Section D – Media

Part 1: Fuel gas and protective gas

The following delivery specifications of Wieland-Werke AG form part of the contract. Any deviating specifications are to be agreed upon between the supplier/contractor and Wieland, and documented.

Created by: Mr. Althoff
Phone: +49 731 944-6273
Email: josef.althoff@wieland.com

The following have to be taken into account:

German Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung, BetrSichV), “Technische Regeln” (accepted codes of good engineering practice, with worksheets), DVGW, VDE, VDI. In addition, the Wieland works standards for electrical, hydraulic and pneumatic equipment, pipe insulation and pipe marking apply.

It is the supplier’s task and responsibility to procure any required special permits or apply for individual tests to be carried out on gas equipment and burners.

1. Specifications for the media used

- Fuel gas at the point of consumption:

<table>
<thead>
<tr>
<th>Plant</th>
<th>Vöhringen</th>
<th>Ulm</th>
<th>Langenberg</th>
<th>Villingen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude of site</td>
<td>495 m above sea level</td>
<td>475 m above sea level</td>
<td>80 m above sea level</td>
<td>704 m above sea level</td>
</tr>
<tr>
<td>Natural gas / air 52/48 %vol</td>
<td>Natural gas H in acc. with DVGW 260</td>
<td>Natural gas H in acc. with DVGW 260</td>
<td>Natural gas H in acc. with DVGW 260</td>
<td></td>
</tr>
<tr>
<td>Hs (Ho) = 5.8</td>
<td>Hs (Ho) = 11.06</td>
<td>Hs (Ho) = 11.1</td>
<td>Hs (Ho) = 11.1</td>
<td></td>
</tr>
<tr>
<td>Hi (Hu) = 5.2</td>
<td>Hi (Hu) = 9.98</td>
<td>Hi (Hu) = 10.6</td>
<td>Hi (Hu) = 10.0</td>
<td></td>
</tr>
<tr>
<td>Network pressure mbar</td>
<td>p = 80 ± 10%</td>
<td>p = 100 - 10%</td>
<td>p = 100 ± 15%</td>
<td>p = 70 ± 5%</td>
</tr>
<tr>
<td>(Hs (Ho) = upper calorific value</td>
<td>Hi (Hu) = lower calorific value)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At the Vöhringen plant, the systems are operated with a natural gas / air mixture.
#### Protective and forming gases / technical gases

<table>
<thead>
<tr>
<th>Vöhringen plant</th>
<th>Ulm plant</th>
<th>Langenberg plant</th>
<th>Villingen plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protective gas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HNₓ PN10</td>
<td>No thermal protective gas</td>
<td>No thermal protective gas</td>
<td>No thermal protective gas</td>
</tr>
<tr>
<td>95% N₂, 5% H₂ / operating pressure 60 mbar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From exo gas generator with CO/CO₂ cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hydrogen</strong> PN25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purity/quality 5.0 (99.999%) Max. 16 bar</td>
<td>Purity/quality 3.0 (99.9%) Max. 16 bar</td>
<td>Purity/quality 3.0 (99.9%) Max. 16 bar</td>
<td>Purity/quality 3.0 (99.9%) Max. 16 bar</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>Operating pressure</td>
<td>Operating pressure</td>
<td>Operating pressure</td>
</tr>
<tr>
<td>Rolled products approx. 8 bar Extruded products approx. 8 bar</td>
<td>8 bar</td>
<td>6-14 bar</td>
<td>5.0-7.0 bar</td>
</tr>
<tr>
<td><strong>Nitrogen</strong> PN16</td>
<td><strong>Emergency nitrogen</strong> PN25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purity/quality 5.0 (99.999%)</td>
<td>Purity/quality 5.0 (99.999%)</td>
<td>Purity/quality 5.0 (99.999%)</td>
<td>Purity/quality 5.0 (99.999%)</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>Operating pressure</td>
<td>Operating pressure</td>
<td>Operating pressure</td>
</tr>
<tr>
<td>Rolled products approx. 10 bar Extruded products approx. 5 bar Copper tubes approx. 5 bar and/or approx. 10 bar N₂ emergency network approx.18 bar</td>
<td>12 bar</td>
<td>6-14 bar</td>
<td>4-10 bar</td>
</tr>
<tr>
<td><strong>Forming gas</strong> PN16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95% N₂, 5% H₂, Operating pressure 5 bar or individual composition</td>
<td>95% N₂, 5% H₂, 6 bar</td>
<td>98% N₂, 2% H₂, Max. 16 bar Max. H₂ content 4.5% or individual composition</td>
<td>97% N₂, 3% H₂, 5 bar Max. H₂ content 4.5% or individual composition</td>
</tr>
</tbody>
</table>
2. Pipes / seals / fittings

Flammable gases

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Pressure/DIN/Temp</th>
<th>Seal/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas / air &lt;100 mbar</td>
<td>Steel tube, galvanised DIN 2440 or DIN EN 10255, DIN 1629 sheet 2</td>
<td>PN10</td>
<td>Pure graphite seal with perforated steel insert and inner eyelet for flange gaskets, for threading fitting washers without inner eyelet, made of 1.4571, with DVGW approval (Wieland stock items group M173-18)</td>
</tr>
<tr>
<td>Natural gas &lt;4 bar</td>
<td>Steel tube black DIN 2448 or DIN EN 10220</td>
<td>PN10</td>
<td></td>
</tr>
<tr>
<td>Forming gas &gt;5%H2</td>
<td>Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td>Pure graphite seal with perforated steel insert and inner eyelet made of 1.4571 with DVGW approval (Wieland stock items group M173-18)</td>
</tr>
<tr>
<td>Liquid gas</td>
<td>Steel tube DIN 2448 or DIN EN 10220, 1.0305 (St 35.8) with 3.1.B material certification DIN 50049 or DIN EN 10204 (no threaded fittings allowed!)</td>
<td>PN40</td>
<td>Spiral wound gasket with inner and outer ring, graphite layer in acc. with DIN, Fire Safe in acc. with TÜV certification (Wieland stock items group M173-09)</td>
</tr>
<tr>
<td>Butane/propane</td>
<td>Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN10</td>
<td></td>
</tr>
<tr>
<td>Hydrogen max. 16 bar</td>
<td>Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td></td>
</tr>
<tr>
<td>T min: -253 °C</td>
<td>brazed with silver solder (high temperature resistant) possibly stainless steel DIN 2462 or DIN EN ISO 1127, 1.4571 welded subject to consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical gases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaseous</td>
<td>Steel tubes galvanised DIN 2440 or DIN EN 10255, DIN 1629 sheet 2</td>
<td>PN10</td>
<td>Hard fibre gasket, anti-stick coating, permissible continuous use range: -50 to +250°C, but to be used only up to 100 °C! (Wieland stock items group M173-04)</td>
</tr>
<tr>
<td>Protective gas &lt;100 mbar</td>
<td>Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td></td>
</tr>
<tr>
<td>Gaseous</td>
<td>Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN16</td>
<td>Hard fibre gasket, anti-stick coating, permissible continuous use range: -50 to +250°C, but to be used only up to 100 °C! (Wieland stock items group M173-04)</td>
</tr>
<tr>
<td>Nitrogen max. 18 bar</td>
<td>Stainless steel DIN 2462 or DIN EN ISO 1127, 1.4571 welded or Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td>Pure PTFE, without reinforcement 1.5 mm thick, with reinforcement 2.5 mm thick (Wieland stock items group M173-16) or Pure graphite seal with perforated steel insert and inner eyelet made of 1.4571 with DVGW approval (Wieland stock items group M173-18)</td>
</tr>
<tr>
<td>Forming gas</td>
<td>Stainless steel DIN 2462 or DIN EN ISO 1127, 1.4571 welded or Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN16</td>
<td></td>
</tr>
<tr>
<td>Oxygen</td>
<td>bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td></td>
</tr>
<tr>
<td>Hydrogen</td>
<td>Stainless steel DIN 2462 or DIN EN ISO 1127, 1.4571 welded or Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td></td>
</tr>
<tr>
<td>Argon</td>
<td>Stainless steel DIN 2462 or DIN EN ISO 1127, 1.4571 welded or Bare copper, DIN 1786 or DIN EN 1057</td>
<td>PN25</td>
<td></td>
</tr>
</tbody>
</table>

3. Device selection and makes

Original type and make designations must be visible (see Section C – Mechanics, Part 5: Thermoprocessing equipment, Section 4, Device selection and makes).

a) Gas applications
(Listed suppliers are to be preferred. Alternative suppliers subject to consultation.)

Gas safety shutoff valves
- Medenus, Fiorentini, Honeywell Gas Technologies
- Honeywell Kromschröder, Uni-Geräte, Bürkert
- Honeywell Kromschröder
- Medenus, Fiorentini, Honeywell Gas Technologies
- Metrotec
- Honeywell Kromschröder

Gas solenoid valves
- Siemens, ABB
- Medenus, Honeywell Kromschröder, Honeywell Gas Technologies
- Honeywell Kromschröder, DUNGS
- Honeywell Kromschröder
- Honeywell Kromschröder (Type subject to consultation)
- Siemens, Honeywell Kromschröder, Aris, A&R, EL-O-Matic
- Honeywell Kromschröder, Siemens
- Leybold

Gas pressure regulators <500 mbar
- Medenus, Fiorentini, Honeywell Gas Technologies
- Honeywell Kromschröder
- Medenus, Fiorentini, Honeywell Gas Technologies
- Metrotec

Gas pressure regulators >500 mbar
- Medenus, Fiorentini, Honeywell Gas Technologies
- Metrotec

Oxygen partial pressure measurement
- Siemens, ABB
- Medenus, Honeywell Kromschröder, Honeywell Gas Technologies
- Honeywell Kromschröder
- Honeywell Kromschröder (Type subject to consultation)
- Siemens, Honeywell Kromschröder, Aris, A&R, EL-O-Matic
- Honeywell Kromschröder, Siemens
- Leybold

Leak testing device
- Siemens, ABB
- Medenus, Honeywell Kromschröder, Honeywell Gas Technologies
- Honeywell Kromschröder
- Honeywell Kromschröder (Type subject to consultation)
- Siemens, Honeywell Kromschröder, Aris, A&R, EL-O-Matic
- Honeywell Kromschröder, Siemens
- Leybold

Electrical temperature, mixture, furnace chamber pressure regulators and transducers
- Siemens, ABB
- Leybold
- Siemens, ABB

Gas filters
- Siemens, ABB
- Leybold

Gas and air pressure switches
- Siemens, ABB
- Leybold

Pilot burners and ignition transformers
- Siemens, ABB
- Leybold

Ignition and monitoring equipment
- Siemens, ABB
- Leybold

Actuators for control/proportional valves and flaps
- Siemens, ABB
- Medenus, Honeywell Kromschröder, Honeywell Gas Technologies
- Honeywell Kromschröder
- Honeywell Kromschröder (Type subject to consultation)
- Siemens, Honeywell Kromschröder, Aris, A&R, EL-O-Matic
- Honeywell Kromschröder, Siemens
- Leybold

Mechanical balanced pressure regulators
- Siemens, ABB
- Leybold

Gas analysis
- Siemens, ABB
- Leybold

Vacuum pumps and vacuum devices
- Siemens, ABB
- Leybold

Absolute pressure switch
- Siemens, ABB
- Leybold

Rotary piston meters
- Siemens, ABB
- Leybold

Thermocouples – only class 1, testable type
- Siemens, ABB
- Leybold

Main burners
- Siemens, ABB
- Leybold

Rotameter flowmeters
- Siemens, ABB
- Leybold

Gas monitoring / gas warning device
- Siemens, ABB
- Subject to consultation
- L+T Gasetecnik, Witt, Thermco

Fans
- Siemens, ABB
- Meierling

Shutoff flaps
- Siemens, ABB
- Jasta, Crane series VIA, Ebro

Ball valves
- Siemens, ABB
- Böhmer

**Shutoff valves for laying pipes**

- **Plant gas network, natural gas**
  - Butterfly valve, stainless steel disc, lug type, GGG40, EPDM seal
  - Gate valve, short length, soft sealing with DVGW approval for gas, make Erhard or Wika up to DN200
  - Butterfly valve make Erhard type ROCO or Wika
    - Gas version for DN200 and up, inside enamelled, EKB fusion bonded epoxy coating, soft sealing
  - Gas ball valve body brass, body brass chrome-plated PTFE seal, with approval for gas (only up to DN50)

- **Liquid gas, Liquefied under pressure**
  - Fire Safe ball valve in acc. with BSI 5146, body cast steel with PTFE seal, make Argus – type EKI 71, Böhmer, von Schefen, with 3.1 B material certification
### Part 1: Fuel gas and protective gas

<table>
<thead>
<tr>
<th>Gas Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid gas</td>
<td>Ball valve make Flowserve, type Argus with PTFE seal, body DIN GS-C25, ball 1.4027 with 2.2 material certification</td>
</tr>
<tr>
<td>Gaseous</td>
<td></td>
</tr>
<tr>
<td>&gt;1 bar</td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Ball valve make ELGAS (Linde) Ms58, ball MS58 chrome-plated, PTFE seal, with 2.2 material certification, <strong>PN25</strong></td>
</tr>
<tr>
<td>Gaseous</td>
<td>Ball valve (for large diameters), cast steel body with PTFE seal and 2.2 material certification</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>as for nitrogen, but approved for H₂, <strong>PN25</strong></td>
</tr>
<tr>
<td>Gaseous</td>
<td></td>
</tr>
</tbody>
</table>