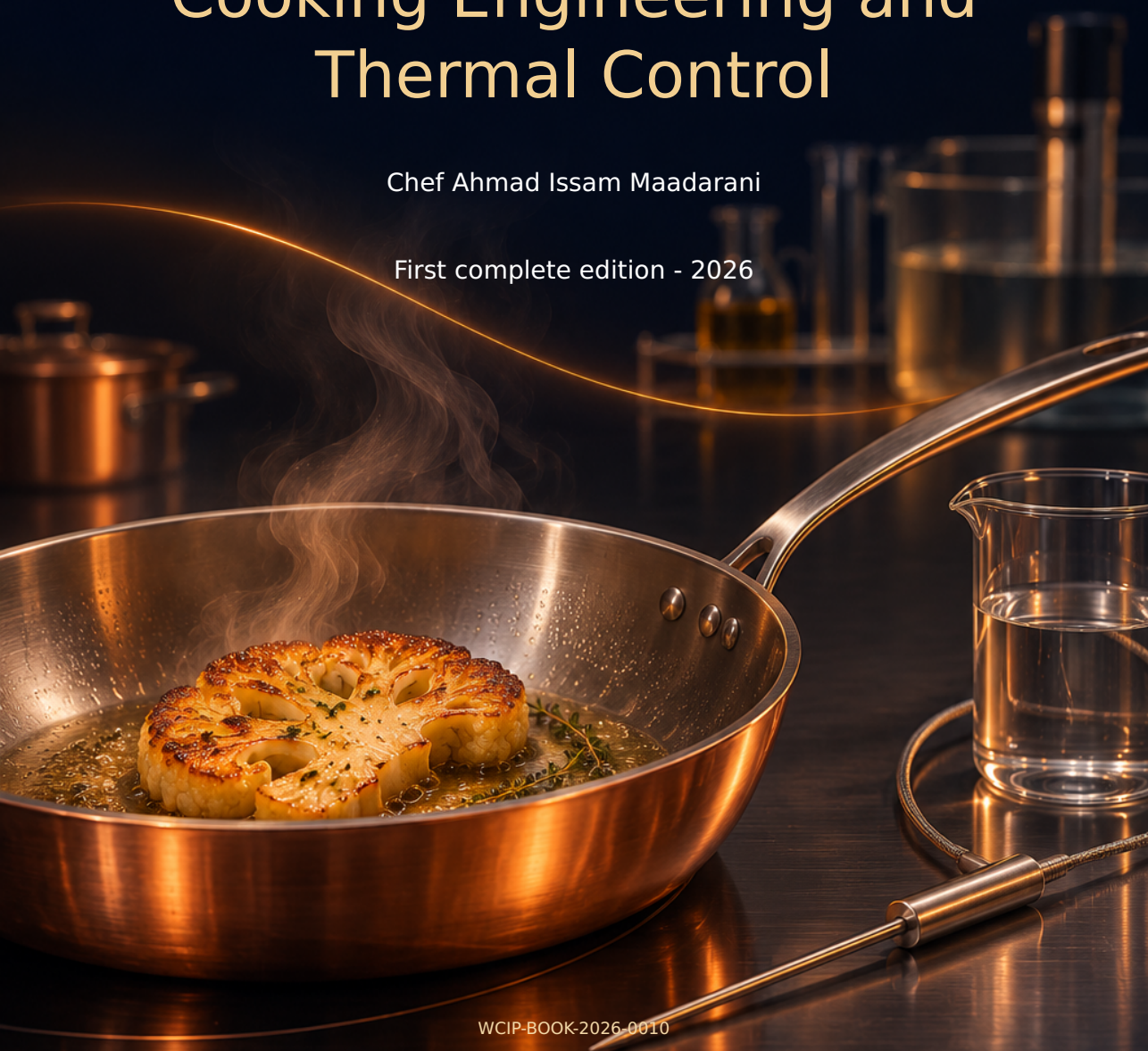
IUOAMC / ICGA / CULINARY SCIENCE

VOLUME II

Cooking Engineering and Thermal Control

Chef Ahmad Issam Maadarani

First complete edition - 2026



WCIP-BOOK-2026-0010

VOLUME II / F02

Title and publication identity

Cooking Engineering and Thermal Control

From physical principles to repeatable kitchen decisions

Author: Chef Ahmad Issam Maadarani

Publisher: International Union of Arab Master Chefs - IUOAMC

Independent Arabic, English and French editions

An applied scientific and academic reference in culinary thermal processes. It develops heat and mass transfer, food transformations and process verification through explanations, worked applications and practical study tools.

The three editions share stable section identifiers, numerical examples and terminology, with searchable text and interactive navigation. The publication record documents the work, author identity and deposited evidence.

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Established physical laws are not claimed as new discoveries. Proposed exercises, illustrative calculations, simulated datasets and observed evidence are distinguished throughout. The proposed decision records are editorial tools, not field-validated scientific metrics.

All numerical cases labelled illustrative or simulated are teaching constructions. They are not measurements performed by IUOAMC or proof of commercial performance. Equipment-specific and food-safety procedures require competent validation at the implementation site. This book supplies no universal pathogen-reduction or shelf-life schedule.

The publication record and QR connect the work to its edition identity and retained evidence. The author retains copyright. ICGA visual identity: UK IPO UK00004350642, Class 41.

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Foreword: understanding before adjusting

A professional kitchen makes decisions under time pressure. A darker surface, a slow core or a changing yield can tempt us to adjust the heat immediately. This book asks for one earlier step: define the question and the evidence that would distinguish competing explanations.

Our purpose is to connect the cook’s observation with a transparent calculation, a reproducible test and a decision that another competent person can review. The value of a formula lies in the assumptions beside it. The value of an experiment lies in the record that allows it to be repeated.

The reference we build should remain useful when equipment and recipes change. For that reason, the book preserves units, boundaries, raw-record templates and the limits of transfer. It treats professional judgement as a reasoned practice strengthened by measurement.

Chef Ahmad Issam Maadarani

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How to use this reference

For a process problem, begin with the chapter index, then the diagnostic tables. Read the principle page together with its worked application; an application is not a universal instruction. Follow the section identifiers when comparing editions or recording a correction.

Each question should identify a specimen, its starting state, the measured outcome and the intended decision. Use the laboratory protocols only with suitable equipment, supervision and approved local safety procedures. Where equipment is unavailable, use the explicitly simulated cases for calculation practice without describing them as observed results.

A complete learning cycle produces a raw record, a checked calculation, an alternative explanation and a bounded conclusion. Assessment answers support self-study; the instructional threshold is not professional accreditation.

For future editions, preserve the identifier of the section being revised. A changed recipe, a corrected value and a changed interpretation should not be treated as the same kind of update.

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Culinary Science and Sensory Evaluation · 150 pages · AR / EN / FR

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Notation, units and precision

Mass is expressed in g or kg, time in s or min, temperature in °C and temperature differences in K where appropriate. Energy is expressed in J or kJ and power in W. Before substitution, make units consistent. The numerical size of a temperature difference in °C equals the same difference in K, while absolute temperatures are not interchangeable.

The approximation symbol and the word “assume” matter. Properties such as heat capacity, diffusivity and latent heat depend on material and conditions. A rounded assumed value may support a teaching calculation without establishing a measured product property.

Reported precision should reflect the measurement method. Keep source values in the calculation record; round only the displayed result as appropriate. Distinguish an exact arithmetic check from uncertainty about the model itself.

$$1\ \text{W} = 1\ \text{J/s}$$
$$1\ \text{kJ} = 1000\ \text{J}$$
$$1\ \text{kg} = 1000\ \text{g}$$

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The six-volume reference pathway

Volume I: Applied Flavor Science.

Volume II: Cooking Engineering and Thermal Control.

Volume III: Food Texture and Structure.

Volume IV: Sensory Evaluation and Professional Culinary Judging.

Volume V: Product Innovation and Recipe Engineering.

Volume VI: Practical Laboratory and Defect Diagnosis Atlas.

The volumes have distinct scopes. This book follows energy, material movement and thermal transformations. Detailed structural mechanics, panel design and complete product-development strategy receive their own treatment in the following volumes. The series shares a terminology framework and a reviewable version history rather than repeating the same introductory text.

Each future publication receives an actual independent edition record when ready. A planned title is not presented as a completed book.