



Exit Air Cleaning Unit QUESTIONNAIRE

Contact Details

Company Name:
Name:
Job Title/Position:
Address:
City:
State:
Zip:
Country:
Phone:
Fax:
Email:
Plant Location:

Foreword

The aim of this questionnaire is providing guidance on gathering necessary information for us to prepare our best, tailored, technical and commercial proposals regarding possible installation of a Cleaning Unit system in your plant.

The system is flexible with regard to various aspects of design, construction and future operation. The options are marked and and commented to make the selection even easier.

All data and information disclosed to us by means of this questionnaire are considered confidential and will not be made available to any third parties without your consent.

Mandatory fields are **boxed**. Please, complete this questionnaire as fully as possible to help us cater for your needs in a comprehensive manner.

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QUESTIONNAIRE

Flowrates and annual on-stream hours.

Flowrates of the air streams to be treated, in m³/hr.

- | | |
|-----------------------|---------------------|
| rated flowrate: | Nm ³ /hr |
|-----------------------|---------------------|

- max. flowrate: Nm³/hr

- min. flowrate: Nm³/hr

Annual on-stream hours: hr/year

Type of the plant and granulation technology

Although the Cleaning Unit is capable of handling various types of pollutants in the exit air, it is designed mainly for urea and ammonium nitrate plants. It works well with new and existing plants using prilling towers or granulators. Please, tick the option corresponding to your situation.

- Existing
- New

- Urea
- Ammonium nitrate
- Other

- Prilling tower
- Granulator
- Other

Type of pollutant to be removed from the air stream

The system is capable of removing both gaseous ammonia and product dust from the granulation section exit air but – should this be the requirement – it can remove the dust only leaving the ammonia content in the stream unchanged. Please, select the pollutants you want removed.

- Product dust
- Ammonia
- Other

Exit Air Stream Specification

Product dust

- | | |
|----------------------------------|---------------------------------------|
| content in the air stream: | mg/m ³ or g/m ³ |
|----------------------------------|---------------------------------------|

- particle size distribution (or screen analysis), inclusive particularly of particle size 1.0 to 0.3 micron,

- kind and content of other contaminants present in the air stream (indicate rated, max. and min. levels):
 - sand or other insoluble particulate matter

- calcium-based additives
- sulphur-based additives
- other

Ammonia

- **content in the air stream:**
 - **rated: mg/m³**
 - max.: mg/m³
 - min.: mg/m³
- air stream temperature
 - **rated: °C**
 - max.: °C
 - min.: °C
- relative humidity:
 - **rated:**
 - max.:
 - min.:
- air stream pressure (indicate abs. or g.)
 - **rated: kPa**
 - max.: kPa
 - min.: kPa

Feedstock Specifications

Acid (for ammonia absorption)

If the ammonia is to be removed from air stream, indicate the specifications of acid available for the Cleaning Process. Please, tick the option corresponding to your situation.

- nitric acid
- sulphuric acid
- availability on site:
 - available
 - to be imported
- concentration: % wt.
- chemical composition:
- suspended solids:

- conditions of supply at Battery Limits:
 - pressure:
 - temperature:

Make-up Water

Only non-fouling water can be used as make-up water, i.e. water giving no solid deposits upon evaporation.

Indicate the properties of the make-up water available for the Exit Air Cleaning Process on Site:

- conditions of supply at Battery Limits:
 - | |
|-----------------|
| pressure: |
|-----------------|
 - | |
|--------------------|
| temperature: |
|--------------------|
- chemical composition, inclusive of total hardness contaminant levels (especially chlorides), conductivity etc.:
.....
- flowrate available and restrictions of usage, if any:
.....
- Steam condensate or process condensate may be used as the make-up water, e.g. process condensate from Urea Plant:
 - Yes:
 - No:

Requirements for the air stream after cleaning

Please, provide the figures for the limits of emission you would like to achieve by applying the Cleaning Unit (product dust / ammonia content in the air vented to the atmosphere).

Product dust

Emission limit: mg/Nm ³
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Ammonia

Emission limit: mg/Nm ³
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By-product solution

The pollutants carried by the exit air are dissolved in the scrubbing liquid circulated in the scrubbers forming a by-product solution. Depending on the kind of dust to be removed and used additions, the liquid can be a solution of urea, ammonium sulphate, ammonium nitrate or urea and ammonium sulphate or urea and ammonium nitrate (with traces of urea). Depending on the design of the Cleaning Unit and on your requirements, the pollutants (product dust and ammonia) can be removed in one or in two separate stages,

thus producing one or two separate streams of by-product solution. For instance, removing urea dust and ammonia with addition of sulphuric acid in a single stage scrubber produces a solution of urea and ammonium sulphate. If a double-stage process is applied, the first stage (dust removal) produces urea solution and the second stage (ammonia removal) produces ammonium sulphate solution.

Please, select the most suitable option. The availability depends on your previous choices.

Single-stage: (one stream)

- urea and ammonium sulphate solution
- urea and ammonium nitrate solution

Double-stage (two separate streams)

- urea solution
- ammonium sulphate solution
- ammonium nitrate solution

Other options:

- preferred discharge mode:
 - continuous
 - batch
- Include a by-product liquid storage in the Proposal
- Indicate preferred storage capacity

Preferred way of utilization of the by-product solution:

- recycling to process (evaporation section)
- crystallization unit
- liquid fertilizer production

Placement option

The Cleaning Unit system can be installed on top of existing equipment or, in case the existing structure is not capable of withstanding an additional load, on ground level. The most preferred location is the one closest to the source of the air stream to be treated – in case of a prilling tower, the optimal location is on the top of the tower. Please, select the most suitable option.

- On top of existing equipment/structures
- On ground level

Utilities

Electricity

- voltage/frequency of the available AC power source:
- maximum rated receivers to be supplied from low/medium voltage network:

- Your requirements applicable to motor control, power distribution and electrical equipment, if any:
.....

Instrument Air

- available pressure:
- dew point:

Steam

- temperature:
- pressure at B.L.:

Weather Conditions on Site

Ambient air temperature

- yearly average:
- maximum:
- minimum:

Air Humidity

- yearly average:
- maximum:
- minimum:

Plot Plan and Information on the Site (if available)

- Please, provide an excerpt of General Plot Plan of the existing premises showing the plot available for the Air Cleaning Unit.
- Attach drawings (plans, sections and elevations) of the prilling tower/granulator and other items of equipment (or sources) wherefrom air streams shall be collected for cleaning.

Existing scrubbing / de-dusting system and equipment, if any

Please, describe as fully as possible

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Required Scope of Work

We are ready to present a proposal encompassing any scope of work required, the minimal option being process licence fee, Basic Engineering and proprietary equipment (scrubbers), the maximal a turn-key project. Please, select the most suitable option.

- E (Engineering)
- EP (Engineering Procurement)
- EPC (Engineering Procurement Construction)
- EPS (Engineering Procurement Supervision over construction)
- Other

Other Requirements

We are capable of preparing technical documentation in any of the widely recognized standards and in a number of languages (English, Polish and Russian). Please, select the most suitable option.

- | |
|---|
| <ul style="list-style-type: none">▪ Applicable Codes and Standards▪ measurement units etc.▪ Language |
|---|
- Preferred system of Process control/instrumentation: