

## PROJECT REFERENCE LIST

Our entire project reference list is too large to include here. This is a sampling of completed projects, intended to represent the range and diversity of our engineering experience. If you have an interest in specific types of projects not represented here, please contact us for more information.

### Part 1 <OUTSIDE MAINLAND CHINA>

| CLIENT                          | UNIT NAME         | Description            |              |                                     | Year |
|---------------------------------|-------------------|------------------------|--------------|-------------------------------------|------|
|                                 |                   | Column Name            | Diameter /mm | Type of Internal                    |      |
| KOHAP                           | PX                | Xylene Splitter        | 7,500        | (146) ADV Trays                     | 1998 |
| SK Oxichem                      | PO/SM             | MBA Column             | 3,600        | (5) ADV Trays                       | 1998 |
| SK Corp.                        | NCC               | Quench Column          | 6,500        | Grid                                | 1998 |
| SK Corp.                        | CDU               | Crude Column           | 5,334        | (6) ADV Trays                       | 1998 |
|                                 |                   |                        |              | (11) Valve Trays                    | 1998 |
| SK Corp.                        | VDU               | Vacuum Column          | 6,900        | Structured Pack'g                   | 1998 |
| SK Corp.                        | #5 CDU            | Crude Column           | 8,200        | (3) ADV Trays                       | 1999 |
| LG Chem.(Naju)                  | Oxo-Alcohol       | Isomer Column          | 2,300/2,950  | (224) ADV Trays                     | 1999 |
| LG Chem.(Yochon)                | Oxo-Alcohol       | Isomer Column          | 3,000        | (145) ADV Trays                     | 2000 |
|                                 |                   | Aldolisation Column    | 2,750        | (10) Sieve Trays                    | 2000 |
| Honam Petrochem.                | NCC               | DePropanizer No.1      | 1,900        | (39) ADV Trays&<br>(10) Sieve Trays | 2000 |
|                                 |                   | DePropanizer No.2      | 1,800        | (20) ADV Trays&<br>(8)Sieve Trays   | 2000 |
|                                 |                   | Process Water Stripper | 1,800        | (15 )ADV Trays                      | 2000 |
| FORMOSA CHEMICALS & FIBRE CORP. | FCFC ARO2 PROJECT | XYLENE COLUMN          | 9,200/10,200 | (149) ADV Trays                     | 2002 |
|                                 |                   | DEHEPTANIZER           | 2,900/4,000  | (40) ADV Trays                      |      |
|                                 |                   | STRIPPER               | 3400         | (56)ADV Trays                       |      |
|                                 |                   | RAFFINATE COLUMN       | 8,100        | (71) ADV Trays                      |      |
|                                 |                   | EXTRACT COLUMN         | 4,800        | (51) ADV Trays                      |      |
| HONGHE CHEMICAL INC.            |                   | CH2CL2 REFINING COLUMN | 1,000        | (100) ADV Trays                     | 2002 |
|                                 |                   | CHCL3 REFINING COLUMN  | 1,500        | (100) ADV Trays                     |      |
|                                 |                   | HCL STRIPPER           | 1,200        | (6) ADV Trays                       |      |

| CLIENT   | UNIT NAME                   | Description                     |             |                 | Year |
|--|-----------------------------|---------------------------------|-------------|-----------------|------|
|  |                             | Type of Internal                | Column Name | Diameter /mm    |      |
| CSCC   | TAR<br>REFINING<br>PLANT    | TAR COLUMN                      | 1,524       | (39) ADV Trays  | 2002 |
| FORMOSA<br>CHEMICALS &<br>FIBRE COR                          | AROMATICS<br>& COMPLEX      | EXTRACT<br>COLUMN               | 3,050       | (50) ADV Trays  | 2002 |
|  |                             | RERUN<br>COLUMN                 | 3,050       | (40) ADV Trays  |      |
|  |                             | TOLUENE<br>COLUMN               | 3,600       | (60) ADV Trays  |      |
|  |                             | RAFFINATE<br>COLUMN             | 4,900       | (70) ADV Trays  |      |
|  |                             | XYLENE<br>SPLITTER<br>COLUMN A. | 5,800/6,600 | (100) ADV Trays |      |
|  |                             | XYLENE<br>SPLITTER<br>COLUMN B. | 6,750       | (2) ADV Trays   |      |
|  |                             | FINISHING<br>COLUMN             | 2,150       | (60) ADV Trays  |      |
|  |                             | DEPENTANIZER                    | 1,250       | (30) ADV Trays  |      |
| CSCC   | TAR<br>REFINING<br>PLANT    | TAR COLUMN                      | 1,516       | (44) ADV Trays  | 2003 |
| CHINA<br>PETROCHEMIC<br>AL<br>DEVELOPEMEN<br>T CORP.(Taiwan) | ACRYLONIT-R<br>ILE<br>PLANT | PRODUCT<br>COLUMN               | 1,981       | (50) ADV Trays  | 2003 |

| CLIENT  | UNIT NAME                   | Description                  |             |                 | Year |
|---|-----------------------------|------------------------------|-------------|-----------------|------|
|   |                             | Type of Internal             | Column Name | Diameter /mm    |      |
| FORMOSA<br>PLASTICS<br>CORPORATION              | ACRYLONIT<br>-RILE<br>PLANT | RECOVERY<br>COLUMN           | 6,200       | (54) ADV Trays  | 2003 |
|   |                             | ACETONITRILE<br>FRACTIONATOR | 2,450       | (15) ADV Trays  |      |
|   |                             | HEADS COLUMN                 | 2,800       | (63) ADV Trays  |      |
|   |                             | PRODUCT<br>COLUMN            | 4,000       | (50) ADV Trays  |      |
|   |                             | LIGHT ORGANIC<br>STRIPPER    | 2,100       | (30) ADV Trays  |      |
|   |                             | ABSORBER<br>COLUMN           | 4,200       | (30) ADV Trays  |      |
| CITGO   |                             | COKER<br>FRACTIONATOR        | 3,962.4     | (6) ADV Trays   | 2004 |
|   |                             |                              | 5,029.2     | (5) Valve Trays |      |
| CHINA<br>PETROCHEMICAL<br>DEVELOPEMENT<br>CORP. | ACRYLONIT<br>-RILE<br>PLANT | HEADS COLUMN                 | 1,372       | (70) ADV Trays  | 2004 |

**Part 2 <MAINLAND CHINA>**

| Year | Customer Location | Column Name   | Installation             | ID (mm)                              | Type of internals   |
|------|-------------------|---|--------------------------|--------------------------------------|---|
| 1995 | Daqing            | Crude Oil Atmospheric Column  | Crude Unit               | 3200                                 | Structured Packing & Trays  |
| 1996 | Daqing            | Lube Vacuum Tower   | Crude Unit               | 7400                                 | Structured Packing & Valve Trays  |
| 1997 | Dongying          | Fuel Oil Vacuum Tower   | Crude Unit               | 8200                                 | Structured Packing  |
| 1998 | XinJiang          | Lube Vacuum Tower   | Crude Unit               | 6400                                 | Feed Distributor  |
| 1999 | Daqing            | C3 Splitter   | Light Ends Fraction Unit | 5200                                 | ADV Trays (181)   |
| 2000 | Fushun            | Depropanizer<br>Deethanizer<br>C3 Splitter<br>De-Isobutanizer<br>Depentanizer | Light Ends Fraction Unit | 2400<br>1600<br>3600<br>3200<br>1400 | ADV Trays (65)<br>ADV Trays (55)<br>ADV Trays (180)<br>ADV Trays (90)<br>ADV Trays (55) |
| 2000 | Panjin            | Lube Vacuum Tower   | Crude Unit               | 4200                                 | Feed distributor  |
| 2000 | Fujian            | Depropanizer<br>C3 Splitter   | Light Ends Fraction Unit | 2200<br>3000                         | ADV Tray (69)<br>ADV Trays (200)  |
| 2000 | Zhenhai           | Prefractionator<br>Sidestripper I<br>Sidestripper II                          | Crude Unit               | 3600<br>2200<br>1800                 | ADV Trays (22)<br>ADV Trays (6)<br>ADV Trays (4)  |
| 2000 | Dalian            | Stabilizer  | Gas Plant                | 3400                                 | ADV Trays (40)  |
| 2000 | Cangzhou          | FCC Main Fractionator   | FCC                      | 4600                                 | ADV Trays (30)  |
| 2000 | Cangzhou          | Absorber Column<br>Desorber Column<br>Second Absorber Column<br>Stabilizer    | Gas Plant                | 2400<br>3000<br>1600<br>3000         | ADV Trays (40)<br>ADV Trays (40)<br>ADV Trays (30)<br>ADV Trays (42)                    |
| 2000 | Liaoyang          | Hexyl-diamine purification column   | Hexyl-diacid             | 3300/<br>2800                        | Structured Packing<br>Feed Distributor  |
| 2001 | Changling         | Main Fractionator   | Coking Cracker           | 3800                                 | ADV Trays (34)  |
| 2001 | Jinan             | Atmospheric Column  | Crude Unit               | 3800                                 | ADV Trays (42)  |
| 2001 | Dalian            | Prefractionator   | Crude Unit               | 4800                                 | ADV Trays (23)  |
| 2001 | Yangzi            | Prefractionator<br>Atmospheric Column   | Crude Unit               | 2600<br>3800                         | ADV Trays (24)<br>ADV Trays (46)  |
| 2001 | Daqing            | Atmospheric Column  | Crude Unit               | 3800/<br>4800                        | Structured Packing (5 beds)<br>ADV Trays (10)   |
| 2001 | Daqing            | Lube Vacuum Tower   | Crude Unit               | 5000/<br>8200                        | Structured Packing (7 beds)<br>Feed Distributor<br>ADV Trays (4)                        |

| Year | Customer Location | Column Name  | Installation             | ID (mm)                           | Type of internals  |
|------|-------------------|--|--------------------------|-----------------------------------|--|
| 2001 | Yueyang           | FCC Main Fractionator  | FCC                      | 4600                              | ADV Trays (30)   |
| 2001 | Zhenhai           | Fractionator   |                          | 3400                              | ADV Trays (36)   |
| 2001 | Maoming           | Diesel oil sidestripper<br>Main Fractionator   | FCC                      | 1400<br>4600                      | ADV Trays (10)<br>ADV Trays (17)                                     |
| 2001 | Qingdao           | Atmospheric Column<br>Sidestripper   | Crude Unit               | 3800<br>1200                      | ADV Trays (46)<br>ADV Trays (14)                                     |
| 2001 | Dalian            | FCC Main Fractionator<br>Diesel oil sidestripper<br>Absorber Column<br>Sponge-Absorber | FCC                      | 7000<br>2200<br>3400<br>2000      | ADV Trays (30)<br>ADV Trays (6)<br>ADV Trays (40)<br>ADV Trays (30)  |
| 2001 | Qilu              | Main Fractionator  | Coking Cracker           | 3600                              | ADV Trays (12)   |
| 2002 | Zhenhai           | De-C5 Column of Reforming Oil  | PX                       | 3400                              | ADV Trays (63)   |
| 2002 | Zhenhai           | De-C5 Column   | PX                       | 5600                              | ADV Trays (100)  |
| 2002 | Zhenhai           | Raffinate Column   | PX                       | 4600                              | ADV Trays (59)   |
| 2002 | Dalian            | Atmospheric Column   | Crude Unit               | 6000                              | ADV Trays (56)   |
| 2002 | Fushun            | Atmospheric Column   | Crude Unit               | 3800/<br>4800                     | ADV Trays (50)   |
| 2002 | Lanzhou           | C3 Splitter(A,B)   | Light Ends Fraction Unit | 4400                              | ADV Trays (200)  |
| 2002 | Lanzhou           | Sponge-absorber  | FCC                      | 2800                              | ADV Trays (30)   |
| 2002 | Jihua             | Absorber Tower<br>Desorber Tower<br>Sponge-absorber<br>Stabilizer                      | FCC                      | 2200<br>2800<br>1400/2400<br>2800 | ADV Trays (30)<br>ADV Trays (30)<br>ADV Trays (24)<br>ADV Trays (40) |
| 2002 | Yangzi            | Prefractionator<br>Atmospheric Column  | Crude Unit               | 3000<br>4200                      | ADV Trays (26)<br>ADV Trays (60)                                     |
| 2002 | Dushanzi          | Pre-Fractionator<br>Stripper<br>Solvent recovery Column                                | Aromatics Complex        | 1800<br>1000/1800<br>2000         | ADV Trays (54)<br>ADV Trays (86)<br>ADV Trays (42)                   |
| 2002 | Dongguan          | Light Organic Stripper<br>Product Column   | FCC                      | 2200<br>2000                      | ADV Trays (16)<br>Structured Packing & Distributor                   |
| 2002 | Yumen             | Sponge-absorber  | FCC                      | 1600                              | ADV Trays (30)   |

| Year | Customer Location | Column Name   | Installation         | ID (mm)                                      | Type of internals   |
|------|-------------------|---|----------------------|--|---|
| 2003 | Yuehua            | Main Fractionator   | FCC                  | 4600   | Structured Packing<br>(2 beds)<br>Feed Distributor<br>ADV Trays (20)                                    |
| 2003 | Yuehua            | Gasoline Fractionator   | FCC                  | 2200   | ADV Trays (24)  |
| 2003 | Changling         | Main Fractionator   | FCC                  | 4600   | ADV Trays (26)  |
| 2003 | Jinshan           | Main Fractionator<br>Stripper<br>Stabilizer   | FCC                  | 4600<br>2200<br>2200                         | ADV Trays (17)<br>ADV Trays (36)<br>ADV Trays (35)  |
| 2003 | Jinshan           | Dry Gas Desulfurizer<br>Solvent Rerun Tower   | FCC                  | 1400<br>1600                                 | ADV Trays (20)<br>ADV Trays (20)  |
| 2003 | Gaoqiao           | De-C <sub>5</sub> +H <sub>2</sub> O Recovery Tower<br>1,3-BD Purification Tower<br>De-TBC Tower               | Cis-butadiene Rubber | 1600/<br>2200<br>1200<br>1200<br>1200        | ADV Trays (17)<br>ADV Trays (23)<br>ADV Trays (24)<br>ADV Trays (89)<br>ADV Trays (9)                   |
| 2003 | Karamay           | Hydrogenation Vacuum Tower  | FCC                  | 2400   | Structured Packing  |
| 2003 | Jinzhou           | Main Fractionator   | FCC                  | 3800   | ADV Trays (17)  |
| 2003 | Xi'an             | Main Fractionator<br>Diesel Oil Stripper<br>Absorber Tower<br>Desorber Tower<br>Sponge-absorber<br>Stabilizer | FCC                  | 3400<br>1200<br>1800<br>2200<br>1000<br>2200 | ADV Trays (30)<br>ADV Trays (6)<br>ADV Trays (30)<br>ADV Trays (30)<br>ADV Trays (22)<br>ADV Trays (40) |
| 2003 | Yan'an            | Atmospheric Column  | Crude unit           | 3000   | ADV Trays (44)  |
| 2003 | Dongying          | Atmospheric Column  | Crude unit           | 3600   | ADV Trays (46)  |
| 2003 | Yan'an            | Main Fractionator<br>Absorber Tower<br>Desorber Tower   | FCC                  | 3800<br>2400<br>2600/2400                    | ADV Trays (12)<br>ADV Trays (40)<br>ADV Trays (40/21)   |

| Year | Customer Location | Column Name                                  | Installation                   | ID (mm)      | Type of internals                |
|------|-------------------|--|--------------------------------|--------------|----------------------------------|
| 2003 | Yan'an            | Absorber Tower                               | FCC                            | 1600         | ADV Trays (28)                   |
|      |                   | Desorber Tower                               |                                | 1600         | ADV Trays (34)                   |
|      |                   | Stabilizer                                   |                                | 1200/1600    | ADV Trays (14/20)                |
| 2003 | Zhenhai           | Benzene Column<br>Stripper                   | Aromatics<br>Complex           | 2600<br>2200 | ADV Trays (65)<br>ADV Trays (32) |
| 2003 | liaoyang          | Desulfurizer<br>Column                       | Carbon<br>Disulfide<br>Complex | 600          | ADV Trays (16)                   |
|      |                   | H <sub>2</sub> S Splitter                    |                                | 500          | ADV Trays (28)                   |
| 2003 | Zhenhai           | Xylene Splitter                              | Aromatics<br>Complex           | 6000         | ADV Trays (171)                  |
| 2003 | Gaoqiao           | Diesel Oil<br>Sidestripper                   | Crude unit                     | 600          | MSR Random<br>Packing            |
| 2003 | Zhenhai           | Main Fractionator                            | FCC                            | 5800         | ADV Trays (25)                   |
| 2003 | Jinling           | Fractionator I                               | FCC                            | 4000         | ADV Trays (40)                   |
|      |                   | Fractionator II                              |                                | 5000         | ADV Trays (21)                   |
| 2004 | Zhanjiang         | Prefractionator                              | Crude Unit                     | 4200         | ADV Trays (42)                   |
|      |                   | Atmospheric<br>Column                        |                                | 5000         | ADV Trays (53)                   |
|      |                   | Atmospheric<br>Stripper                      |                                | 2000         | ADV Trays (14)                   |
|      |                   | C4 Splitter                                  |                                | 1800/2400    | ADV Trays (50)                   |
|      |                   | Isomerization<br>Reactant Refining<br>Column |                                | 1800         | ADV Trays (40)                   |
| 2004 | Zhanjiang         | Light Organic<br>Flash Column                | Crude Unit                     | 3000         | Sieve Trays (3)                  |
| 2004 | Zhenjiang         | Main Fractionator                            | FCC                            | 3000         | ADV Trays (29)                   |
|      |                   | Sponge-absorber                              |                                | 1000         | ADV Trays (30)                   |
|      |                   | Stabilizer                                   |                                | 1400/1600    | ADV Trays (40)                   |
| 2004 | Jinling           | Solvent Recovery<br>Column                   | Sulfur<br>Recovery<br>Complex  | 2200         | ADV Trays (23)                   |
|      |                   | Absorber Tower                               |                                | 2300         | Pall Ring Random<br>Packing      |
|      |                   | Acidic Gas Washer                            |                                | 1500         | Pall Ring Random<br>Packing      |
| 2004 | Gaoqiao           | Dehydration Tower                            | Acrylonit-<br>rile Unit        | 800          | ADV Trays (50)                   |
|      |                   | Hydrocyanic Acid<br>Splitter                 |                                | 800          | ADV Trays (61)                   |
| 2004 | Yangzi            | Stripper                                     | Aromatics<br>Complex           | 2500         | ADV Trays (40)                   |
| 2004 | Taizhou           | Atmospheric<br>Column                        | Crude<br>Unit                  | 2600         | ADV Trays (52)                   |
|      |                   | Atmospheric<br>Stripper                      |                                | 1200         | ADV Trays (18)                   |