



Exploration & Production

GENERAL SPECIFICATION

CORROSION

GS EP COR 003

Boiler water treatment

00	10/2008	First issue
Rev.	Date	Notes



Contents

1. Scope	3
2. Reference documents	3
3. Definitions	4
4. Water treatment	4
5. Chemistry of boiler water	5
6. Steam quality	5
7. Water chemistry	5
7.1 Dissolved oxygen	5
7.2 Iron, copper, hardness and suspended solids	5
7.3 pH	6
7.4 Organic compounds	6
7.5 Silica	6
7.6 Alcalinity	6
7.7 Conductivity	6
8. Condensates	6
9. Analytical control	6
10. Hot water loop	8
Appendix 1	9

1. Scope

This General Specification defines minimal requirements relative to boiler water treatment to minimize the risks of corrosion and fouling, reduce cleaning, and thus increase the efficiency of boilers and steam-using equipment.

Two types of natural circulation boilers are considered in this document:

- Water-tube boilers
- Fire-tube boilers.

Steam generation water treatment is a sophisticated water chemistry area and requires an understanding of the fundamentals of boiler water chemistry.

The requirements given in this document apply to boilers operating continuously. This specification does not cover conditions relative to particular operations such as start up, shutdown or fast fluctuation steam production.

This specification doesn't cover:

- Boilers with copper tubing or other "exotic" materials
- Electric boilers
- Recovery steam generators of specific design.

The particular case of pressurized hot water loop is also considered in this document.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
NF EN 12952-12	Water-tube Boilers And Auxiliary Installations - Part 12: Requirements For Boiler Feedwater And Boiler Water Quality
NF EN 12953-10	Requirements for feedwater and boiler water quality.

Professional Documents

Reference	Title
	Consensus on operating practices for the control of feedwater and boiler water chemistry in modern industrial boilers. The American Society of Mechanical Engineers - 1994

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP COR 002	Corrosion control on production facilities: Field operations

3. Definitions

Direct conductivity	Conductivity directly measured in water
Cationic conductivity	Water conductivity measured downstream a strong acid ion exchange resin
Makeup water	Water which compensates water and steam losses of the circuit
Demineralised water	Water with a cationic conductivity < 0.2 µS/cm and silica (SiO ₂) < 0.02 mg/l
T.D.S.	Total dissolved solids

4. Water treatment

An appropriate on-site treatment of the water is **always needed**. This treatment has two main objectives:

- The prevention of corrosion and fouling of the various elements of the boiler (economizer, vaporization tubes, superheater)
- The production of vapor of suitable quality following the main criteria below:
 - Silica concentration < 0.02 ppm
 - pH of condensates > 8.5 and < 9.2.

Whenever possible, a **pretreatment of the water external to the circuit must be privileged**.