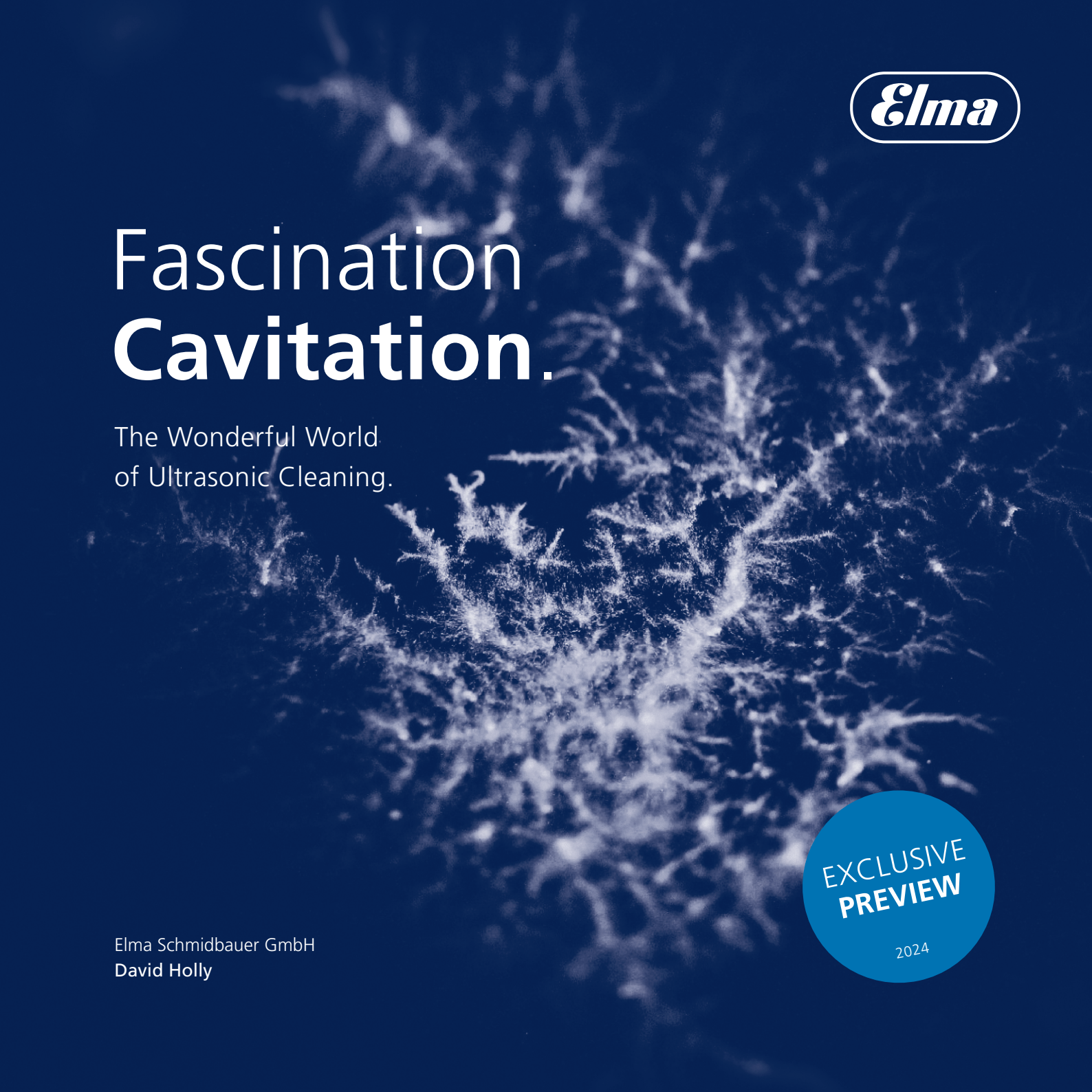

Fascination **Cavitation.**

The Wonderful World
of Ultrasonic Cleaning.

EXCLUSIVE
PREVIEW
2024

Elma Schmidbauer GmbH
David Holly

FOREWORD

Passion for highest purity. Since 1948.

From pioneer to innovation leader.
My grandfather Hans Schmidbauer was a tinkerer and always had a large portion of curiosity in his blood. He was never satisfied with the status quo. So it came as it had to come. As a trained watchmaker, he noticed that the process of cleaning watches and their smallest parts was too time-consuming.

And so it made sense for him to build a product. That was the birth of his own company, the „Präzisionsfabrik für Elektrische Maschinen", Elma. His first product, the **Elma Super Elite**, paved the way for the young company's success. The name Elma became a household word among watchmakers, and today there is probably hardly a watchmaker who does not know Elma.

The success story of Elma started in Singen (Hohentwiel) and developed continuously over the years. In the early 1960s, the first successful steps were taken in the field of **ultrasonic technology**, which over the years has become one of our core competences.

In 1973, there was the first handover within the family to my father Manfred H. Schmidbauer, who continued to shape the company, established ultrasound as a cleaning technology in other industries as well, and drove the international expansion to more than 80 countries today. Since 2021, I have been able to stand on the bridge and lead the company into the digital future.

As you read our ultrasonic magazine, I hope you enjoy your journey of discovery into **The Wonderful World of Ultrasonic Cleaning**.

Let us inspire you.

Sincerely
Yours, Mirja Schmidbauer

PROLOGUE

The Wonderful World of Ultrasonic Cleaning.

Fascination Cavitation.
Whether cleaning glasses at the optician around the corner, cleaning during the manufacturing process of medical instruments, or at a billion-dollar high-tech company in the semiconductor industry with the toughest requirements for purity: **Ultrasonic cleaning** is a highly relevant professional cleaning process.

It is remarkable that only few people know how ultrasonic cleaning actually works. Admittedly, it is not exactly an easy process to understand, often somewhat mystified due to its complexity. The following knowledge base is therefore intended to give you a simplified introduction to the world of ultrasonic cleaning and to give an overview of the most important interrelationships. There is no claim to completeness here; cavitation is still being researched, so it is still not fully understood in all areas.

Let us now dive together under the surface of the ultrasonic tank and enter the fascinating world of cavitation.

Elma Schmidbauer GmbH
David Holly
June 2023

PROLOGUE

Fascination Cavitation.

CAVITATION

Expert knowledge for your application.

CHAPTER 1

The Four Basic Parameters of Cleaning.

The cleaning[1] circle according to Dr Sinner.
Let's imagine that we spent a nice barbecue with friends or family. The next morning, the unpleasant task awaits – cleaning the grill grate. It can be an advantage to know the basic parameters of cleaning. These are summarized in the so-called **Sinner's circle**[2]:

Let's start with the first parameter: the **media**. For our grill grate, water with a dash of detergent is certainly more effective than simply tap water. If the water is then also as hot as possible, we have also already considered the **temperature** parameter. It is generally known that soaking the burnt-in grate for a few hours can help, and this is represented here by the **time** (or duration) parameter. Last but not least: the mechanical effect, in short **mechanics**. Well, what works better, a paint brush or a wire brush?

All four parameters together form a kind of conservation variable, a **cleaning effect**. Unfortunately, it is seldom the case that you simply compensate for a reduction in one parameter by increasing another. The individual parameters depend on each other and often show a kind of threshold behavior or a generally non-linear character.

In our example, even after a long soak and the use of hot water with detergent, scrubbing is certainly the most strenuous task. What if we could simply place the grill in a cleaning tank with a liquid that would do the mechanical part for us? Inside the tank, many small „micro-brushes" do the cleaning, removing the burnt and greasy residue everywhere on the grate.

Hard to imagine.
But that's exactly what **ultrasonic cleaning** can do!

Of course, in reality it is not „micro brushes", but a particularly fascinating effect: **cavitation**.

[1] Also known as „purification circle".
[2] Named after the surfactant chemist Herbert Sinner (1900 in Chemnitz, † 1988 in Hilden).*

INSIGHTS

Valuable insider tips for your application.

Would you like to find out more? Simply get in touch with our contact persons via one of the channels below. We look forward to an exciting exchange with you.

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SUMMARY

Elma supports you with **valuable insider tips**. In the first section of the book, we focus on technical aspects. Our questions are therefore: What does ultrasound actually mean? How does cavitation work? What operating modes are available? In the second section, we turn our attention to the user: Which influencing factors determine the cleaning process? How can the cleaning process be refined using which methods? And, of course, a manual like this should not be without a glossary of all the important technical terms. All in all, a perfect **guide for every ultrasonic cleaning user**.