

Annex C

Calibration Certification for  
the On-line Stack  
Monitoring System

Annex C1

## Calibration Certification for the CEMS

(1)

# Commissioning Check List 试运行检查项目表 MCS100FT

|                           |                    |
|---------------------------|--------------------|
| <b>Customer data 客户资料</b> |                    |
| Customer: <u>OSCAR</u>    | Plant: <u>OWTF</u> |
| Location: <u>SHW</u>      |                    |

|                                       |
|---------------------------------------|
| <b>1. Device data 设备资料</b>            |
| Device type 设备类型: <u>MCS100FT (1)</u> |
| Serial no. 序列号: <u>1607 0493</u>      |
| Sample probe type 取样探头类型: <u>SFU</u>  |

|   |   |   |   |
|---|---|---|---|
| <b>2. Plant data 电厂资料</b>                   |   |   |   |
| Location 标签编号                               | Outside 室外 <input type="checkbox"/>               | Under cover 有保护罩 <input type="checkbox"/>       | Inside 室内 <input checked="" type="checkbox"/> |
| Orientation of the stack 取样点方向              | Horizontal 水平 <input type="checkbox"/>            | Vertical 垂直 <input checked="" type="checkbox"/> |   |
|   | Horizontal 水平 <input checked="" type="checkbox"/> | Vertical 垂直 <input type="checkbox"/>            |   |
| Orientation of sample gas probe 取样探头方向      | Horizontal 水平 <input checked="" type="checkbox"/> | Vertical 垂直 <input type="checkbox"/>            |   |
| Pressure 压力 <u>1010</u> hpa                 | Gas temperature 烟气温度 <u>410</u> °C                |   |   |
| Plant operating status 电厂运行情况 <u>Normal</u> |   |   |   |

| <b>3. Prerequisite 系统运行条件</b>   |                                     |                          |            |
|---|-------------------------------------|--------------------------|------------|
|   | Y                                   | N                        | Remarks 备注 |
| 3.1. Documentation + Delivery complete<br>文件+货物是否齐全   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.2. Platform at measurement spot has suitable dimension?<br>测量点平台的尺寸是否合适?  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.3. If this measurement location is under legal regulation, has it been acknowledged by an official body?<br>如果安装位置需要符合法律法规, 此安装位置是否被官方认可? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.4. Customer specific data for parameterization available?<br>用户对系统参数的特殊要求是否可行?  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.5. Cables, tubes and sample line installed but not connected?<br>电缆、管线和取样管线安装但没有连接?   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.6. Compressed air station installed and compressed air available?<br>压缩空气站已安装并且压缩空气可以使用?  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |

| 4. Preliminary work 预备工作   |                                     | Y                        | N | Remarks 备注 |
|--|-------------------------------------|--------------------------|---|------------|
| 4.1. Mounting of flanges like described in the Operating Instruction?<br>法兰安装是否按照图纸? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.2. Check for damage<br>检查外部损伤  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.3. Check ambient conditions<br>检查环境条件  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.4. Check mounting conditions<br>检查安装条件   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.5. Check cables / wires for correct installation<br>检查电缆/电线及其连接状况                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.6. Check main power supply voltage<br>检查总供电电压                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |


| 5. Periphery 外部设备                            |                                     | Y                        | N | Remarks 备注 |
|--|-------------------------------------|--------------------------|---|------------|
| 5.1. Check compressed air supply<br>检查压缩空气供应 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| Inlet 入口(5 bar): 6 Bar                       |                                     |                          |   |            |

| 6. Sample probe 取样探头                                |                                     | Y                        | N | Remarks 备注 |
|---|-------------------------------------|--------------------------|---|------------|
| 6.1. Connect bundle of tubes and cables<br>管线和电缆的连接 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 6.2. Install probe<br>探头安装                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |

| 7. MCS100FT   |                                     | Y                        | N | Remarks 备注                         |
|---|-------------------------------------|--------------------------|---|------------------------------------|
| 7.1. Switch on analyzer and wait for warm up<br>打开分析仪并等待预热  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.2. Check sample conditions<br>检查样气情况  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| Flow rate 流量: 230 l/h   |                                     |                          |   |                                    |
| 7.3. Check zero conditions<br>检查零点情况  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| Flow rate 流量: 160 l/h   |                                     |                          |   |                                    |
| 7.4. Perform zero point setting<br>零点设置   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | Test results within specification. |
| 7.5. Perform span test<br>量程测试  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.6. Parameterize the I/O Module<br>设置 I/O 模块参数   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.7. Measured values are plausible<br>测量值是否合理   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.8. Save device data<br>储存设备数据   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.9. Complete Commissioning Sign-Off Sheet<br>完成试运行签署表  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |
| 7.10. Instruct the operator personnel<br>操作员培训<br>Hand over the maintenance manual and check lists<br>移交维护手册和检查表<br>- Measurement reading<br>读取测量值<br>- Perform customer maintenance<br>演示维护方法<br>- Read messages<br>读取信息 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |                                    |

### 8. Measured value

| Index<br>编号 | Source<br>信号源    | Unit<br>单位         | Range 范围 |        | Reading<br>(actual)<br>实际读数 | Output<br>value<br>产值    |
|-------------|------------------|--------------------|----------|--------|-----------------------------|--------------------------|
|             |                  |                    | Start 开始 | End 结束 |                             |                          |
| 1           | HCL              | mg/Nm <sup>3</sup> | 0        | 120    | 60.22 ppm                   | 60.22 ppm                |
| 2           | HF               | mg/Nm <sup>3</sup> | 0        | 5      | 4.34 ppm                    | 4.34 ppm                 |
| 3           | CO               | mg/Nm <sup>3</sup> | 0        | 1000   | 128.21 ppm                  | 128.20 ppm               |
| 4           | NO               | mg/Nm <sup>3</sup> | 0        | 500    | 122.01 ppm                  | 122.00 ppm               |
| 5           | NO <sub>2</sub>  | mg/Nm <sup>3</sup> | 0        | 200    | 98.81 ppm                   | 98.80 ppm                |
| 6           | NO <sub>x</sub>  | mg/Nm <sup>3</sup> | 0        | 500    | 412.11 mg/m <sup>3</sup>    | 412.12 mg/m <sup>3</sup> |
| 7           | SO <sub>2</sub>  | mg/Nm <sup>3</sup> | 0        | 300    | 83.21 ppm                   | 83.21 ppm                |
| 8           | CO <sub>2</sub>  | Vol o/o            | 0        | 25     | 20.01 o/o                   | 20.01 o/o                |
| 9           | H <sub>2</sub> O | Vol o/o            | 0        | 40     | 32.02 o/o                   | 32.01 o/o                |
| 10          | O <sub>2</sub>   | Vol o/o            | 0        | 21     | 20.95 o/o                   | 20.95 o/o                |
| 11          | TOC              | mg/Nm <sup>3</sup> | 0        | 300    | 122.01 ppm                  | 122.01 ppm               |
| 12          | NH <sub>3</sub>  | mg/Nm <sup>3</sup> | 0        | 100    | 53.30 ppm                   | 53.31 ppm                |
| 13          | CH <sub>4</sub>  | mg/Nm <sup>3</sup> | 0        | 100    | 112.01 ppm                  | 112.01 ppm               |
| 14          |                  |                    |          |        |                             |                          |
| 15          |                  |                    |          |        |                             |                          |

| Remarks 备注   |  |
|--|--|
|  |  |
| <p>Date<br/>日期: <u>25/7/2018</u></p> <p>Engineer<br/>工程师: <u></u> </p> | <p>Name 签名</p> <p>Plant<br/>personnel<br/>用户代表: <u></u></p> |



(2)

# Commissioning Check List 试运行检查项目表

## MCS100FT

|                           |                    |
|---------------------------|--------------------|
| <b>Customer data 客户资料</b> |                    |
| Customer: <u>Oscar</u>    | Plant: <u>OWTF</u> |
| Location: <u>SHW</u>      |                    |

|   |
|---|
| <b>1. Device data 设备资料</b>              |
| Device type 设备类型: <u>MCS100FT (2)</u>   |
| Serial no. 序列号: <u>1607 0494</u>        |
| Sample probe type<br>取样探头类型: <u>SFU</u> |

|  |  |  |  |
|--|--|--|--|
| <b>2. Plant data 电厂资料</b>                      |  |  |  |
| Location 标签编号                                  | Outside<br>室外 <input type="checkbox"/>               | Under cover<br>有保护罩 <input type="checkbox"/>       | Inside<br>室内 <input checked="" type="checkbox"/> |
| Orientation of the stack 取样点<br>方向             | Horizontal<br>水平 <input type="checkbox"/>            | Vertical<br>垂直 <input checked="" type="checkbox"/> |  |
| Orientation of sample gas probe<br>取样探头方向      | Horizontal<br>水平 <input checked="" type="checkbox"/> | Vertical<br>垂直 <input type="checkbox"/>            |  |
| Pressure 压力 <u>1010</u> hpa                    | Gas temperature 烟气温度 <u>410</u> °C                   |  |  |
| Plant operating status<br>电厂运行情况 <u>Normal</u> |  |  |  |

|   |                                     |                          |            |
|---|-------------------------------------|--------------------------|------------|
| <b>3. Prerequisite 系统运行条件</b>   |                                     |                          |            |
|   | Y                                   | N                        | Remarks 备注 |
| 3.1. Documentation + Delivery complete<br>文件+货物是否齐全   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.2. Platform at measurement spot has<br>suitable dimension?<br>测量点平台的尺寸是否合适?   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.3. If this measurement location is under<br>legal regulation, has it been<br>acknowledged by an official body?<br>如果安装位置需要符合法律法规, 此安装<br>位置是否被官方认可? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.4. Customer specific data for<br>parameterization available?<br>用户对系统参数的特殊要求是否可行?   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.5. Cables, tubes and sample line installed<br>but not connected?<br>电缆、管线和取样管线安装但没有连接?  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |
| 3.6. Compressed air station installed and<br>compressed air available?<br>压缩空气站已安装并且压缩空气可以使<br>用?   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |            |

| 4. Preliminary work 预备工作   |                                     | Y                        | N | Remarks 备注 |
|--|-------------------------------------|--------------------------|---|------------|
| 4.1. Mounting of flanges like described in the Operating Instruction?<br>法兰安装是否按照图纸? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.2. Check for damage<br>检查外部损伤  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.3. Check ambient conditions<br>检查环境条件  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.4. Check mounting conditions<br>检查安装条件   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.5. Check cables / wires for correct installation<br>检查电缆/电线及其连接状况                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 4.6. Check main power supply voltage<br>检查总供电电压                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |

| 5. Periphery 外部设备                            |                                     | Y                        | N | Remarks 备注 |
|--|-------------------------------------|--------------------------|---|------------|
| 5.1. Check compressed air supply<br>检查压缩空气供应 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| Inlet 入口(5 bar):      6      Bar             |                                     |                          |   |            |




| 6. Sample probe 取样探头                                |                                     | Y                        | N | Remarks 备注 |
|---|-------------------------------------|--------------------------|---|------------|
| 6.1. Connect bundle of tubes and cables<br>管线和电缆的连接 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |
| 6.2. Install probe<br>探头安装                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |            |



| 7. MCS100FT   |                                     | Y                        | N | Remarks 备注                                |
|---|-------------------------------------|--------------------------|---|---|
| 7.1. Switch on analyzer and wait for warm up<br>打开分析仪并等待预热  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.2. Check sample conditions<br>检查样气情况  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| Flow rate 流量: 240 l/h   |                                     |                          |   |   |
| 7.3. Check zero conditions<br>检查零点情况  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| Flow rate 流量: 150 l/h   |                                     |                          |   |   |
| 7.4. Perform zero point setting<br>零点设置   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.5. Perform span test<br>量程测试  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | <i>Test results within specification.</i> |
| 7.6. Parameterize the I/O Module<br>设置 I/O 模块参数   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.7. Measured values are plausible<br>测量值是否合理   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.8. Save device data<br>储存设备数据   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.9. Complete Commissioning Sign-Off Sheet<br>完成试运行签署表  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |
| 7.10. Instruct the operator personnel<br>操作员培训<br>Hand over the maintenance manual and check lists<br>移交维护手册和检查表<br>- Measurement reading<br>读取测量值<br>- Perform customer maintenance<br>演示维护方法<br>- Read messages<br>读取信息 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |   |   |

### 8. Measured value

| Index<br>编号 | Source<br>信号源    | Unit<br>单位         | Range 范围 |        | Reading<br>(actual)<br>实际读数 | Output<br>value<br>产值    |
|-------------|------------------|--------------------|----------|--------|-----------------------------|--------------------------|
|             |                  |                    | Start 开始 | End 结束 |                             |                          |
| 1           | HCL              | mg/Nm <sup>3</sup> | 0        | 120    | 60.21 ppm                   | 60.21 ppm                |
| 2           | HF               | mg/Nm <sup>3</sup> | 0        | 5      | 4.32 ppm                    | 4.32 ppm                 |
| 3           | CO               | mg/Nm <sup>3</sup> | 0        | 1000   | 128.20 ppm                  | 128.20 ppm               |
| 4           | NO               | mg/Nm <sup>3</sup> | 0        | 500    | 122.00 ppm                  | 122.00 ppm               |
| 5           | NO <sub>2</sub>  | mg/Nm <sup>3</sup> | 0        | 200    | 98.80 ppm                   | 98.81 ppm                |
| 6           | NO <sub>x</sub>  | mg/Nm <sup>3</sup> | 0        | 500    | 412.22 mg/m <sup>3</sup>    | 412.21 mg/m <sup>3</sup> |
| 7           | SO <sub>2</sub>  | mg/Nm <sup>3</sup> | 0        | 300    | 83.21 ppm                   | 83.21 ppm                |
| 8           | CO <sub>2</sub>  | Vol o/o            | 0        | 25     | 20.00 o/o                   | 20.00 o/o                |
| 9           | H <sub>2</sub> O | Vol o/o            | 0        | 40     | 32.01 o/o                   | 32.01 o/o                |
| 10          | O <sub>2</sub>   | Vol o/o            | 0        | 21     | 20.95 o/o                   | 20.95 o/o                |
| 11          | TOC              | mg/Nm <sup>3</sup> | 0        | 300    | 122.01 ppm                  | 122.01 ppm               |
| 12          | NH <sub>3</sub>  | mg/Nm <sup>3</sup> | 0        | 100    | 53.30 ppm                   | 53.30 ppm                |
| 13          | CH <sub>4</sub>  | mg/Nm <sup>3</sup> | 0        | 100    | 112.02 ppm                  | 112.02 ppm               |
| 14          |                  |                    |          |        |                             |                          |
| 15          |                  |                    |          |        |                             |                          |

| Remarks 备注   |  |
|--|--|
|  |  |
| <p>Date<br/>日期: <u>25/7/2018</u></p> <p>Engineer<br/>工程师: <u></u> </p> | <p>Name 签名</p> <p>Plant<br/>personnel<br/>用户代表: <u></u></p> |



Annex C2

## Calibration Certification for the CAPCS



