 2"-24"       | 150 / 300 / 600   | API-600                          | API-598                          |
| Gate                 | 26"-42"      | 150 / 300         | BS-1414                          | BS-6755 Pt-I                     |
| Globe                | 2"-8"        | 150 / 300 / 600   | BS-1873                          | -do-                             |
| Check                | 2"-24"       | -do-              | BS-1868                          | -do-                             |
| Gate/<br>Globe/Check |              | 900 / 1500 / 2500 | B-16.34<br>(Refer 12.6 also)     | API 598 / BS-6755 Pt.I           |
| Ball                 | 1/2"-16"     | 150 / 300 / 600   | BS-5351 / API 6D                 | BS – 6755 Pt. I / API-598        |
|                      |              | 900 / 1500        | API 6D                           | API-598                          |
| Plug                 | 1/2"-12"     | All               | API-599 / BS 5353                | API-598 / BS 6755 Pt.I           |
| Btrfly               | 3" & above   | All               | API-609 / BS 5155 /<br>AWWA C504 | API-598 / BS-6755 Pt-I<br>/ AWWA |
| Diaphram             | ALL          | -                 | BS-5156                          | BS-6755 Pt-I                     |
| Bronze               |              |                   | RELEVANT IS STD.                 | RELEVANT IS STD.                 |
| Cast Iron            |              |                   | RELEVANT IS STD.                 | RELEVANT IS STD.                 |

- 12.5 If not covered in 12.3, the valve shall be as per B16.34 / relevant MSS-SP Standard.
- 12.6 For details of the valves specifications, refer specifications 6-44-0006. Features not covered by 6-44-0006 and the relevant code shall be to the manufacturer's standard.
- 12.7 Unless otherwise specifically called for, upto 600# rating, 2" and larger size steel Gate, Globe & Check valves in Hydrocarbon and utility service shall have bolted bonnets. Pressure-seal bonnets or covers shall be used for Classes 900# and above to minimize bonnet leakage. However, valves with Pr-seal Bonnet shall have wall thickness & stem diameter as per API-600, (if required). Welded bonnets or screwed & seal welded bonnets are acceptable for sizes lower than 2" for Classes 900# & above.
- 13.0 For Non-Destructive Testing (NDT) specification, refer EIL' STD 6-44-0016.
- 14.0 For Welding specifications, refer EIL specs. 'Welding Specification for fabrication of piping(6-77-0001)' & 'Welding charts for piping classes(6-77-00005)'.
- 15.0 For 'Caustic Soda service graph' refer sheet 15 of 15.

TABLE FOR MIDDLE NUMBER

| Middle Number | Carbon Steel<br>A                               | Alloy Steel<br>B, C, D, E, F, G, H | SS304 / SS304H /<br>SS304L<br>K                     | SS 316 / 316H / 321 /<br>321H / 347<br>M |
|---------------|-------------------------------------------------|------------------------------------|-----------------------------------------------------|------------------------------------------|
| 1             | CA=1.5                                          | CA=1.5                             | CA=NIL<br>(SS304)                                   | CA=NIL<br>(SS316)                        |
| 2             | CA=1.5<br>(IBR)                                 | CA=1.5 (IBR)                       | CA=NIL<br>(SS304-CRYO)                              | CA=NIL<br>(SS321-CRYO)                   |
| 3             | CA=1.5<br>(CAT'D)                               | CA=6.0                             | CA=NIL<br>(CAT 'D' SS304)                           | CA=1.5<br>(SS321)                        |
| 4             | CA=1.5<br>(LTCS)                                | CA=3.0                             | CA=1.5<br>(SS304H)                                  | CA=NIL<br>(SS321)                        |
| 5             | CA=1.5<br>(Hydrogen)                            | CA=1.5<br>(Hydrogen)>230°C         | CA=3.0<br>(SS304H)                                  | CA=NIL<br>(SS316H) – H <sub>2</sub>      |
| 6             | CA=4.5                                          | CA=4.5                             | CA=1.5<br>(SS304L)                                  | CA=NIL<br>(SS316H)                       |
| 7             | CA=1.5<br>(Vacuum)                              |                                    | CA=NIL<br>(SS304L-Vacuum)                           | CA=NIL<br>(SS347)                        |
| 8             | CA=1.5<br>(Conc. Sulphuric<br>Acid)             |                                    | CA=1.5<br>(SS304L-CRYO)                             | CA=1.5<br>(SS347)                        |
| 9             | CA=3.0                                          |                                    | CA=1.5<br>(SS304)                                   | CA=1.5<br>(SS316)                        |
| 10            | CA=1.5<br>(Offsites)                            |                                    |                                                     |                                          |
| 11            | CA=3.0<br>(Hardness controlled)                 |                                    | CA=NIL<br>(SS304L)                                  |                                          |
| 12            |                                                 |                                    | CA=NIL<br>(SS304-IBR)                               |                                          |
| 13            | CA=6.0                                          |                                    |                                                     |                                          |
| 14            |                                                 |                                    |                                                     |                                          |
| 15            | CA=3.0<br>(Liquid Sulphur)                      |                                    | CA=1.5<br>(SS304 H <sub>2</sub> & CO <sub>2</sub> ) | CA=1.5<br>(SS321H - H <sub>2</sub> )     |
| 16            | CA=4.5<br>(NACE)                                | CA=4.5 (NACE)                      | CA=1.5<br>(SS304L - NACE)                           | CA=1.5<br>(SS321 - NACE)                 |
| 17            | CA=3.0<br>(dry Chlorine)                        |                                    |                                                     |                                          |
| 18            | CA=1.5<br>(Oxygen)                              |                                    | CA=NIL<br>(SS304L-Oxygen)                           |                                          |
| 19            | CA=3.0<br>(Caustic / Amine,<br>Stress relieved) |                                    |                                                     |                                          |
| 20            | CA=1.5<br>(Jacket for A15A)                     |                                    |                                                     |                                          |
| 32            | CA=1.5<br>(Tracing)                             |                                    | CA=NIL<br>(Tracing)                                 |                                          |
| 33            | CA=1.5<br>(Fire Water)                          |                                    |                                                     |                                          |

NOTE: USE MIDDLE NUMBERS 21 TO 30 & 91 TO 99 FOR PROJECT DEPENDENT CLASSES.

TABLE FOR MIDDLE NUMBER

| Middle Number | SS316L<br>N           | NICKEL<br>/TITANUM<br>J | ALLUMINIUM<br>L | MONEL / ALLOY 20<br>P    |
|---------------|-----------------------|-------------------------|-----------------|--------------------------|
| 1             | CA=NIL                | CA=NIL (NICKEL)         |                 | CA=NIL (MONEL)           |
| 2             | CA=1.5 (CRYO)         | CA=1.5 (NICKEL)         |                 | CA=1.5 (MONEL)           |
| 3             |                       | CA=NIL (TITANUM)        |                 | CA=NIL (ALLOY 20)        |
| 4             |                       | CA=1.5 (TITANUM)        |                 | CA=1.5 (ALLOY 20)        |
| 5             | CA=1.5 H <sub>2</sub> |                         |                 |                          |
| 6             | CA=NIL (Vacuum)       |                         |                 |                          |
| 7             |                       |                         |                 |                          |
| 8             |                       |                         |                 |                          |
| 9             |                       |                         |                 |                          |
| 10            |                       |                         |                 |                          |
| 11            |                       |                         | CA=NIL          |                          |
| 12            |                       |                         |                 |                          |
| 13            |                       |                         |                 |                          |
| 14            |                       |                         |                 |                          |
| 15            |                       |                         |                 |                          |
| 16            | CA=1.5(NACE)          |                         |                 |                          |
| 17            |                       |                         |                 |                          |
| 18            |                       |                         |                 | CA=NIL (MONEL)<br>OXYGEN |
| 19            |                       |                         |                 |                          |
| 20            |                       |                         |                 |                          |
| 32            |                       |                         |                 |                          |
| 33            |                       |                         |                 |                          |

NOTE: USE MIDDLE NUMBERS 21 TO 30 & 91 TO 99 FOR PROJECT DEPENDENT CLASSES.

TABLE FOR MIDDLE NUMBER

| Middle Number | Hastelloy / Inconel / Incoloy Q | PVC / FRP S        | LINED STEEL Y                                                   | HDPE / PVDF / TEFLON Z                       |
|---------------|---------------------------------|--------------------|-----------------------------------------------------------------|----------------------------------------------|
| 1             | CA=NIL (INCONEL 600)            | CA=NIL (PVC)       | CA = NIL (TEF LINED)                                            | CA=NIL (HDPE) H <sub>2</sub> SO <sub>4</sub> |
| 2             |                                 | CA=1.5 (PVC / FRP) |                                                                 |                                              |
| 3             | CA = NIL (INCOLOY 800)          | CA=NIL (FRP)       | CA = NIL (RUBBER LINED - SOFT)                                  |                                              |
| 4             | CA = 1.5 (INCOLOY 800)          |                    | CA = NIL (RUBBER LINED – SEMI HARD) 30% HCL                     | CA = NIL (HDPE) 30% HCL                      |
| 5             |                                 |                    | CA = 3.0 (<= 2”) & NIL (>= 3”) (CEMENT LINED) CAT ‘D’ SEA WATER | CA = NIL (HDPE) 50% HF                       |
| 6             | CA = 1.5 (INCOLOY 800H)         |                    |                                                                 |                                              |
| 7             |                                 |                    |                                                                 |                                              |
| 8             |                                 |                    |                                                                 |                                              |
| 9             |                                 |                    |                                                                 |                                              |
| 10            |                                 |                    |                                                                 |                                              |
| 11            |                                 |                    |                                                                 |                                              |
| 12            |                                 |                    |                                                                 |                                              |
| 13            |                                 |                    |                                                                 |                                              |
| 14            |                                 |                    |                                                                 |                                              |
| 15            |                                 |                    |                                                                 |                                              |
| 16            |                                 |                    |                                                                 |                                              |
| 17            |                                 |                    |                                                                 |                                              |
| 18            |                                 |                    |                                                                 |                                              |
| 19            |                                 |                    |                                                                 |                                              |
| 20            |                                 |                    |                                                                 |                                              |
| 32            |                                 |                    |                                                                 |                                              |
| 33            |                                 |                    | CA = 3.0 (<= 2”) & NIL (>= 3”) (CEMENT LINED) FIRE WATER (SEA)  |                                              |

NOTE: USE MIDDLE NUMBERS 21 TO 30 & 91 TO 99 FOR PROJECT DEPENDENT CLASSES.

**TABLE FOR PRESSURE TEMPERATURE RATING FOR BALL, PLUG & BUTTERFLY VALVES**

| ITEM                     | PRESSURE RATING<br>(PIPING CLASS)   | SIZE<br>RANGE (NB<br>INCHES) | PRESSURE IN kg / cm <sup>2</sup> |       |       |           |       |       |       |       |                  |  |
|--------------------------|-------------------------------------|------------------------------|----------------------------------|-------|-------|-----------|-------|-------|-------|-------|------------------|--|
|                          |                                     |                              | TEMPERATURE IN °C                |       |       |           |       |       |       |       |                  |  |
|                          |                                     |                              | -29 TO<br>38                     | 50    | 65    | 100       | 120   | 150   | 175   | 200   | >200             |  |
| BALL (Soft<br>Seated)    | 150# (AS PER PMS)                   | Upto 16"                     | 19.99                            | 19.58 | 19.2  | 17.93     | 17.2  | 16.12 | 15.22 | 7.03  | DO<br>NOT<br>USE |  |
|                          | 300# (AS PER PMS)                   |                              | 52.00                            | 51.02 | 49.8  | 41.85     | 37.3  | 27.4  | 19.15 | 7.03  |                  |  |
|                          | 600# (AS PER PMS)                   |                              | 104.1                            | 98.46 | 91.4  | 64.61     | 49.3  | 38.6  | 29.68 | 17.6  |                  |  |
| PLUG (Soft<br>Seated)    | 150# (AS PER PMS)                   | Upto 8"                      | 19.33                            | 19.3  | 18.63 | 17.6      | 16.89 | 15.82 | 14.93 | 14.06 |                  |  |
|                          | 300# (AS PER PMS)                   |                              | 52.02                            | 50.35 | 48.26 | 43.4      | 40.0  | 37.4  | 35.23 | 28.1  |                  |  |
| PLUG<br>(Lubricated)     | 150# (AS PER PMS)                   | Upto 12"                     | 19.99                            | 19.58 | 19.12 | 18.05     | 17.28 | 16.12 | 15.15 | 14.28 |                  |  |
|                          | 300# (AS PER PMS)                   |                              | 52.0                             | 51.1  | 49.96 | 47.3      | 46.82 | 46.1  | 45.5  | 44.6  |                  |  |
|                          | 600# (AS PER PMS)                   |                              | 104.1                            | 102.2 | 99.95 | 94.7      | 93.74 | 92.3  | 91.1  | 89.4  |                  |  |
| Butterfly (Soft<br>Seat) | 150# (J5A, A3A,<br>A33A, A5Y, A33Y) | Upto 48"                     | 10.55                            | 10.55 | 10.55 | DON'T USE |       |       |       |       |                  |  |
|                          | 150#                                |                              | 19.99                            | 19.58 | 19.2  | 17.93     | 17.20 | 16.12 | 15.22 | 7.03  |                  |  |

NOTE: IF THE CLASS PRESSURE / TEMPERATURE IS LOWER THAN THIS TABLE, CLASS PRESSURE / TEMPERATURE TO BE FOLLOWED.

## INSTRUCTIONS TO PROCESS USER

1. Piping Material Specification (Extracts) are meant only for the Process Engineers. Process Engineers require some specific standard information of each Piping Class for their use. The Extract attempts to condense the STD PMS by extracting the relevant portions required by the Process Engineers. The extent of the relevant extract required has been discussed with Process and has their concurrence. If the Process Department after a period of use requires any further data, the same can be added to this extract.
2. For all EIL jobs only the EIL STD PMS shall be used unless otherwise the Process Licensor imposes his specification.
3. The following method of working is suggested for Process department:
  - a) Piping department is issuing to Process Dept one legible copy of the standard PMS and its extracts. It is requested that each Process Engineer may please be provided with a copy of the extract for their regular use.
  - b) For every job, the Process Engineer shall use this extract of the PMS, however the full PMS can be referred to as and when required.
  - c) During the course of preparation of Process Package, if any new Class (not covered in STD PMS) is required the Process Engineer shall contact the Lead Piping Engineer. The Lead Piping Engineer will get the new piping class designation from the Piping Department Standardisation Cell and convey to Lead Process Engineer.
  - d) Process Engineer shall ensure the following during Process Package:
    - i) Correct Piping Class based on the service he selected.
    - ii) Design pressure / design temperature of various lines are within the range of the selected Piping Class.
    - iii) Only the type of valves restricted to size ranges indicated are used.
    - iv) Special care for using soft seated valves (Ball, Plug & Butterfly) in view of reduced Press / Temp capability.
4. At the end of the Process Package the Lead process Engineer is requested to hand over a copy of the extract to the Lead Piping Engineer clearly marking up the following:
  - a) List of all Piping Classes used in the Process Package.
  - b) Any extra sizes of any Piping Classes as required, Any extra type of valve with size range as required.
  - c) For the new Piping Classes, details of piping material class, ANSI rating, size range, corrosion allowance, service, various types of valves with size range and basic pipe material shall be marked up in the blank Piping Material Class format available with the extracts.
  - d) Even if there is no change required in the STD PMS, Process should send back one copy of the Extracts identifying the Classes.

After receiving the marked up extracts, Piping shall make necessary revisions / updations and issue job PMS.

**INSTRUCTIONS TO PIPING ENGINEERS  
FOR PREPARATION OF JOB SPECIFICATIONS**

1. The process department is provided with STD PMS along with its extracts. The extracts include instructions to process users and outlines the procedure to be followed by process engineers while using STD PMS for various jobs. Piping engineers are also requested to follow the procedure outlined in the instructions to process department.
2. After getting the marked up copies of extracts of STD PMS for the job from Lead Process Engineer the Lead Piping Engineer shall issue JOB PMS as per Procedure for Preparation of Job Piping Material Specification (Doc. No. 5-1643-2001)
3. Revisions in the STD PMS for making the JOB PMS to be carried by Piping Department is strictly restricted to the following:
  - a) Additions / changes desired by Licensor / Process Lead Engineer.
  - b) Changes desired by the Client.

Attempts should be made to minimize revisions asked by Client / Licensor. If any such revision in any piping class becomes unavoidable, the changes are permitted only in respective job specification but the class designation should not be changed and the changes are to be considered special for the particular project.
4. The piping lead engineer should thoroughly go through the general notes of std PMS before making the job specification and in case any new class designation is required to be made the lead piping engineer should contact piping standardisation group. Development of PMS for new classes should be done in consultation with Piping Standardisation Group / SMMS.

# CAUSTIC SODA SERVICE GRAPH

