

Introduction Ruid organizations

Ruid is a technology-based startup that was born with the aim of researching and developing innovative technological devices for the health area, with more than 8 years of experience in research and technological development focused on medical applications, in 2020 it is legally constituted as a Colombian company thanks to its great inventive level and development in which in 2020 it is decided to constitute as a legal company with the aim of commercializing our first and successful devices called Clean-Fast (equipment for the reprocessing of endoscopes).

We currently work in 3 research areas such as the area of endoscopy "reprocessing of endoscopes", gynecology, with our cervical dilatometer development, and pathology (System of automatic detection of carcinogenic patterns in histological images of prostate biopsy).. Additional in Ruid we provide preventive and corrective maintenance service of medical equipment, our main objective is to develop devices that are of power for life and can be distributed nationally and internationally and that their inventive levels manage to turn these developments into Patentable products.

Technical characteristics.

The *Clean-Fast* is an innovative technological device for the reprocessing of endoscopes, its main feature is that the innovative technological system for the irrigation of liquids does not use pumps, and incorporates a linear piston-type system which generates a turbulent flow and aperiodic eddies inside the endoscope channel to improve the scanning of microorganisms and optimize irrigation times. the turbulence generated inside the endoscope channel increases the energy to drive the flow of fluids and increase the pressure by improving the scanning of microorganisms inside the endoscope channel.



The *Clean-Fast* is a compact equipment of low electrical consumption where one of its great benefits lies in its easy use which the auxiliaries interact with the equipment by means of a 7" touch screen, it is easy to install and versatile by incorporating different functions necessary to perform an optimal reprocessing of the endoscopes (as suggested by the manual of the World Association of Gastroenterology) such as the following functions:

- Leak testing
- Cleaning

- Disinfection
- Drying
- Smanagement software (EndoSoft) to carry out the traceability of reprocessed endoscopes and the maintenance of endoscopes.



Compatibility with endoscopes.

The *Clean-Fast* is a compactable technological device with all brands of endoscope such as: Olympus, Pentax, Fujinon, Sonoscope, among others.

Chemical compatibility

- Disinfectants based on Glutaraldehydes and Orthofaldehydes
 - Alkacide, Cidex, Sonacide, Sporicidin, Hospex, Omnicide, Metricide, Surgibac G, Fenomix-Gt, Opidex Grandpa, Cidex Grandpa, Opadix.
- Detergentand enzymatic and multi-enzymatic detergents with enzymes such as:
 - Protease P, Lipase, Amylase, Cellulase, Anionic Surfactant, Non-Ionic Surfactant, Sodium Benzene Sulfonate.

Features and Benefits.

- The *Clean-Fast* is a multifunctional device where in the same device includes the different functions (Leak test, cleaning, disinfection, drying and management software).
- Compatible with all the marks of the endoscopes.
- Compatible with all brands of high-level detergent and disinfectant developed for endoscope reprocessing.
- Low power consumption.

- Compact equipment, its innovative design guarantees that it is not necessary to restructure or make modifications to the infrastructure in the endoscope unit for its installation and operation.
- Ensures safety for clinical patients.
- Management software (EndoSoft) in which we carry out the traceability of the reprocessing carried out and the preventive and corrective maintenance of the different endoscopy equipment, in the management software we can find the following functions:
 - Identification and history of the users who carried out the different reprocessing
 - Record of date and time of reprocessing's
 - History of frictioncarried out in each reprocessing "leak test, cleaning, disinfection, drying"
 - Identification of the reprocessed endoscope
 - Record of preventive and corrective maintenance, "Scheduled, performed and / or pending".
 - Equipment Inventory
 - Unlimited document storage (in the cloud).
- General characteristics of the management software (EndoSoft).
 - It generates a large number of reports, graphic indices on the traceability of reprocessing.
 - Keep all information about reprocessing, equipment, and maintenance plans documented and organized.
 - Plan jobs, generate and keep your maintenance calendars updated automatically.
 - Manage work orders.
 - Administer the inventory of equipment.

Drying of the Canals.

Observation.

The drying reprocessing step has often been ignored or incompletely performed, and is easy to lead to human error[1]. A survey conducted in the United States on reprocessing in 249 endoscopy units performing ERCP showed that 52% of the centers did not meet the guidelines of various societies and did not use forced air to dry the endoscopes[2]. The guidelines are not compatible with each other and do not always specify the parameters for proper drying [3]. Recent studies have found residual fluid in up to 95% of endoscope

channels after reprocessing and drying, suggesting that drying patterns need to be improved [4,5].

Therefore, it is very important to highlight that in the Clean-Fast equipment we have incorporated the drying of the channels and this is done automatically after each cycle of reprocessing (Leak-drying test, cleaning-drying, rinsing-drying, disinfection-drying, rinsing-drying) improving the quality of the reprocessing.

Product declarations.

1. **Clean-Fast:** Equipment for the reprocessing of endoscopes that incorporates the functions Leak testing, Cleaning, disinfection, drying.



2. **EndoSoft:** It is a professional management software for the control of the administration and traceability of the reprocessing of endoscopes and maintenance, which helps to have organized all the information about equipment, reprocessing and maintenance.



Compliance with standards.

- IEC 60601-1
- Decree 4725 "Colombian decree that talks about the sanitary registration"
- ISO 17025

Validation.

The Clean-Fast began as a research project where its validation is carried out in an institution in Cali-Colombia for a period of 5 years in which it worked perfectly, complying with the institutional protocols, during this period microbiological tests were carried out on

different batches of endoscopes to verify their microbiological conditions for which the result of the microbiological tests is annexed, and quality tests performed on the Clean-Fast equipment such as calibration, electrical safety test.

Validation Tests

- Calibration
- Electrical safety test according to IEC 60601-1
- Microbiological tests (Thioglycolate cultures, culture of common germs incubation of 72 hours) aerobic microbiological analysis plate count, anaerobic plate count, pseudomonas aeruginosa presence/absence, staphylococcus, total coliforms, fecal coliforms, e-coli, klebsiella, rescue from thioglycolate, mold and yeast count among others.

Intellectual property

- Patent of Invention, *Owner Ravid S.A.S*

Countries Based.

- ✓ Patent filed in Colombia "in **2020**"
- ✓ WIPO (World Patent Organization). "In the **year 2021**"
- ✓ United States "**September 2022**"
- ✓ Mexico "**September 2022**"

- Trademark Registration:

Rruvid Class 42 according to the 11th edition of the Nice International Classification: research and development service in the field of hardware and software.

Current status.

- ✓ Ready for production.

Note:

It is currently being marketed in Colombia through a distributor.

Provision of services and maintenance.

For the maintenance of the Ravid equipment, he will carry out theoretical-practical training to the relevant Steris personnel.

Bibliography.

1. Jung M, Beilenhoff U. Hygiene: the looming Achilles heel in endoscopy. *Visc Med.* 2016;32(1):21–8.
2. Thaker AM, Muthusamy VR, Sedarat A, Watson RR, Kochman ML, Ross AS, et al. Duodenoscope reprocessing practice patterns in U.S. endoscopy centers: a survey study. *Gastrointest Endosc.* 2018;88(2):316-322.e2.
3. Kovaleva J. Endoscope drying and its pitfalls. *J Hosp Infect.* 2017;97(4):319–28.
4. Hervé RC, Keevil CW. Persistent residual contamination in endoscope channels; a fluorescence epimicroscopy study. *Endoscopy.* 2016;48(7):609–16.
5. Ofstead CL, Wetzler HP, Johnson EA, Heymann OL, Maust TJ, Shaw MJ. Simethicone residue remains inside gastrointestinal endoscopes despite reprocessing. *Am J Infect Control.* 2016;44(11):1237–40.