Guideline

Internal Cleaning of Water-Tube Steam Generating Plants and Associated Pipework

VGB-R 513 e
Second Edition 2006
To replace the 1st edition 2002
Translated by:
Fachverband Dampfkessel-, Behälter und Rohrleitungsbau e.V. Düsseldorf (FDBR)

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Published by
VGB PowerTech e.V.

Obtainable from:
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PREFACE to 1st Edition

VGB Guideline "Internal Cleaning of Water-Tube Steam Generating Plants and Associated Pipework"

Upon request of the power plant manufacturers and due to numerous damage on plant equipment and misunderstandings, the VGB Technical Committee "Steam Generating Plants", in connection with other related VGB Technical Committees, felt compelled to deal with the complex subject "Internal Cleaning of Water-Tube Steam Generating Plants and Associated Pipework".

This guideline is a collection, evaluation and comparison of various company specifications, technical knowledge and opinions and was established in close cooperation of power plant manufacturers with the relevant associations.

This guideline was established to the best of our knowledge and belief, but does not pretend to completely cover all aspects. It is considered a practical guide and is not intended to replace the technical knowledge of its users.

No liability will be taken for the correctness of its contents since especially plant-specific peculiarities have to be taken into account in each individual case.

In addition, the handling of cleaning agents, effluent disposal as well as noise reduction during blow-through operations has largely been considered.

The detailed description of the procedures, planning and performance cover information on processes that have proved to be reliable in practice. Specific emphasis was placed on the checking and verification of cleaning results.

The cleaning procedures mentioned shall not be considered to be alternative or additional procedures. The parties involved are free to use individual or the complete range of procedures which shall be agreed between purchaser and supplier of the plant in each individual case.

The decision on the selection of the cleaning procedure shall be based on the fouling condition of the steam boiler plant and associated pipework, originating from fabrication and quality assurance, shipping and storage as well as assembly work. Further decisive criteria may be the disposal of cleaning effluents from the steam boiler and environmental reasons such as noise nuisance caused by the steam blowing process, but also design and process-related matters.

Cleaning procedures should be performed shortly prior to hot commissioning so that the results of successful cleaning of the steam generating plants and associated pipework are not impaired by corrosion or other contamination occurring anew during extended outage periods.

Where required, e.g. after long periods of operation, large repairs and extended inspection periods as well as for other reasons, internal cleaning may become necessary. For operational steam boiler plants the internal fouling condition, plant design, mode of operation, feedwater and boiler water quality as well as the extent of inspections and repair play an essential role for the selection of the cleaning procedures to be applied.

Users are therefore asked to inform the VGB on experience gained with and proposals for improving this guideline, so that the VGB, upon evaluation of the information provided, may supplement or change this guideline appropriately.
We would also like to mention that the companies and associations having participated in
the establishment of this guideline, especially the authors, are prepared to proffer advice
regarding the planning and performance of the various process steps, but also in the case
of divergent opinions and contract-related matters.

The following companies and associations participated in the establishment of this
guideline.

Representatives of power plant users:

Dr. Farwick  STEAG AG, KW Voerde
Kempkes  PreussenElektra Engineering GmbH, Gelsenkirchen
Kröger  VGB-Geschäftsstelle, Essen
Küster  PreussenElektra Kraftwerke AG, KW Knepper, Dortmund
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Representatives of power plant and turbine manufacturers as well as cleaning companies:

Ala-Hakula  Babcock Borsig Power Energy GmbH, Oberhausen
Baer  Siemens AG, Mülheim
Borchardt  Therm Service für Kraftwerke und Industrie GmbH, Seevetal
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With this guideline, the authors hope to have made a major contribution to an increased
efficiency regarding the internal cleaning of steam generating plants.

Our thanks are due to all participants for their careful and thorough work which has gone
into the making of this guideline during numerous committee meetings.

Essen, January 2002

VGB PowerTech e.V.
PREFACE to 2nd Edition

On account of the excellent acceptance found world-wide of the 1st edition of the VGB Guideline "Internal Cleaning of Water-Tube Steam Generating Plants and Associated Pipework" as well as the numerous additions proposed and wishes expressed by manufacturers and users of steam generating plants regarding the inclusion of additional subjects, the authors of this guideline felt compelled to establish a revision of this guideline which was finalised in December 2005.

On the occasion of revision work technical changes were included.

Especially the following subjects were included or revised:
- boilout with organic chemicals
- pre-operational/chemical cleaning with organic acids, ammonium EDTA
- on-line method for reducing deposit layers by means of amines and polycarboxylates
- combination of pre-operational cleaning and steam blowing as coherent process
- tabular overview on cleaning processes
- steam blowing at sliding pressure in combined-cycle plants in connection with gas turbines (continuous steam blowing)
- compressed-air cleaning
- silencing through water injection
- water quality during steam blowing
- mechanical internal cleaning of pipework and components
- economic considerations of power plant chemistry

The following companies and associations participated in the establishment of this guideline.

Representatives of power plant users:

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Representatives of power plant and turbine manufacturers as well as cleaning companies:

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- Borchardt
- Clary
- Foussat
- Glück
- Herberg
- Kallweit
- Kuhnke
- Lönne
- Schmitz
- Senger
- Teutenberg
- Dr. Zellermann

Babcock-Hitachi Europe GmbH, Oberhausen
Therm Service für Kraftwerke und Industrie GmbH, Seevetal
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Essen, January 2006

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## CONTENTS

1. General .......................................................................................................................... 10
2. Agreement on cleaning procedures ................................................................. 10
   2.1 Invitation to tender ....................................................................................... 10
   2.2 Requirements .............................................................................................. 10
   2.3 Cleaning procedures .................................................................................... 11
3. Flushing of steam boiler plants ........................................................................ 11
   3.1 Introduction ...................................................................................................... 11
   3.1.1 Water quality ........................................................................................ 11
   3.1.2 Water velocities ...................................................................................... 12
   3.1.3 Flushing of plant sections ........................................................................ 13
   3.1.4 Water demand ......................................................................................... 13
   3.2 Planning and execution ............................................................................... 13
   3.3 Control and further treatment ....................................................................... 14
   3.4 Disposal of flushing water .......................................................................... 14
4. Alkaline boilout of steam boiler plants .......................................................... 15
   4.1 Introduction ...................................................................................................... 15
   4.2 Principles of boilout procedure .................................................................... 15
   4.3 Planning and execution ............................................................................... 15
   4.4 Water quality and demand .......................................................................... 16
   4.5 Boilout procedure .......................................................................................... 16
   4.5.1 Strong-alkaline boilout (breathing method) ............................................. 16
   4.5.2 Weak-alkaline boilout .............................................................................. 18
   4.5.3 Boilout with organic chemicals ............................................................... 19
4.6 Control and post-treatment .............................................................................. 20
5. Pre-operational / operational chemical cleaning of steam boiler plants ...... 20
   5.1 Introduction ...................................................................................................... 20
   5.2 Pre-operational acid cleaning of new plants .............................................. 21
   5.2.1 Acid cleaning with mineral acids ............................................................ 21
   5.2.2 Pre-operational cleaning with organic acids and complexing agents .... 22
   5.3 Chemical cleaning of operational plants ...................................................... 22
   5.3.1 Acid cleaning .......................................................................................... 23
   5.3.2 Method for reducing deposit layers by means of amines and polycarboxylates . 23
   5.4 Procedures ...................................................................................................... 23
   5.5 Procedural steps ........................................................................................... 27
5.5.1 Preparatory measures and functional testing .......................................................... 27
5.5.2 Pre-flushing (Flushing prior to operational cleaning) ........................................... 28
5.5.3 Flushing with wetting agents ............................................................................... 28
5.5.4 Treatment with acids .......................................................................................... 29
5.5.5 Flushing to low conductivity ................................................................................ 30
5.5.6 Passivation and copper dissolution .................................................................... 30
5.6 Monitoring of pre-operational/operational chemical cleaning .............................. 31
5.6.1 Parameters to be monitored ................................................................................ 31
5.6.2 Procedural steps for monitoring of pre-operational cleaning with hydrofluoric acid........................................................................................................... 32
5.6.3 Procedural steps for monitoring of operational cleaning with e.g.: hydrofluoric acid and hydrochloride acid ................................................................. 33
5.6.4 Check for successful cleaning ............................................................................ 34
5.7 Guarantees .............................................................................................................. 34
5.7.1 Pre-operational acid cleaning ........................................................................... 34
5.7.2 Operational chemical cleaning ......................................................................... 35
5.7.3 Determination of metal loss ............................................................................... 35
5.8 Penalties ................................................................................................................ 35
5.9 Liability for damage ............................................................................................. 35
5.10 Amount and treatment of effluent (shown as example) ....................................... 35
6 Steam blowing of steam boiler plants and associated pipework ............................ 37
6.1 Introduction ............................................................................................................ 37
6.2 Discharge of steam blow exhaust ......................................................................... 38
6.2.1 Discharging steam blow exhaust into the atmosphere ..................................... 38
6.2.2 Discharging steam blow exhaust into waters .................................................. 38
6.2.3 Discharging steam blow exhaust into the condenser ...................................... 38
6.3 Noise reduction measures ..................................................................................... 40
6.3.1 Silencers ............................................................................................................ 40
6.3.2 Condenser ......................................................................................................... 42
6.3.3 Silencing through water injection (silent or low-noise blowing) ....................... 42
6.3.4 Discharging into waters .................................................................................... 44
6.4 Temporary steam blow pipework and equipment ................................................ 44
6.5 Target plate .......................................................................................................... 45
6.5.1 Dimensioning and surface quality .................................................................... 45
6.5.2 Location of target plate installation .................................................................. 46
6.6 Steam blow valves ................................................................................................. 46
6.6.1 Use of boiler main steam stop valve or by-pass stations ........................................ 47
6.6.2 Retrofitting of valves for steam blowing ............................................................... 47
6.6.3 Use of specific steam blow valves ....................................................................... 47
6.7 Steam blow velocity ............................................................................................. 47
6.8 Preparatory technical work for steam blowing ..................................................... 48
6.9 Safety aspects during steam blowing .................................................................... 49
6.10 Steam blowing processes .................................................................................... 49
6.10.1 Steam blowing in several bursts ........................................................................ 50
6.10.2 Steam blowing at sliding pressure without pressure accumulation .................. 51
6.10.3 Steam blowing at modified sliding pressure with pressure accumulation .......... 54
6.10.4 Steam blowing at sliding pressure for combined-cycle units in connection with gas turbines (continuous steam blowing) ......................................................... 56
6.10.5 Compressed-air cleaning ................................................................................ 57
6.11 Water quality during steam blowing .................................................................... 58
6.12 Comparison of steam blowing methods ................................................................. 58
6.13 Steam blowing results, control, evaluation and records ......................................... 58
6.13.1 Absolute number of impact size per unit area.................................................... 59
6.13.2 Relative number of impacts ............................................................................... 60
6.13.3 Control of cleanliness prior to and after steam blowing .................................... 60
6.14 Responsibility ...................................................................................................... 60
7 Combination of pre-operational cleaning and steam blowing .................................. 61
7.1 General ................................................................................................................. 61
7.2 Combination of pre-operative cleaning and steam blowing .................................... 61
7.2.1 Weak points of the individual methods ............................................................. 61
7.2.2 Advantages of combining pre-operative cleaning and steam blowing ............... 62
7.3 Summary ............................................................................................................... 63
7.3.1 Combination of pre-operative cleaning and steam blowing ............................ 63
8 Mechanical internal cleaning of pipework and components ..................................... 63
9 Annexes .................................................................................................................. 64
9.1 Hardness of target plate materials ....................................................................... 64
9.1.1 Influence of target plate hardness on size of indentation .................................. 64
9.1.2 Conversion of impact size on another target material ....................................... 66
9.1.3 Table with material designations ..................................................................... 67
9.2 Analysis procedures ............................................................................................. 67
9.2.1 Turbidity (spectral absorption coefficient) ......................................................... 67
9.2.2 Soluble iron ...................................................................................................... 68