

HYDROCARBON PROCESS PIPING  
150 Psig at +100°F Maximum  
-50°F Minimum

Pipe

|                                       |       |                                                                                  |
|---------------------------------------|-------|----------------------------------------------------------------------------------|
| $\frac{1}{2}$ " thru $1\frac{1}{2}$ " | P-44  | ASTM A-312, Grade TP-304, Schedule 80S, seamless stainless steel pipe.           |
| 2" thru 24"                           | P-38A | ASTM A-333, Grade 1, standard weight, seamless steel pipe, Charpy Test at -50°F. |

Fittings

E = 90° Ell, L = 45° Ell, T = Tee, X = Cross, R = Reducer

|                              |          |                                                                            |
|------------------------------|----------|----------------------------------------------------------------------------|
| $\frac{1}{2}$ " thru $3/4$ " | ELT-60   | 150-lb. stainless steel screwed fittings, AISI, Type 304.                  |
| 1" thru $1\frac{1}{2}$ "     | ELTXR-77 | 2000-lb. forged stainless steel screwed fittings, ASTM A-182, Grade F-304. |
|                              | C-20     | 150-lb. stainless steel screwed coupling, Type 304.                        |
|                              | C-13     | 3000-lb. stainless steel screwed coupling, ASTM A-182, Grade F-304.        |
|                              | PC-6     | Hex head, Grade F-304, stainless pipe plug, Ladish.                        |
|                              | R-83     | Extra-heavy, Type 304, stainless steel swaged nipple.                      |
|                              | U-11     | 150-lb. screwed, Type 304, stainless steel union, Ladish or Cooper Alloy.  |

Note: All stainless fittings to be Ladish or Camco.

|             |          |                                                                            |
|-------------|----------|----------------------------------------------------------------------------|
| 2" thru 24" | ELTR-41A | Standard weight, seamless steel, welding fittings, ASTM A-420, Grade WPL1. |
| 2" thru 24" | PC-4     | Welding cap, wall thickness and material to conform with welding fittings. |

Flanges

|                                       |          |                                                                                                         |
|---------------------------------------|----------|---------------------------------------------------------------------------------------------------------|
| $\frac{1}{2}$ " thru $1\frac{1}{2}$ " | F-86-RF  | 150-lb. raised face, threaded flange, ASTM A-182, Grade F-304, ANS (ASA) B16.5.                         |
| 2" thru 24"                           | F-39A-RF | 150-lb. raised face welding neck flange, ASTM A-350, Grade LF-1, Charpy Test at -50°F, ANS (ASA) B16.5. |
| 2" thru 24"                           | F-38A-RF | 150-lb. raised face, blind flange, ASTM A-350, Grade LF-1, Charpy Test at -50°F, ANS (ASA) B16.5.       |

\* General Revision

ST0405046



Branch Connections

|           |        |                                                                                                                                                                                                  |
|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Up to 1½" | BC-2S  | For threaded piping, use straight size or reducing tee. When branch is smaller than header, a nipple and reducing coupling or swaged nipple may be used.                                         |
|           | BC-16W | For welded piping, branch lines may be welded in without reinforcement regardless of size combination. For threaded branch connection, use Thredolet or 3000-lb. full coupling welded to header. |

|                    |      |                                                                          |
|--------------------|------|--------------------------------------------------------------------------|
| (3) <u>Gaskets</u> | G-24 | Spiral-wound, 304 stainless steel asbestos gasket, Flexitallic Style CG. |
|--------------------|------|--------------------------------------------------------------------------|

|                       |       |                                                            |
|-----------------------|-------|------------------------------------------------------------|
| <u>Joint Compound</u> | JC-15 | Teflon tape 1/2 inch by 3 mil thickness, Scotch Brand 547. |
|-----------------------|-------|------------------------------------------------------------|

|                     |     |                                                                                         |
|---------------------|-----|-----------------------------------------------------------------------------------------|
| <u>Flange Bolts</u> | B-3 | ASTM A-193, Grade B-7, alloy steel bolt studs with ASTM A-194, Grade 2H heavy hex nuts. |
|---------------------|-----|-----------------------------------------------------------------------------------------|

|                       |      |               |
|-----------------------|------|---------------|
| <u>Bolt Lubricant</u> | BL-2 | Fel Pro C-5A. |
|-----------------------|------|---------------|

Valves

|             |                  |                                                                                                                     |
|-------------|------------------|---------------------------------------------------------------------------------------------------------------------|
| ½" thru 1½" | V-579C<br>(Gate) | 600-lb. screwed, OS/Y, solid wedge, gate valve, 316 stainless steel for cryogenic service to -200°F, bolted bonnet. |
|-------------|------------------|---------------------------------------------------------------------------------------------------------------------|

|         |        |         |          |
|---------|--------|---------|----------|
| Aloyco  | 4210-A | Ladish  | 8663     |
| Crane   | 66170  | Pacific | S-51     |
| Hancock | 3611   | Persta  | 7605.3SS |
| Jenkins | 8888D  | Powell  | 1972A    |

|            |                   |                                                                                                                     |
|------------|-------------------|---------------------------------------------------------------------------------------------------------------------|
| ½" thru 2" | V-SP-16<br>(Gate) | 150-lb. ANS (ASA) flanged, 316 stainless steel, gate valve, OS/Y, bolted bonnet, Teflon packing for -200°F service. |
|------------|-------------------|---------------------------------------------------------------------------------------------------------------------|

|         |        |         |       |
|---------|--------|---------|-------|
| Aloyco  | 127    | Pacific | S-500 |
| Hancock | 100-SW | Powell  | 2491  |
| Ladish  | 8275   |         |       |

|             |                   |                                                                                                                                 |
|-------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 2" thru 24" | V-SP-36<br>(Gate) | 150-lb. flanged, OS/Y, gate valve, ASTM A-352, Grade LCB body and bonnet, 316 stainless stem and disc, nickel alloy seat rings. |
|-------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------|

|         |      |          |         |
|---------|------|----------|---------|
| Crane   | 47LR | Pacific  | LCB-150 |
| Lunk    | 1502 | Walworth | 5202-F  |
| Jenkins | 1009 |          |         |

ST0405047

Valves (Continued)

|                                       |                   |                                                                                                                                                     |             |          |               |
|---------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|---------------|
| $\frac{1}{2}$ " thru $1\frac{1}{2}$ " | V-505C<br>(Globe) | 150-lb. screwed, OS/Y, globe valve, 316 stainless steel for cryogenic service to -200°F, plug type disc, bolted bonnet.                             |             |          |               |
|                                       |                   | Aloyco                                                                                                                                              | 310B        | Pacific  | S-701         |
|                                       |                   | Crane                                                                                                                                               | 61370       | Persta   | 2501.3SS      |
|                                       |                   | Hancock                                                                                                                                             | 11          | Powell   | 2474A         |
|                                       |                   | Jenkins                                                                                                                                             | 1316-A      | Velan    | S-074B-13M    |
|                                       |                   | Ladish                                                                                                                                              | 7270        |          |               |
| $\frac{1}{2}$ " thru $1\frac{1}{2}$ " | V-355A<br>(Globe) | 150-lb. flanged, OS/Y, globe valve, 316 stainless, bolted bonnet, Teflon packing.                                                                   |             |          |               |
|                                       |                   | Aloyco                                                                                                                                              | 311         | Pacific  | S-700         |
|                                       |                   | Crane                                                                                                                                               | 61375       | Persta   | 2501.1SS      |
|                                       |                   | Hancock                                                                                                                                             | 10          | Powell   | 2475A or 2429 |
|                                       |                   | Jenkins                                                                                                                                             | 1317-A      | Velan    | F-C74B-13M    |
|                                       |                   | Ladish                                                                                                                                              | 7272        |          |               |
| 2" thru 12"                           | V-162B<br>(Globe) | 150-lb. flanged, OS/Y, globe valve, ASTM A-352, Grade LCB body, 316 stainless trim, for -50°F service.                                              |             |          |               |
|                                       |                   | Crane                                                                                                                                               | 143-L       | Powell   | 1531          |
|                                       |                   | Jenkins                                                                                                                                             | 1040-S      | Sella    | 3111-F-11LCB  |
|                                       |                   | Lunk                                                                                                                                                | 1542        | Stockham | 15-GPF-12-LCB |
|                                       |                   | Pacific                                                                                                                                             | LCB-160-12  | Velan    | F-074B-2M-LCB |
|                                       |                   | Persta                                                                                                                                              | 2501.1C LCB | Walworth | 5275-F        |
| $\frac{1}{2}$ " thru 6"               | V-678C<br>(Angle) | 150-lb. flanged, angle valve, 316 stainless steel for cryogenic service to -200°F, bolted bonnet, Teflon packing.                                   |             |          |               |
|                                       |                   | Aloyco                                                                                                                                              | 331B        | Ladish   | 7282          |
|                                       |                   | Crane                                                                                                                                               | 61475       | Powell   | 2479 or 2437  |
|                                       |                   | Hancock                                                                                                                                             | 50          |          |               |
| 3" thru 4"                            | V-141B<br>(Plug)  | 150-lb. flanged, 3-way, 2-port, 90° turn, transflo type, plug valve, ASTM A-352, Grade LCB body, wrench operated, lubricated, for -50°F service.    |             |          |               |
|                                       |                   | Nord                                                                                                                                                | 27105-LCB   |          |               |
| 3" thru 4"                            | V-507B<br>(Plug)  | 150-lb. flanged, 3-way, 2-port, 90° turn, transflo type, plug valve, ASTM A-352, Grade LCB body, worm gear operated, lubricated, for -50°F service. |             |          |               |
|                                       |                   | Nord                                                                                                                                                | 27169-LCB   |          |               |

Note:

1. Piping shall be installed in accordance with Engr. Spec. 47-110.

\* General Revision

ST0405048



THE DOW CHEMICAL COMPANY

TEXAS DIVISION  
FREEPORT TEXAS 77541

Date: April 7, 1970

To: \_\_\_\_\_

Attached is a copy of Engineering Specification, Piping  
Spec. 46-591, Dated 4-15-70, Page(s) 1 thru 3 of 3  
which is in final form for issuing.

If this specification meets your approval, please sign below and return.

Issuing date has been set for 4-15-70. To meet this deadline this copy must be returned promptly as it cannot be issued until we receive your signature as approved.

Note: (R) on the specification indicates revision.

APPROVED: \_\_\_\_\_ MSC Date: 4/7/70

NOT APPROVED AS MARKED: \_\_\_\_\_ Date: \_\_\_\_\_

RETURN TO:

Angie H. Barnes  
Building A-1801

ahh

ST0405045

ST0405045