

## INJECTOR DESIGNS

All injectors are built-to-order and can be designed and fabricated according to ASME B31.3, European Pressure Equipment Directive and other customer-specified codes and U-stamp compliance. The following list includes the most common types of injector designs:

- Hydraulic injectors
- Single nozzle injectors
- Water-jacketed injectors
- Insulated injectors
- Insulated recirculation injectors
- Sulfur-burning injectors
- Low-profile injectors
- Multi-directional injectors
- Desuperheating injectors
- Multiple nozzle injectors
- Retractable injectors
- Air/gas atomizing injectors
- Recirculation injectors
- Air purge injectors
- Kiln injectors
- Humidification injectors

## ADDITIONAL EQUIPMENT/ACCESSORIES

- Quills and spool pieces
- Valve regulation packages
- Hose kit/mounting tube kits
- Liquid manifolds

## MODELING SERVICES

### Computational Fluid Dynamics (CFD)

- Liquid and gas flow in scrubbers, towers, ducts and dryers
- Internal flow characteristics in spray nozzles
- Gas and liquid mixing in two-fluid nozzles
- Wall impact and shadowing

### Finite Element Methods (FEM)

- Spray injector design
- Material suitability with effects of pressure loads, thermal stresses and corrosion

### Fluid Structure Interaction (FSI)

- The interaction between fluid flow at given conditions and the affected solid structure
- Vibration analysis, thermal failure, fatigue
- The impact of changes in various design parameters or process condition changes

## TESTING SERVICES

### ASME® B31.1 and B31.3 Testing

- Visual testing
- Radiographic examination – 5%
- Liquid penetrant examination – 100%
- Material testing reports
- Hydrotesting
- Weld map

### Custom Testing

- Radiographic examination – 100%
- Liquid penetrant examination – 100%
- Ultrasonic examination
- Magnetic particle examination
- Positive material identification of all components
- Ferrite test of weld
- Letter of compliance
- Weld map
- Spray and flow testing



## LUNCH & LEARN WORKSHOP

For more information or a no-obligation Lunch & Learn Workshop on nozzle selection, injector design/placement and modeling services, please contact your local sales engineer.

References available upon request.

