
**Industrial furnaces and associated
processing equipment — Method of
measuring energy balance and
calculating efficiency —**

**Part 1:
General methodology**

*Fours industriels et équipements associés — Méthode de mesure du
bilan énergétique et de calcul de l'efficacité —*

Partie 1: Méthode générale



Reference number
ISO 13579-1:2013(E)

© ISO 2013



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

| | |
|--|-----------|
| Foreword | v |
| Introduction..... | vi |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions | 1 |
| 3.1 Terms related to type of energy used in this part of ISO 13579 | 1 |
| 4 Symbols used in this part of ISO 13579 | 5 |
| 5 Basic principles | 10 |
| 5.1 General | 10 |
| 5.2 Energy flow diagram | 13 |
| 5.3 Process Heating Assessment Survey Tool | 13 |
| 6 Basic conditions of measurement and calculation | 14 |
| 6.1 State of furnace | 14 |
| 6.2 Duration of measurement | 14 |
| 6.3 Unit of specific energy consumption | 14 |
| 6.4 Reference conditions | 14 |
| 6.5 Unit of amount of gas | 14 |
| 6.6 Fuel | 14 |
| 7 Type of energy evaluated in this part of ISO 13579 and its systematization | 15 |
| 7.1 General | 15 |
| 7.2 Energy balance | 15 |
| 7.3 Thermal energy balance | 17 |
| 7.4 Energy balance of electrical generation | 18 |
| 7.5 Recycled energy | 18 |
| 8 Measurement method | 18 |
| 8.1 General | 18 |
| 8.2 Fuel | 19 |
| 8.3 Atomization agent | 19 |
| 8.4 Combustion air and exhaust gas | 20 |
| 8.5 Controlled atmospheric gas | 24 |
| 8.6 Products and jigs/fixtures for product handling | 25 |
| 8.7 Temperature of furnace surface | 25 |
| 8.8 Furnace inner wall temperature | 25 |
| 8.9 Inner furnace pressure | 26 |
| 8.10 Cooling water | 26 |
| 8.11 Electrical auxiliary equipment | 26 |
| 8.12 Generation of utilities | 26 |
| 8.13 Recycled energy | 26 |
| 9 Calculation | 26 |
| 9.1 General provisions | 26 |
| 9.2 Total energy input | 27 |
| 9.3 Total energy output | 30 |
| 9.4 Total energy efficiency | 35 |
| 10 Energy balance evaluation report | 36 |
| Annex A (informative) Assesment of uncertainty of the total energy efficiency | 37 |
| Annex B (informative) Measurement method concerning regenerative burners | 39 |